April 1985
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Buyer's Guide to Under-$500 Printers

inCider

The Apple Journal

Printers: How to Choose the Right One for You

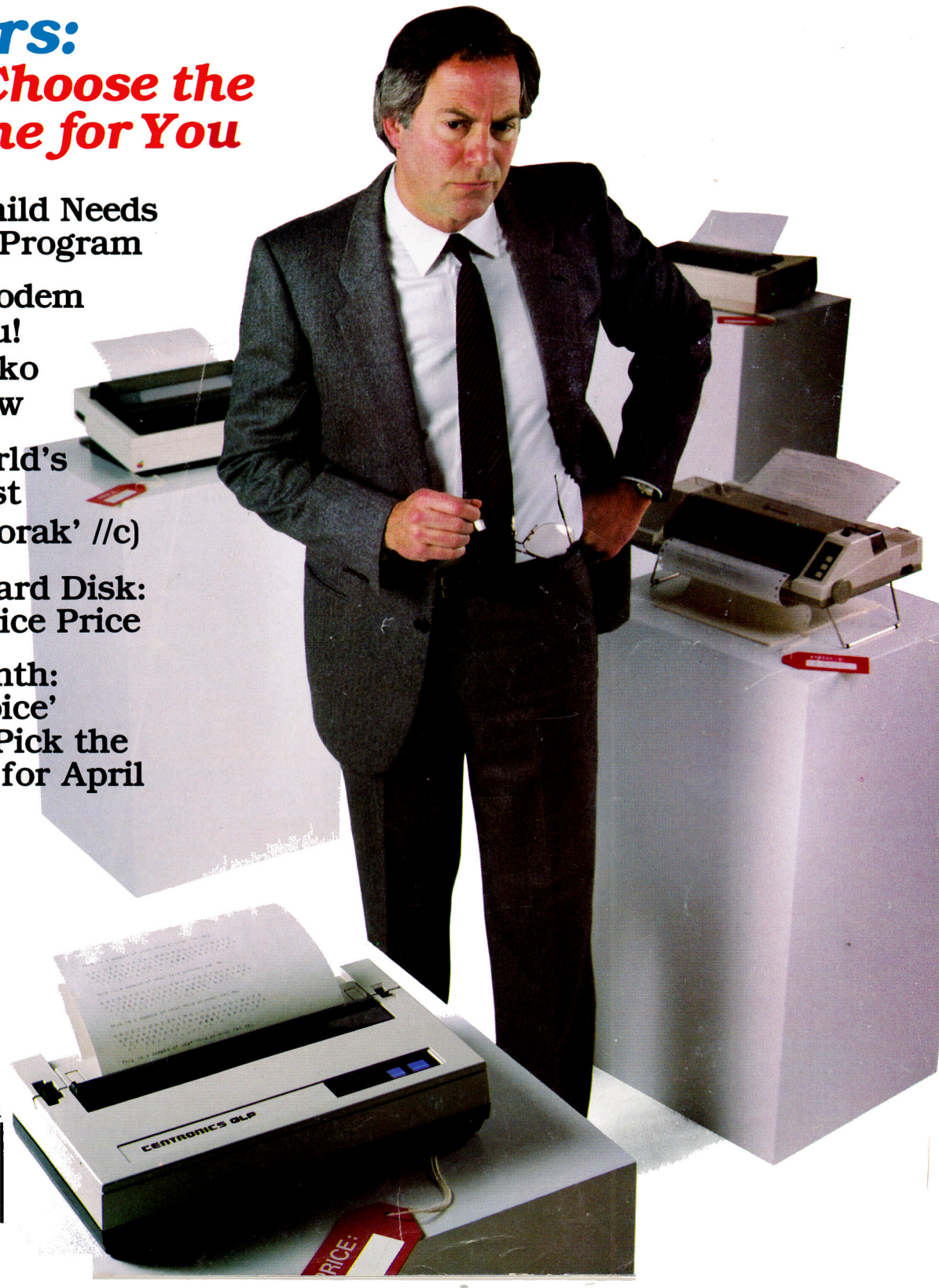
Why Your Child Needs A Data-Base Program

Make that Modem Work for You! Matthew Lesko Tells You How

Meet the World's Fastest Typist (And Her 'Dvorak' //c)

'The Sider' Hard Disk: Big Power, Nice Price

New this Month: 'Editors' Choice' Our Editors Pick the Top Product for April



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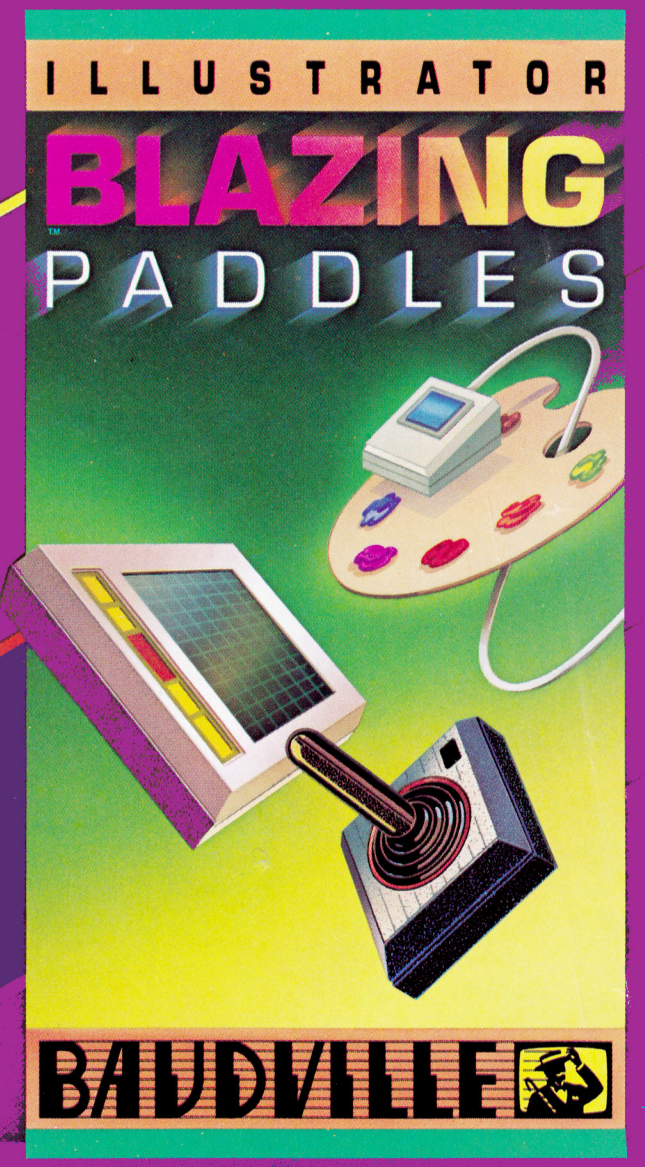

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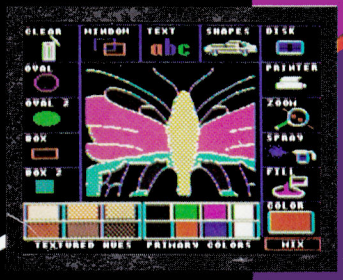

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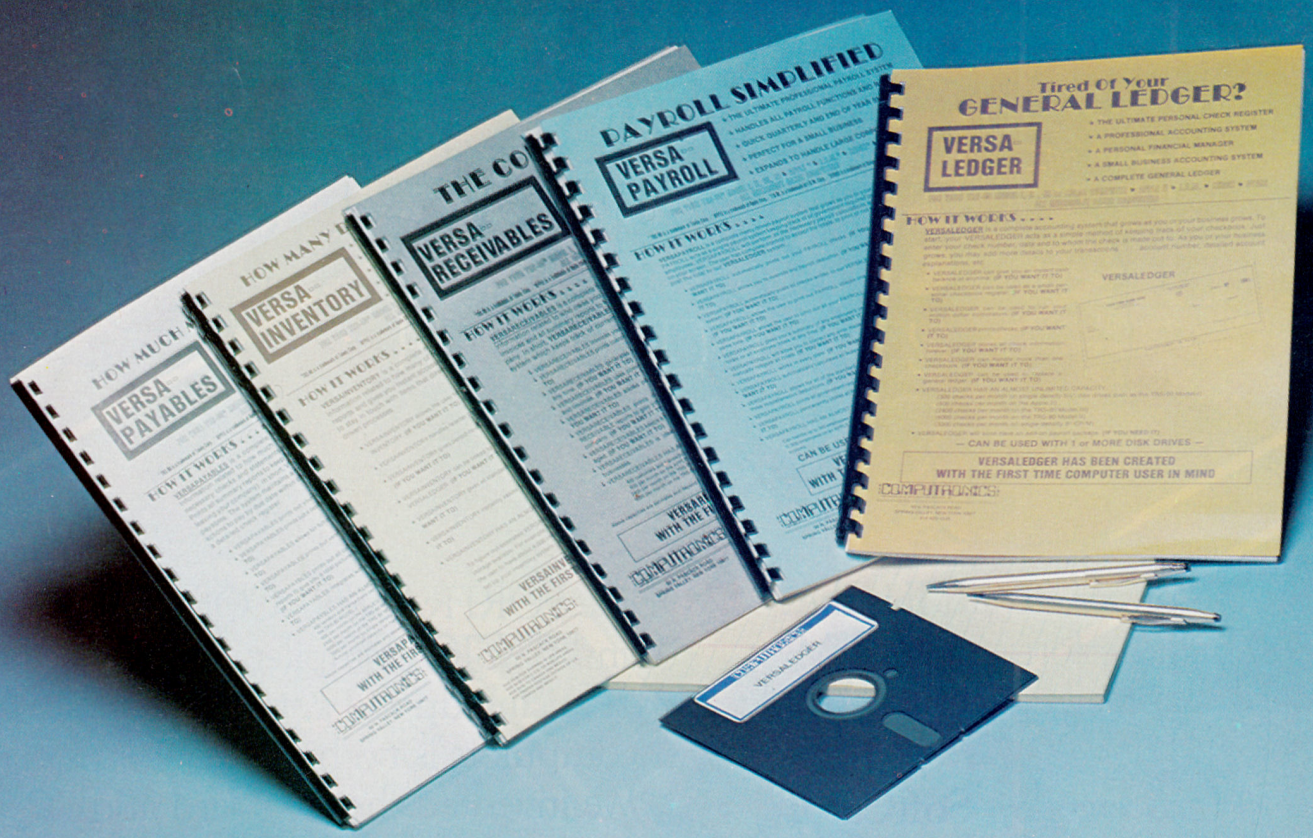

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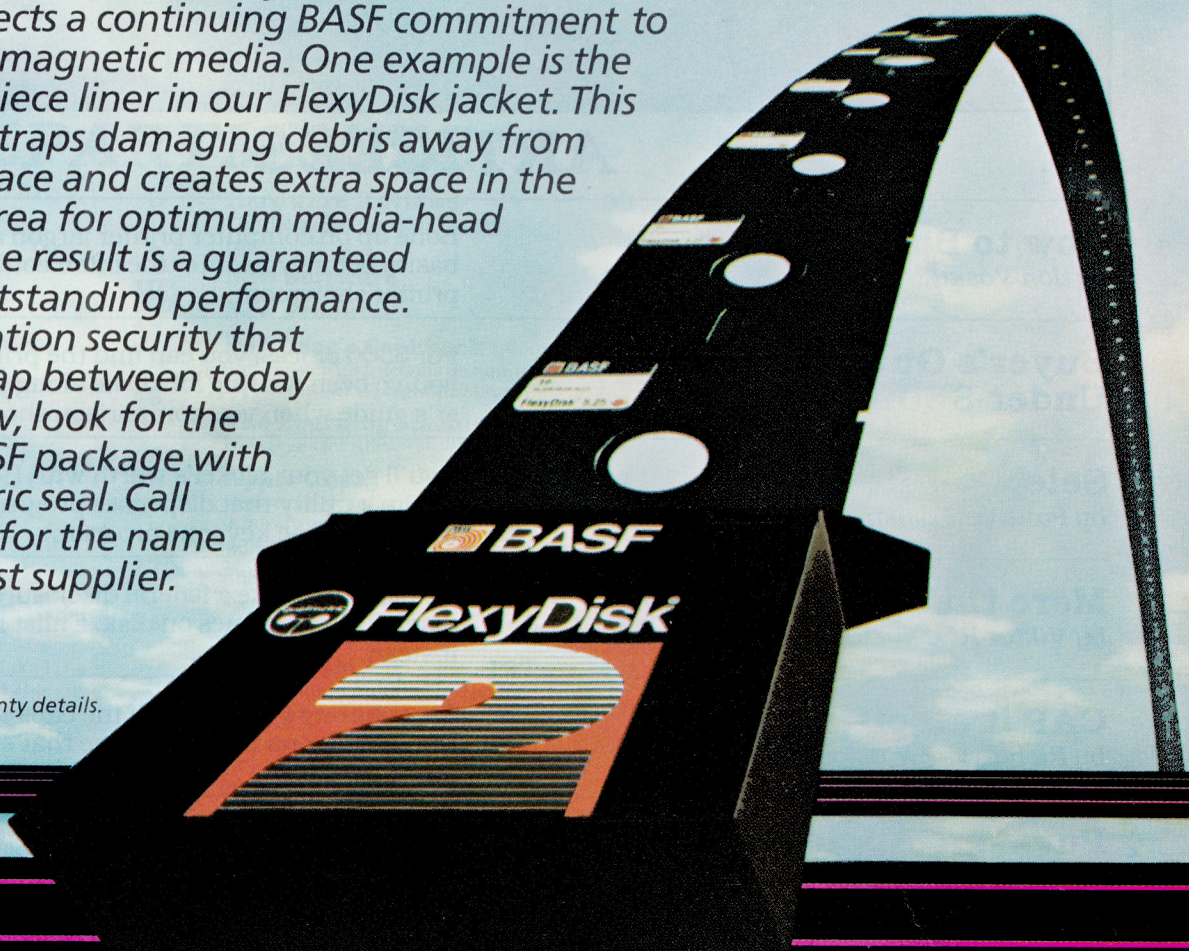

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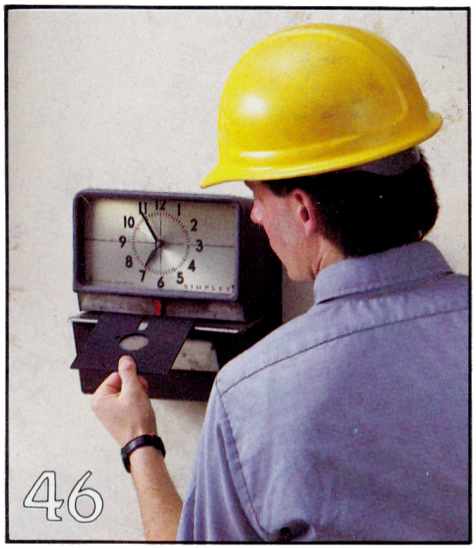

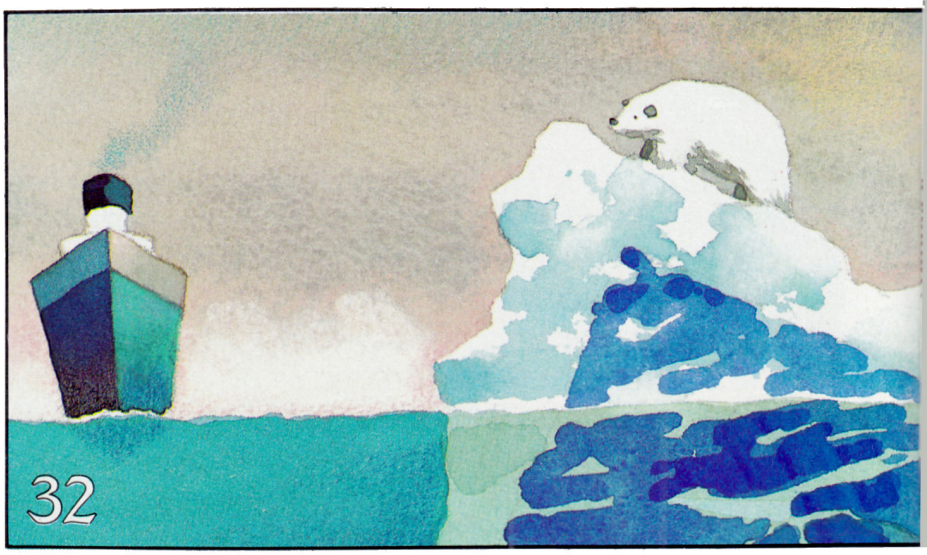

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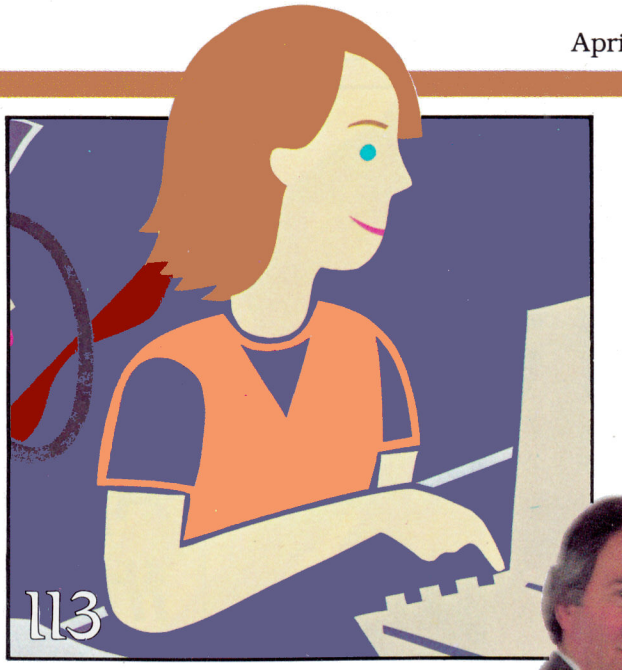

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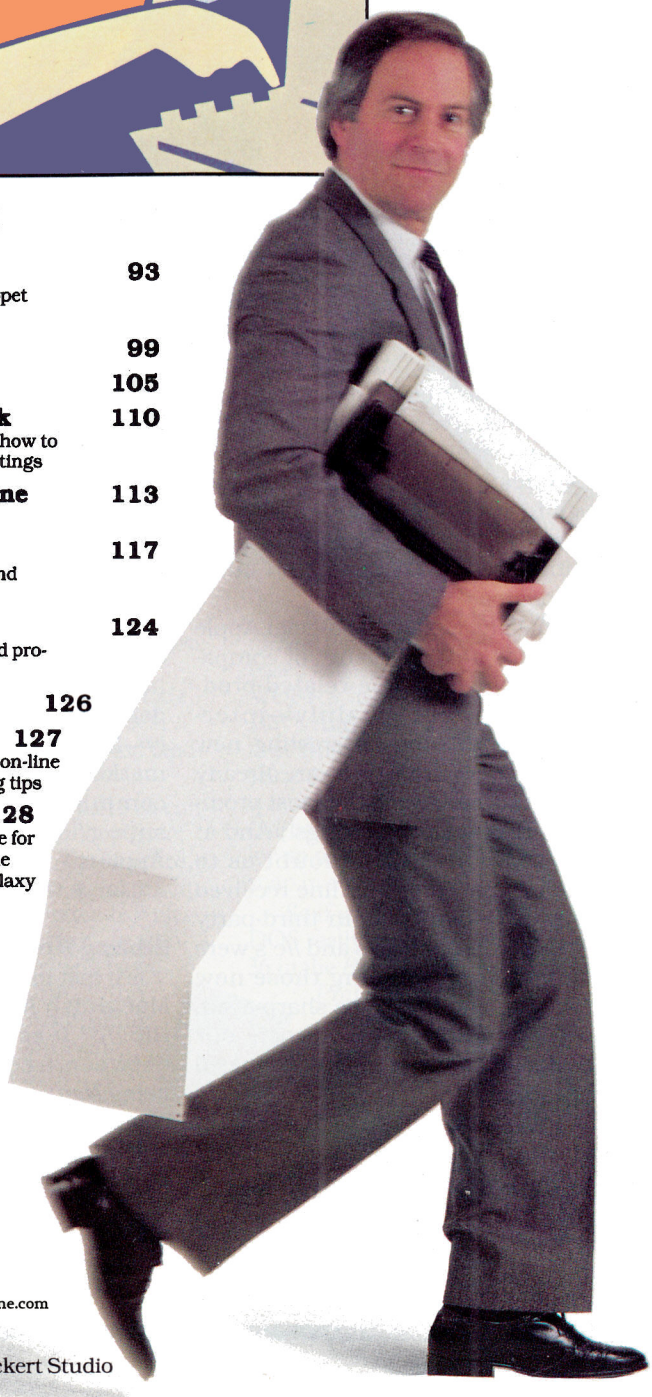

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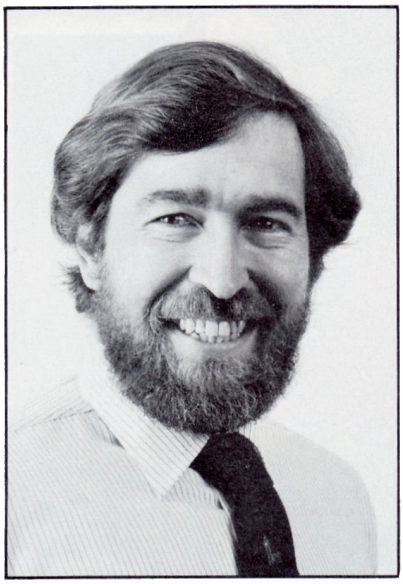


Apple Misses the Boat

What a bummer! There was no Apple booth at the 1985 Consumer Electronics Show this year in Las Vegas. So what? Well, CES is no rummage sale. As a showcase for new audio, video, and microcomputer consumer products, it's in a class all by itself. Hundreds of domestic and foreign exhibitors flock to this show of shows to introduce new products, size up the competition, renew contacts, and make friendships.

Ironically, despite no official Apple entourage at CES, plenty of companies displayed Apple-related products—software, mainly—interspersed with some interesting new hardware. (Our reviewers are already at work investigating the most promising of these new offerings.) And at CES there was little doubt as to which Apple computer line received the most attention from third-party developers: Apple //e's and //c's were everywhere, modeling those new products. You had to be sharp-eyed, however, to find a Macintosh; our decidedly informal survey revealed only seven.

Apple's absence at CES seems to indicate a cavalier attitude toward the consumer market. Too bad; other companies are taking dead aim at it.

Consider IBM's PCjr. Through sheer will, and deep pockets, IBM defied defeat and rebuilt jr into the machine it should have been. Oh yes, they also lowered the price.

Apple has managed to prosper despite competition from Commodore, Atari, and Radio Shack. An Apple is, well, an Apple. And for the discriminating buyer, those other machines just won't do. But an IBM might. . .especially if the price is right.

But for now, Apple //c's and //e's are on a roll, with Apple production lines hard-pressed to keep up with the demand. My gripe—concern, actually—is that without more aggressive marketing techniques and renewed commitment to the high-end consumer/low-end business market, Apple is going to see interlopers stealing large wedges of its pie.

Sibling Rivalry

Is it just me or is Apple pushing the Macintosh harder than the //e and the //c? It seems that somewhere between free Mac "test drives," being *Newsweek*'s patron for a week (Apple ads hyping nothing but the Macintosh), and sponsoring a Mac/Lisa ad during Super Bowl XIX that scored lower than the Dolphins, Apple is treating its 8-bit products like poor relations. This is odd, since the Apple II product line continues to be the company's bread and butter.

All is not lost, however. Apple has announced solid refinements to the II line—primarily to the //e—so that even though they continue to be upstaged, at least they'll be updated. First, the venerable 6502 chip is being retired in favor of the 65C02, a standard on the //c. This move should resolve the annoying partial incompatibility problem between the //e and the //c—good news for both consumers and software developers.

Other important improvements include a new ROM with mouse-text characters and the substitution of a monitor ROM that will facilitate the use of a mouse on the //e. The modification supports multiple windowing, better animated graphics, and smoother mouse-cursor movement.

The new ROMs, coupled with the 65C02, will allow users to boot from hard disks, write BASIC programs in upper- and lowercase, and (by virtue of the additional instruction sets in the 65C02) write tighter code. Another bit of good news is the return of the mini-assembler to the //e.

by Paul Quinn

Rumor has it that other good stuff for the Apple II is in the works. We'll keep you posted on any developments. Meanwhile, let's hope that the promotional considerations for the //e and //c are punched up a little.

Can We Talk On-line Services?

In November, we published an unusual list of "alternate" data bases for modem users who grow weary of offerings from The Source and CompuServe. The list, "Priceless Data Bases for (Almost) Nothing," was compiled by Matthew Lesko, author of several best-selling books on consumer information resources and founder of Information, USA, a data service that assists businesses in computer decision making. The article included on-line sources for career information, free weather data, financial data bases, and commercially available software.

Many of you liked these items, so we asked Mr. Lesko if he had any more. Plenty, he assured us, and he would be more than pleased to give us a monthly supply if we so desired. We did. Thus was born a new column, Data-Gram. You'll find it on page 127.

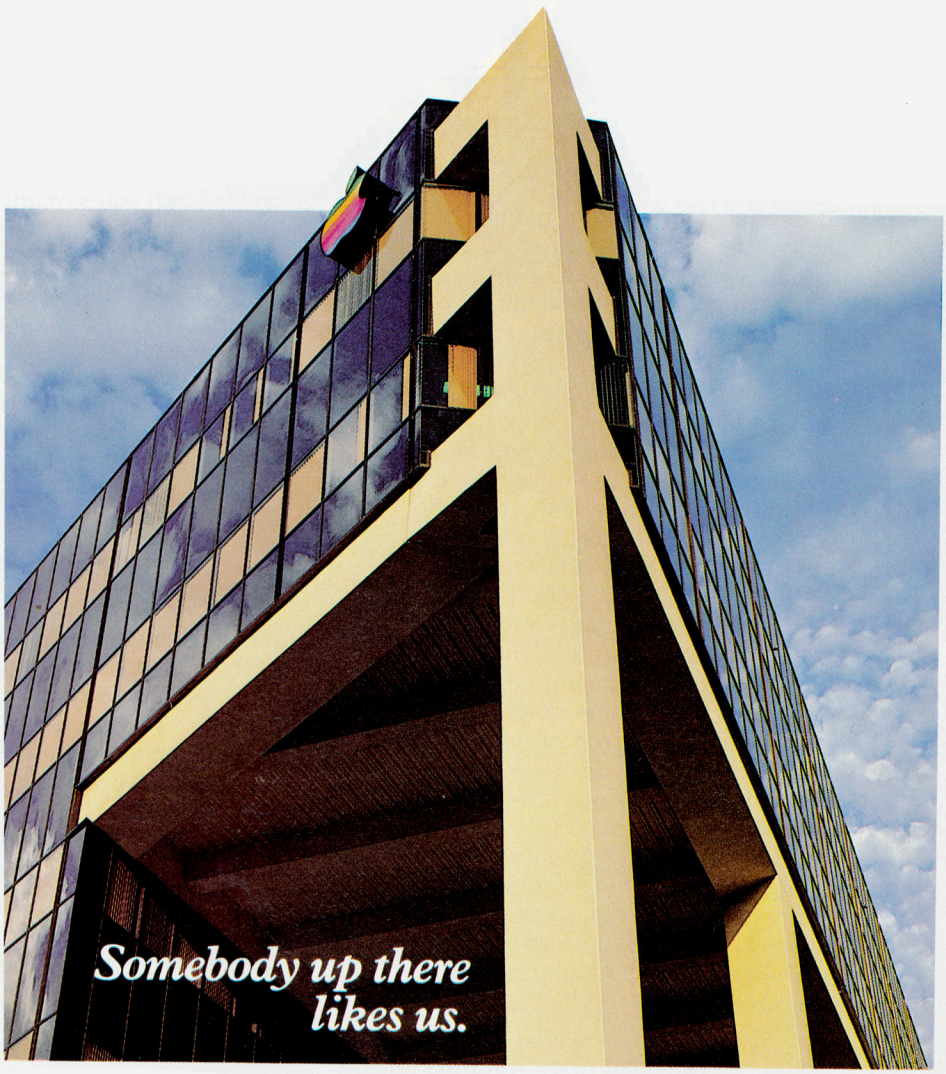
You'll be amazed not only at the rich variety of consumer and business data bases already on-line, but also at the surprisingly low cost—often just the price of a phone call—that delivers extraordinary and useful information.

And when you've exhausted the data mentioned in that column, why not access the *inCider* Bulletin Board at (603) 924-9801 and download a free program or two. Nothing like a modem, eh?

And finally, for fans of The Game Reserve, I'd like to share with you now a cryptic dispatch from the bush, hand-delivered to Peterborough by a Masai warrior:

"This is my last safari. Alter egos, too, shall pass. Brian walks among us.

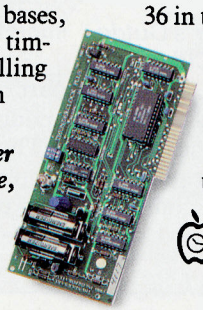
God save the Queen,
Warden Shiftky" ■



The people at Apple® should know a good peripheral when they see one. And when they developed ProDOS™ to upgrade the Apple II line, they made it automatically recognize and read Thunderclock.

Not surprising, when you consider Thunderclock's long list of useful applications. In the office, the lab and at home. It starts with time and date stamping disk files and just keeps growing. To automatically accessing data bases, sending electronic mail, timing experiments, controlling your sprinklers and even tracking satellites.

The fact is, the better you are with your Apple, the more useful Thunderclock becomes.



Thunderclock adds a new dimension to all the new ProDOS-based software (like APPLEWORKS™ and WORD JUGGLER IIe™). And gives you access to the time from years down to milliseconds. It comes with a one-year warranty and never misses a tick. On-board batteries keep it running for up to four years before you snap in a new pair.

So if you want to make ProDOS really produce, turn to page 36 in the *Basic Programming With ProDOS* manual. Then get yourself a Thunderclock. You'll see why somebody up there likes us.

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LETTERS

Assembly Assistance

I have an Apple II Plus and would like to learn assembly programming. I've checked with my local Apple user group, but it hasn't been much help. No one in this small group knows much about assembly programming. Perhaps *inCider* readers can point me in the right direction.

I've read in several reference books, and I agree that one of the best ways to learn assembly is to view working programs written by other people. Does anyone know of disks that contain tested and assembler-ready assembly source code, with comments that explain various programs? Or, can someone recommend books or magazines that list complete programs? (I don't mean general reference books that contain bits of theory. I want to look at, use, and modify programs that *do* something, not just ring the bell.) I'm particularly interested in the assembly code for a word processor, a data-base manager, utilities, and an accounting system. I'm not at all interested in games.

Tom Smith
1416 NE 98th Avenue
Vancouver, WA 98664

Sorry, Tom, we can't give you the information you're looking for either. The books we know of on assembly language are tutorial, not practical, in nature. But maybe somebody else has one up on our staff. If so, they can drop us a line: Letters, inCider, 80 Pine Street, Peterborough, NH 03458. —eds.

Advanced Reading

My new Apple //c's *Owner's Guide*, page 88, recommends *inCider* as a magazine for new users.

In your December 1984 issue, page 58, you recommend a Christmas gift peripheral of a mobile power supply—AKA a $98,500 Rolls Royce complete with cigarette lighter.

Hey, people, give us new users on the block a break. Can't you save the advanced stuff till later?

George Kuck
9700 Highway 101 North
Redwood Valley, CA 95470

Believe it or not, even editors have a sense of humor. Seriously, it should be possible to plug your computer into your car. We're looking into it. Have computer, will travel. —eds.

Too Many Frills

The computer is an exciting new learning tool, and I think its potential is beyond what many imagined. However, I feel that the trend in educational software development may be moving in the wrong direction.

I'm a high-school senior. Last year, I developed an educational software package that drills students on the exact values of trigonometric functions. When I tried to market the program, I learned a lot about the educational software industry.

Several classes at my school tested the program, Trig Tutor, to make sure it really was a useful product—that it was actually possible for the student to learn the subject with my program. It was. I made nine copies and sent them out with complete documentation to top distributors and to some smaller distributors as a back-up. All but one of the companies turned the product down. These were some of their reasons:

"We liked the program a lot, but it doesn't meet our marketing needs at this time."

"Your program is good, but it's too short for us to market."

"Trig Tutor would work well as part of a larger program, but it isn't enough on its own."

The gist was that I had a good, well-written program that simply didn't take up enough sectors on the disk to make it a marketable product. Trig Tutor has no flashy graphics or sound effects. These companies market their products on store shelves. People come in, look at the air-brushed cover, test out the graphics and sound effects on the store computer, and decide how they're going to learn math.

The company that did buy my program doesn't sell its products in stores. It sells them to schools and libraries through the mail. Trig Tutor is a short program because it doesn't need to be any longer to get its point across. Should an educational tool be judged on its length or on its ability to communicate a complicated idea?

It's important for educational software designers to realize that the computer isn't a textbook. It's much easier to flip through 50 pages in a book than to scan through 50 computer screens full of blurry words and poor pictures. Poor pictures take up disk space and may take hours to browse through. But since books fill the same need, these textbook programs are a waste of time and money.

For educational programs to reach their full potential, we must start by writing programs that teach. The program doesn't need to be long; it doesn't need to draw colorful pictures; it doesn't even have to make any noise. All it has to do is teach. I hope to see more products of educational value and not as many flashy toys.

Michael Katz
1318 North Orange Grove
Los Angeles, CA 90046

You state a well-presented case, Michael. You're right to say programs should be accepted on their educational merit—but those flashy, noisy programs don't lack educational value. Sometimes, it isn't enough just to sit the student down with a computer program. "Flashy" graphics and "noisy" sounds often improve student attention and performance. They don't just fill disk space. —eds.

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LETTERS

Reset and Reboot

In your November 1984 issue, the article by Kerry J. Lanz, "Capturing Big Game Screens" (p. 62), is one of the most useful techniques that I have read in a while. I've tried it on my Apple //e and I think that it's fabulous.

If I follow the directions, however, I can't print out every screen—only half of them. I have a suggestion to help an Apple //e owner print out anything on the screen at any time. On the Apple //e, instead of pressing control-reset, press control-open apple-reset to reboot the computer and print out any image on the screen.

Jason Koornick
59 Baxter Road
Brookline, MA 02146

Correction

O'Brien's Journal in January 1985, page 86, contains the following misleading passage:

"The usual way of reconciling two-prong outlets and three-prong power cords is to take a pair of pliers and yank out the circular grounding lug from the cord. Alternately, in a fit of devious intellect, some have used extension cords that allow the grounding plug to pass harmlessly, and ineffectually, over the outlet.

Though suitable for power drills, saws, and sanders, such tactics are tantamount to Apple homicide."

The author's original second paragraph, however, begins as follows:

"These *may seem* [our emphasis] like suitable tactics for power drills, saws, and sanders, but, the intelligence of such logic aside, they are tantamount to homicide for your Apple."

We apologize to our readers and to Mr. O'Brien for any misunderstanding created by the edited version.

inCider

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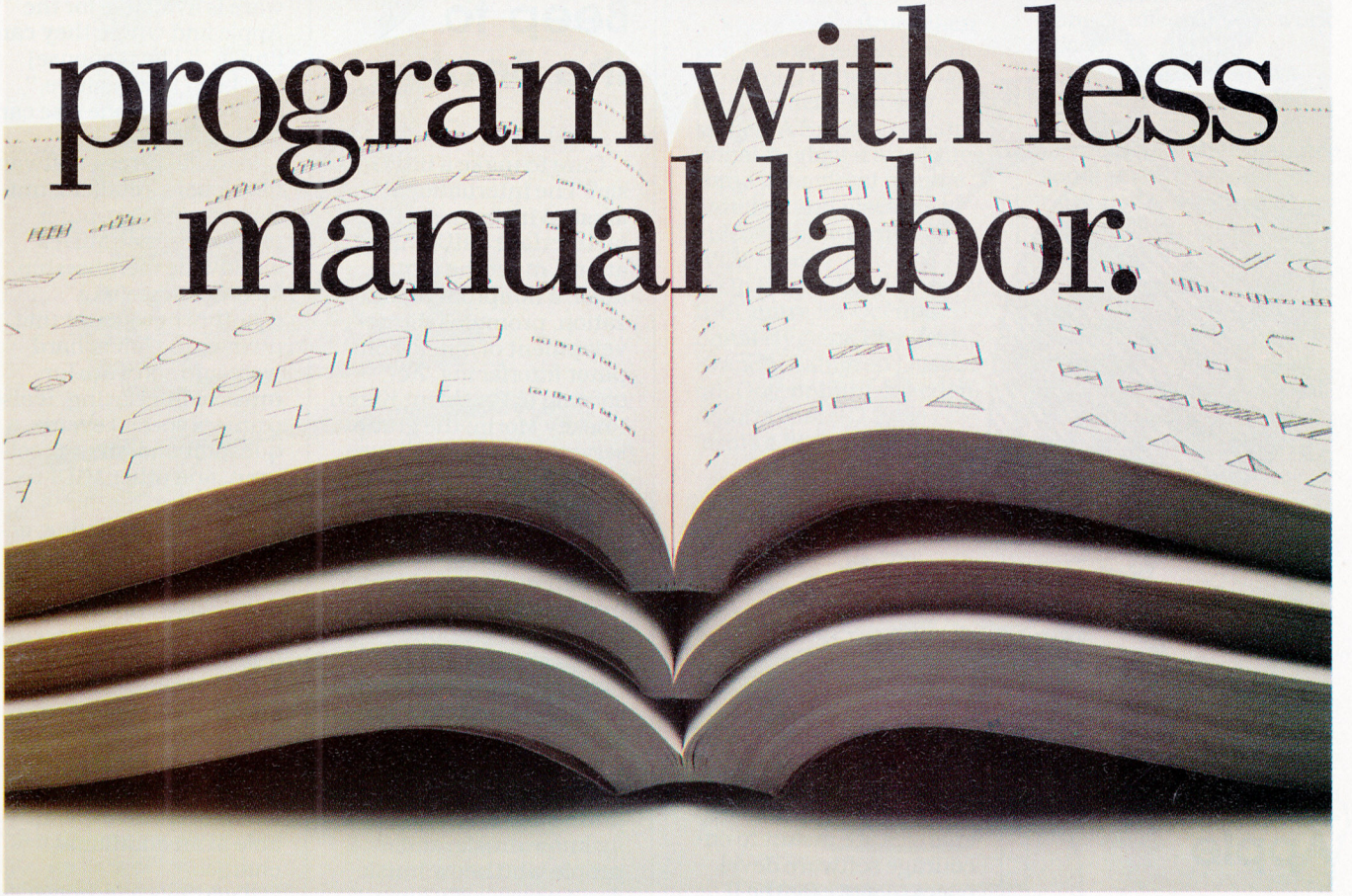

The idea behind choosing a computerized SAT program over a manual is to save you from piles of paperwork. But surprisingly, two of the best-known programs come with big, fat manuals and only 2 or 3 double-sided disks.

When that much information is put into the manual, what's left to put into the computer?

Why not buy a computer program that's really a computer program? Buy The Perfect Score from Mindscape for just $69.95.*

It has 6 double-sided disks and a real skinny manual. It even has printout capability and a continuous on-screen clock. All this makes The Perfect Score more computerized than those others.

Now, if this cold logic fails to convince you, perhaps an emotional appeal to your sense of patriotism and social consciousness will. Your choice is this. Either you buy their SAT, which kills innocent trees to make all that paper. Or you buy our SAT with 6 disks and Save America's Trees.

The Perfect Score, $69.95, from Mindscape

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*Suggested retail price. Available for Apple; Commodore 64; and IBM: The Perfect Score: Computer Preparation for the SAT. (C) 1984 Mindscape, Inc. All rights reserved.

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New and Improved Apple

What could the folks in Cupertino do to make the Apple //e any better? It's already the computer of choice among educators and more than holding its own in the marketplace. Try adding three new ROMs and a 65C02 microprocessor. That's what Apple Computer is doing to improve //c and //e software compatibility, according to Peter Levy, Apple II Division Marketing Manager.

Dealers will begin to receive the upgraded //e system as soon as Apple exhausts its remaining 6502 inventory. The new //e will contain the //c's 65C02 microprocessor, and have two new monitor ROM chips and one new character-generator ROM chip. There will be no external changes.

Apple's hardware changes are meant to encourage software developers to write for the II family by making the Apple Mouse universal. The new ROMs will contain mouse-text characters and more graphics symbols. The ROMs and the 65C02 will let users size windows and create smoother animated graphics, imitating the Macintosh and Lisa.

Other new features these chips will provide are the ability to boot from a hard disk, support for BASIC programs written in upper- and lowercase, and the return of a mini-assembler as a standard feature on the II.

According to Apple's marketing department, registered Apple //e owners will be able to purchase a field upgrade for the improvements for $90.

Beep to the Beat

Care to make a little music? The International Musical Instrument Digital Interface (MIDI) Association can set the tempo. MIDI, a nonprofit organization, promotes the development of music/computer interfacing. According to President Karen Rockey Morin, the group serves as a clearinghouse for information for those interested in combining musical skills with computer technology.

With more and more musicians taking advantage of the computer—for composition or performance—many have technical questions, but don't know where to turn for the answers.

"[Salespeople] at a computer store don't necessarily know music, and people who know music don't necessarily know computers. We put it together," Morin says.

Morin's organization also tells members what music software or hardware is available for the Apple and where they can find it. "[The response] has been just positive," she says. "No one else can do this for them."

Manufacturers, software developers, retailers, musicians, and computer users comprise MIDI's worldwide membership. Members receive a monthly newsletter that reviews the latest hardware and software for musical interfacing. It also features special events, a question-and-answer column, and other MIDI-related topics.

A technical hot line, accessible on Mondays, Wednesdays, and Thursdays, answers callers' questions. For those with less immediate problems, MIDI sponsors a data base and an electronic library filled with musical interfacing information. Special services, publications, and materials are available at an additional charge.

If you're a computer musician and interested in MIDI, contact Morin at 11857 Hartsook Street, North Hollywood, CA 91607, (818) 505-8964.

edited by Cynthia Carr

Yours for the Asking

Mac owners take heart. *InfoWorld* recently voted the Apple Macintosh 1984's "Hardware Product of the Year." But while the machine receives plaudits, its lack of available software is enough to discourage the most enthusiastic owner. All is far from lost, however, because The Public Domain Exchange has been hard at work collecting software for the Mac.

Judy Rosenthal of The Public Domain Exchange says her project started after people at computer shows kept asking for hard-to-find Apple and Macintosh public-domain software. She notes that while there was a lot for IBM computers, there was very little for the Apple and even less for the Mac.

Rosenthal's listings differ from other public-domain sources in that they don't merely list filenames; they describe each program on the disks. That way there are no surprises or disappointments after you order.

"People want to know what does it [the program] really do," she says. "The description tells them exactly what programs are on the disk. This is the uniqueness of our public-domain software catalog."

The Public Domain Exchange offers 30 disks, at $10 each, for the Mac. Rosenthal says the most popular programs include business- and home-finance, communications, code-cracking, and font styles. For $1, the organization will send you a listing of its Mac software. An introductory set of three disks and a catalog costs $28. The Exchange has also written a book, scheduled for May release, entitled *The Best of Apple Public Domain Software*—programs for the Mac and the Apple.

If you'd like the Mac listing, or one for the Apple II family, write to The Public Domain Exchange at 673 Hermitage Place, San Jose, CA 95134, or call (408) 942-0309.

Ionic Health Hazard

There was a time when behavioral changes were explained by psychological disorders. Not any longer. A Swedish occupational hygienist attributes some behavioral change patterns and diseases to video display terminal (VDT) use.

Dr. Eugen Ungethum at the Centre for Occupational Hygiene Physical Branch, Sahlgren Hospital, Gothenburg, Sweden, reports that VDT use forms a high-voltage static electric field between the screen and the operator. According to Ungethum's research, the voltages cause measurable atmospheric effects in the workspace.

His study also shows that this highly charged field decreases small air ion density—an imbalance some scientists consider responsible for disease and behavioral change patterns.

Ungethum, who has been studying the effects of VDTs in the workplace since 1978, considers his findings "of fundamental importance in the field of occupational air hygiene."

Keep 'Em Rolling

Things are moving at Apple Computer where the two-millionth Apple II personal computer has rolled off the assembly line at Apple's Carrollton, Texas, manufacturing plant.

Demand for the trusty II keeps business hopping. According to Del Yocam, executive vice-president and general manager of the Apple II division, one Apple II comes off the line every six seconds each working day.

"Production and sales of the Apple II product line are currently at all-time highs in the product's seven-year history," Yocam says. "Both the Apple //c and the Apple //e are selling strongly in the consumer-retail channel, while the Apple //e continues to be the computer of choice in the education market.

Making news of interest to inCider *readers? Alert The Cider Press at 80 Pine Street, Peterborough, NH 03458.*

How to Buy a Printer

by Jon Voskuil

The salesperson was right. Look at those sleek lines, the dynamic design, the options galore. But don't get drawn in by looks. Check under the hood. Take it for a test spin. How do you turn this printer on, anyway?

Buying a printer, like buying a car, is no easy task, and you should sit down and think about what you want before you set foot in a store. No printer does everything well. If it prints graphics, it probably isn't good for formal correspondence. If it's good for correspondence, it may be agonizingly slow for long program listings.

We've gathered information on printers that cost $500 or less—money that buys a lot more printer now than it did a few years ago. The more you know about printers, the better you'll be able to choose the one for your needs. So before you go shopping, bone up on basic terminology, printer features, and options.

The Choice Is Yours

A printer produces a character as a pattern (matrix) of dots that resembles the character or as the complete character formed by a molded piece of metal or plastic. Although dot-matrix printers are usually strong on speed, economy, and versatility, they have difficulty making a pattern of dots look as sharp and refined as a molded character.

A dot-matrix printing head contains rows of pins, wires, or ink jets, one just above another, facing the paper. In the pin version, the most common, an electromagnet behind each pin makes it strike the paper through a ribbon. By moving the head across the paper and "firing" the pins, the printer forms a line of characters.

At worst, dot-matrix characters are crude, distinctly dotty, and hard to read. Some printers don't even have a pin that prints below the line, so characters with descenders (g, j, p, q, y) are raised up.

Most matrix characters aren't that bad, however, and some are quite good. A printhead with many small pins can form a better-looking character than one with fewer, larger pins. Most heads have at least eight; some have the rows staggered to print overlapping dots. Even those with a single column of pins may overlap dots by reprinting the line one-half dot lower on the paper.

Among the available printing modes, the crudest and fastest is draft mode. Other modes produce sharper characters, but at a slower speed. Such enhanced modes are often called report, correspondence, or near-letter-quality. If a matrix printer claims letter-quality status (the highest praise), don't believe it until you see it.

The other way to print characters is by making an imprint of a molded

Before you leave for the computer store, know exactly what you need in a printer. Here's a pre-purchase guide written by veteran *inCider* reviewer, Jon Voskuil.

Photography: White/Packert Studio

character, most often found on a daisy wheel—a light plastic or metal wheel with dozens of flat, flexible spokes radiating out from a central hub. It looks like, well, a daisy. At the end of each spoke is a molded character or two. The wheel is mounted vertically on a shaft that spins to put any character in the 12 o'clock position, facing the paper. An electromagnetic hammer then strikes the spoke from behind to print the character.

When it comes to print quality, the one area where dot-matrix printers struggle, daisy-wheel printers excel. In contrast, their weak areas tend to be those where matrix printers are strong: speed, versatility, and economy.

"In print quality, matrix printers struggle, but daisies excel. In contrast, daisies are weak and matrixes strong in speed, versatility, and economy."

Let's Talk Numbers

Printer speed is measured in characters per second (cps). Slower daisy printers chug along at around 10 cps; faster ones reach up to 50 cps. Matrix printers rank in a different class. The slowest ones match the fastest daisies; the fastest clock in at about 200 cps.

Speed ratings are generally accurate, but you must understand what they mean: Printers with the same speed rating are not always equal. Take a matrix printer rated at 100 cps. That number doesn't reflect its *sustained printing speed* but its *maximum printing speed*. Once it starts printing across a line at highest speed (and lowest print quality), it can continue at that rate until it stops for breath at the end of the line.

That leaves much unsaid. How long does it take to stop, change direction, and begin to print the next line? How quickly does the paper advance to the next line? Does the printhead waste time returning all the way to the left side before it starts to print the next line? Or can it print bi-directionally, so the next line starts printing right-to-left without delay? How many characters per inch is it pumping out at maximum speed? Is the speed different for various print densities?

And don't forget character quality. If the printer can produce 100 draft-quality characters per second, how many near-letter-quality characters can it produce in the same second? Many matrix printers make two passes in the same direction across a line to produce clearer characters, but that slows them down a lot—50 to 75 percent.

Besides mechanical speed constraints, there's one of another kind. Most printers have a buffer—a small amount of memory that holds characters to be printed while the printhead catches up. In a small buffer—just a single line's worth of characters—the printer may have to pause after every line while the buffer stocks new characters from the computer. A larger buffer avoids this problem.

Sprinting speed, then, is only a general indicator of true printing speed, or *throughput*. Determining the time it takes to churn out a 5000-word document isn't an easy task.

Of course, speed isn't your only concern. You need to consider three other features, closely related to each other: paper width, character spacing, and columns.

All printers handle standard, 8½-inch typing paper. Some have wider platens for 11-inch or 14-inch paper. Platen width may be an important consideration when you print spreadsheets or items that need to cram a lot of information onto each line.

Character spacing, or pitch, determines how many characters you can print on a line. Character clarity and readability are affected by character spacing.

How Much Fits in an Inch?

Most printers offer both 10 and 12 characters per inch (cpi), and others supply an additional compressed pitch of about 16 cpi. There are printers that can double each character's width so the pitch becomes 5, 6, or 8 cpi. Proportional spacing, another feature, gives work a typeset appearance.

A printer may be rated according to the number of columns, or characters, it prints on a line. At 10 cpi, an 8½-inch page holds 85 characters or columns across. Usually the maximum is 80 columns, leaving a ¼-inch margin on each side. At 12 cpi, the same 8-inch line holds 96 characters. And at 16.5 cpi, you get 132 columns. This last is a kind of magic number, carried over from larger machines that print 132 columns at 10 cpi on 14-inch paper. Note that 16.5 cpi isn't the easiest pitch to read, but it's useful when you need to compress large charts onto standard paper.

Up for the Pitch

With most printers, your computer must send one or more special control characters to change from one pitch to another—and there's little standardization. Also, some printers let you flip a panel switch to change pitch.

Line spacing doesn't mean double or single spacing; rather, it's the distance *between* each single-spaced line. In other words, it's the number of single-spaced lines per inch. The usual spacing is 1/6 inch, for six lines per inch or 66 lines on 11-inch paper. You may have the option to change this to 1/8 inch. Depending on your printer, you may specify any spacing up to a limit—say, up to an inch in increments of 1/48 inch.

Pick a Character

On daisy printers, you can change the style of the printed characters by changing the print wheel. Wheels, available in 10, 12, and 15 pitch, come in a variety of typefaces or fonts—even foreign alphabets and scientific symbols. Matrix printers may also be able to print more than one font. Some print italics; others let you define new characters not included in the printer's memory or in a font.

By means of control characters sent by the computer, most printers can underline characters or print in boldface. Printers capable of superscripts or subscripts back up or advance the paper a half-line, print the characters, and then return to the base line. Others can print half-height characters in the upper or lower half of the normal line space.

Feeding Time

There are three different approaches to feeding the paper through the printer: friction, pin, and tractor. Friction feeding is most useful with single sheets and with continuous rolls of paper. Spring-loaded rollers press the paper against the rubber platen on its under side, just like a typewriter. A retractable bail holds the paper against the platen just above the printhead.

Not all friction-feed mechanisms are alike. You won't want one that makes it hard to align the paper or that doesn't keep the paper straight.

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Pin feeding is used with fan-folded paper that has holes along the sides. The holes mate with pins at both ends of the platen, so the paper is pulled through evenly. (The paper width must match the pin spacing.)

Tractor feeding, although similar to pin feeding, is a bit more elaborate and versatile. The tractors mate with the same paper holes that pins do, but the tractor mechanism is separate from the platen roller and adjusts to fit paper widths. This is the best mechanism if your printing tasks vary to include things like mailing labels and multipart forms.

"Even if you have a color printer, you must have the appropriate program to generate the printout."

All printers can feed paper by friction. Some come with a pin feeder as well, but usually tractor feeding is an extra-cost option. If you need tractor feeding, be sure it's available for the printer you're considering. A few printers also offer automatic feeders for sheets of paper.

The Graphics Touch

Most matrix printers print graphics as well as characters. Daisy printers can print crude graphics using the period to form a pattern of dots, but aren't really suited to graphics. To print graphics, you need the right printer *and* the right interface card and program. Printers differ in the way they form dot patterns, and you must be sure your computer, program, printer card, and printer are all compatible.

Since color printing is new, not many users or companies have had much experience with it. A few matrix printers can use multicolor ribbons to add color to characters and graphics. Remember: Even if you have a color printer, you must have the appropriate program to generate the printout or the color feature is worthless.

How Do I Plug It In?

There are two kinds of printer interfaces, or ways to connect your printer to the computer. The parallel, or Centronics-compatible, interface is pretty standard. You need a parallel printer interface for your computer and a connecting cable with parallel-type connectors at each end. The serial, or RS-232, interface can be trickier. Not only do you need a serial interface for your computer and a connecting cable with serial-type connectors, but the cable may need to be specially wired. Make sure all the parts work together before you take them home.

One kind of interface is as good as another; many printers come with both though rarely with cables or the interface card. Plan to spend at least $75 for these items.

Things That Go Wrong

Ribbons wear out, daisy wheels break, and printheads eventually die of exhaustion. Ribbon cartridges are easy to replace, but may be expensive. Ribbon spools are harder to replace, but less expensive than cartridges. Every printer takes a specific ribbon, so you have no choice about the ribbon type—just be aware of the cost. Manufacturers may quote an estimated ribbon life, but that depends on how dim the printing is before you consider the ribbon worn out.

Matrix printheads are durable, but not immortal. You may be able to replace matrix printheads yourself and save on labor cost.

Does It Bite?

You can only judge some things about a printer in person:

- How easy are the controls? Are they conveniently placed and clearly marked? Are seldom-used switches still accessible without disassembling the printer?
- How smoothly does the feeding mechanism work? Does it fight you or help you? Does the paper tend to stick or jam?
- How much noise does the printer make, and is the pitch bothersome to your ears? How much does it vibrate?
- How easy is it to replace the ribbon and the daisy wheel? Is it a messy job?

Decision Making

Any printer you buy will involve a compromise between its advantages and disadvantages. If letter-quality appearance is a must, you need a daisy printer, but you'll sacrifice a matrix printer's speed and versatility. If you're after letter quality but can't tolerate 10 or 15 cps, you'll have to spend more for a higher-speed daisy printer. If draft quality or near-letter quality is good enough, you'll be happiest with a matrix printer.

When you shop, print samples from different machines. Keep in mind what you need as you size up their features, so you don't buy more or less than you need. ■

Write to Jon Voskuil at 75 Union Street, Milford, NH 03055.

Manufacturers

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2323 South Bascom Avenue
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(408) 559-8000

Apple Computer
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Cupertino, CA 95014
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Brother International
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C. Itoh Electronics
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Torrance, CA 90505
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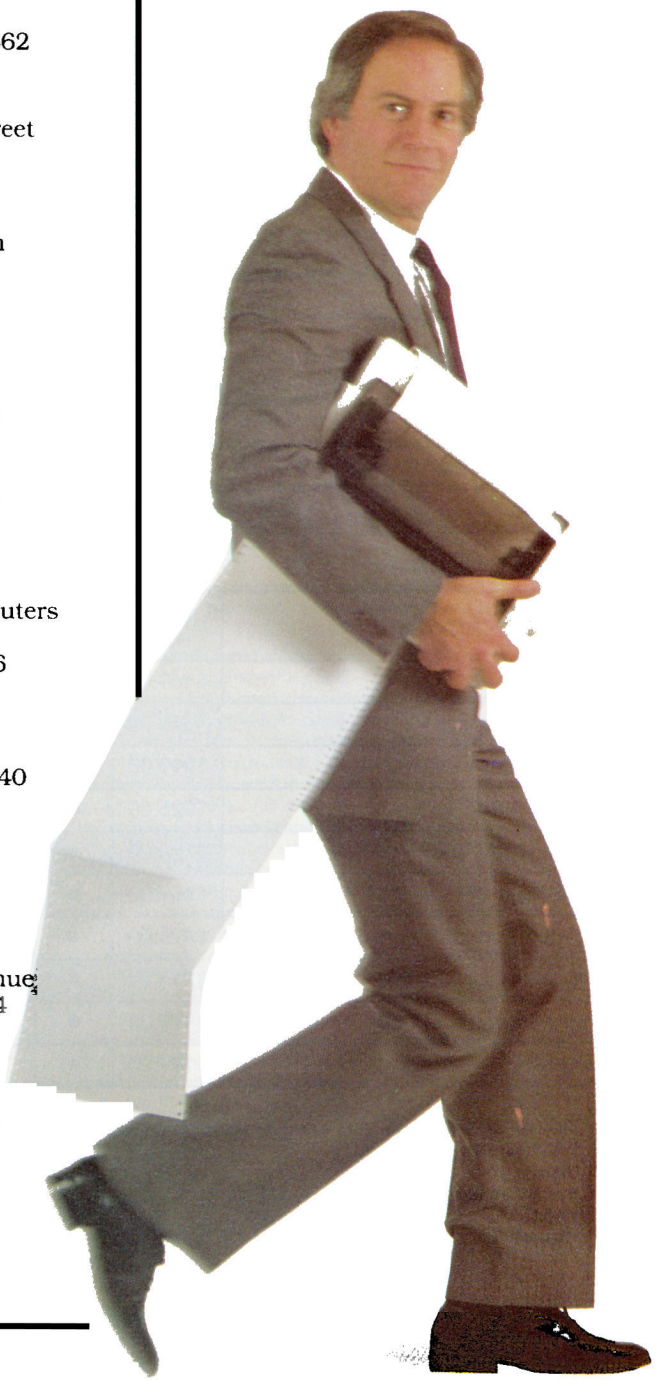

Buyer's Guide to

	Price	Standard Interface		Optional Interface	Maximum Speed (Characters Per Second)	Characters Per Inch[1]	Proportional Spacing	Memory Buffer	Variable Line Spacing
		Parallel	Serial						
Daisy-Wheel									
Alphacom Alphapro	$399.95			P,S	20	10, 12, 15	●	.1K	●
Brother HR-15	$499.00	●	●		17	10, 12, 15	●	3K	●
Comrex CR2	$499.00	●		S	20	10, 12, 15	●	3K	●
DataPort LQ	$295.00	●			15.3	12	●	8K	●
Juki Model 6000	$295.00	●		S	10	10, 12, 15			●
Star PowerType	$499.00	●	●		18	10, 12, 15	●	1 line	
TTX 1014	$499.00	●	●		14	12, 13, 14	●		●
Thermal/Other									
Alphacom Traveler[4]	$199.95			P,S	60	10		1 line	●
81[4]	$169.95			P,S	80	10		1 line	●
Apple Silentype[4]	$395.00		●		40	10			●
Scribe[5]	$299.00		●		80	10, 17		1 line	●
Brother HR-5[5]	$225.00	●	●		30	10, 12, 15		1K	●
Dynax Fortis DX5[5]	$225.00	●	●		30	10, 12			●
Ergo Hush 80[4]	$159.00	●	●		80	4.5, 6, 9	●	1 line	●
Hewlett-Packard ThinkJet[6]	$495.00	●			150	6, 10.7, 12, 21.3		1K	●
Okidata Okimate-20[5]	$268.00	●			80				
Star Micronics STX-80[4]	$199.00	●		S	60	5.5, 11		1 line	
TTXpress[4]	$199.00	●	●		40	5, 10, 20	●	.5K	●

1 All these printers use standard 8.5" wide paper. To calculate the number of columns of print, multiply the characters per inch by 8.5.
2 K = thousand; M = million
4 Thermal
5 Thermal transfer
6 Ink-jet
7 Ink cartridge

Under—$500 Printers

Standard Paper Feed								Ribbon			
Friction	Tractor	Sheet	Boldface	Italics	Underlining	Superscript/Subscript	Graphics	Character Life[2]	Cost	Weight in Pounds	Other Features
•			•	•	•	•		300K	$6.50	18	
•			•	•	•	•		150M	$5.95	19	
•			•	•	•	•		60K	$5–6	20	Converts to typewriter
•			•	•	•					6.3	No ribbon, but inked rollers; alternate character sets
•			•		•	•				15	Alternate character sets
•									$5.00	22	Alternate character sets
•	•				•	•	•	80K	$6.49	17.2	Alternate character sets

•					•		•			5.5	No ribbon, but special paper; rechargeable batteries; AC adapter
•					•		•			7	No ribbon, but special paper
		•			•	•				6	No ribbon, but special paper
	•		•	•	•	•	•	85K	$7.00	14.1	Alternate character sets; color compatible
•			•	•	•	•	•	50M	$3.50	4.5	Four D batteries; AC adapter
•						•	•	50K	$3.50	3.5	Alternate character sets; four D batteries
			•				•			2.5	No ribbon, but special paper; alternate character sets
•	•		•		•		•	1M[7]	$7.95	5.5	Foreign language sets
•	•	•	•			•	•			6	Color printing
•							•			7.7	No ribbon, but special paper
•					•		•			2.2	No ribbon, but special paper; four C batteries; AC adapter

Impact Dot-Matrix

	Price	Standard Interface		Optional Interface	Maximum Speed (Characters Per Second)	Characters Per Inch[1]	Proportional Spacing	Memory Buffer	Variable Line Spacing
		Parallel	Serial						
Axiom-Seikosha GP-550AP	$369.00	●			86	12, 17	●	1 line	
GP-250X	$499.00	●	●		50	10	●		●
Blue Chip M120/10	$240.00	●		S	120	10, 12		3 lines	●
BMC BX1000	$299.00	●	●		100	10		2K	●
Brother M-1009	$249.00	●	●		50	10, 12, 15		1K	●
C. Itoh 8510B	$495.00			P,S	120	5, 6, 8.5, 10, 12, 17	●	2K	●
Centronics GLP	$299.00	●		S	50	5, 8.5, 10, 17		2K	●
DataPort DM	$225.00	●	●		30	10	●	5K	●
Dynax DM5	$235.00	●			50	5, 8.5, 10, 17			●
Epson RX-80	$269.00	●		S	100	10, 12, 17.6		1 line	●
RX-80 FT+	$369.00	●		S	100	10, 12, 17.6		1 line	●
RX-100	$499.00	●		S	100	10, 12, 17.6		1 line	●
Facit 4510	$495.00	●	●		120	10, 12, 17		2K	●
Fujitsu DotMax-9	$499.00			P,S	180	10, 12, 17.1	●	2K	●
Inforunner Riteman 2C	$349.00		●		120	5, 8.5, 10, 17		1 line	●
Riteman R64	$399.00	●			120	5, 8.5, 10, 17		1 line	●
Riteman F+	$399.00	●		S	105	5, 6, 8.5, 10, 12, 17	●	2K	●
Mannesmann MT80 Spirit	$269.00	●		S	80	10, 16.5		2K	●
NCR 6411	$495.00	●			120	5, 6, 8.5, 10, 12		2K	●
Okidata Microline 92	$499.00	●		S	160	10, 12, 17.1			●
Microline 182	$299.00	●		S	120	10, 12, 17.1	●		
Panasonic KXP-1090	$349.00	●			96	10	●	1 line	
KXP-1091	$449.00	●			120	10, 12	●	1K	
Personal Micro Computers DMP-85	$395.00	●			120	10, 12, 17	●	1.3K	●
Smith-Corona D100	$295.00	●		S	120	5, 6, 8.3, 10, 12, 16, 17	●	1 line	●
Fastext-80	$259.00	●		S	80	5, 6, 8.3, 10, 12, 16, 17		1 line	●
Star Micronics Gemini 10X	$399.00	●		S	120	5, 6, 8.5, 10, 12, 17		10 lines	●
Xerox Diablo P101	$499.00	●			80	5, 10, 16.5	●	1K	●

1 All these printers use standard 8.5" wide paper. To calculate the number of columns of print, multiply the characters per inch by 8.5.
2 K = thousand; M = million
3 Pinfeed

Standard Paper Feed								Ribbon			
Friction	Tractor	Sheet	Boldface	Italics	Underlining	Superscript/Subscript	Graphics	Character Life[2]	Cost	Weight in Pounds	Other Features
●	●	●	●	●	●	●	●	8000	$14.95	16	Alternate character sets
	●						●			8.5	
●	●		●	●	●	●	●	1M	$9–12	11	
●				●		●	●		$4.25	18	
●	●		●		●	●	●	200M	$4.25	6.6	
●	●		●	●	●		●	1M	$7.50	18.1	
●		●	●	●	●	●	●	500K	$4.25	6.6	Alternate character sets
●			●	●	●	●	●	162K	$4.30	5.5	Four D batteries; AC adapter; alternate character sets
	●					●	●		$3.80	6.6	Alternate character sets
	●		●	●	●	●	●	3M	$14.00	13	Alternate character sets
●	●		●	●	●	●	●	3M	$14.00	13	Alternate character sets
●	●		●	●	●	●	●	3M	$24.00	19.8	15.5-inch carriage; 15-inch computer paper
●	●				●		●	4M	$4–12	20	Foreign character sets
●	●		●	●	●	●	●	2M	$13.00	19	
●	●[3]		●	●	●	●	●	1M	$9.00	11	
●	●[3]		●	●	●	●	●	1M	$9.00	11	
●	●	●	●	●	●	●	●	500K		8.6	
●	●		●	●	●	●	●		$12.00	11	
●	●	●	●		●		●	2M	$4.00	18.7	Alternate character sets; optional communications interface
●			●	●	●	●	●			16	Alternate character sets
●			●	●	●	●	●			8.8	
●	●	●	●	●	●	●	●	4M	$9.95	15.5	Foreign character sets
●	●	●	●	●	●	●	●	4M	$9.95	15	Alternate character sets
●	●		●		●	●	●		$7.00	19	Foreign character sets
●	●				●	●	●	4M	$16.95	18	Alternate character sets
●					●		●	1M	$9.50	8.8	Alternate character sets
●				●	●	●			$2.49	15.4	Alternate character sets
●	●		●		●	●	●	2M	$8.00	20.5	Foreign character sets

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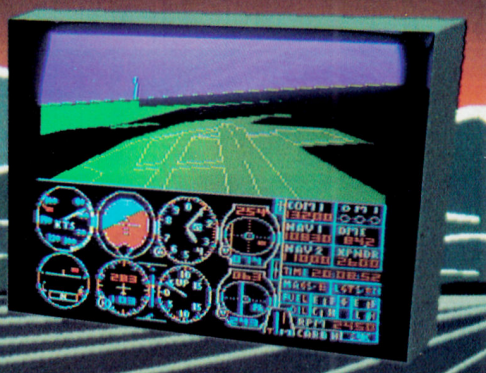
For Apple II+, Apple IIe, & Apple IIc



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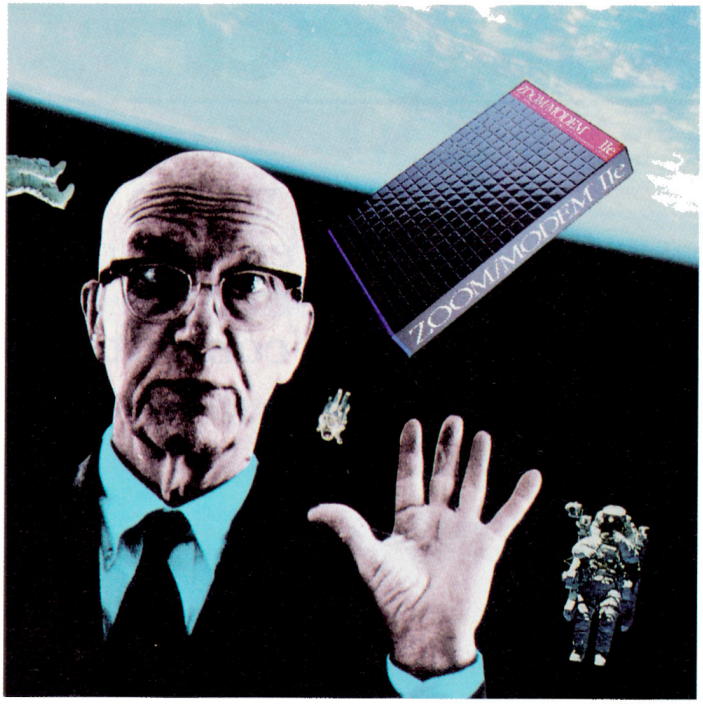
R. BUCKMINSTER FULLER, Architect, Inventor, Author, Educator and Early Data Freak.



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Select-a-File

This DOS 3.3 utility makes program selection automatic—even for the new computer user.

by Paul Van Bloem

If you have ever been deep in a project when someone in your family has needed help to get a program running, you know it can be an aggravation to both you and to them. I decided to put my Apple itself to work to solve this problem. I wrote a program that, when booted up, presents a clear and descriptive list of the programs on the disk and provides a simple way to run them.

Of course, several programs on the market already perform this task in different ways. Beagle Bros has a couple, for example, and your user's group probably has several, too. But I decided that writing my own would allow more versatility, and, besides, the programming would be fun.

The finished program, Hello Menu (see the **Program listing**), is saved as the hello program on a disk; when the disk is booted, it automatically presents a menu of the programs on the disk. Then, selecting an item on the menu automatically RUNs, BRUNs, or EXECs the corresponding program.

Let's say you have a disk with a number of games on it. **Figure 1** shows the catalog of such a disk: one hello program, one binary game, three Applesoft games, and three Applesoft games with subsidiary files (TANK uses TANK.NOISE and TANK.PIC, ANIMALS uses ANIMALS.FILE, and CHICKEN uses OBJ.CHICKEN and CHICKEN.PROG). Note that the 13 files in **Figure 1** do not mean there are 13 menu choices. You want your family and friends to choose from a menu similar to the one shown in **Figure 2**, which doesn't include the subsidiary files listed in **Figure 1**.

What You Do

Type in Hello Menu, following the line descriptions in the **Table** to understand how the program works. (Note that lines 80–99 and 9999 involve choices as you type.) Save the program as the hello program on your disks. Then, lock all the programs you want to show up on the menu, and make sure all the others—including the hello menu—are unlocked. Now, when your friends boot the disk, Hello Menu will load and display a menu for them to choose from. To choose a program, they just press its letter, or X to exit the program (see **Figure 2**). Note that the options are shown in inverse.

I suggest you give your files descriptive names. These names will help your friends decide if this is the game they want, and since your friends don't have to type the name of the file to run it, the longer name won't slow them down.

An Added Feature: A Prompted Reset-Boot

If you or your friend accidentally boots the wrong disk or decides to switch from one program to another in midstream, it simplifies things if there is an easy way to boot another disk. If you have an Apple //e or //c, you can reboot with an open-apple-control-re-

Illustration by Katherine Mahoney

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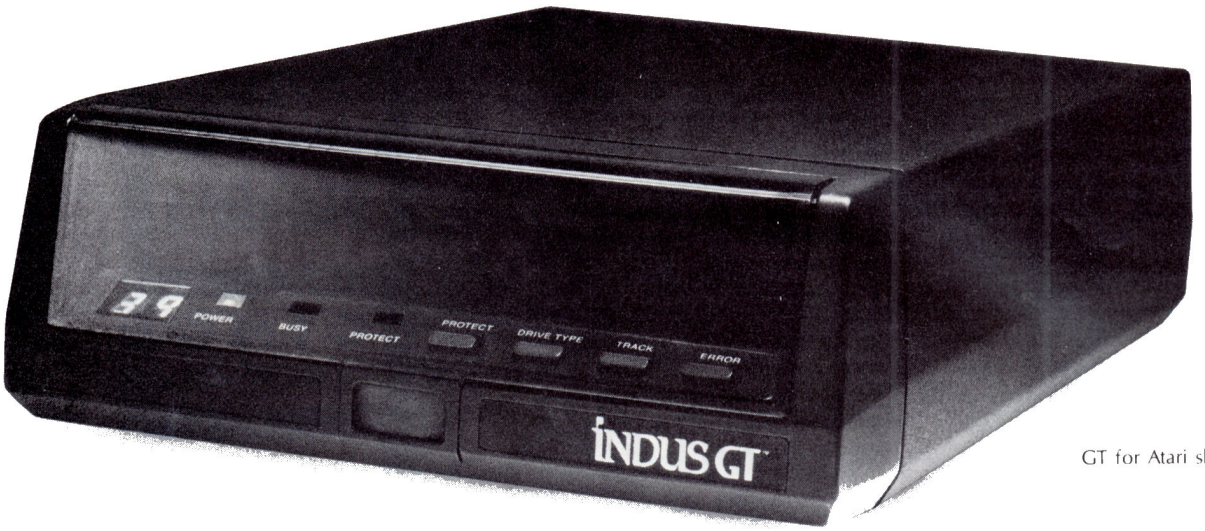

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Circle 390 on Reader Service Card.

Program listing. *Hello Menu. Lines 80–99 are the optional routine providing the reset-boot.*

```
0  REM ************************
1  REM *       HELLO MENU       *
2  REM *                        *
4  REM *  COPYRIGHT (C) 1984    *
5  REM *    PAUL VAN BLOEM      *
6  REM *      PO BOX 459        *
7  REM *   GLENWOOD LANDING,    *
8  REM *    NEW YORK  11547     *
9  REM ************************


10  REM PROGRAM GIVES MENU OF
11  REM  ALL LOCKED FILES ON A
12  REM  DOS 3.3 DISK, AND
13  REM  ALLOWS ONE TO BE RUN
14  REM  WITH A SINGLE KEYPRESS
80  POKE 1010,0: POKE 1011,3: POKE 1012,166
90  FOR I = 768 TO 834
91  READ J: POKE I,J
92  NEXT I
93  DATA  32, 88,252,169, 11,133, 37, 32, 36,252
94  DATA 169, 15,133, 36,169,194, 32,237,253,169
95  DATA 207, 32,237,253, 32,237,253,169,212, 32
96  DATA 237,253,169,191, 32,237,253, 32, 12,253
97  DATA 201,217,208,  6, 32,237,253, 76,  0,198
98  DATA 201,206,208,239, 32,237,253,169, 22,133
99  DATA  37, 32, 36,252, 76,208,  3
100  REM GET CATALOG ON SCREEN
110  HOME : GOSUB 1000
120  POKE 44452,255: POKE 44513,67
130  PRINT  CHR$ (4)"CATALOG"
140  POKE 44452,22: POKE 44513,2
200  REM FIND FILE LIST ON SCREEN
210 B =  PEEK (37):T = 5
220  IF B = 23 THEN  FOR T = 1 TO 5:V = T: IF  FN SC(5
     ) = 160 THEN  NEXT T
250  REM WRITE TITLE (A$)
260  READ A$
270  IF T > 2 THEN  VTAB 1: POKE 35,T - 1: CALL  - 958
     : POKE 35,24: VTAB T - 2: HTAB 21 - ( LEN (A$) /
     2): INVERSE : PRINT A$: NORMAL
280  IF T <  = 2 THEN A$ =  LEFT$ (A$,23):A$ =  MID$ (
     SP$,1, INT ((23 -  LEN (A$)) / 2)) + A$ + SP$: INVERSE
     : FOR I = 1 TO 23: VTAB I: HTAB 38: PRINT " "; MID$
     (A$,I,1);" ";: NEXT : NORMAL
300  REM GIVE EACH FILE A LETTER
310  FOR I = 0 TO B - T
320  VTAB I + T: HTAB 3: PRINT "..";: INVERSE
330  PRINT  CHR$ (I +  ASC ("A"));: NORMAL : PRINT ".."
     "
340  NEXT
400  REM GET CHOICE
410  VTAB 24: IF B < 23 THEN  VTAB B + 2
420  PRINT "PICK ONE (OR ";: INVERSE : PRINT "X";: NORMAL
     : PRINT " TO EXIT) ->";
430  GET H$: IF H$ = "X" THEN  PRINT "EXIT";: VTAB 23:
      END
440  IF H$ < "A" OR H$ >  CHR$ (B - T +  ASC ("A")) GOTO
     430
450  PRINT H$;:R =  ASC (H$) -  ASC ("A") + T
500  REM GET FILE TYPE OF CHOICE
510 V = R:F$ =  CHR$ ( FN SC(2) - 128)
520 C$ = "RUN": IF F$ = "B" THEN C$ = "BRUN"
530  IF F$ = "T" THEN C$ = "EXEC"
600  REM GET NAME OF CHOICE
610  REM FIND OUT HOW LONG NAME IS BY CHECKING BACKWAR
     DS FROM RIGHT SCREEN EDGE
620 V = R: FOR E = 37 TO 9 STEP  - 1: IF  CHR$ ( FN SC
     (E) - 128) = " " THEN  NEXT E
630  REM READ NAME IN ONE CHAR AT A TIME
640 N$ = "": INVERSE : FOR I = 8 TO E
650 N$ = N$ +  CHR$ ( FN SC(I) - 128)
660  VTAB R: HTAB 8: PRINT N$: NEXT
670  NORMAL
700  REM CLEAR SCREEN & RUN CHOICE
```

Listing continued.

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City _____ State ____ Zip ____
Phone _____ Sign here _____

set combination (or control-reset if you have disabled the reset key); but if you have a II or a II Plus, you need something to save wear on the on/off switch. My answer is a reset-boot, a technique used (for other reasons) in a lot of commercial programs.

The following line demonstrates the simplest form of reset-boot:

```
90 POKE 1012, PEEK (1011)
```

This fools the Apple into thinking it has just been turned on when you press the reset key. The Apple then boots a disk as it always does when it has just been turned on, and brings you to the menu. (Page 37 of the *Apple II Reference Manual* provides more information on this topic.)

Hello Menu uses a more complex version of the reset-boot. Hitting the reset key activates a machine-code program that is POKEd into memory by lines 80–99. The machine code is roughly equivalent to the following BASIC program:

```
10 HOME: VTAB 10: HTAB 18
20 PRINT "BOOT?";
30 GET H$: IF H$ < > "Y"
   AND H$ < > "N" GOTO 30
40 IF H$ = "Y" THEN PR#6
50 END
```

This prompted reset-boot, unlike the one-line version, boots only if you answer Y to the BOOT? question. Otherwise it works like a normal reset.

It's very important that you type in the DATA statements in lines 80–99 correctly. To check your work, I suggest you add a temporary line 70 as follows:

```
70 X = 0: FOR I = 1 TO 67:
   READ J: X = X + J:
   NEXT: ?X: END
```

The correct value for X is 9554. If you get another value, you've made a typo somewhere. If you do get 9554, you have probably entered the DATA statements correctly.

If you don't reset-boot out of a program that is equipped with it, but run the program to its normal conclusion, the reset-boot will carry over into any program you run next. *Watch out*, because if reset-boot is in effect when you're writing a program and you hit reset before saving the program, all will be lost. Of course, including the reset-boot routine in the new program will avoid this problem. ■

If you'd like a source listing of the reset-boot routine, or want other technical information, write to Paul Van Bloem at P.O. Box 459, Glenwood Landing, NY 11547. Reader response is also welcome.

Figure 1. *The disk catalog as it normally appears.*

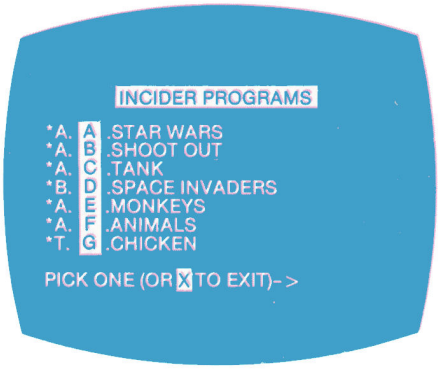

Figure 2. *The converted catalog that Hello Menu displays.*

Listing continued.

```
710  IF R > 1 THEN  FOR I = 1 TO R - 1: VTAB I: CALL  -
     868: NEXT
720  VTAB R: HTAB 38: PRINT "   ": REM 3 SPACES
730  FOR I = R + 1 TO 24: VTAB I: CALL  - 868: NEXT
740  VTAB R: HTAB 1: PRINT  SPC( 7);: HTAB 1: PRINT C$
     ;
750  PRINT : PRINT  CHR$ (4)C$N$
999  END
1000  REM INITIALIZE
1010  DEF  FN SC(H) =  PEEK (1024 + 128 * (V - 1) - 98
     4 *  INT ((V - 1) / 8) + H - 1)
1020 SP$ = "                    ": REM 20 SPACES
1099  RETURN
9999  DATA INCIDER PROGRAMS
```

End of listing.

Table. *Detailed program description.*

Lines	Description
80–99	The reset-boot routine. These lines are optional.
100–140	Puts a catalog on the screen. POKE 44452,255 changes the number of files the Apple displays before awaiting a keypress. Usually it shows 22 and then waits; changing the number to 255 effectively eliminates the keypress wait. POKEing 44513 with 67 makes the Apple print only locked files in the catalog. Once these two POKEs are done, type CATALOG and then restore the two memory locations to their usual values.
200–220	Determines the number of files on the screen and where they are located. B is set to the bottom row with a file on it, and T to the top row.
250–280	Writes the title (from the DATA statement on line 9999) across the top of the screen if there's room, or down the right side if there isn't. It's a good idea to limit your title to 23 characters, so it will fit along the right edge.
300–340	Starting with A, prints a letter next to each filename.
400–450	Gets your choice. If you choose X (to exit), the program ends; otherwise, R is set equal to the row of your choice.
500–530	Gets the file type (A, I, B, or T) from the screen, and sets C$ equal to the command necessary to execute that file type (RUN, BRUN, or EXEC).
600–670	Reads the filename (stored in N$) from the screen and displays the name in inverse.
700–750	Clears the screen and then runs the selected program.
1000–1099	An initializing subroutine. The function in line 1010 will return the ASCII value of the character at line V, column H. To find what is at line 10, column 20, for instance, you would type: V = 10: PRINT FN PK (20)
9999	Put the title of your disk after this line, or leave it blank if you don't want a title.

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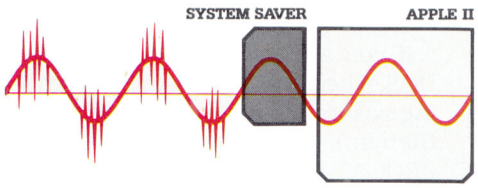

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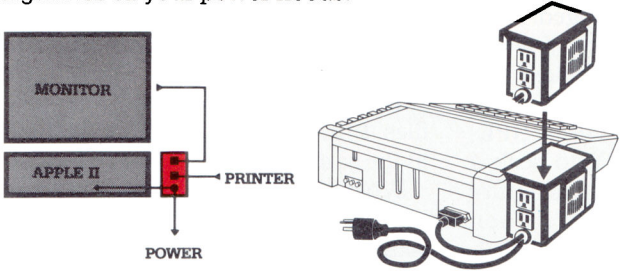

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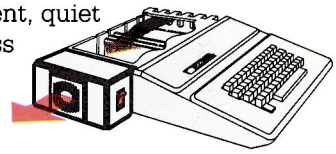

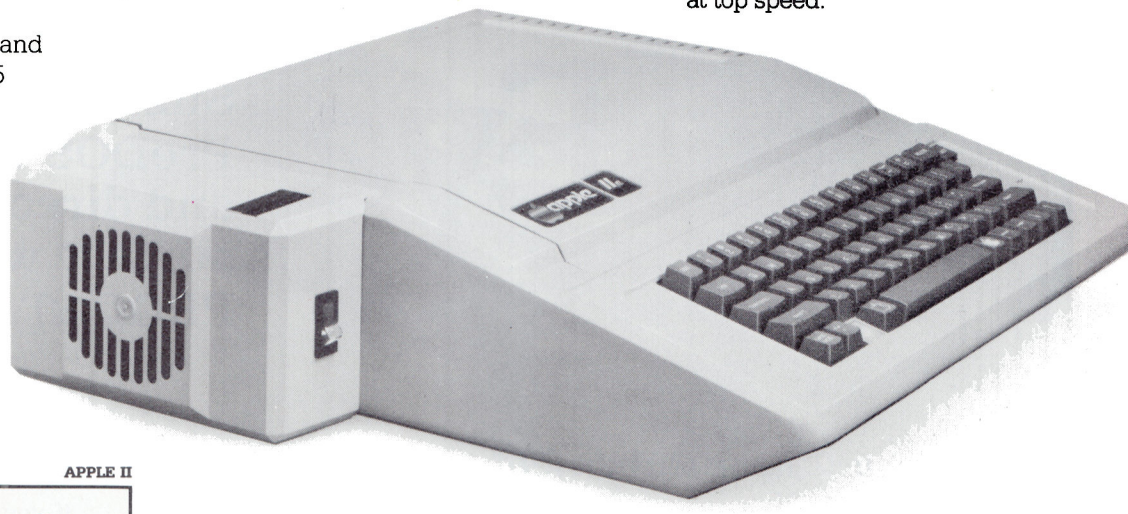

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More than Meets the Eye

Submerged ProDOS files and directories surface with PROCAT.

by Viktor Rubenfeld

ProDOS, the newest operating system for the Apple II family, offers powerful enhancements to both DOS 3.3 and Applesoft. Just as a variety of powerful disk utilities sprang up to assist DOS 3.3 users, many others will also become available for ProDOS users.

The ProDOS CATALOG command displays only the files contained in a single disk directory. Files in other disk directories, or in subdirectories of the directory being cataloged, are not displayed. For instance, **Figure 1** shows a catalog of the primary disk directory (called the volume directory) on the EXAMPLES disk distributed by Apple with the reference manual *Basic Programming with ProDOS*. To find a given file, such as E.S.P., on this disk, you must individually catalog up to six directories: the volume directory and the subdirectories DIRECTORY, PRACTICE, PROGRAMS, DATA, and EXTRAS. However, with PROCAT you can simultaneously display on screen or on a printer the names of all the files on the disk, with each file indented under its own directory. The pathname required to find every file on the disk is also conveniently displayed. PROCAT will also let you locate any program on your disk, then load and run it with a single keystroke.

Type in PROCAT from the **Program listing**. Then, to use it simply respond to the following prompts as they appear on the screen:

- NAME OF VOLUME? Type in the name of the disk to be cataloged.
- 80 COLUMNS? (Y/N) Type Y if you are using an 80-column display, N if you are using a 40-column display.
- SEEK PATHNAME FOR A SPECIFIC FILE? (Y/N) Type Y to seek a specific file, or N to catalog the entire disk. If you respond with Y, when PROCAT prompts NAME OF FILE?, type in the name of the file you are seeking.
- DIRECT OUTPUT TO PRINTER? (Y/N) Type Y for a printed copy of PROCAT output, N for a screen display only.

If you are a first-time user of ProDOS, when to use the leading and trailing slashes around volume names and filenames may confuse you. With PROCAT this isn't a problem; regardless of how you place the slashes, the program will reformat the input to meet its own requirements.

PROCAT begins by listing the files contained in the disk's volume directory. If it encounters a new directory file during this process, it will open it and list the files it contains, then return to listing the remaining files in the previous directory. Should the subdirectory itself contain directory files, PROCAT will open and list them in the same way.

Whenever PROCAT begins reading a new directory, it prints a row of asterisks to mark the point clearly. Immediately below this it prints the pathname it is using to find the files. The name of the directory file being listed is printed next, followed by the names of the files it contains. Subdirectory filenames are indented two columns;

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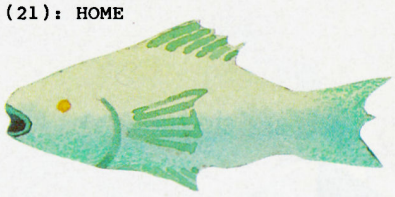
Program listing. *PROCAT.*



```
5  PRINT  CHR$ (12): PRINT  CHR$ (21): HOME
8  PRINT "********************"
9  PRINT
11  PRINT "     >>>PROCAT<<<"
12  PRINT
13  PRINT "   COPYRIGHT 1984"
14  PRINT "         BY"
17  PRINT "  VIKTOR RUBENFELD"
18  PRINT
20  PRINT "********************"
30  PRINT : PRINT
50  INPUT "NAME OF VOLUME? ";V$
60  IF  LEFT$ (V$,1) <  > "/" THEN V$ = "/" + V$
65  IF  RIGHT$ (V$,1) = "/" THEN V$ =  LEFT$ (V$, LEN (V$) - 1)
70  PRINT "80 COLUMN? (Y/N) ";
80  GET A$:C = 63: IF A$ = "N" THEN C = 30
90  IF A$ <  > "Y" AND A$ <  > "N" THEN 80
100  PRINT A$
110  PRINT "SEEK PATHNAME FOR SPECIFIC FILE? (Y/N) ";
120  GET A$: IF A$ <  > "Y" AND A$ <  > "N" THEN 120
130  PRINT A$: IF A$ = "N" THEN 160
140  INPUT "   NAME OF FILE? ";SF$
142  IF  LEFT$ (SF$,1) = "/" THEN SF$ =  RIGHT$ (SF$, LEN (SF$) -
     1)
145  IF  RIGHT$ (SF$,1) = "/" THEN SF$ =  LEFT$ (SF$, LEN (SF$) -
     1)
150  IF  LEN (SF$) < 15 THEN SF$ = SF$ + " ": GOTO 150
160  PRINT "DIRECT OUTPUT TO PRINTER? (Y/N) ";
170  GET A$: IF A$ <  > "Y" AND A$ <  > "N" THEN 170
180  PRINT A$
190 D$ =  CHR$ (4)
200  IF A$ = "Y" THEN  PRINT D$;"PR #1":PS$ = "ON"
210  DIM F$(100),LFO$(100)
220 F$(DN) = V$
230 PRNT$ = "YES"
240  FOR A = 1 TO C: PRINT "*";: NEXT : PRINT : HTAB 1 + (2 * DN
     ): PRINT ">PATHNAME: ";F$(DN)
250  PRINT D$;"OPEN "F$(DN)",TDIR"
260  PRINT D$;"READ "F$(DN)
270  INPUT L1$: IF F$(DN + 1) = "" THEN  HTAB 1 + (2 * DN): PRINT
      LEFT$ (L1$,C): REM    READ             NAME
280  INPUT L2$: IF F$(DN + 1) = "" THEN  HTAB 1 + (2 * DN): PRINT
      LEFT$ (L2$,C): REM    READ             TITLE
290  INPUT L3$: PRINT L3$: REM  READ BLANK LINE
300  INPUT L4$
310  IF  LEFT$ (L4$,6) = "BLOCKS" THEN 510
320  IF  MID$ (L4$,2,15) =  MID$ (F$(DN), LEN (V$) + 2,15) THEN
     300
330  IF LFO$(DN) <  > "" AND L4$ <  > LFO$(DN) AND PRNT$ = "NO" THEN
     300
340  IF L4$ = LFO$(DN) AND PRNT$ = "NO" THEN PRNT$ = "YES": GOTO
     300
350  HTAB 1 + (2 * DN): PRINT  LEFT$ (L4$,C): REM  READ FILES
360  IF SF$ = "" THEN 390
365  IF  MID$ (L4$,2,15) <  > SF$ THEN 390
370  PRINT : PRINT  CHR$ (7);: PRINT  CHR$ (7);"   >>>GOT IT!<<<
     ": PRINT "   PATHNAME FOR "SF$: PRINT "   IS": PRINT "  "F$
     (DN): PRINT : PRINT D$;"CLOSE "F$(DN)
375  PRINT "RUN THIS FILE NOW? (Y/N) ";
380  GET R$: IF R$ <  > "Y" AND R$ <  > "N" THEN 380
385  PRINT R$: GOTO 540
390  IF  MID$ (L4$,18,3) <  > "DIR" THEN 450
400  PRINT D$;"CLOSE "F$(DN):LFO$(DN) = L4$:DN = DN + 1
410 F$ = F$(DN - 1)
420  IF  RIGHT$ (F$,1) = " " THEN F$ =  LEFT$ (F$, LEN (F$) - 1)
     : GOTO 420
430 F$(DN) = F$ + "/" +  MID$ (L4$,2,15)
440  GOTO 240
450  IF L4$ <  > "" THEN 300
460  IF L4$ = "" AND DN > 0 THEN  PRINT "END OF FILE.": GOTO 490

470  IF L4$ = "" AND DN = 0 THEN 500
480  IF DN = 0 THEN 500
490  IF DN > 0 THEN  PRINT D$;"CLOSE "F$(DN):DN = DN - 1:PRNT$ =
     "NO": GOTO 240
500  INPUT L5$: PRINT L5$: REM  READ BLOCK COUNT
510  PRINT : PRINT L4$: PRINT D$;"CLOSE "V$
520  IF SF$ <  > "" THEN  PRINT : PRINT "FILE "SF$" NOT FOUND!"
530  PRINT
540  IF C = 30 AND PS$ = "ON" THEN  PRINT D$;"PR#0"
550  IF C = 63 AND PS$ = "ON" THEN  PRINT D$;"PR#3"
560  IF R$ <  > "Y" THEN  END
570  IF  RIGHT$ (F$(DN),1) = " " THEN F$(DN) =  LEFT$ (F$(DN), LEN
     (F$(DN)) - 1): GOTO 570
580  PRINT D$;"- "F$(DN);"/";SF$
```

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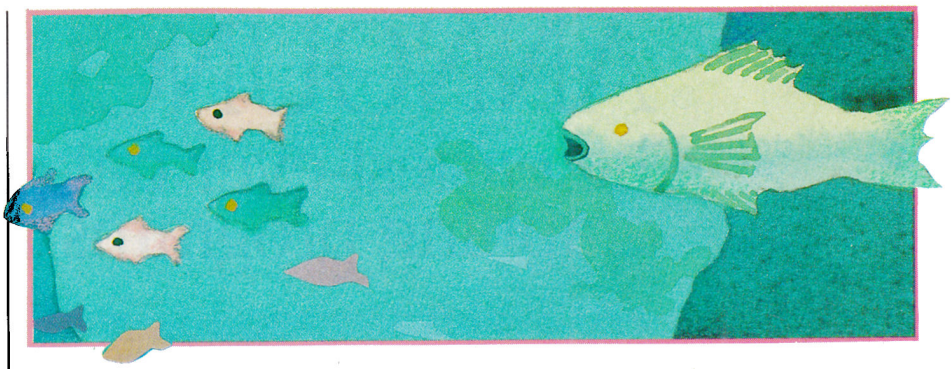

Figure 1. *A sample ProDOS volume directory from Apple's EXAMPLES disk.*

```
/EXAMPLES

 NAME            TYPE  BLOCKS  MODIFIED         CREATED          ENDFILE SUBTYPE

*PRODOS           SYS       29   1-SEP-83  0:00   3-SEP-83 11:50    14336
*BASIC.SYSTEM     SYS       21   1-SEP-83  0:00   3-SEP-83 11:49    10240
 STARTUP          BAS        7  22-JUL-83 11:41  22-JUL-83  0:00     2750
 HELP             BAS        1  22-JUL-83 11:27  22-JUL-83 11:27       54
 DIRECTORY        DIR        1  28-MAR-83  0:00  28-MAR-83  0:00      512
 PRACTICE         DIR        1  18-JUL-83  0:00  18-JUL-83  0:00      512
 PROGRAMS         DIR        3  29-AUG-83 17:51  28-MAR-83  0:00     1536
 DATA             DIR        1  29-AUG-83 18:07  28-MAR-83  0:00      512
 EXTRAS           DIR        1  29-AUG-83 17:53  28-MAR-83  0:00      512
 POSTAGE.RATES    BAS        8  17-JUL-83  0:00  17-JUL-83  0:00     3273

BLOCKS FREE:  108     BLOCKS USED:  172     TOTAL BLOCKS:  280
```

Figure 2. *PROCAT disk directory in 80-column mode.*

```
****************************************************************
>PATHNAME: /EXAMPLES
/EXAMPLES
 NAME            TYPE  BLOCKS  MODIFIED         CREATED

*PRODOS           SYS       29   1-SEP-83  0:00   3-SEP-83 11:50
*BASIC.SYSTEM     SYS       21   1-SEP-83  0:00   3-SEP-83 11:49
 STARTUP          BAS        7  22-JUL-83 11:41  22-JUL-83  0:00
 HELP             BAS        1  22-JUL-83 11:27  22-JUL-83 11:27
 DIRECTORY        DIR        1  28-MAR-83  0:00  28-MAR-83  0:00
****************************************************************
  >PATHNAME: /EXAMPLES/DIRECTORY
  DIRECTORY
   NAME            TYPE  BLOCKS  MODIFIED         CREATED

   TEXT             TXT        1  18-MAR-83 11:31  18-JUL-83 15:09
   APPLESOFT.PROG   BAS        1  18-MAR-83 11:31  18-JUL-83 15:10
   APPLESOFT.VARS   VAR        1  18-MAR-83 11:32  18-JUL-83 15:10
   SYSTEM.PROGRAM   SYS        1  <NO DATE>         18-JUL-83 15:10
   BINARY           BIN        1  <NO DATE>         18-JUL-83 15:10
   RELOC.CODE       REL        1  18-MAR-83 11:32  18-JUL-83 15:10
   USER.DEFINED.1   $F1        1  18-MAR-83 11:33  18-JUL-83 15:11

END OF FILE.
****************************************************************
>PATHNAME: /EXAMPLES

 PRACTICE         DIR        1  18-JUL-83  0:00  18-JUL-83  0:00
****************************************************************
  >PATHNAME: /EXAMPLES/PRACTICE
  PRACTICE
   NAME            TYPE  BLOCKS  MODIFIED         CREATED

   RENAME.ME.1      BAS        1  18-MAR-83 11:41  18-JUL-83 15:11
   RENAME.ME.2      BAS        1  18-MAR-83 11:41  18-JUL-83 15:11
   RENAME.ME.3      BAS        1  18-MAR-83 11:42  18-JUL-83 15:11
   DELETE.ME.1      BAS        1  18-MAR-83 11:42  18-JUL-83 15:11
   DELETE.ME.2      BAS        1  18-MAR-83 11:42  18-JUL-83 15:12
   DELETE.ME.3      BAS        1  18-MAR-83 11:42  18-JUL-83 15:12
   LOCK.ME.1        BAS        1  18-MAR-83 11:43  18-JUL-83 15:12
   LOCK.ME.2        BAS        1  18-MAR-83 11:43  18-JUL-83 15:12
  *LOCKED.UP.1      BAS        1  21-MAR-83 13:23  18-JUL-83 15:13
  *LOCKED.UP.2      BAS        1  18-MAR-83 11:43  18-JUL-83 15:13

END OF FILE.
****************************************************************
>PATHNAME: /EXAMPLES

 PROGRAMS         DIR        3  29-AUG-83 17:51  28-MAR-83  0:00
****************************************************************
  >PATHNAME: /EXAMPLES/PROGRAMS
  PROGRAMS
   NAME            TYPE  BLOCKS  MODIFIED         CREATED

   WHIZBOOM         BAS        1  29-AUG-83 16:46  18-JUL-83 15:13
   TWO.LINER        BAS        1  <NO DATE>         18-JUL-83 15:13
```

Figure continued.

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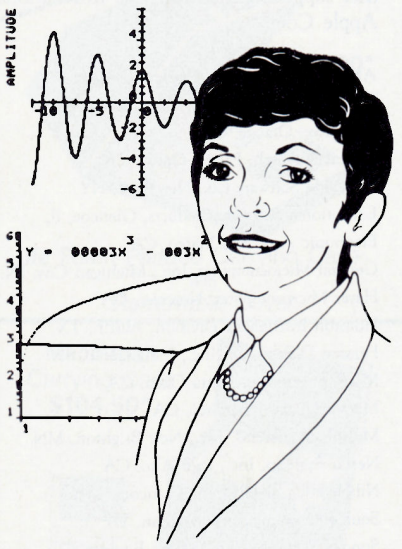

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Figure continued.

```
          VERY.SHORT       BAS        1  <NO DATE>          18-JUL-83 15:13
          ONERR.DEMO       BAS        1  <NO DATE>          18-JUL-83 15:14
          PART1            BAS        1  29-AUG-83 16:54    18-JUL-83 15:14
          PART2            BAS        1  <NO DATE>          18-JUL-83 15:14
          E.S.P.           BAS        3  <NO DATE>          18-JUL-83 15:14
          LISTSELF         BAS        1  29-AUG-83 17:02    18-JUL-83 15:15
          MAKE.FRUIT       BAS        1  29-AUG-83 17:09    18-JUL-83 15:15
          GET.FRUIT        BAS        1  29-AUG-83 17:13    18-JUL-83 15:15
          CONJUGATE        BAS        1  29-AUG-83 17:17    18-JUL-83 15:15
          CONJUGEATEN      BAS        1  29-AUG-83 17:23    18-JUL-83 15:15
          CONJUGEAT        BAS        1  <NO DATE>          18-JUL-83 15:16
          USE.SUB          BAS        1  29-AUG-83 17:25    18-JUL-83 15:16
          MAKE.TEXT        BAS        3  29-AUG-83 17:26    18-JUL-83 15:16
          GET.TEXT         BAS        1  29-AUG-83 17:28    18-JUL-83 15:16
          ADDRESS          BAS        4  29-AUG-83 17:31    18-JUL-83 15:17
          MAKE.BLACK.BOOK  BAS        1  29-AUG-83 17:34    18-JUL-83 15:17
          EXEC.DEMO        BAS        6  29-AUG-83 17:39    18-JUL-83 15:17
          NEW.PROGRAM      BAS        1  29-AUG-83 17:40    18-JUL-83 15:17
          AWAY             BAS        1  19-MAR-83 13:12    18-JUL-83 15:18
          MAKE.DOIT        BAS        1  29-AUG-83 17:42    18-JUL-83 15:18
          DOIT.EXEC        TXT        1  29-AUG-83 17:42    18-JUL-83 15:18
          POKER            BAS        1  29-AUG-83 17:43    18-JUL-83 15:18
          POKER.EXEC       TXT        1  29-AUG-83 17:43    29-AUG-83 17:43
          SHOWOFF.EXEC     TXT        3  29-AUG-83 17:39    18-JUL-83 15:19

        END OF FILE.
        ************************************************************
        >PATHNAME: /EXAMPLES

         DATA             DIR        1  29-AUG-83 18:07   28-MAR-83  0:00
        ************************************************************
          >PATHNAME: /EXAMPLES/DATA
          DATA
           NAME            TYPE   BLOCKS   MODIFIED          CREATED

           FOUR.FRUITS      TXT         1  29-AUG-83 17:11   18-JUL-83 15:20
           VERB.LIST        TXT         1  29-AUG-83 17:17   18-JUL-83 15:20
           TEXT             TXT         1  29-AUG-83 17:27   18-JUL-83 15:20
           BLACK.BOOK       TXT         3  29-AUG-83 17:34   18-JUL-83 15:20
           PICTURE          BIN        17  18-MAR-83  0:00   18-JUL-83 15:21
           LISTFILE         TXT         1  29-AUG-83 17:02   29-AUG-83 17:02
           POKER.EXEC       TXT         1  29-AUG-83 17:28   29-AUG-83 17:28
           SHOWOFF.EXEC     TXT         1  29-AUG-83 17:29   29-AUG-83 17:29

        END OF FILE.
        ************************************************************
        >PATHNAME: /EXAMPLES

         EXTRAS           DIR        1  29-AUG-83 17:53   28-MAR-83  0:00
        ************************************************************
          >PATHNAME: /EXAMPLES/EXTRAS
          EXTRAS
           NAME            TYPE   BLOCKS   MODIFIED          CREATED

           TIME             BAS         7  28-MAR-83 14:32   18-JUL-83 15:21
           READ.DIRECTORY   BAS         1  29-AUG-83 17:53   18-JUL-83 15:21

        END OF FILE.
        ************************************************************
        >PATHNAME: /EXAMPLES

         POSTAGE.RATES   BAS        8  17-JUL-83  0:00  17-JUL-83  0:00

        BLOCKS FREE:  108      BLOCKS USED:  172      TOTAL BLOCKS:  280
```

End of figure.

sub-subdirectory filenames, four columns; and so on.

PROCAT customizes its listing to the width of your screen. If you're using an 80-column display, PROCAT will list the name, type, length, date modified, and date created for each file. For a 40-column display, it displays only the name, type, and length information. See **Figure 2** for an example of 80-column PROCAT output.

If you want to examine the contents of any single directory or subdirectory on the disk, simply type in that directory's full pathname at the NAME OF VOLUME? prompt. For example, to examine the contents of the PROGRAMS directory in **Figure 2**, type EXAMPLES/PROGRAMS at that prompt. PROCAT will output only the contents of that directory and any subdirectories it contains.

If you know a file exists on the disk but do not know its pathname, respond Y at the prompt SEEK PATHNAME FOR A SPECIFIC FILE? and enter the name of the file you are seeking at the next prompt. PROCAT will locate the required pathname and display the following message:

```
>>>GOT IT!<<<
THE PATHNAME FOR E.S.P.
IS
EXAMPLES/EXTRAS/E.S.P.
RUN THIS FILE NOW? (Y/N)
```

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Write to Viktor Rubenfeld at 4012 Highland Avenue, Manhattan Beach, CA 90266.

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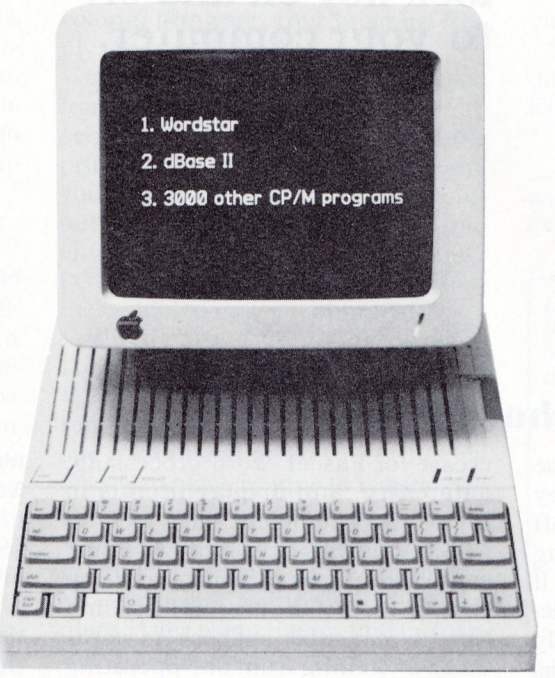
The Z-80c can use all 128K in the IIc, or 64K can be reserved as a RAM disk.



The Z-80c fits neatly inside the IIc. Installation is easy and only takes about 10 minutes (it just plugs in). After installation, your IIc will act and look just like other IIc's, only now you can run all that great CP/M software that others can only dream about.

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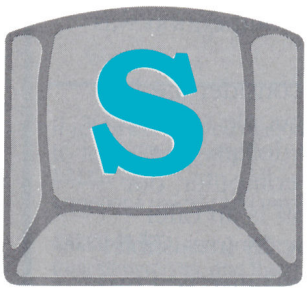

by Richard P. Winslow

Switching the caps-lock key on and off while programming or when going from Pascal to DOS is bothersome. If you operate a DOS/BASIC program development system and also frequently use other operating systems such as Pascal, you can inhibit the caps-lock hassle when you switch between systems by implementing the DOS/BASIC environment described in this article.

All BASIC programs using printers require some modifications for maximum effectiveness in this environment. However, since the implementing routines are standard, inserting them in your programs is an easy task and doesn't require re-invention for every program. Also, only those BASIC programs that output data to locations other than the screen will require modification. A little programming is not a high price to pay for a keyboard environment that is consistent from one operating system to another.

What I want is a system with a keyboard that gives me shifted upper/lowercase for Pascal, word processing, data entry, and display literals in BASIC, and automatic caps lock for DOS and BASIC keywords. Then the caps-lock key could remain in the up position most of the time, so I wouldn't have to remember to check its status when switching from one operating system to another.

The Restricted-Case Environment

The //e has an operating mode that provides this kind of operation when running DOS and entering BASIC programs. Apple refers to it as "restricted case" mode. To enter this mode, you must first activate the //e's built-in 80-column firmware, which is present whether or not the machine contains an 80-column card. If your //e doesn't have an 80-column card, you activate the firmware by typing POKE 49162,0 then PR#3. Typing PR#3 activates the firmware if you have an 80-column card.

After activating the firmware, invoke the restricted-case mode by pressing the escape key, then the R key. Nothing happens on the screen, but internally some gear shifting takes place. Now, with the caps-lock key *up*, type in the DOS command, CATALOG, and see the word "CATALOG" displayed in all caps.

Next try typing in a line of BASIC that contains a *display literal*—something between quotation marks—such as 10 PRINT "Hi Mom!". The BASIC keyword PRINT will appear in all caps without having to shift for it. Also notice that between the quotation marks the keyboard automatically switches into lowercase with an active shift key.

A further bonus from activating the 80-column firmware is a special "escape mode" cursor when you're using the escape and arrow (or I, J, K, M) keys to move the cursor around during program editing. This special cursor contains an inverse plus sign (+) while escape mode is active. Press the escape key once to see the new cursor, and again to return to the normal cursor.

Establishing the Operating Environment

Now that you know the //e is capable of the type of operation you want, all that remains is to make invoking re-

stricted mode automatic in a program. **Listing 1** is a short BASIC routine that serves this purpose. As shown, it assumes an 80-column card is installed. If your //e doesn't have an 80-column card, be sure to include POKE 49162,0 before issuing the PR#3.

A convenient way to use the routine to establish your programming environment is to include it as part of your hello program. Once the routine runs, the environment is set until the system is re-booted, you hit control-reset, you or your program issues some other PR# command (like PR#1 to turn on your printer), or the 80-column firmware is deactivated.

Programming Considerations

The routine shown in **Listing 1** is set up to enter and execute a short (9-byte) machine-language routine in page 3 of memory ($0300 hex, 768 decimal). The routine itself may be placed in any convenient location in the Apple's memory. All you need to do is change the 768 and 767 in the FOR statement and the subsequent CALL statement to reflect the new location. As an example, to locate the routine in page 40 of memory ($4000 hex, 16384 decimal) the FOR statement becomes FOR I = 16384 to 16383 + 9 and the CALL becomes CALL 16384.

If you decide to use your hello program to establish the restricted-case operating environment, you will want to preserve that environment as you run your various programs. Without incorporating some precautions, running a program that contains PR# commands will result in bizarre screen effects, especially if your machine has an 80-column card.

- **80-Column Programs.** Those programs that use both the printer and the screen will need some modifications at program entry, program exit, and whenever the program switches its output from screen to printer and back again.

Listing 2, the routine used at entry and exit, is similar to **Listing 1** with the addition of a PEEK statement to check if the 80-column firmware is active. If the answer is no, the routine turns it on and sets up the restricted-case environment as in **Listing 1**.

Having established the 80-column screen and restricted-case operation, issuing a PR#1 to access the printer without first deactivating the 80-column firmware will result in a "sprained" screen display. To deactivate the 80-column firmware, your program simply issues a PRINT CHR$(21).

Use the routine in **Listing 3** to switch from sending output to the screen to sending it to an Epson-compatible printer. When the printing is done and you wish to switch back to screen output, issue a PR#3 and CALL the machine-language routine previously POKEd into memory to re-establish the restricted-case environment.

When exiting the program, it's a good idea to use the PEEK in **Listing 2** to determine if the operating environment is still intact. If necessary, issue a PR#3 and again CALL the machine-language routine to re-establish the restricted-case environment.

- **40-Column Programs.** Those programs that run best with a 40-column screen can still operate in this environment. After using the routine in **Listing 2** at the start to check for, and if necessary establish, the 80-column restricted-case environment, your program should issue a CALL 52569 to switch from an 80-column display to a 40-column display. This CALL leaves all other operating parameters intact. You will also need to use this CALL when switching back from printer output to screen output within a program.
- **Programming Without an 80-Column Card.** Machines that don't have an 80-column card will use the same programming considerations just discussed, with the requirement that the POKE 49162,0 be used just before issuing any PR#3 commands. Programming on these machines doesn't require the CALL 52569 to enable the 40-column display.

Using a hello program that establishes an 80-column environment and then running some system software supplied by Apple such as Master Create or FID without first manually switching to a 40-column screen produces some hard-to-read displays. To manually change from an 80-column display to a 40-column display, press the escape key followed by the 4 key. Pressing escape then 8 returns your display to 80 columns. Neither of these escape sequences affects the restricted-case environment.

Now you are set to try these procedures out on your printer. The caps lock is a problem no more. ■

Write to Richard Winslow at Hall's Ranch Rt., Box 8455, Wheatland, WY 82201.

Listing 1. *This BASIC routine invokes the restricted-case mode. Line numbers will depend on where you insert the routine in your program.*

```
PRINT CHR$(4);"PR#3"
FOR I = 768 TO 767 + 9
   READ J
   POKE I, J
NEXT I
DATA 173, 251, 4, 9, 128,
   141, 251, 4, 96
PRINT
CALL 768
```

Listing 2. *Listing 1 modified for programs that use both a printer and the screen.*

```
IF PEEK (-16353) < 128 THEN
   PRINT CHR$(4);"PR#3"
   FOR I = 768 TO 767 + 9
      READ J
      POKE I, J
   NEXT I
   DATA 173, 251, 4, 9, 128,
      141, 251, 4, 96
   PRINT
   CALL 768
```

Listing 3. *This routine switches from sending output to the screen to sending it to an Epson-compatible printer.*

```
PRINT CHR$(21)
PRINT CHR$(4);"PR#1"
PRINT CHR$(9);"80N"
```

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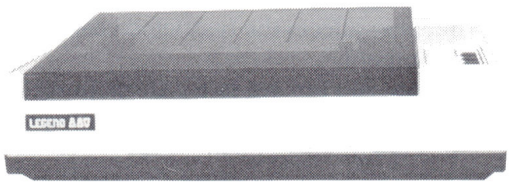

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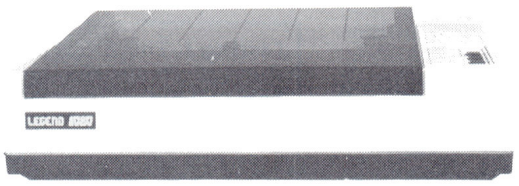

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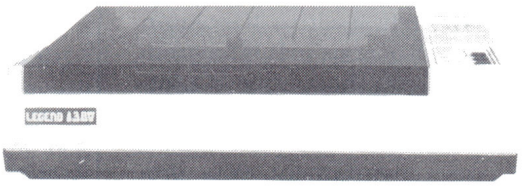

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Turn the Page

by Mark R. Craven

How many times have you read about text pages 1 and 2 and hi-res graphics pages 1 and 2? The hi-res pages you probably know. Text page 1 is for both text and lo-res graphics. But what about text page 2? All the *Applesoft Programmer's Reference Manual* says is, "It is not easily accessible to the user."

Well, that statement is not really true. It *is* quite accessible with only a couple of POKE statements. The two short Applesoft BASIC listings, FLIPFLOP.1 and FLIPFLOP.2 (**Listings 1** and **2**), demonstrate a screen-flipping technique that displays screens from both text pages.

Using the Listings

Page 2 is stationary text; that is, you may not write on that screen. It's strictly to be BLOADed from another program to display a large body of text occasionally for reference.

Refer to the **Table** for line descriptions of the listings. FLIPFLOP.1 creates a screen display on text page 1. That portion of memory where page 1 resides ($0400–$07FF or 1024–2047) is then saved as a binary file named INSTR. FLIPFLOP.2 then resets the Applesoft-program LOAD vectors so it loads itself above page 2. Finally, the INSTR file is loaded into the memory range of text page 2 ($0800–$0BFF or

Listing 1. *FLIPFLOP.1.*

```
10  TEXT : HOME
20  FOR I = 1 TO 3: READ B$(I): NEXT
30  FOR I = 1 TO 10: READ A$(I): NEXT
90 V = 4:X$ = "FIRST WE WILL CREATE THE INSTRUCTIONS": GOSUB 240
     :V = 6:X$ = "ON PAGE ONE OF TEXT, THEN WITH THE": GOSUB 240
     :V = 8:X$ = "STROKE OF A KEY, WE WILL SAVE PAGE ONE": GOSUB
     240
100 V = 10:X$ = "TO PAGE 2 ($0800-0BFF) FOR USE WITHIN": GOSUB 2
     40:V = 12:X$ = "THE NEXT PROGRAM, FLIPFLOP.2": GOSUB 240
110  VTAB 23: HTAB 1: PRINT "PRESS ANY KEY WHEN READY...";: GET
     X$: POKE  - 16368,0
120  HOME
130  FOR I = 1 TO 3: GOSUB 250: NEXT
140  FOR I = 1 TO 5: VTAB 6 + 2 * I: HTAB 1: PRINT A$(I): NEXT
150  FOR I = 1 TO 5: VTAB 6 + 2 * I: HTAB 21: PRINT A$(5 + I): NEXT

160  PRINT : PRINT "^L MEANS CONTROL-L   ^=CONTROL KEY"
170  VTAB 23: PRINT "PRESS ANY KEY TO CONTINUE...";: GET X$: POKE
      - 16368,0
180  PRINT  CHR$ (13);
190  PRINT  CHR$ (4);"BSAVE INSTR,A$400,L$400"
200  DATA "INSTRUCTION PAGE FOR","YOUR SPECIAL PROGRAM","(FOR DE
     MO PURPOSES ONLY)"
210  DATA  "^A=MOVE CURSOR UP","^B=MOVE CURSOR DOWN","^C=CLEAR S
     CREEN","^E=ENTER EDIT MODE","^F='FIND' MODE","^O=OPEN FILE"
     ,"^L=MOVE CURSOR LEFT","^R=MOVE CURSOR RIGHT","^S=NEXT SCRE
     EN","^T=TERMINATE SESSION"
220  HOME : PRINT "YOUR INSTRUCTION SCREEN IS NOW COMPLETE": PRINT
     : PRINT "NOW YOU MUST RUN THE SECOND PROGRAM": PRINT : PRINT
     "          FLIPFLOP.2"
230  VTAB 23: PRINT "END": END
240  VTAB V: PRINT X$: RETURN
250  VTAB I + 2: HTAB 20 -  LEN (B$(I)) / 2: PRINT B$(I): RETURN
```

Listing 2. *FLIPFLOP.2.*

```
10  REM  RESET PROGRAM POINTERS TO THE END OF PAGE 2 TEXT ($0C01
     --3073)
20  IF  PEEK (104) <  > 12 THEN  POKE 103,1: POKE 104,12: POKE 3
     072,0: PRINT  CHR$ (4);"RUN FLIP-FLOP.2"
30  PRINT  CHR$ (4);"BLOAD INSTR,A$800": REM  LOAD PAGE 2 INSTRU
     CTIONS INTO PAGE 2 TEXT MEMORY
40  TEXT : HOME
50  REM  SET UP SCREEN DISPLAY TEXT PAGE 1
60  FOR I = 1 TO 10: READ A$(I): NEXT
70  FOR I = 1 TO 10
80  VTAB 2 * I + 2: HTAB 10: PRINT A$(I)
90  NEXT
100  DATA  ,"THIS IS AN EXAMPLE","OF USING PAGE 2","AS AN INSTRU
     CTION PAGE","AND FLIP FLOPPING","BETWEEN THE TEXT SCREENS",
     "UNDER THE CONTROL","OF THE USER.","        ","ITS EASY!","P
     RESS ANY KEY TO CONTINUE..."
110  VTAB 24: HTAB 1: PRINT "<ESC> FOR INSTRUCTIONS...<Q> TO QUI
     T..";: GET X$: POKE  - 16368,0
120  IF X$ =  CHR$ (27) THEN 150
130  IF X$ = "Q" THEN 180
140  GOTO 110
150  POKE - 16299,0: REM SOFT SWITCH FOR PAGE 2
160  GET A$: POKE  - 16368,0
170  POKE  - 16300,0: GOTO 100: REM  SOFT SWITCH FOR PAGE 1
180  END
```

Table. Program line descriptions.

Line(s)	Description
FLIPFLOP.1	
90–110	List program information screen.
170	Ensures that the screen display doesn't scroll before disk write.
190	Saves page 1 text to binary file INSTR; sets parameters.
200–210	Create a display screen of commands.
FLIPFLOP.2	
10	Checks if program pointers are set above text page 2.
100–170	A looping routine that displays text pages 1 and 2.

2048–3071), making it a simple matter to flip between pages and display either one.

Type in the two listings as shown. If you need help, refer to "Beginner's Cookbook" on p. 110 of this magazine. Then RUN FLIPFLOP.1 (**Listing 1**). First you'll see a list of information about what the program will be doing. After you read the first screen, press any key to advance to the second. The screen of commands that follows is the display FLIPFLOP.1 creates. After the screen is full, the message PRESS ANY KEY TO CONTINUE appears. Obviously, the message regulates program flow, but it also serves as a warning that the screen save is about to take place.

Creating the demonstration instruction page is the sole function of FLIPFLOP.1. To create your own displays, you must use your own DATA statements or PRINT statements. When your screen is finished, save it by typing BSAVE INSTR,A$400,L$400. You can make as many screens as you want by BSAVEing under different names.

FLIPFLOP.2 (**Listing 2**) creates the page-flipping routine using INSTR. If the Applesoft-program LOAD vectors aren't set to the area above text page 2, they must be reset to load FLIPFLOP.2 at $0C01 (3073), instead of $0801 (2049), which happens to be the text page 2 area of memory. This is why your *Programmer's Manual* says that page 2 is not easily accessible. Page 2 is the normal Applesoft program loading address.

A looping routine enables you to display pages 1 and 2 of text. Note how fast the screen fills. You receive instant instructions at the press of a key.

This page-flipping routine lends a professional look to programs where large blocks of text need to be displayed. You can BLOAD a new instruction screen at any time, as long as you created the appropriate screens to load.

A Graphics Bonus

This technique will work with lo-res graphics as well as text. As noted on page 132 in your *Programmer's Manual*, the soft switch for graphics is POKE – 16304,0. Once you create your lo-res graphics, you need only BSAVE as before. Just be sure that, before you display the screen, the POKE – 16304,0 is executed along with a POKE – 16299,0, the page 2 soft switch, so you'll display lo-res graphics from page 2.■

Write to Mark R. Craven at 662 Raygene Way, North Salt Lake, UT 84054.

File Compactor

by Dale A. Etheridge

Have you ever noticed that the more you modify the files on a disk, the slower disk access becomes and the noisier your drive gets? This occurs whether you're writing programs or using a word processor.

The reason is a little quirk in the DOS 3.3 (and earlier) operating system. When you save a changed file, DOS starts putting it at the same location previously used by the file. If the file is now larger, however, it may not all fit if something else is stored immediately following the original file. In that case, sectors of the new version get scattered around wherever there's room. Then, when the file is retrieved, DOS has to look for it in two or more locations, and that takes time—more time than if the sectors formed one contiguous block. The more you work with a disk, the more segmented and scattered the files become and the harder your disk drive must work.

The FID program on your DOS Master Disk is the answer. With it you can compact all the files on a disk into contiguous blocks. While this can be done with a one-drive system, two drives make it easier, and the following instructions are based on two drives.

Here are the steps to follow:

1) Copy the disk to be compacted onto a "work disk" using COPY, COPYA, or any similar copy program. (The work disk should be in drive 2.) If your copy program is one that displays the copied sectors, you'll see this procedure's dramatic before-and-after effects.

2) Remove the original disk from drive 1 and replace it with a disk that contains the FID program from your System Master disk. Then, type BRUN FID,D1.

3) With your work disk in drive 2, use the FID catalog function to check that all the files are unlocked. If not, unlock them with the FID unlock function. To speed things up, use the equals sign (=) wildcard for the filename and no prompting.

4) With FID's delete function, remove all of the files on the work disk (using the wildcard again). This retains DOS on the disk, but clears the segmented files.

5) Place the original disk in drive 1, and use FID to copy the files from the original disk onto the work disk. Again, the wildcard name makes it easier.

6) You can now quit FID and return to your copy program to copy the work disk back over the original disk.

You now have all the files on your disk stored in contiguous blocks. File retrieval should be faster and quieter, and, as a bonus, you have the "work disk" as a back-up of your original.■

Address correspondence to Dale A. Etheridge at 5026 Roswell Street, Las Vegas, NV 89120.

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Put Your Apple on Time

Add time-dating capability to your Apple II with an internal clock. We compare three of the most popular units.

by Steven Williams

Apple Computer omitted an internal clock from its II series of computers, and for many applications such a device is, indeed, unnecessary. But a clock is essential to any software that handles chronological data. Ready access to time and date is necessary for business, bulletin board control, and building environment programs.

To meet these needs, a number of independent manufacturers market Apple II clocks. Most of these devices come in the form of a card that fits into one of the computer's peripheral slots. In this article I'll take a look at three of the most popular of these clocks: Timemaster II, Thunderclock Plus, and Apple Clock.

Timemaster II

Applied Engineering, a seasoned firm that devotes its resources solely to Apple peripherals, has marketed three clock cards since 1980. The versatile Timemaster II is the latest addition to the firm's clock showcase.

Timemaster II sports four modes of operation. Not only can it return the date and time in its own format, but it can simulate the formats of Apple Clock, Thunderclock, and the original Timemaster. Hence, Timemaster II may be used with software tailored for other clocks—programs such as ProDOS, which Apple designed with Thunderclock in mind. (According to Apple, future releases of ProDOS will support Timemaster II.)

Timemaster II's two DOS 3.3 disks contain routines in Applesoft BASIC, assembly language, and Pascal to locate the clock card's slot, setting, and reading. Demonstration programs such as a hi-res analog clock and a millisecond stopwatch are among the BASIC files that come on the disks. There is also a routine to interface the clock with CP/M.

Running a program called Install DOS Dater patches a DOS 3.3 disk to automatically stamp the date and time on the disk catalog whenever you SAVE, BSAVE, or RENAME files. While many Apple II users cherish Install DOS Dater, ProDOS owners need not use the utility. Since Timemaster II can simulate Thunderclock, it will date- and time-stamp a ProDOS file without a patch.

One of Timemaster II's most rewarding uses is to generate interrupts at established intervals. Periodic interrupts can do such things as check a modem for incoming calls or empty a buffer of data. The programmer may specify intervals of an hour, a minute, a second, or 1/1024 of a second by storing certain values in two control registers on the clock card.

A NiCad battery on the Timemaster II card manages the clock when the Apple is turned off or the power fails. Charging itself while the computer is on, the battery can maintain the clock for five to seven months before recharge is necessary.

Since Timemaster II simulates the Thunderclock and Apple Clock and functions under Applesoft BASIC, 6502 machine language, Pascal, and

Photography by Ed Judice

CP/M, it's compatible with almost all clock-dependent software. Also, the programmer friendliness of the clock's interrupt capability and supplementary routines should encourage software authors to incorporate it into commercial programs.

Thunderclock Plus

Thunderclock Plus, the only clock mentioned in the ProDOS manual, has won Apple Computer's endorsement as the official ProDOS timepiece. It assumes, without modifications, ProDOS date- and time-stamping duties.

The single Thunderclock Plus disk contains 24 machine-language and BASIC (both Integer and Applesoft) programs. One binary utility called Screen maintains a time readout. Another program lets you read the time without using the on-card firmware. A demonstration highlights the clock's salient features.

Thunderclock's outstanding 56-page, 8½-by-5½-inch *User's Guide* documents each program thoroughly. The "All About Interrupts" chapter, for instance, explains the manipulation of interrupts through CALL statements to a machine-language program. The documentation for Timemaster II and Apple Clock can't match the organization and thoroughness of Thunderclock's guide.

Thunderclock, unlike Timemaster II, lacks a program to date- and time-stamp DOS 3.3 files. Instead, Thunderware sells a DOS-Dater utility separately for $29.

Control characters, embedded within BASIC input statements, command the four different read modes. The clock card can return the date and time in numerics, ASCII a.m./p.m., and ASCII 24-hour formats. It can also simulate Apple Clock. Thunderclock can generate 64, 256, or 2048 interrupts per second, up to twice the rate of Timemaster II.

Two replaceable, size N alkaline batteries power the card. The batteries should last about four years regardless of how often you use the Apple.

One of Thunderclock's innovative applications is monitoring the BSR/X-10 Home Control System, a device that orchestrates remote control of lights and appliances linked to AC outlets. Thunderware markets a $49 interface to the BSR/X-10. Scheduler Software drives the BSR/X-10 in the "background," which slightly reduces primary use of the Apple.

Thunderclock's chief advantages are its fine documentation, BSR/X-10 compatibility, and sanctioned ProDOS kinship. Apple's endorsement practically ensures software for this clock.

Apple Clock

If you study similarities between clocks, you may wonder why Timemaster II and Thunderclock offer modes that emulate Mountain Computer's Apple Clock. Do competitors recognize this clock as the industry standard?

Apple Clock offers nothing beyond the expected basics—generation of the date and time. Predating ProDOS, Apple Clock isn't equipped to work with the new operating system.

The tutorial and design sections of the *Operating Manual*, like the "Theory of Operation" chapter, guide the beginner through the workings of the clock. A third of the 51-page documentation describes the Pascal routines provided on the accompanying disk. BASIC software, including a program called Set the Time, is also included.

It takes a surgeon's skill to change the interrupt frequency from one per second to any of 31 other settings, because you must operate on the card with a razor knife and soldering iron. Timemaster II and Thunderclock owners need only POKE certain values into RAM locations.

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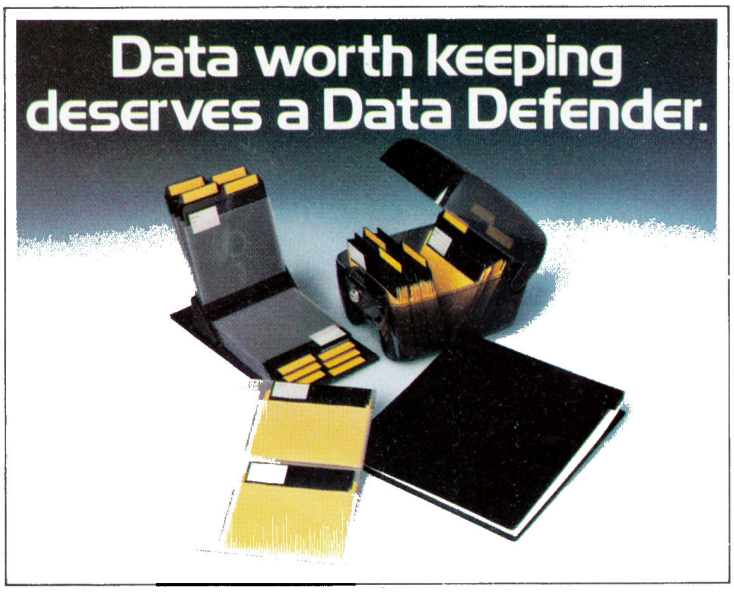

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computer is on. Keeping the Apple on for four days, which the manual assures won't damage the computer, fully charges the battery. You can attach an external battery to keep the clock battery charged if you anticipate not using the computer for more than a week.

You might expect Mountain Computer to counter the competitive prices quoted by other hardware makers. On the contrary, they sell their peripheral for more than double Timemaster II's price.

Despite its lack of innovative features, Apple Clock reliably supplies the essential chronological information—the date and time.

Time's up. Now you know what makes three popular clock cards tick. Refer to the **Table** to see how each stands up against the other. ■

Write to Steven Williams at Melrose Drive, Chester, NJ 07930.

Table. *Clock comparison chart.*

	Apple Clock	Thunderclock Plus*	Timemaster II
Emulation Mode	None	Apple Clock	Apple Clock, Thunderclock
Date/Time Stamping	None	Stamps ProDOS; software stamps DOS 3.3, $29 extra	Stamps ProDOS in Thunderclock mode; software included stamps DOS 3.3
Interrupts	31 settings from 0.1ms to 3.3×10^7ms	64, 256, or 2048 per second	Once per hour, minute, second, or 1/1024 second
Compatibility	Integer and Applesoft BASIC, Binary, Pascal	Integer and Applesoft BASIC, Binary, Pascal	Integer and Applesoft BASIC, Binary, Pascal, CP/M
Power Source	NiCad self-rechargeable battery	Two size N alkaline batteries	NiCad self-rechargeable battery

*BSR/X-10 interface, $49 extra

Product Information

Apple Clock
Mountain Computer
300 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6650
$280

Thunderclock Plus
Thunderware
P.O. Box 13322
Oakland, CA 94661
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Using ProDOS Part 2

Menu Magic

by Lee Swoboda

Harness the power of Apple's new operating system through its menu-driven utility programs.

"Using ProDOS" is a six-part hands-on tutorial describing the use of ProDOS, Apple's newest disk operating system for the II family. In February, we examined the file structure of ProDOS. This month we'll start using ProDOS utilities (special-purpose programs) from the built-in menus.

ProDOS comes in two flavors. You get Version 1.0.1 when you buy a Disk II or a DuoDisk drive. It is found on the ProDOS User's Disk that comes bundled with the hardware. Version 1.0.2 is sold with Apple //c's. It comes on the disk called System Utilities. The differences between ProDOS 1.0.1 and 1.0.2 lie in the way you access the ProDOS utility programs. For the most part, however, they do not differ in the operations they perform.

In the discussion that follows, Version 1.0.1 will be synonymous with the User's Disk, Version 1.0.2 will be synonymous with the System Utilities disk, and the master disk will refer to both.

You boot ProDOS using the same procedure used to boot DOS 3.3. If your computer is off, put the master disk into drive 1 (the internal drive on the //c) and turn the computer on. If it already is on, place the disk in drive 1, type PR#6, and hit the return key. Depending on the version of ProDOS you have, the computer will display either the menu shown in **Figure 1** or that shown in **Figure 2**.

The ProDOS Main Menu

DOS 3.3 starts you off with a "hello" program; so does ProDOS. However, unlike DOS 3.3, which allows you to name the hello program, the initial ProDOS program is always called Startup. With your master disk, Startup loads the utility programs and then displays the main menu. This menu enables you to select ProDOS utility functions without having to know the ProDOS commands.

Copying Your Master Disk

The first thing you should do is copy your master disk. Like the DOS 3.3 COPYA utility, the ProDOS copy utility formats your disk automatically;

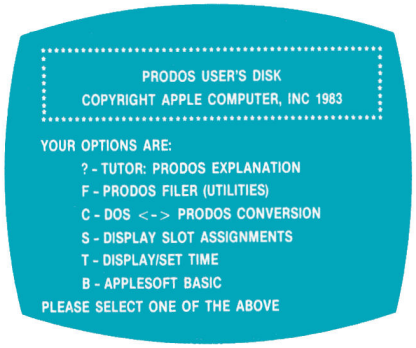

Figure 1. *User's Disk main menu.*

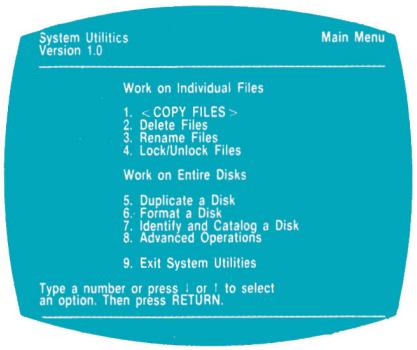

Figure 2. *System Utilities main menu.*

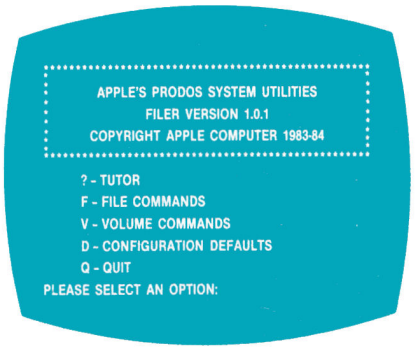

Figure 3. *User's Disk "Filer" menu.*

you don't need a formatted disk.

Here's the technique for Disk II and DuoDisk owners. (//c owners should skip to the section headed "Copying the System Utilities Disk.")

1) Insert the ProDOS User's Disk in drive 1 and start the system either by turning the computer on or by typing PR#6 and pressing the return key. The computer will display the main menu, shown in **Figure 1**, on the video screen.
2) From the main menu type F in upper- or lowercase to select the "Filer" utilities. The computer will display the "Filer" menu shown in **Figure 3**.
3) From the "Filer" menu, type V to select the "Volume" utilities. The computer will display the "Volume" menu shown in **Figure 4**.
4) From the "Volume" menu, type C to select the "Copy" utility. The computer will display the menu shown in **Figure 5**.
5) If you have two disk drives, place a blank disk in drive 2. Respond to the questions in the "Copy" menu by telling the computer to "Copy the volume in Slot 6, Drive 1 to the volume in Slot 6, Drive 2." Because these are the default values, you don't have to type the numbers; just press return and the computer will type the numbers for you.
6) If you have one disk drive, type in the numbers 6, 1, 6, and 1. Don't worry, the computer will tell you when to switch disks. The first three numbers are default values, so just press return to accept them. Type the final 1 before pressing return.
7) The "Copy" menu also allows you to specify a name for the new volume. Because you are making an exact copy of the User's Disk, simply press return. The computer will give the same name to the copy and display it in the screen area after the prompt "New Volume Name."
8) Press return again to accept the default name and start copying. The computer will first indicate that it is "Formatting" the blank disk. Then it will indicate that it is repeatedly "Reading" and "Writing" pieces of files from the old to the new disk. The in-use lights on the two drives will blink on and off accordingly. When it is done, the computer will return you to the "Copy" menu. For those with one disk drive, the computer will tell you when to switch disks.
9) Press the escape key twice to return to the "Filer" menu.
10) From the "Filer" menu, type Q to exit the menu. The computer will display the "Quit" menu and ask which program you want to load when you quit. It will suggest "BASIC.SYSTEM," which is the ProDOS-BASIC link.
11) Press the return key to accept the default. The computer will restart ProDOS and redisplay the User's Disk main menu. You have finished copying the disk.

Copying the System Utilities Disk

If you are an Apple //c owner, you employ a different method to copy your master disk.

1) Boot the System Utilities disk and wait until the menu shown in **Figure 2** appears.
2) Select the "Duplicate a Disk" option by typing 5 and hitting the return key.
3) From the next menu, hit the return key to choose the built-in drive as the location of your source disk.
4) From the next menu, hit return if you have one disk drive, type 2 and hit return if you have an external drive.
5) Make sure that System Utilities is in the internal drive and hit return.
6) If you have two drives, put a blank disk into the external one. If you have only one drive, be sure to follow the prompts that tell you when to insert the blank disk (the destination disk) and when to put System Utilities (the source disk) into the drive. When you reach the menu shown in **Figure 6**, select the default volume name "/UTILITIES" by hitting the return key.
7) The computer will now format the blank disk and copy the contents of the System Utilities disk onto it. Owners of one-drive systems will have to do a lot of disk swapping, as directed by the computer.
8) When the "Duplicating. . .Done!" message appears, hit the escape key to get back to the main menu.

Now that you have a copy of your master disk, whether it is Version 1.0.1 or 1.0.2, label it and store the original in a safe place. Use the copy from now on.

Formatting a Disk

When you buy disks they are blank, but your Apple II can't use a blank disk. It must store information in a specific pattern on the disk so it knows where to find the information later. Therefore, before you can start to store information on a disk, you must *format* (initialize) it—that is, record a magnetic roadmap on the disk for the computer to follow.

In DOS 3.3, the INIT command formats the disk, but ProDOS doesn't have an INIT command (we will see why later in this series). Instead, your master disk contains a utility to format a blank disk.

It's good practice to format all the disks in a box as soon as you open it. That way you won't be caught in the middle of some important program without a formatted disk and without a way to create one.

To learn how to format a ProDOS disk, refer to "Beginner's Cookbook" on pages 110–111 of this month's *inCider*. It will tell you all you need to know.

ProDOS eases formatting by providing menus for you to follow, but the procedure is still not simple and not one you'll want to do often. The great-

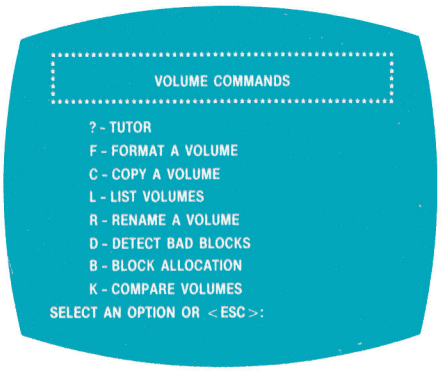

Figure 4. *User's Disk "Volume" menu.*

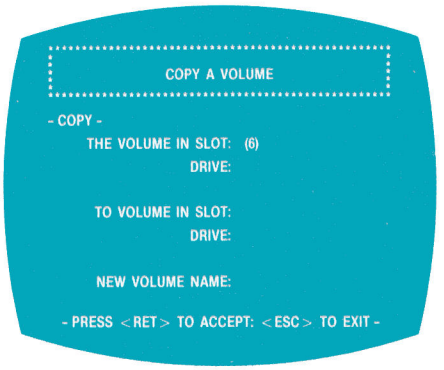

Figure 5. *User's Disk "Copy Volume" menu.*

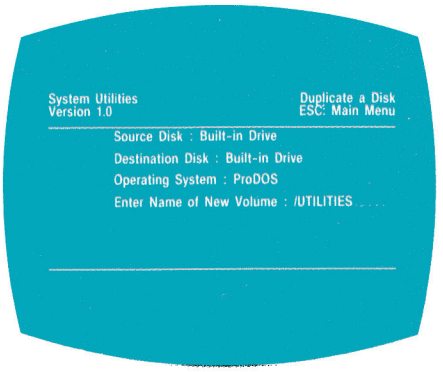

Figure 6. *System Utilities "Duplication" menu.*

er difficulty of formatting disks in ProDOS (compared to DOS 3.3) makes it all the more important that you keep several formatted disks available.

Other Volume Utilities

Formatting and copying are ProDOS volume (disk) utilities; there are other such utilities as well. Other Version 1.0.1 volume options include the following:

- *List Volumes.* Press the L key to list the slot number, drive number and volume name of all disks currently available to the computer. ProDOS automatically finds disk drives and determines the names of the disks in each.
- *Rename a Volume.* Press the R key to display a menu for changing the name of a volume.
- *Detect Bad Blocks.* Press the D key to test the integrity of a disk. ProDOS will analyze each block on the disk and tell you which, if any, are "bad" (contain defects). If the disk is "good," the computer will display the message "0 BAD BLOCKS."
- *Block Allocation.* Press the B key to find the remaining capacity of a disk in any slot or drive. ProDOS will examine the directories on the disk you select to find the number of free (unused) and used blocks. As we will see in Part 4 of this series, the CAT and CATALOG commands also yield this information.
- *Compare Volumes.* Press the K key to make ProDOS compare two disks of your choice. ProDOS reads each block on each disk and compares them byte-by-byte to make doubly sure you have copied a disk correctly. If the two disks are identical, the computer will display the message "Compare Complete."

Additional Version 1.0.2 volume options are accessed by selecting number 8 from the main menu. The options are similar to those described for Version 1.0.1.

File Maintenance

When you format and copy an entire disk or use any of the utilities just listed, you work from a volume menu. Below the volume level lie subdirectories and files. ProDOS also allows you to manipulate these levels.

Version 1.0.1 File Commands

Go to the "Filer" menu again. Type F to select the "File Commands." The computer will display the menu shown in **Figure 7**. You may select one of the following options:

- *List ProDOS Directory.* Type L to list the files in a directory. The computer will ask for the pathname. If the User's Disk is still in drive 1, type /USERS.DISK and press return. The computer will list the User's Disk files on the video screen:

PRODOS
BASIC.SYSTEM
FILER
CONVERT
STARTUP
MOIRE
HYPNOSIS
ANIMALS

It will also list information about the files, but we will defer our discussion of this feature until Part 4.

- *Copy Files.* Type C to copy a file from one volume to another *or from one directory to another.* You must type the complete pathname of the source and destination files (and don't forget the leading slash!).
- *Delete Files.* Type D to delete a file from a directory. Once again, you will have to type the complete pathname of the file you want to delete. As with DOS 3.3, you cannot delete locked files (see "Alter Write Protection" below).
- *Compare Files.* Type K to compare two files byte-by-byte to make sure they match exactly. As with the "Compare" option in the "Volume Command" menu, you can use this utility to make sure you copied a file correctly.
- *Alter Write Protection.* Type A to lock unlocked files and vice versa.
- *Rename Files.* Type R to change the name of a file. The computer will ask you for the pathname under which the file now resides and the pathname under which you want it to reside. One caution here: You cannot rename a file from one directory or volume to another (you must use the "Copy File" option for that), so the volume name and subdirectory names must be the same in both pathnames.
- *Make Directory.* Type M to create a new subdirectory. The computer will ask you to type the pathname. Unless you type the full pathname, the computer will assume you want to create a new directory on the startup disk (in this case, the ProDOS User's Disk). For example, to create a new subdirectory named TEST on the User's Disk, you may merely type TEST and press return. The computer will assume you want the directory on the User's Disk. You could also type /USERS.DISK/TEST and press return.
- *Set Prefix.* Type P to set a prefix. The prefix "teaches" the computer part of a pathname for it to automatically use until you change the prefix.

Version 1.0.2 File Commands

//c owners can also copy, delete, rename, lock and unlock, and list files from the main menu. The "Set Prefix" and "Create a Subdirectory" options are accessed from the "Advanced Operations" item of the main menu.

Let's work through a sample exercise that uses some ProDOS file utili-

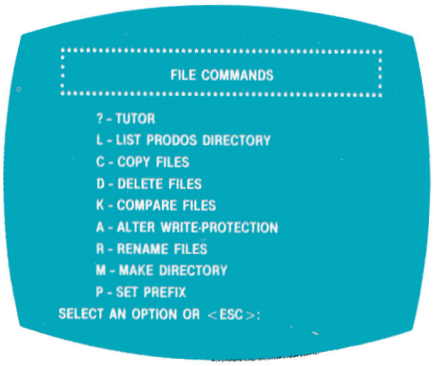

Figure 7. *User's Disk "File" menu.*

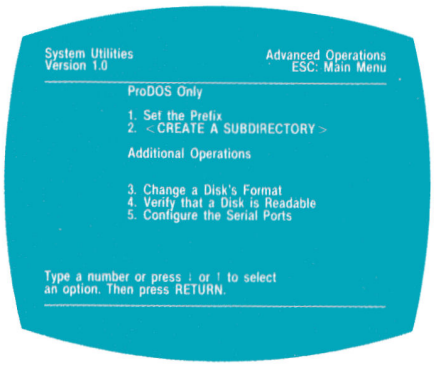

Figure 8. *System Utilities "Advanced Operations" menu.*

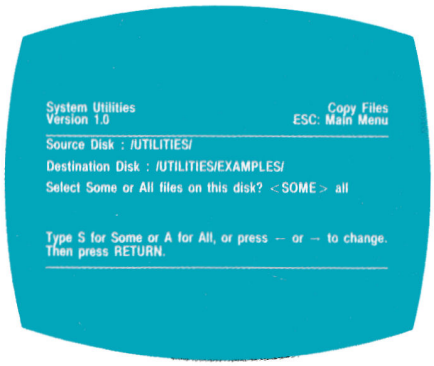

Figure 9. *System Utilities "File Copy" menu.*

ties from the menus, first using Version 1.0.1 and then Version 1.0.2.

The ProDOS User's Disk contains three Applesoft BASIC programs: MOIRE, HYPNOSIS, and ANIMALS. We'll create a subdirectory and move those programs into it.

Here's how with Version 1.0.1:

1) Boot your User's Disk (follow step 1 of the "Copying Your Master Disk" instructions.)
2) From the main menu, type F to select the "Filer" utilities. The computer will display the "Filer" menu (**Figure 3**).
3) From the "Filer" menu, type F again to select the "File" utilities. The computer will display the "File Commands" menu (**Figure 7**).
4) From the "File Commands" menu type M to select the "Make Directory" option. The computer will ask you for the pathname.
5) The menu header displays the current prefix, "/USERS.DISK/." Because we want to make a subdirectory in the same volume, we don't need to specify the prefix in the pathname. Type the subdirectory name EXAMPLES (without the leading slash, because that is part of the prefix already) and press return. The disk drive will turn on and off, then the computer will display the message "MAKE DIRECTORY COMPLETE," indicating the computer has added the new subdirectory /USERS .DISK/EXAMPLES on the volume USERS.DISK.
6) Press the escape key to return to the "File Commands" menu.
7) From the "File Commands" menu, type C to select the "Copy Files" option. The computer will display the "Copy Files" menu.
8) You must enter two pathnames: the pathname of the file you want to copy and the pathname of the file after you copy it. Note in the menu header that the prefix is still "/USERS.DISK/." For the first pathname, type MOIRE—the first file you will copy—and press return.
9) The computer will ask you to type the second pathname. Type EXAMPLES/MOIRE and press return twice. Drive 1 will come on, make some swooshing sounds, then go off. The computer will display the message "COPY COMPLETE." You have copied the file MOIRE from the volume /USERS .DISK/ to the subdirectory /USERS .DISK/EXAMPLES.
10) Repeat steps 8 and 9, first using HYPNOSIS and EXAMPLES/HYPNOSIS as the two pathnames, then ANIMALS and EXAMPLES/ANIMALS. You have copied all three files to the subdirectory EXAMPLES.
11) Press the escape key to return to the "File Commands" menu.
12) From the "File Commands" menu, type L to select the "List ProDOS Directory" option.
13) Type the pathname EXAMPLES (the prefix is still /USERS.DISK/). The computer will list the files in the subdirectory EXAMPLES: "MOIRE," "HYPNOSIS," and "ANIMALS."
14) Press the escape key to return to the "File Commands" menu.
15) Press escape again to return to the "Filer" menu.
16) Type Q to quit the "Filer" menu.
17) Press return to accept the computer's suggestion that you quit to "BASIC.SYSTEM." The computer will display the ProDOS User's Disk main menu.

See how simple ProDOS is to use from the built-in menus? You now have two copies of each of the three programs, one in the /USERS.DISK volume directory and one in the /USERS.DISK/EXAMPLES subdirectory. Try using the "Delete Files" option to delete the three files in the /USERS.DISK directory.

Creating a Subdirectory with Version 1.0.2

Creating a subdirectory with ProDOS 1.0.2 differs from the procedure described above. Follow these steps:

1) Select "Advanced Operations" from the main menu.
2) From the next menu, shown in **Figure 8**, select "Create a Subdirectory."
3) From the menu after that, hit return to select the built-in drive.
4) You now have to supply a name for your new subdirectory. Type in EXAMPLES and hit return.
5) When the subdirectory has been created, hit the escape key twice to get back to the main menu.
6) Copying files into a subdirectory is a bit tricky in Version 1.0.2. From the main menu, select the "Copy Files" option.
7) From the next menu, type in 3 and hit the return key.
8) Hit return again to indicate that "/UTILITIES" will be the source of the files to be copied.
9) From the next menu, hit 3 and the return key.
10) You now have to enter the pathname of the subdirectory you will be copying to. Since the subdirectory is on the /UTILITIES volume, type in EXAMPLES and hit return.
11) Your screen should look like **Figure 9**. Hit return to get a list of the files on /UTILITIES. Note that your new subdirectory is on the list.
12) Mark ProDOS as the file to be copied by following the instructions at the bottom of the screen, then hit return.
13) When the computer prompts you to insert the destination disk, simply hit the return key. You are not copying ProDOS onto a new disk, but rather into a subdirectory on the same disk.
14) When you get the "Copying ProDOS. . .Done!" message, hit the escape key to return to the main menu.

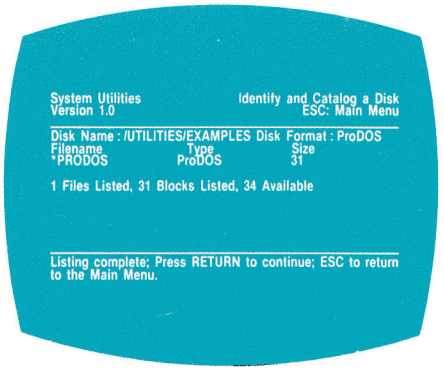

Figure 10. *System Utilities "Identify and Catalog" display.*

15) To verify that ProDOS has indeed been copied into the EXAMPLES subdirectory, hit 7 and the return key.
16) From the next menu, hit 3 and return.
17) Next, type in EXAMPLES and hit return.
18) Select the "Display" option by hitting return. You will see the screen shown in **Figure 10**, indicating that ProDOS has been copied into the EXAMPLES subdirectory. Hit the escape key to return to the main menu.

Converting DOS 3.3 Files

ProDOS and DOS 3.3 are incompatible. ProDOS includes a utility, however, that converts DOS 3.3 files to ProDOS disk format. The following instructions lead you step-by-step through the conversion. First, Version 1.0.1:

1) Go to the User's Disk main menu.
2) Type C to select the "DOS 3.3-ProDOS Conversion" utility. The computer will display the menu shown in **Figure 11**. The top line of the menu indicates the direction of the transfer. The default assumes a transfer from DOS 3.3 to ProDOS. The menu options allow you to:

- Change the direction of transfer (from ProDOS to DOS 3.3).
- Change the drive in which the DOS 3.3 disk is located.
- Reset the date.
- Set a ProDOS prefix.
- Start transferring files (assuming the above parameters are correct).

3) Type T to select the option to transfer files. The computer will ask you to type the name of the DOS 3.3 file you want to transfer.
4) Place the DOS 3.3 disk in drive 2 (if you have only one drive, wait for the computer to tell you when to switch disks), type the name of the file you want to transfer to ProDOS, and press return. If you want to transfer all the files on a DOS 3.3 disk to ProDOS, type an equals sign (=) and press return. ProDOS will tell you it is reading the file. After some disk-drive clunking, the computer will announce that it is done.
5) Press the escape key to return to the "Convert" menu.
6) Type Q to exit the "Convert" menu.
7) Press return to accept the computer's suggestion that you quit to "BASIC.SYSTEM." This completes the DOS 3.3-ProDOS file transfer.

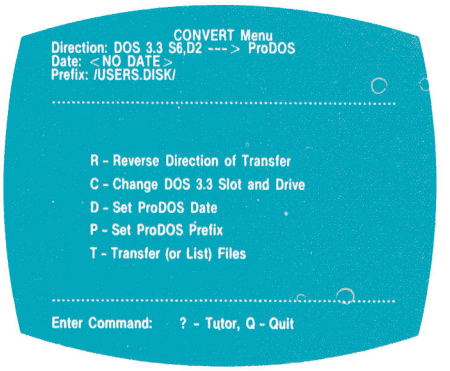

Figure 11. User's Disk "Conversion" menu.

You must exercise some caution using the DOS 3.3-ProDOS file transfer utility. First, the utility will not allow you to list the files on the DOS 3.3 disk. You must either remember the *exact* names of the DOS 3.3 files you want to transfer or use the equals sign to convert all DOS 3.3 files on the disk. If the DOS 3.3 disk is copy-protected, as many commercial disks are, you will not be able to convert the files.

In addition, the utility will not work equally well on all types of files. It must load the file to be transferred into the computer's memory before it can proceed. Applesoft programs and sequential text files transfer well. However, I have run into problems trying to transfer machine-language programs that occupy the same memory addresses as the Convert utility, because the utility protects itself from being destroyed. If you try such an "illegal" transfer, the computer will beep and stop the procedure. You cannot transfer random access text files.

Here is a summary of files you can and can't transfer:

Applesoft—yes
Sequential text—yes
Random access text—no
Binary—maybe

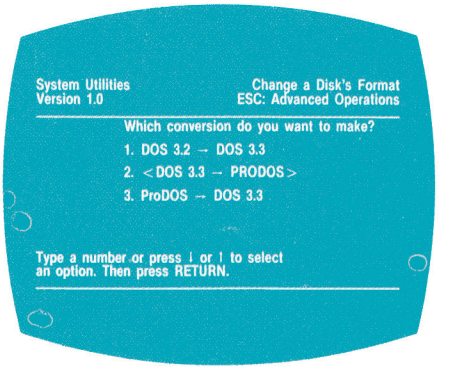

Figure 12. *System Utilities "Conversion" menu.*

Integer—yes, but will not execute in ProDOS

Version 1.0.2
DOS-ProDOS Conversion

Follow these steps:

1) You access the conversion utility from "Advanced Operations," so type an 8 from the main menu and hit the return key.
2) From the next menu, type 3 and hit return.
3) From the menu after that, shown in **Figure 12**, select the type of conversion you want to make. To be consistent with the Version 1.0.1 example, type in 2 and hit return. If you don't have any DOS 3.3 files, you can abandon this exercise by hitting the escape key twice. You can't convert files you don't have!
4) If you're still with me, hit the return key again to select the internal drive.
5) Hit return once more.
6) You will now be prompted to insert the source disk into the drive. Make sure that it is a DOS 3.3 disk. Hit return.
7) When prompted, insert a blank disk into the drive and accept the default volume name by hitting return. ProDOS will format this disk as part of the conversion process.
8) Follow the prompts and swap disks as indicated by the computer. When you see the "Update Complete" message at the bottom of the screen, hit the escape key twice to return to the main menu. If you have a second drive, you will, of course, be spared the agony of disk swapping.

The caveats concerning conversions under Version 1.0.1 apply to Version 1.0.2, with one exception. Since the 1.0.2 conversion utility is located on the auxiliary bank of RAM, most of

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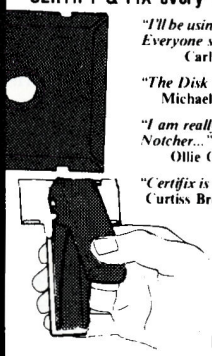

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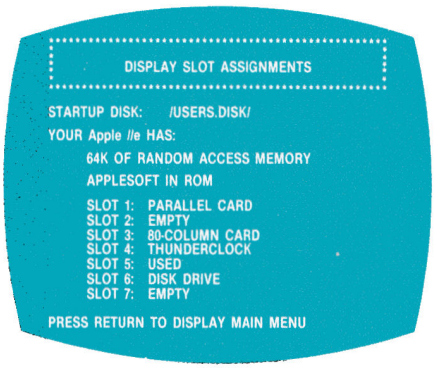

Figure 13. *User's Disk "Slot Assignments" display.*

your DOS 3.3 Binary files should convert to ProDOS without any trouble. Also, Version 1.0.2 converts a disk at a time, not a file at a time.

Other ProDOS Functions

The User's Disk (Version 1.0.1) main menu includes three other functions. They include:

- *Display Slot Assignments.* Type S to tell ProDOS to look at each slot in your Apple and display the kind of card it contains in the format of **Figure 13**. This function is a bonus from ProDOS' need to find that information for its own use. ProDOS dates files whenever they are created or modified. When you tell ProDOS to look for a pathname, it must know where to find disk drives. So Apple built programs into ProDOS that test your computer to discover what kind it is, how much memory it has, and where the clock card (if you have one) and disk drives are. This utility merely displays this information to you.
- *Display/Set Time.* Type T to display or set the system time. This is the information ProDOS uses to date files (more on file dating in Part 4). If you have a clock card that uses the Mountain Computer/Thunderclock format, ProDOS will poll the clock to find out the time. When you change the ProDOS time, you *do not* change the clock time. If you don't have a clock card, you can set the time and date manually using this option. If you don't set a time and date, the computer will default to the value "NO DATE."
- *Applesoft BASIC.* Type B to transfer control of the system from the ProDOS User's Disk to *ProDOS* BASIC, a slightly enhanced version of Applesoft BASIC. The ProDOS-Applesoft link will be the primary subject of Part 3 of this series.

The System Utilities disk (Version 1.0.2) has some special features of its own. The most important of these is accessed via the "Advanced Operations" option of the main menu. Version 1.0.2 lets you configure the serial ports (**Figure 14**) of the //c so you can hook up just about any standard serial device to your computer (given the proper cabling). See chapter 4 of the System Utilities manual for a detailed explanation of this option.

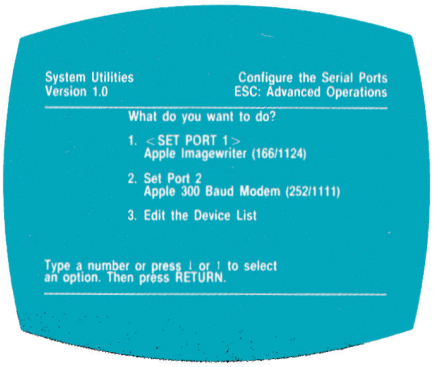

Figure 14. *System Utilities "Serial Port Configuration" menu.*

In Part 2, we have examined the use of ProDOS from the built-in utility menus. For the casual user, these menus will probably provide all the capability needed. But you can also use ProDOS without the menus. The commands aren't that complicated once you understand the concepts of ProDOS we have just discussed. In upcoming months, we'll study how ProDOS and Applesoft BASIC fit together, some improvements Apple has made to BASIC, and how to use ProDOS from BASIC. I hope you will return next time to learn more about the power of ProDOS. ■

Lee Swoboda can't answer all questions individually, but if the answer is not lengthy and you include a stamped, self-addressed envelope, he will do his best to respond. Answers to other questions will appear in future articles or in the Letters column of inCider. *You can write to Lee Swoboda c/o Padapple Computer Consulting, 1451 NE Paulson Road, Poulsbo, WA 98370.*

SCRG PRODUCTS FOR THE APPLE COMPUTER

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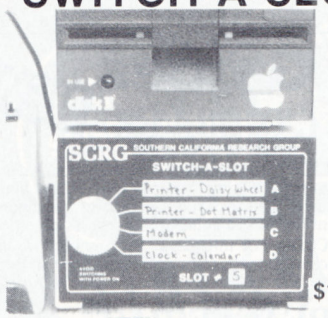

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The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

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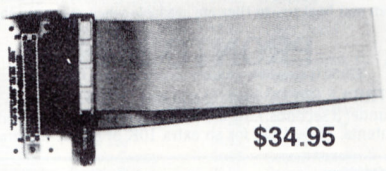

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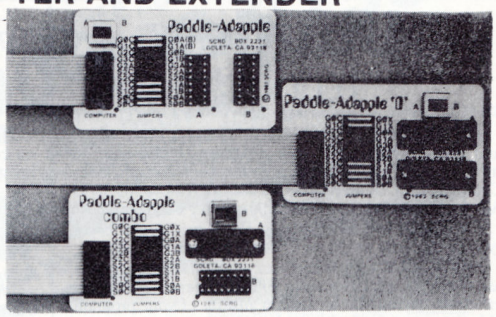

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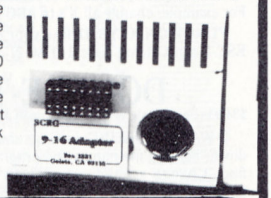

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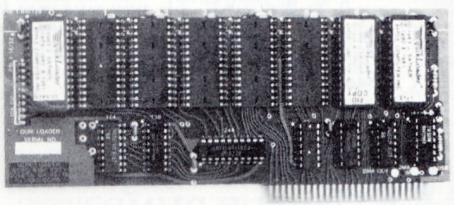

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To run a program from the quikLoader, bring up the quikLoader catalog (Q-reset), and the names of the programs will be displayed, along with an index letter. Pressing the index letter will instantly load and run the program.

Up to 23 programs on the quikLoader can be displayed on the screen at one time. If you have more programs, you may scroll through the catalog in either direction.

The quikLoader is **ideal** for applications requiring a dedicated computer. Your program can be automatically loaded and run at "power-up".

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Putting your own programs on the quikLoader 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.

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If you have a program that is valuable, it will become **more** valuable when it is instantly available to you. We are actively seeking licenses from software publishers to allow their popular programs to be made available for the quikLoader. Independent authors are encouraged to write programs suitable for the quikLoader. If the author wishes, we will market the program (with appropiate royalties), or the author can take care of all marketing. In either case, we will make known to our customers the availability of these programs.

We start your library of programs with the most popular utilities on the card, FID and COPYA. Now, if you have to copy a disk, you don't have to search for the master disk. You can start copying within 3 seconds after turning on the computer.

We are currently licensed to sell several very popular programs on EPROM. **DOUBLE—TAKE** by BEAGLE BROS., and **COPY][PLUS** by CENTRAL POINT SOFTWARE. The introductory price for DOUBLE—TAKE is $45.00. This includes the program exactly the same as you would buy it at your dealer for $34.95 (including disk and documentation), and a programmed 27128 EPROM (worth about $25.00). COPY][PLUS cost $65.00. This includes the original program (worth $39.95) and **two** programmed 27128's.

Other programs available directly from us or the publishers are, **BARKOVITCH I/O TRACER AND SINGLE STEP TRACE, MICRO/TYPOGRAPHER** from **TIDBIT SOFTWARE, ECHO** speech synthesizer software from **STREET ELECTRONICS,** and **MERLIN** assembler, from **ROGER WAGNER PUBLISHING.** More commercial programs are now in the works.

MEMORY CAPACITY

The quikLoader has eight sockets for EPROMs. These sockets can accommodate standard EPROMs from 2716 to 27512. These types can be freely intermixed. The memory capacity of the quikLoader depends on the EPROMS used. For example, the 2716 can hold 2K of programs, and the 27512 can hold 64K. (Frankly, the current costs of the 27512 is prohibitive,but should come down drastically in the next year.) At this writing, the least cost-per-bit is provided by the 2764, which can hold an 8K program. Using these "chips", the quikLoader becomes a 64K ROM. Using larger capacity EPROMs allows it to become a 128K, 256K, or even a 512K card. If more memory capacity is needed, the quikLoader operating system supports multiple quikLoaders.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 5% additional space for programs and data on your disks.

ABOUT THE DESIGNER

The quikLoader was designed by Jim Sather, author of UNDERSTANDING THE APPLE][(forward by Steve Wozniak), published by QUALITY SOFTWARE (21601 Marilla Street, Chatsworth, CA 91311 (818) 709-1721).

SYSTEM REQUIREMENTS

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

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.

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Beagle Bros Apple® Software Report

Ad Number 201 — *"All the News That Fits"* — *Spring 1985*

Utilities

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PROGRAM PACKER: D CODE squeezes every wasted and unused byte out of your programs to save valuable memory space and increase program speed and efficiency. Combine lines, shorten variables and/or remove REMarks. Also locate wasted code that can't possibly be executed.

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MORE: Set up de-bugging "breakpoints" so your program stops when you want. Search for strings and variables, *fast*—Almost any program can be searched in about 2 seconds!

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GPLE is Beagle Bros' "GLOBAL PROGRAM LINE EDITOR". It works like a word processor for your Applesoft program lines:

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X=3.14159 of your program's variables in the order
Y=255 used, with their current values

A$: 5 10 150 ← **CROSS-REFERENCE:** Alphabetizes every
X: 10 20 3000 variable your program uses, and displays
Y: 5 40 55 60 them with their line numbers

Plus **AUTO-LINE-NUMBER**, new improved Re-Number, Hex-Dec Converter, Program Stats, eliminate or re-define the cursor...

```
10 TEXT: ? CHR$(21): HOME:
   POKE 33,7: REM Replace the
   periods in line 20 with spaces.
20 PRINT ".@@@@@@.@@...
   @@@.O.O.@@..^..@
   (.~~~---.=====./.....\
   .ASCII..ANNIE"
30 C=C+0: N=N+1: POKE 1539,
   173+16*C: FOR X=1 TO 9:
   POKE 1542+X,N+X: S=PEEK
   (49193+X): NEXT
40 IF N<246 THEN 30
```

10 TEXT: HOME: FOR P=0 TO 255: VTAB 1: NORMAL: PRINT "POKE 243,";P: POKE 243,P: LIST: NEXT: REM *Try replacing the 243's with 50's*

BEAGLE BASIC™

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BETTER APPLE BASIC: Put Applesoft in RAM so you can change it. Adds new commands like *Else, Swap, Tone...*

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CHANGE DOS: 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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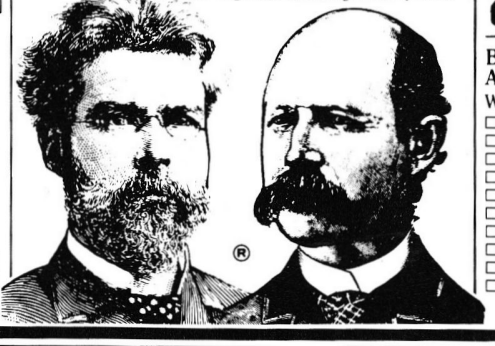

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```
1  POKE 50,229
10  PRINT
100  PRINT "TEST"
1000  NORMAL
10000  CALL 65338
```

And...

APPLE DISK ORGANIZER

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ORGANIZE YOUR DISK LIBRARY: Fatcat "reads" all of your DOS 3.3 and ProDOS disk catalogs into one or more "Master Catalog" for fast searching, sorting and printing. Update your library by simply reading new or altered disks.

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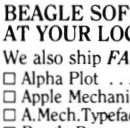

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WORLD'S FASTEST TYPIST

by Tom Benford

Come spend an entertaining and enlightening afternoon with the holder of the World's Fastest Typist title since 1975. Barbara Blackburn, an engaging, witty, and conversant person, will dazzle you with typing speeds sometimes in excess of 190 wpm and yet be surprisingly modest about this remarkable accomplishment.

This 64-year-old grandmother, convinced of the superiority of the Dvorak layout over the standard qwerty keyboard, has nothing but the highest praise for the //c, which she uses exclusively, and for the design team at Apple for being farsighted enough to include the Dvorak switch on the machine. Traveling with her //c, Barbara promotes the Dvorak keyboard and Scarborough's MasterType software.

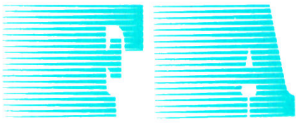
Photo by Tom Benford

When Barbara Blackburn shifts her //c into "Dvorak," watch out!

inCider: Barbara, how did you first come into contact with the Dvorak keyboard, and how long ago was that?

Blackburn: I learned it in 1938 at Huff Business College. The reason I learned the Dvorak layout was because I was a very poor typist in high school; to be perfectly honest, I hated the standard keyboard and I flunked typing! Well, I went to business college in Kansas City and when they saw

my typing grades, a Mrs. Huff asked if I wanted to learn the Dvorak keyboard, since Royal Typewriters was interested in promoting it at that time. Mrs. Huff suggested that I learn it, with the idea of becoming a demonstrator for the Royal/Dvorak machine.



It didn't turn out that way, though. Royal didn't go ahead with their plans because of the economic depression, fearing it might put too many people out of work. The amazing thing about it all is that today there are only two typewriters in the U.S. that can't be converted to the Dvorak configuration—the Brother and the Royal. But now with computers it's easy to make the conversion with programs like Scarborough's. They've been farsighted enough to include Dvorak in their MasterType program. This all makes it very easy to learn.

inCider: Do you feel that the Dvorak keyboard is really starting to catch on now?

Blackburn: Oh, yeah. The transition is slow, but a lot of companies are showing interest in it. Ford Motor Company is retraining a group of their people in Detroit on it. St. Vincent's Hospital in Portland is retraining their transcription department. The State of Oregon has quite a few people who know it. In fact, they ask on their application if you're a Dvorak typist. I think with the computers that are available now and the switchable keyboard you'll be seeing a lot more use of the Dvorak layout.

inCider: Have you used a computer with the Dvorak keyboard?

Blackburn: Oh, sure. I have an Apple //c that I got a while back, and I use it all the time.

inCider: How do you like the feel of the //c keyboard?

Blackburn: I like it, really, now that I've gotten used to it. Quite frankly, using the //c has ruined my desire to use a regular typewriter. I have a Smith-Corona typewriter set up in Dvorak layout, but I just don't use it any more since I got the Apple.

inCider: Who's your present employer?

Blackburn: State Farm Insurance Company in Salem—the Northwest Regional Office. I'm a word-processing specialist for them.

inCider: How does State Farm feel about the notoriety you've achieved?

Blackburn: Well, they've been quite surprised, but quite pleased as well, because it's brought notoriety to their entire word-processing center. In February of 1983 I was on Faces and Places, and that brought a TV crew in. Then there was the story about me in the *Christian Science Monitor*. The CBS Evening News picked up on it, and Charles Osgood came out. They spent six hours taping the center and me. It's been quite amazing to State Farm to a certain extent.

inCider: How did Klepper Associates and Scarborough Systems find out about you?

Blackburn: Well, there was an article in *USA Today* that mentioned both me and MasterType. I got a call from Sandy Bain, Scarborough's V.P. of Marketing, and here I am today. Even after all my years of experience, using the program has done me a lot of good, too. It's a fun program to use, and it's helped me increase my speed.

inCider: Is it hard to make the transition from the traditional qwerty layout to Dvorak?

Blackburn: No. Actually, it should take less than 40 hours to make the switch. Within six months' time your speed should exceed what you were doing on the qwerty layout by about 25 percent. Using MasterType will ease the transition and help you make those gains in speed. The program contains some excellent qwerty drills that I've used with the Dvorak setup, and it works out beautifully.

inCider: What is the principal difference between the qwerty and Dvorak layouts?

Blackburn: With Dvorak, all of the vowels are controlled by the left hand, while the most-used consonants are on the right. A Dvorak typist spends 70 percent of typing time on home row. Here's an example of the efficiency of the Dvorak layout: The fingers of a typist using the qwerty layout for eight hours will travel between 15 and 16 miles, while a Dvorak typist's fingers will only travel about a mile.

inCider: I understand you're in the *Guinness Book of World Records*. Is that correct, Barbara?

Blackburn: Yes, that's right. The first entry was in the 1975 Record Book, and I've held the title of World's Fastest Typist continuously since then. I'm listed as holding the speed typewriting records for both continuous and short-burst timings: 150 wpm for 50 minutes (37,500 keystrokes) and 170 wpm for four-minute bursts using the Dvorak keyboard. I'm probably a little faster than that now on the //c.

inCider: How did the Guinness people find out about you?

Blackburn: A friend of mine from Sacramento, Phil Davis, knew my typing abilities, and he's been a Dvorak enthusiast for years. I had done some timings in Toronto at the Canadian National Exhibition, and it was all documented. Phil had a friend at the Guinness Book, so he wrote to him about these speed tests and told him of my Dvorak typing skills. They, in turn, checked it out and found it to be true.

Well, Phil sent me a copy of the letter he wrote to Guinness, and I thought it was a bunch of baloney. I didn't give it another thought after that. Then, one night I came home and my son came running out and said, "Hey, Mom, what would you say if I told you that you're in the Guinness Book?" I remember that I was getting out of our Scout, and I told him, "I'd say you were nuts!" He replied, "Well, you are!" He opened up the book, showed it to me, and I was dumbfounded! Right about then, I decided that maybe Phil knew what he was talking about. That's how I got in the book, and I've been in it ever since.

inCider: Barbara, I've noticed that you go like a bat on some of these exercises, but you're slower on others. How come?

Blackburn: As I mentioned, I'm using the basic qwerty lessons with the Dvorak layout. Some letter combinations don't lend themselves to speed. Some of the words aren't "Dvorak-minded" as far as finger movements go—they're downright awkward. The combination of letters in "zigzag" doesn't work together well at all. The ability to intermix the exercises with either keyboard layout is one of the features that makes MasterType the best program available on the market, in my opinion.

inCider: Do you think we'll be seeing more Dvorak options on other computers?

Blackburn: Yes, without a doubt. Apple has taken the bold first step and others are sure to follow. There's a keyboard ROM available for converting other Apples to Dvorak, and the Macintosh is drawing lots of Dvorak attention as well. ■

Write to Tom Benford at P.O. Box 4125, Osborneville, NJ 08723.

History of the Dvorak Keyboard

The Sholes Universal Keyboard (more commonly referred to as the qwerty keyboard) was specifically designed to slow down typists. On the early manual typewriters, fast typing invariably made the keys jam at the platen area where they struck the ribbon. Awkward key placement, coupled with the heavy strokes required to make the keys hit the ribbon hard enough, effectively solved the key-clash problem.

And so it was until, in 1932, a group headed by Dr. Henry Sussallo started a project to study the learning and instruction of typing. Dr. August Dvorak, an associate professor at the University of Washington, was named director of the project. He studied films and notes made by Dr. Frank Gilbreth and his wife Lillian (co-authors of *Cheaper by the Dozen*) on champion typists.

Dvorak analyzed the physical activity of typing into nine components. On the basis of this analysis and a frequency study of the letters of the alphabet, he devised a more efficient keyboard layout in which the vowels and the most frequently used consonants are located in the home row. Other frequently used letters are closer to home row than those seldomly used. This layout was originally called the Dvorak Simplified Keyboard, but today it's more commonly known as the Dvorak Keyboard or Dvorak Layout. Dvorak was granted a patent for his Simplified Keyboard in 1936.

Through the years, resistance to this more efficient layout has been high for a number of reasons, the economic depression, World War II, and the set ways of most typists among them. Now, however, interest in the Dvorak Keyboard has been spurred by several computer and word-processor manufacturers, and the American National Standards Institute (ANSI) has recognized the Dvorak Keyboard as an alternative standard.

As of November 1984, there were 85,000 known users of the Dvorak Keyboard. Telephone directory assistance employs over 11,000 Dvorak terminals; governmental organizations and colleges in several states use the Dvorak Layout; and Blue Shield, Social Security, and the Ford Motor Company are considering its adoption. The Dvorak Layout is gaining momentum.□

Figure. *A comparison of the qwerty keyboard to the Dvorak Keyboard.*

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Diplomat
International Solutions
P.O. Box 2381
Saratoga, CA 95070
(408) 354-2988
//e
$148

This kit to convert the //e for double duty in either qwerty or Dvorak mode includes keycaps, a switch, and an adapter board. (You must replace two chips within the computer.)

Dvorak Overlays
Hooleon Company
Box 201
Cornville, AZ 86325
(602) 634-7517
//e, //c
$24.95

This peripheral is a high-quality overlay for Dvorak keyboards.

Hyper Typer
Standard Software
121 Southwest Salmon
Suite 1600
Portland, OR 97204
(503) 227-0008
II Plus, //e, //c
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This program teaches Dvorak through speed and repetition.

Learn to Type
Arrays, Inc./Continental Software
11203 South Hindry Avenue
Los Angeles, CA 90045
(800) 421-3930
II Plus, //e, //c
$49.95

One of the easiest Dvorak typing programs you can get.

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Scarborough Systems
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Tarrytown, NY 10591
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//c
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This action-packed game for basic and advanced typing practice features Dvorak finger positioning.

Smartkey II Plus
Software Research Technologies
3757 Wilshire Boulevard
Suite 211
Los Angeles, CA 90010
(213) 384-5430
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$89.95

For computers using CP/M and MS-DOS, this program redefines the keys on your keyboard.

Smith-Corona's Short Course for the American Simplified Keyboard (ASK) Typewriter
Dvorak International Federation
P.O. Box 128
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(802) 247-6020
$10.95

This typing manual (originally published by Smith-Corona) is based on lessons developed by Dr. Dvorak when he first designed the keyboard.

Typing Strategy
Behavioral Engineering
230 Mt. Herman Road
Suite 207
Scotts Valley, CA 95066
(408) 438-5649
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$39.95

This program is a typing method that uses the Dvorak keypad.

WizType
Sierra On-Line
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
II Plus, //e, //c
$34.95

This practice/game software teaches the Dvorak keyboard and tests typing skills.

The list of products and manufacturers jumping on the Dvorak bandwagon is growing daily. For up-to-the-minute information concerning anything Dvorak, contact Virginia de Ganahl Russell, president of the Dvorak International Federation, at the address above.

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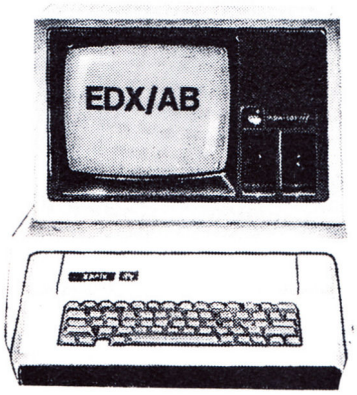

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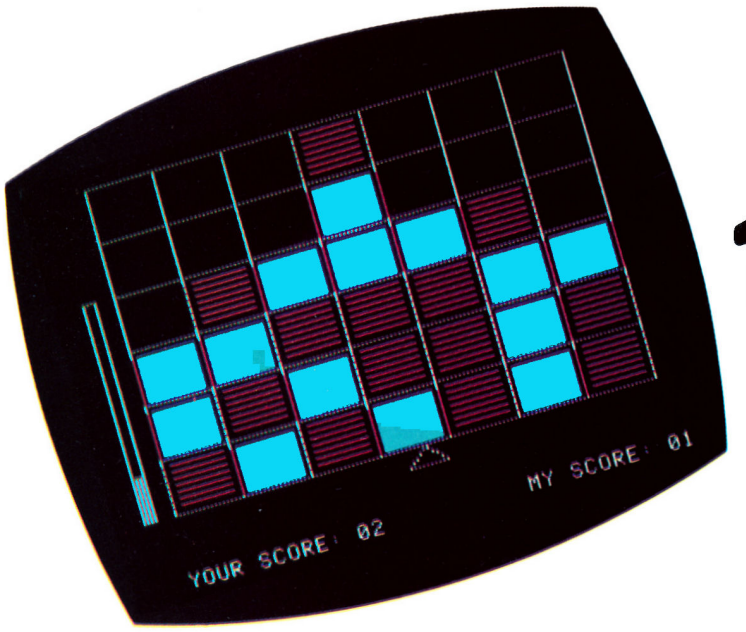


4 the Fun of It

Connect the boxes and beat the computer at its own game.

by Steven Rypkema

"It's too fast, I can't win," you cry, as you try to connect four blocks in the grid and prevent the computer from doing the same. The scene of the struggle is FOURFUN, an addictive game that will entertain you for a long time.

The goal is to beat the computer at building chains of four boxes horizontally, vertically, and diagonally. You and the computer each place one box with each turn. The game continues until the grid is completely filled, then you can press the escape key to start again.

When you run FOURFUN, you must first choose a difficulty level. Type your choice from 1 to 5 and press the return key. A six-row-by-seven-column grid appears on the screen immediately. As you play, the grid fills in with your lined (red on a color screen) and the computer's solid (blue) boxes.

See the photo above for a sample screen of a level 1 game. A pointer, the triangle at the bottom of the grid, indicates your location. Its initial position is in the middle, but the left- and right-arrow keys will move it. You can place boxes by column only. Boxes you add stack on top of previous ones to determine the row location. When you have chosen the column in which to place a box, drop it into position by pressing the space bar.

On the left side of the screen is a narrow rectangle—a time "thermometer." The maximum height of this timer varies, depending on your level of play. The timer is highest in level 1, to give you the most time to make a choice. If you fail to place your box before your time is up, the computer scores a point, but it's still your turn.

Your score increases by one point for each four boxes you connect. It's possible to score more than once with one placement. For example, if one box completes both a diagonal and a vertical row of four, you score twice. Or, if you've filled an entire horizontal row except for the middle field, and then you drop a box there, you score four points—for making four combinations of four boxes. Scores are displayed at the bottom of the screen at all times—your score at the left and the computer's at the right.

The Listings

Refer to "Beginner's Cookbook" on p. 110 if you need help in typing in and saving the listings. **Listing 1** is the main program, written in Applesoft BASIC. It takes care of all functions except determining the computer's move and checking scores. The machine-language program in **Listing 2** performs these latter functions. Because of machine-language speed, the computer needs virtually no time to formulate a good move, and scores are instantly updated and displayed. In addition, the game begins immediately after you've chosen your level of play. Save **Listing 2** by typing:

*BSAVE FOURFUN.B,A$1500,L$496

Figure 1. *Shows how the situation of the Photo is stored in memory.*

```
0300-    01 05 01 05 01 05 01
0308- 05 01 05 01 01 05 01 05
0310- 05 01 01 01 05 05 00 01
0318- 05 05 05 01 00 00 00 00
0320- 05 00 00 00 00 00 00 01
0328- 00 00 00
```

Figure 2. *The relationship between board positions and memory locations.*

$0324	$0325	$0326	$0327	$0328	$0329	$032A
$031D	$031E	$031F	$0320	$0321	$0322	$0323
$0316	$0317	$0318	$0319	$031A	$031B	$031C
$030F	$0310	$0311	$0312	$0313	$0314	$0315
$0308	$0309	$030A	$030B	$030C	$030D	$030E
$0301	$0302	$0303	$0304	$0305	$0306	$0307

Listing 1. *The main Applesoft FOURFUN listing.*

```
100  POKE 7,0
110 D$ =  CHR$ (4)
130  PRINT D$;"BLOAD FOURFUN.B"
160  HOME : VTAB (10): PRINT "          WHICH LEVEL DO
     YOU"
161  PRINT
162  PRINT "          THINK YOU CAN HANDLE?"
163  PRINT
164  INPUT "          (1-5)    ";LL
165  IF LL < 1 OR LL > 5 GOTO 164
168 LV = 20 * (6 - LL)
170  DIM C(7)
180  FOR I = 1 TO 43: POKE 767 + I,0: NEXT I
185  POKE 49168,0
190 COL = 5
200  HCOLOR= 1: HOME : HGR
210  FOR I = 0 TO 165 STEP 25
220  HPLOT 17,I TO 255,I
230  NEXT I
240  FOR I = 17 TO 255 STEP 34
250  HPLOT I,0 TO I,150
260  NEXT I
270  VTAB (23)
280  PRINT "  YOUR SCORE: 00           MY SCORE: 00"
290  FOR I = 1 TO 7
300  POKE 640 + I,0
310  NEXT I
315 TQ = 0
320 X = 140
321  HCOLOR= 0: FOR I = 2 TO 5: HPLOT I,150 TO I,150 -
     LV: NEXT I
322  HCOLOR= 1
325  HPLOT 1,150 TO 7,150 TO 7,149 - LV TO 1,150 - LV TO
     1,150
330 TR = 0
340  IF  PEEK (49152) = 136 THEN X = X - 35
342  IF  PEEK (49152) = 149 THEN X = X + 35
344  POKE 49168,0
346  IF X < 35 THEN X = 35
348  IF X > 245 THEN X = 245
350 PP = X
360  HCOLOR= 1
370  HPLOT X,151 TO (X + 10),159 TO  ABS (X - 10),159 TO
     X,151
380  IF  PEEK (49249) > 127 GOTO 500: REM DROP YOUR PI
     ECE
390 TR = TR + 4
400 YC = 149 -  INT (TR / 5)
410  HPLOT 1,YC TO 5,YC
420  IF YC > 150 - LV GOTO 430
422  POKE 249,1: CALL 6425
424  HCOLOR= 0
425  HPLOT X,151 TO (X + 10),159 TO  ABS (X - 10),159 TO
     X,151
426  HCOLOR= 1: GOTO 320
430  IF  PEEK (49152) = 155 GOTO 180
435  IF TQ > 139 GOTO 430
440  IF  PEEK (49152) < 136 GOTO 380
445 TR = TR + 6
446  HPLOT 1,YC - 1 TO 5,YC - 1
450  HCOLOR= 0
460  HPLOT X,151 TO (X + 10),159 TO  ABS (X - 10),159 TO
     X,151
470  IF  PEEK (7) > 6 THEN  POKE 7,0
480  POKE 7, PEEK (7) + 1
490  IF  PEEK (49152) <  > 160 GOTO 340
500  HCOLOR= 0: POKE 49168,0
510  HPLOT X,151 TO (X + 10),159 TO  ABS (X - 10),159 TO
     X,151
520 X =  INT ((X - 17) / 35) + 1
525  IF X = 0 THEN X = 1
530  POKE 6,X
540 Q =  PEEK (640 + X) + 1
542  POKE 640 + X,Q
550  IF  PEEK (640 + X) > 6 THEN  CALL 65338: GOTO 340

555 TQ = TQ + Q
560 P = 5
570  IF COL = 5 THEN P = 1
580  POKE 769 + 7 * ( PEEK (640 + X) - 1) + (X - 1),P
590 Y = 7 -  PEEK (640 + X)
600  HCOLOR= COL
610 T = 2 * (6 - COL) + 1
620  IF COL = 6 THEN COL = 5: GOTO 640
630 COL = 6
640  FOR I = 3 TO 23 STEP T
650  HPLOT ((X - 1) * 34 + 20),((Y - 1) * 25) + I TO (
     (X - 1) * 34 + 48),(Y - 1) * 25 + I
660  NEXT I
670  POKE 26,4 * P: CALL 6024
680  IF COL = 5 GOTO 320
690  CALL 5376
900 X =  PEEK (6)
910  GOTO 525
```

Listing 2. *FOURFUN's machine-language accessory.*

```
1500- 20 52 15 20 5D 15 D0 49
1508- 20 65 15 D0 44 20 6D 15
1510- F0 05 20 7D 15 F0 3A 20
1518- 75 15 F0 05 20 7D 15 F0
1520- 30 A9 00 85 FD E6 FD A5
1528- FD C9 07 F0 14 20 AA 15
1530- 20 7D 15 D0 F0 A6 06 BD
1538- 80 02 C9 06 10 E7 4C 51
1540- 15 A9 01 85 07 20 AA 15
1548- A6 06 BD 80 02 C9 06 10
1550- F4 60 A9 03 85 09 85 CF
1558- A9 00 85 08 60 A9 0F 85
1560- 1A 20 B9 15 60 A9 03 85
1568- 1A 20 B9 15 60 A9 0A 85
1570- 1A 20 B9 15 60 A9 02 85
1578- 1A 20 B9 15 60 A5 06 85
1580- FC AA BD 80 02 0A 0A 0A
1588- 38 FD 80 02 85 1B 8A 18
1590- 65 1B 85 CE A0 00 A9 05
1598- 91 CE 20 65 15 A0 00 98
15A0- 91 CE A6 06 A5 FC 85 06
15A8- 8A 60 A5 07 85 06 C9 07
15B0- D0 04 A9 00 85 07 E6 07
15B8- 60 A9 00 85 06 20 D8 15
15C0- A5 06 D0 13 20 3B 16 A5
15C8- 06 D0 0C 20 7A 16 A5 06
15D0- D0 05 20 12 17 A5 06 60
15D8- A9 FA 85 1C A9 04 85 F9
15E0- A5 1C 18 69 07 85 1C C9
15E8- 2B F0 50 A8 20 FA 15 C5
15F0- 1A F0 16 C6 F9 F0 E5 4C
15F8- EC 15 B1 08 18 C8 71 08
1600- C8 71 08 C8 71 08 88 88
1608- 60 A2 01 84 1B 88 B1 08
1610- F0 05 E8 C8 4C 0E 16 C8
1618- E0 04 F0 04 B1 08 F0 09
1620- 88 20 ED 16 F0 10 4C 03
1628- 17 20 ED 16 F0 03 4C 03
1630- 17 A4 19 4C 20 16 A4 1B
1638- 4C F3 15 A9 00 85 1D A9
1640- 03 85 F9 E6 1D A5 1D C9
1648- 08 F0 2F A8 20 61 16 A5
1650- 1B C5 1A F0 07 C6 F9 F0
1658- E6 4C 4C 16 A5 1D 85 06
1660- 60 A9 00 85 1B A2 04 A5
1668- 1B 18 71 06 85 1B 98 69
1670- 07 A8 CA D0 F2 38 E9 15
1678- A8 60 A9 00 85 1E A9 03
1680- 85 F9 E6 1E A5 1E C9 05
1688- D0 03 4C 12 17 A8 20 9D
1690- 16 A5 1B C5 1A F0 1F C6
1698- F9 F0 E3 D0 F1 A9 00 85
16A0- 1B A2 04 A5 1B 18 71 08
16A8- 85 1B 98 69 08 A8 CA D0
16B0- F2 38 E9 19 A8 60 84 1B
16B8- A2 01 98 38 E9 07 A8 B1
16C0- 08 F0 09 98 18 69 08 A8
16C8- E8 4C BF 16 84 FA E0 04
16D0- F0 09 98 18 69 08 A8 B1
16D8- 08 F0 0A A4 FA 20 ED 16
16E0- F0 1C 4C 03 17 20 ED 16
16E8- F0 F1 4C 03 17 84 19 98
16F0- 38 E9 07 F0 06 30 04 A8
16F8- B1 08 60 A9 01 60 A4 1B
1700- 4C 97 16 A5 19 38 E9 07
1708- F0 02 10 F9 18 69 07 85
1710- 06 60 A9 03 85 1F A9 03
1718- 85 F9 E6 1F A5 1F C9 08
1720- F0 65 A8 20 32 17 A5 1B
1728- C5 1A F0 1F C6 F9 F0 E6
1730- D0 F1 A9 00 85 1B A2 04
1738- A5 1B 18 71 08 85 1B 98
1740- 69 06 A8 CA D0 F2 38 E9
1748- 11 A8 60 84 1B A2 01 98
1750- 38 E9 07 A8 B1 08 F0 09
1758- 98 18 69 06 A8 E8 4C 54
1760- 17 84 FA E0 04 F0 09 98
1768- 18 69 06 A8 B1 08 F0 0A
1770- A4 FA 20 ED 16 F0 0B 4C
1778- 03 17 20 ED 16 F0 F1 4C
1780- 03 17 A4 1B 4C 2C 17 60
1788- A9 00 85 F9 A6 06 BC 80
1790- 02 84 FF 8A 88 F0 05 18
1798- 69 07 D0 F8 85 FE A6 06
17A0- BC 80 02 88 98 29 02 C9
17A8- 02 F0 15 98 F0 04 C9 05
17B0- D0 07 A9 01 85 FB 4C C4
17B8- 17 A9 02 85 FB 4C C4 17
17C0- A9 03 85 FB A5 FE 38 E9
17C8- 15 10 06 18 69 07 4C C9
17D0- 17 85 FC A9 07 85 FA 20
17D8- 33 19 A9 01 85 FC 85 FA
17E0- A5 06 C9 05 30 05 38 E9
17E8- 03 85 FC A5 06 C9 05 30
```

Listing continued.

Listing continued.

```
17F0- 05 A9 08 38 E5 06 85 FB
17F8- A5 FC A4 FF 88 F0 06 18
1800- 69 07 4C FC 17 85 FC 20
1808- 33 19 A9 00 85 1B A5 FE
1810- 38 E9 18 F0 02 10 09 E6
1818- 1B 18 69 08 F0 F9 30 F7
1820- 85 FC A9 08 85 FA A5 06
1828- 38 E5 FF C9 FE F0 04 C9
1830- 03 D0 11 A5 FC C9 07 D0
1838- 04 A9 0F 85 FC A9 01 85
1840- FB 4C 71 18 C9 FF F0 04
1848- C9 02 D0 0E A0 02 A5 1B
1850- C9 03 D0 01 88 84 FB 4C
1858- 71 18 C9 00 F0 04 C9 01
1860- D0 12 A9 03 85 FB A5 1B
1868- F0 07 A9 04 38 E5 1B 85
1870- FB 20 33 19 A9 06 85 FA
1878- A9 00 85 FD 85 1B A5 06
1880- 18 65 FF C9 0A D0 05 A9
1888- 11 4C A9 18 C9 09 D0 05
1890- A9 09 4C A9 18 C9 08 D0
1898- 05 A9 01 4C A9 18 C9 0B
18A0- 10 04 C9 05 10 05 4C F5
18A8- 18 85 FD A5 FE 38 E5 FD
18B0- E9 12 F0 02 10 09 E6 1B
18B8- 18 69 06 F0 F9 30 F7 AA
18C0- 18 65 FD 85 FC A9 01 85
18C8- FB E0 04 F0 25 E0 0B F0
18D0- 21 A4 1B E0 05 D0 07 C0
18D8- 03 F0 17 4C F0 18 E0 12
18E0- F0 10 E0 0C F0 0A C0 03
18E8- F0 08 E6 FB C0 02 F0 02
18F0- E6 FB 20 33 19 A5 F9 F0
18F8- 39 A5 1A C9 14 F0 1A 20
1900- 60 19 AD 5F 07 C9 B9 D0
1908- 08 A9 AF 8D 5F 07 EE 5E
1910- 07 EE 5F 07 C6 F9 D0 E7
1918- 60 20 60 19 AD 75 07 C9
1920- B9 D0 08 A9 AF 8D 75 07
1928- EE 74 07 EE 75 07 C6 F9
1930- D0 E7 60 A6 FC BD 00 03
1938- 85 FD A0 03 8A 18 65 FA
1940- AA BD 00 03 65 FD 85 FD
1948- 88 D0 F1 C5 1A D0 02 E6
1950- F9 C6 FB F0 0A A5 FC 18
1958- 65 FA 85 FC 4C 33 19 60
1960- A9 90 85 FC EA A9 00 85
1968- 07 A5 A0 85 FF A0 80 A6
1970- FC E8 D0 FD AD 30 C0 C8
1978- D0 F5 E6 FF A9 10 65 FC
1980- EA 85 FC EA A5 FF F0 E5
1988- A5 07 C9 0A 30 01 60 E6
```

End of listing.

I suggest that you start with the machine-language listing. Then, once you're sure there are no mistakes, enter the main listing.

Modifications

It's tough to beat the computer, especially at level 5. But, as you become more adept you'll eventually succeed. At that point you'll want to enhance the game. There are three ways to add new strategies to the program.

First, substituting lower numbers for 20 in line 168 decreases the maximum height of the thermometer at all levels. For example, changing 20 to 10 makes the time half as long as before.

The second modification challenges your reaction speed. Change line 320 to:

```
320 X = (INT(RND(1)) + 1) * 35
```

Now the pointer doesn't automatically return to the center location every time, but chooses a random position to make it even harder to beat the timer.

Finally, you can enhance the computer's level of performance. After you've played the game several times, you'll recognize certain situations where the computer makes unintelligent moves. By writing a routine, you can improve its "thinking."

In doing this, you need to know that the arrangement of boxes in the grid is stored in memory in a sequence of 42 elements. The status of each box is represented by a value of zero, one, or five—zero for unoccupied boxes, one for your boxes, and five for the computer's boxes. I chose these particular values because the sum of four elements will reveal what kind of boxes the elements represent. If the sum is seven, for instance, the group of four elements must include one 5, two 1's, and one 0. **Figure 1** shows the memory sequence for the grid in the photo, and **Figure 2** shows the memory locations.

When adding routines, don't alter certain memory locations—$280–$286, $301–$32A, and $06–$07—that form the link between the Applesoft and machine-language programs.

As a hypothetical situation, suppose there are three of your boxes in a column with at least one blank field above. You want to ensure that the computer will play the blank field. **Listing 3** is an assembly-language version of such a modification. It starts at location $1A00, selects the desired move, and stores the result (the number of the column) in location $06 (the storage location for the column selection). The BASIC line:

```
700 CALL 6656 : REM = $1A00
```

when inserted in **Listing 1** calls the routine.

Listing 4, a BASIC version of **Listing 3**, accomplishes the same goal when inserted in **Listing 1**, but is slower.■

Contact Steven Rypkema at MIU Box 333, Fairfield, IA 52556.

Listing 3. *An assembly-language routine to modify FOURFUN.*

```
INIT    LDA #$03      ;BASE ADDRESS
        STA $09       ;OF THE TABLE
        LDA #$00      ;SHOWN IN
        STA $08       ;FIGURE 2

        LDA #$03      ;THREE OF YOUR PIECES
        STA VALUE     ;PLUS ZERO MAKES THREE

VERT    LDA #$00      ;"COLUMN" CONTAINS
        STA COLUMN    'NUMBER OF COLUMN

NXTCOL  LDA #$03      ;THERE ARE THREE
        STA COUNT     ;POSSIBLE ROWS OF FOUR
        INC COLUMN    ;IN ONE COLUMN
        LDA COLUMN
        CMP #$08
        BEQ EXIT
        TAY
NCL1    JSR ADVERT    ;ADD FOUR VERTICAL ELEMENTS
        LDA SUM       ;COMPARE THE RESULT
        CMP VALUE     ;WITH THE VALUE 3
        BEQ FNDONE
        DEC COUNT
        BEQ NXTCOL
        JMP NCL1

FNDONE  LDA COLUMN    ;FOUND ONE, THEN STORE
        STA $06       ;THE COLUMN NUMBER IN $06
EXIT    RTS

ADVERT  LDA #$00
        STA SUM
        LDX #$04
ADV1    LDA SUM
        CLC
        ADC ($08),Y
        STA SUM
        TYA
        ADC #$07
        TAY
        DEX
        BNE ADV1
        SEC
        SBC #$15
        TAY
        RTS
```

Listing 4. *An Applesoft version of Listing 3.*

```
700 FOR I = 768 TO 774
701 FOR J = 1 TO 3
702 IF PEEK (I + J) + PEEK
    (I + J + 7) + PEEK (I
    + J + 14) + PEEK (I +
    J + 21) = 3 THEN POKE
    6,(I - 767)
703 NEXT J
704 NEXT I
```

The Simulation Game: Part 1

Learn how to create a computer simulation as you type in Idiot's Delight.

One of the most exciting aspects of the computer revolution is how computer simulations are changing the way we work and play. A simulation is an imitation or analogue that mimics an actual event or phenomenon.

The most common example of a computer simulation is the computer game. The game may be an aircraft flight simulator or an interplanetary battle against invading Ergsnooks. The program may be filled with action-packed graphics or simply contain narrative that describes conditions and events. It is still a simulation.

The electronic spreadsheet programs that are now so widely used are simulations of business functions. They handle "what if" questions that can be quantified numerically to forecast sales trends and the effects changes in the economic environment might have on those trends. Industrial simulations suggest outcomes of events such as a regulator failure in a power plant or the failure of a rocket engine to ignite on a space mission.

In this month's column, I'll describe some of the concepts involved in creating a computer simulation. As an example, I'll begin the design of a program that simulates a popular game of solitaire. The program will include creating and shuffling the deck, and laying out the cards, play-by-play, using an appropriate video-display subroutine.

Idiot's Delight

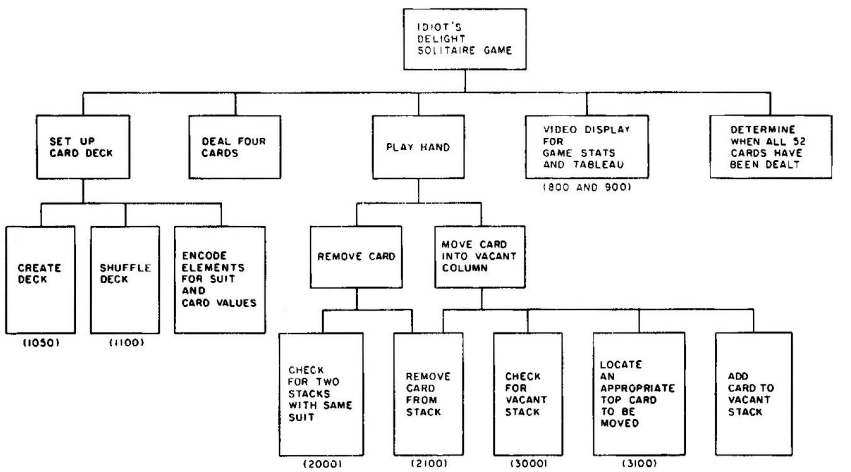
Before attempting to write a computer simulation, it's essential that you understand the actual event to be simulated. The solitaire game in this article is a game known variously as Idiot's Delight or Aces Up. If you aren't familiar with it, latch onto a deck of cards and play several rounds to see how it works.

Idiot's Delight begins by dealing four cards face-up in a horizontal row on a table. These four cards will form the base of four stacks of cards, called the "tableau." If any of the four cards on top of the stacks are in the same suit, only the card of that suit with the highest value is left on the tableau. Aces are high. The other card or cards of that suit are removed from the tableau and discarded.

This card-removal process is repeated with any newly revealed cards until there are no longer two top cards of the same suit. Then, if there are any vacant stacks (all cards having been removed), a top card from one of the remaining stacks may be moved into it. This transfer will reveal a new card that was under the card moved to the vacant stack. After a move to a vacant stack, play proceeds as before.

When no further cards can be removed or moved to vacant stacks, you deal another hand of four cards from

Figure 1. *Hierarchy diagram for Idiot's Delight, showing individual functional units that will eventually become program subroutines.*



by Dan Bishop

the shuffled deck, with these new cards placed on top of the old ones. The object of the game is to deal out the entire deck, with only the four aces remaining in the tableau.

Module Identification

There could be several justifications for creating a computer simulation of Idiot's Delight. For example, can the game ever be won? If so, on average, how many games must be played before winning? What is the average number of cards remaining in the tableau after X number of games have been played? What criterion should be used to determine which card to move into a vacant stack?

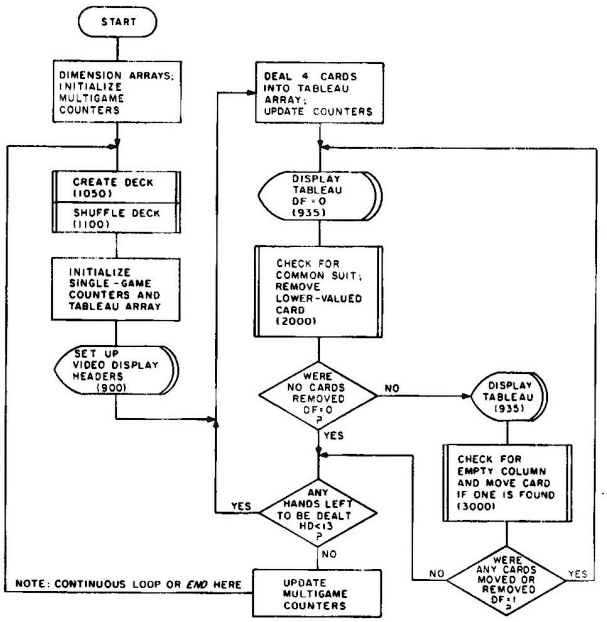
These questions could be answered by actually playing several games and accumulating statistics on them. For the last question, you would have to establish one criterion for card removal and play several games under that condition, then change the criterion and play more games, finally comparing the results. A computer makes this kind of project much more feasible because it is so fast. It can produce a statistically significant number of results in a reasonable amount of time. With Idiot's Delight, you could easily run through 1000 games for each case. Some kinds of simulations become possible *only* with a computer.

Program Design

The first step in writing any program is to identify the functional units, or modules, needed to accomplish the given task. **Figure 1** shows the hierarchy diagram of functions for Idiot's Delight. The modules needed must create the deck of cards, shuffle (or randomize) the deck, deal 13 hands of four cards each, check the tableaux for card removal, check them for vacant columns, and determine which card to move into a vacant column and then move it. In addition, a module is needed to display the tableaux on the screen so the progress of play can be observed.

Most of the modules shown in the hierarchy diagram will become subroutines in the program. Only two, the dealing of each hand and the determination of the end of the game, will be part of the main program. The majority of the main program will consist of subroutine calls to the various modules.

Figure 2. *Flowchart for the main program sequence in Idiot's Delight, Listing 1. Note the similarity between the sequence of instructions described in the flowchart and the description of the actual game presented in the article.*



One additional feature that doesn't appear in the hierarchy diagram will be needed—a flag variable that the main program can check after each subroutine runs to determine whether any cards were removed or moved. The flag variable I've used is DF. If it has a value of 1 after returning from a subroutine, a card move was made and the new tableau must be evaluated for possible moves before a new hand can be dealt. If DF has a value of zero, then no card moves were made during execution of the last subroutine and a new hand is in order.

Figure 2 shows the flowchart for the main program in **Listing 1**. Notice that the flowchart describes what is to be done and the sequence in which the steps are to be taken, but in most cases it does not detail the exact BASIC instructions. Note also the similarity between the flowchart and the game description in the text. Flowcharts can be as general or as detailed as you want to make them. Their importance lies in helping design the program and in helping others understand the design.

Creating Cards

A deck of cards consists of 52 unique items. Just how such items are represented in a computer program depends on the individual programmer's creativity and desires. A two-dimensional array of four columns (suits) and 13 rows would work as well as a one-dimensional array of 52 elements for Idiot's Delight. The arrays could be string or numeric. In the latter case, numeric values would have to be assigned to the jack, queen, king, and ace.

I've used a one-dimensional array, and the initial card deck, CD(1)–CD(52), is set up with 52 unique values by assigning the value of the respective subscript to each particular element—CD(1) = 1, CD(33) = 33, and CD(52) = 52, for example. **Listing 2** is a simple FOR. . .NEXT loop that handles this task. The first 13 elements are spades, elements 14–26 are hearts, 27–39 are clubs, and 40–52 are diamonds. The first element in each set is the ace, and the last is the king.

I chose to use numeric codes for values assigned to the shuffled-deck array, SD(1)–SD(52). The rightmost digit in each element is 1, 2, 3, or 4 and is assigned on the basis of which group of 13 the card came from. For instance, if the card selected for SD(11) comes from CD(39), then the rightmost digit in SD(11) will be 3 (corresponding to

Listing 1. *Main program sequence of Idiot's Delight. Note that most of the instructions are subroutine calls. The flag variable DF is set to 1 within a subroutine if a card move is made. The main program checks the value of DF after the subroutine is completed to determine whether to proceed or cycle back and repeat the tableau-evaluation process.*

```
1   REM  FOUR CARD SOLITAIRE
2   REM  PROGRAM BY DAN BISHOP / CUSTOM COMP
3   REM
4   REM  **** VARIABLES USED  ****
5   REM    GN-GAMES COMPLETED
6   REM    CN-CARDS LEFT,ALL GAMES
7   REM    BN-BEST GAME CARD COUNT
8   REM    GW-GAMES WON
9   REM    CR-CARDS REMOVED
10  REM    CT-CARDS LEFT ON TABLE
11  REM     CD-CARDS DEALT
12  REM     HD-HAND NUMBER
13  REM     CD()-UNSHUFFLED DECK
14  REM     SD()-SHUFFLED DECK
15  REM     PD()-TABLEAU ARRAY
16  REM    PE()-REARRANGED TABLEAU
17  REM          ARRAY FOR DISPLAY
18  REM    DF-FLAG FOR CARD MVMNT
19  REM    I,J,K,KK-LOOP COUNTERS
20  REM        & SUBSCRIPTS
95  REM
96  REM  ********************
97  REM    MAIN PROGRAM SEQUENCE
98  REM  ********************
99  REM
100  DIM CD(52),SD(52),PD(13,4),PE(13,4)
109  REM  INITIALIZE MULTIGAME VARIABLES
110 GN = 0:CN = 0:BN = 52:GW = 0
119  REM  CREATE NEW DECK
120  GOSUB 1050
129  REM  SHUFFLE DECK
130  GOSUB 1100
139  REM  INITIALIZE COUNTERS
140 CD = 0:CR = 0:CT = 0:HD = 0
149  REM  ZERO TABLEAU ARRAY
150  FOR I = 0 TO 13: FOR J = 1 TO 4:PD(I,J)
      = 0: NEXT J,I
159  REM  SETUP VIDEO DISPLAY
160  GOSUB 900
199  REM  PLAY NEXT HAND (HD)
200 HD = HD + 1
209  REM  DEAL FOUR CARDS
210  FOR J = 1 TO 4
220 CD = CD + 1
230 PD(HD,J) = SD(CD)
240 PD(0,J) = PD(0,J) + 1
250  NEXT J
260 CT = CT + 4
269  REM  DISPLAY TABLEAU
270  GOSUB 935
278  REM  CHECK FOR COMMON SUIT
279  REM  AND REMOVE LOWEST CARD
280 DF = 0: GOSUB 2000
290  IF DF = 0 THEN 330
299  REM  DISPLAY TABLEAU
300  GOSUB 935
308  REM  CHECK FOR VACANT STACK
309  REM  MOVE CARD IF VACANT
310  GOSUB 3000
318  REM  IF ANY CARDS MOVED,
319  REM  REPEAT CYCLE
320  GOTO 280
328  REM  IF ANY CARDS LEFT,
329  REM  DEAL ANOTHER HAND
330  IF HD < 13 THEN 200
339  REM  UPDATE MULTIGAME COUNTERS
340 GN = GN + 1:CN = CN + CT
350  IF CT < BN THEN BN = CT
360  IF CT = 4 THEN GW = GW + 1
369  REM  CYCLE FOR ANOTHER GAME
370  GOTO 120
371  REM  LEAVE LINE 370 OUT IF
372  REM  YOU WANT ONLY ONE GAME
380  END
```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Listing 2. *Subroutine that creates a sequential deck of cards. Values 1–13 are spades, 14–26 are hearts, 27–39 are clubs, and 40–52 are diamonds.*

```
1044  REM
1045  REM  ***************
1046  REM  SUBROUTINE TO CREATE
1047  REM  UNSHUFFLED DECK
1048  REM  ***************
1049  REM
1050  FOR I = 1 TO 52
1055 CD(I) = I
1060  NEXT I
1065  RETURN
```

clubs), because the value 39, from CD(39), belongs in the third group of 13 cards (27–39). The appropriate digit can be determined by dividing the integer value of the card number from CD by 13.1 and adding 1 to the result. For instance, INT(CD(II)/13.1)+1 would yield element II from the CD() array. Take any number between 1 and 52, insert it into this expression in place of CD(II), and you'll get values ranging between 1 and 4.

The leftmost digit(s) in each element in the shuffled-deck array represent the value of the card, ranging from 2 to 14. Since Idiot's Delight treats aces as high, any value of 1 is changed by the program to 14 so card-value comparisons can be straightforward.

In order to come up with four sets of figures ranging from 2 to 14, the program performs a *modulo* (remainder) function on the original card-deck values that ranged from 1 to 52. With the modulo function, only the remainder from a division operation is retained. For example, 7 divided by 5 is 1 with a remainder of 2, expressed in modulo arithmetic as 7 MODULO 5 = 2. Some BASICs have this function built in, but Applesoft does not.

To create a modulo function in Applesoft, you first divide the argument by the divisor, yielding a decimal value—for example, 7/5 = 1.400. Next, perform the division a second time, but take the integer value of the result: INT(7/5) = 1. Now subtract the second result from the first, multiply this value by the divisor, and apply the integer function to the result. That is, INT((1.400 – 1)*5) = 2 or INT((7/5 – INT(7/5))*5) = 2. For your deck of cards, where the divisor must be 13

and the card value is represented by CD(II), the expression to use is INT ((CD(II)/13 – INT(CD(II)/13))*13). This results in values between 0 and 12, as long as the values for CD(II) lie between 1 and 52.

We are almost to the range (2–14) that we need. By simply adding 2 to the result of the modulo calculation, the range changes to 2–14. Then, since we want the shuffled deck to carry this value to the left of the single digit representing the card's suit, the result is multiplied by 10, giving values from 20 to 140, and the digit for the suit is added on. So, 21 is a two of spades, 22 a two of hearts, 23 a two of clubs, 24 a two of diamonds, 124 a queen of diamonds, and 143 an ace of clubs.

Shuffling the Deck

So much for converting a number into a code to represent card value and suit. What about shuffling? We could devise an algorithm that simulates the actual shuffling of a deck by dividing the initial array into two parts, then merging them together again by alternating elements from each half. But there is a more efficient way to randomize the cards with the computer, and with an end result that is more random.

First, choose a random number between 1 and 52 using the RND function built into Applesoft BASIC: II = INT(RND(1)*52 + 1). Next, check the corresponding element in the initial card deck, CD(II), to see if that element has been chosen yet. Since the same card cannot be used more than once, the program must keep track of which cards have been pulled out. You do this by setting CD(II) equal to zero when element CD(II) is selected. Then, as soon as a random number, II, has been generated, the value of CD(II) is checked. If it isn't zero, then that card value can be transferred to the SD() array at element position I. CD(II) is *then* set to zero. Since there is no relation between II, the random number used to select a card from the CD() array, and I, the sequentially determined subscript for the SD() array, the cards are "stacked" into the SD() array quite randomly.

Now, if a random number, II, is generated and the value for CD(II) is zero, card CD(II) has already been used. In

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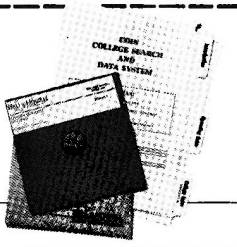

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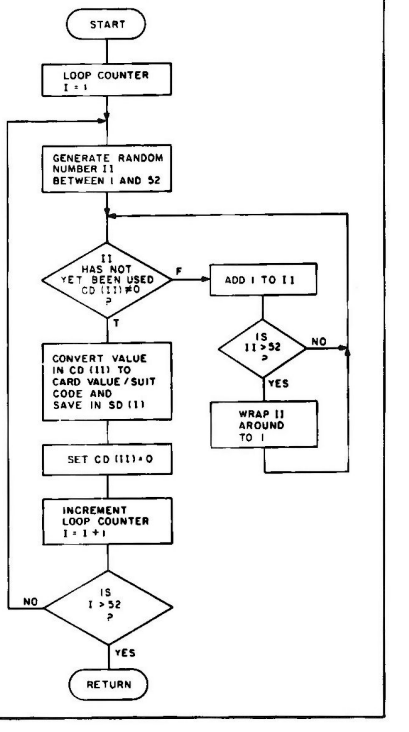
Figure 3. *Flowchart for the subroutine in Listing 3 that simulates the shuffling of a deck of cards by randomly selecting cards from the initial array, CD(), and stacking them sequentially into the shuffled-deck array, SD(). This subroutine also converts the raw-number value obtained from the CD() array into a coded value that depicts both card value (2–14) and suit value (1–4).*



this case, the program could simply cycle back to generate another random number, and this procedure *would* work well at the beginning when the new number is probably a usable value. But toward the end, when most of the cards have been pulled from CD(II), the computer might have to generate 100 random numbers before finally hitting one that has not been chosen yet.

To avoid this time-consuming problem, I have used a different approach when an unacceptable random number has been generated. Instead of generating another, I add 1 to the original random number, then use it. If this element in CD() is also zero, I add 1 again. The computer proceeds through the array until an acceptable element is found. When II surpasses a value of 52, it is assigned a value of 1 to wrap the search process back around to the beginning of the array.

Figure 3 shows the flowchart for

the randomizing and card-value assignment routines, and **Listing 3** presents the BASIC code for this operation. When this subroutine has reached its conclusion, the initial-deck array, CD(), is filled with zeroes, and the shuffled-deck array, SD(), contains code values ranging from 21 to 144, all randomly arranged and not repeated.

Testing Subroutines

One of the great advantages to using a structured approach to writing programs is that each subroutine can be tested separately to verify that it is doing its intended job. To run just the lines of code in a subroutine, while in command, or immediate, mode enter the command GOTO, followed by the line number of the first line in the subroutine. For instance, if you have a subroutine beginning at line 1050, enter GOTO 1050. The computer will begin executing the program at the line you have designated, and it will continue until it reaches the subroutine's RETURN command, at which point the message RETURN WITHOUT GOSUB ERROR or RG ERROR will appear and execution will stop. But that is precisely where you wanted the program to stop anyway!

The next step is to verify that the subroutine did what it was supposed to do. You can usually do this by telling the computer to display the current values of all the variables pertinent to the subroutine by using a PRINT command, such as PRINT A,RZ,B$,C$. If these values are array elements, you can even type in a FOR. . .NEXT loop while in command mode to display the values.

If some variables need values coming into the subroutine, you can enter assignment statements, such as AB = 25.8 and RS$ = "TUESDAY", while in command mode and before entering the GOTO. Unlike the RUN command, GOTO does not initialize the variable space in memory, so whatever values you assign will be available to the subroutine.

To illustrate the use of this technique, enter **Listings 1**, **2**, and **3** into your Apple. Save them on disk, so you can finish the program next month. Now, since the subroutines at 1050 and 1100 both use arrays, and since arrays must be dimensioned, add the line 105 END to your program. This

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way you can RUN the program and it will stop as soon as the arrays have been dimensioned.

Next enter RUN to dimension the arrays, followed by GOTO 1050. After a few seconds you'll see the error message that signals to you that the computer has finished the subroutine. Did the subroutine work? If it did, the CD() array should hold sequential values from 1 to 52. Find out by typing in FOR I = 1 TO 52: PRINT CD(I): NEXT I, as a single line with no line number. Then press the return key. Since the subroutine assigned values to CD(I) that corresponded to the values of the subscript I, the numbers 1–52 should scroll on your screen. To stop the scrolling, hold down the control key and press S. To restart the process, hit control-S again.

If your values for the CD() array seem correct, enter the command GOTO 1100. This subroutine takes a little longer to complete, but the error message will appear shortly. Enter FOR I = 1 TO 52: PRINT SD(I): NEXT I. Again, 52 numbers should scroll down the screen, but this time the numbers should range from 21 to 144 in random order, with no repeats and no number having a right digit larger than 4. Further checking should reveal that all 52 cards are represented.

You have just tested two subroutines to verify that they work properly, without having to complete the whole program first. Furthermore, by testing individual subroutines, you know right away where any problems lie. Programming becomes simpler and less prone to bugs when you use structured design.

You now have saved two subroutines that can be inserted into any program that requires a deck of 52 shuffled cards. Professional programmers keep whole libraries of such subroutines, merging them together as needed for each new program. There's no counting the time and trouble saved by this approach.

Conclusion

Next month I'll conclude construction of the Idiot's Delight simulation. I'll describe in detail the design and coding for the card-removal, vacancy-filling, and video-display subroutines. In the meantime, you may wish to design an algorithm for converting the codes placed in the shuffled-deck array, SD(), with alphanumeric strings for display, so, for instance, 112 displays as J-H and 84 displays as 8-D. ■

You can write to Dan Bishop at Custom Comp, P.O. Box 429, Buena Vista, CO 81211.

Listing 3. *Subroutine that creates a "shuffled" deck, SD(), and encodes the numeric elements to depict both card value and suit in a single number. Suit is represented by the rightmost digit (1–4), while card value is the leftmost one or two digits (2–14).*

```
1094  REM
1095  REM  ****************
1096  REM  CREATE SHUFFLED DECK
1097  REM  WITH CARD VALUES
1098  REM  ****************
1099  REM
1100  HOME : PRINT "SHUFFLING": FOR I = 1 TO
      52
1105 II =  INT ( RND (1) * 52 + 1)
1110  IF CD(II) <  > 0 THEN  GOTO 1130
1115 II = II + 1
1120  IF II > 52 THEN II = 1
1125  GOTO 1110
1130 CX =  INT ((CD(II) / 13 -  INT (CD(II) /
      13)) * 13.001) + 2
1135 SD(I) = 10 * CX + ( INT ((CD(II) - 1) /
      13) + 1)
1140 CD(II) = 0
1145  NEXT I
1150  RETURN
```

See It in Print

Illustration by Richard Cowdrey

New printer technologies—from dot-matrix to laser—can do the job on all that's fit to print.

When compared to the more than one million operations your Apple can perform per second, even the fastest printers are agonizingly slow.

However, we do still need them. While we have monitors and modems that display and transfer information electronically, we haven't yet relinquished the last vestige of our arboreal heritage—paper, the concrete carrier of our thoughts. So, until we climb down from the trees, we'd do well to follow the old proverb's advice to "know thine enemy."

Types

All printers are alike in that they use paper, and that paper must move through the machine. Over and above that, there must be a way to make impressions of characters print on the paper. The ways in which the printhead does this divide printers into two supergroups: impact and non-impact.

Impact Printers

Dot-matrix and letter-quality are probably the two most familiar types of impact printers. While the cost of letter-quality is dropping, unless your primary goal is word processing, you'll probably head toward dot-matrix.

Dot-Matrix Printers

While dot-matrix is inexpensive, its disadvantage is poorly formed characters, because each element in the printhead matrix makes a separate impression. Manufacturers have attempted to compensate for this deficiency. Some have added printing-enhancement instructions to ROM that permit a second impression. On a second "pass," the printhead shifts slightly to fill in the open spaces. Called bold or double-strike printing, this markedly improves the typical "gappy" character formation.

Another alternative is to increase the density of the printhead matrix to increase the number of dots in a char-

by Bill O'Brien

acter. When you use double-strike techniques with a higher-density printhead, the result closely rivals the fully formed characters of letter-quality printers. This correspondence-quality output, as it is called, may fall just short of formal business requirements, but for most correspondence it's more than adequate.

Daisy-Wheel and Ball Printers

There are two types of impact printers that create fully formed characters. One is the daisy-wheel, where raised characters at the ends of the spokes of either a plastic or metal wheel are driven against a ribbon to make the impression. A similar arrangement involves an IBM Selectric-type ball that contains the characters. No matter which type you look at, you'll notice that, though they print faster than you can type, letter-quality printers are slower than dot-matrix printers.

Non-Impact Printers

Until a few years ago, the only printer that qualified in the non-impact group was a thermal printer, which uses a wire matrix printhead in almost the same fashion as dot-matrix printers do. However, at the command to print, minute sparks from the wires in the thermal printhead discolor heat-sensitive paper. This type of printer is not fast and the paper is unacceptable for most purposes, but it is very quiet. Apple's first printer, the Silentype manufactured for them by Trendcom, was thermal.

The latest twist in thermal technology is represented by Apple's SilentScribe printer. Instead of treated paper, it uses a treated ribbon which is available in both black and colors. The problem with this type of printer is that, while the purchase price is usually quite low, the per-sheet printing cost is higher than average. The price of the ribbon ($6.95 for SilentScribe ribbons at a store near me) and the fact it can be used only once make it costly.

Ink-jet Printers

The new wave of affordable printer technology for microcomputer owners is the ink-jet printer. The ink-jet printer doesn't use a ribbon, doesn't have an impact mechanism, doesn't employ heat, and doesn't use sensitized paper. It prints by pulsing a small jet of liquid ink from a cartridge through a nozzle onto the paper. Color printing is simply a matter of putting a color-ink cartridge in the machine. Black and color cartridges can be used simultaneously. The color cartridge is divided into three compartments containing red, yellow, and blue. If the software that controls the printing contains color instructions, ink flow is generated from the color cartridge; if it doesn't, then only black is used.

Ink-jet printers work well with graphics, because the nozzle can spray until the dots reach the desired density. This also creates fine bold standard print. However, regular unenhanced print is generally agreed to be barely acceptable from current ink-jet technology.

Keeping your ink jet working is another problem. Some manufacturers supply a new nozzle with every ink cartridge to avoid clogging. However, for many situations, especially when multiple color cartridges are involved, that isn't practical.

All this leads to a very sensitive issue, "the aftermarket"—the source of cheaper ribbons, ribbon refills, and other printer products that cost less—and, according to some, are worth less—than the equivalent merchandise offered by the machine's manufacturer.

Cheap (as in quality) ribbons are usually more of a nuisance than a danger to impact printers. They break, tangle, or produce uneven ink coverage. But do you remember the clogs and blotchy print when you filled that old fountain pen with the 15-cent-per-bottle ink? Nozzles on ink-jet printers can clog just as easily. If you do buy an ink-jet printer, always use quality ink from reputable suppliers.

Laser Printers

Behind every good laser printer is a good photocopy machine. And it's no accident, either; that's one of the reasons they're so expensive.

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"Behind every good laser printer is a good photocopy machine."

melts it into permanent position on the paper. To keep the room from filling with unused black or colored powder, also called toner, the excess is returned to the printer's reservoir.

As in its distant dot-matrix cousin, each printed character or symbol is composed of dots. However, the laser is programmed to address all points on the page. Because of this, and since the toner is composed of particles meaured in thousandths of an inch, the resulting print can be very attractive. This technology is also very fast. While dot-matrix and letter-quality printers are rated in characters per second, laser printers are usually rated in lines per second or pages per minute.

The problem with laser printers is that they're only good for coarse output in graphics work. Apple's laser printer might break this rule, but as of this writing it's still not on the market to tell.

My Recommendations

When you look at printers, you probably should pass over dot-matrix machines that use spools of ribbon. They're messy and they're outdated. The only exception is Okidata. They make an excellent, durable printer that still uses spools.

If you need a printer to fill in preprinted forms, make sure it has a tear bar close to the printhead and the sprocket assembly is behind or alongside the printing mechanism. That way you can tear off the printed form without losing the blank form that follows it.

Lower-priced letter-quality printers are generally less durable than the more expensive spread. If you print more than a handful of pages each day (and certainly if you're doing program listings), none of the "under $1000" models will suit your needs; they tend to break when stressed.

Typewriters that double as computer printers are usually bad news. I have yet to recommend one and I don't think I'll change my mind.

There are two types of tractor-feed mechanisms: uni- and bidirectional. If your work includes things like subscripts and superscripts, or if you use forward and reverse vertical paper movement, a bidirectional tractor is imperative.

Although I've seen output from laser printers, I've never used one. They create a printed page that looks like a very well-done photocopy, but barring a compelling need for extremely high-speed printing, and until the graphics question is ironed out, I'd be hard pressed to recommend one. The least expensive laser printer is still as expensive as some of the more costly letter-quality printers—in the $3500 range.

GOOD NEWS

The Sider 10-megabyte hard disk drive (see *inCider*'s review on p. 93 of this issue) seems to be an excellent buy. The only drawback is that it works only with the Apple II series and the Franklin. An Apple clone called the Basis (BAH-sis) is out there and its owners comprise a sizable group. It would be nice if the Sider worked with this computer as well.

Well, it just might. Last December, a New York Basis user group disassembled the Sider ROM and modified it to work with the German Apple work-alike. As of this writing the group hasn't decided whether to do anything with it, but perhaps they will. Contact them through your local Basis group.

A PLEA

Hardly a month goes by that the mailbox here at Futility Base doesn't receive at least one desperate request for help: "What Apple should I buy? Which peripherals? I'm going to do some word processing. . .or some spreadsheet work. . .or some database analysis."

I love to help. In fact, my friends know that sometimes it's difficult to keep me from helping. But there must be a starting point, a common ground of understanding. Michelangelo did some painting; so does Earl Scheib. But somehow, I don't think the Sistine Chapel would have looked as good in Diamond Gloss Enamel.

If you really want a valid recommendation for something you'll spend quite a bit of money on, please try to be as specific as possible: What exactly do you want to do? Is it word processing? All right, but is that for memos, letters, short stories, or novels? Maybe you're doing data-base work, but does that mean a list of 30 friends who get Easter cards, the third-world members of the United Nations, or every person in the world whose first name begins with D?

I believe you're writing to me and *inCider* for a more qualified opinion than you feel you could get from a salesperson. Thank you for that trust. But if you want me to live up to that trust, I'll need an exact description of what you want to do. Okay? Okay.

With that, I'll finish and slip away for a week to somewhere quiet. Things get rough when you have six printers and none of them has an acoustic enclosure. By the way, that's something you might consider for your computer environment. Unfortunately, it's one of the few things I can't say to, "Make mine Apple." They don't sell one.■

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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Greg Glau of **InCider** says: *"Borrowing money is no problem with the loan analysis section to guide you. Work Force II is easy to understand and operate. It's an honest value..."* **June 1984**

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Circle 214 on Reader Service Card.

The Complete Computer

Here's a 50 character per second, plain paper, dot matrix printer that you can use with virtually any home or office personal computer. It's built really tough to withstand heavy use. It's really easy to use. And, it even prints graphics. Price Slashed to $129.

By Drew Kaplan

Complete your computer. Now you can harness the full power of your computer. From writing letters to listing programs, your computer will be incredibly more useful.

It uses **plain paper** and it's super reliable. It prints both upper and lower case characters. And, if you aren't using a printer with your computer, read on.

LISTING/INDEXES/LETTERS AND MORE

Experience the thrill of actually writing your letters and reports on your computer. Now you'll be able to use all of your computer's word processing and **correcting** capabilities to really explore your creative talents.

It's easy. Some of the new word processing programs are so 'user friendly' that you can learn to use them in just about 10 minutes. Change a line, change a word, move a line. Just push a button.

Are data bases a four letter word? Not on your life. Now you can use your computer to organize all your telephone numbers, your stocks, stamps, and recipes.

If you're using your computer for business, you can have a complete, instantly accessible file for each customer by name, what they bought, when, etc.

A data base will let you find or organize and print out any information you want, however you want, whenever you want.

There's no more complicated programming required. And, inexpensive data base programs are availible at any computer store.

PERMANENT RECORD

If you have a modem, you're in for a treat. You can access encyclopedias, stock market reports, and much more. When you sign on a service like Com puServe or The Source, the world is quite literally at your finger tips.

With a printer, you can get a 'hard copy' of all the incoming information. You can get everything from SAT test simulations and IQ tests to loan amortization schedules.

AFRAID OF PROGRAMMING?

You don't need to know the first thing about programming to use this or any printer. But, if you've never typed in and run a program, here's the easiest one I know. Turn on your computer.

Commodore Owners, and Atari Owners, your computer, and most others will say 'Ready'. Just push Control and Reset on an Apple. Then type the following:

10 PRINT "DAK IS WONDERFUL"
20 GOTO 10
RUN

You should type a carriage return at the end of each line. Why not try this program now? Next time, I'll tell you how to get out of the program, and maybe even discuss peeks and pokes.

If the program isn't running, type LPRINT instead of PRINT in line 10.

To you sophisticated programmers, think how easy your life will be when you can print out program lists that you can study at length.

And, you won't have to load a bunch of disks to find a program when you print out a menu for each of your disks.

LOOK AT ALL IT DOES

An ad in several August computer magazines listed a $149 thermal printer (that needs expensive thermal paper) as the lowest priced printer in the U.S.

Imagine a 50 character per second, plain paper, full 80 column dot, matrix printer with a built-in standard Centronics Parallel Interface, slashed to just $129.

This printer handles plain old cheap standard fanfold pin feed computer paper from 4.5" to 9.5" wide, with it's built-in adjustable tractor pin feed drive.

It's so powerful you can even use two-part forms for a carbon copy. Plus, there's an impact control for print darkness.

It understands and prints 116 upper and lower case characters, numerals and symbols. And that's not all.

You can even print Double Width characters. **And, look at this.** This printer has full graphic capabilities with 480 dot horizontal resolution and 63 dot per inch vertical resolution. So, you can print out your pictures, pie charts or graphs.

Circle 214 on Reader Service Card.

It prints 10 characters to the inch, six lines to the inch. In short, it's going to make typewriters into dinosaurs. When hooked to your computer, you'll never have to retype anything again. If you find an error, just make the correction and let the computer retype your work for you.

The printer is made by C.ITOH/Leading Edge in Japan. It's built to really take heavy use. But in the unlikely event that it should need service, there are approximately 400 service centers nation wide.

It takes standard long life inked ribbon cassettes that are readily available nation-wide. This is a printer that will give you many years of continuous reliable service and enjoyment.

AND NOW THE BAD NEWS

If you're the president of a large company sending important business letters, you may want a $1000 daisy wheel printer. But for most uses, dot matrix printers are incredibly faster, and there isn't any way to print out a graph or picture on a daisy wheel printer.

But, there are two things you need to know about this printer. First, it has about the dumbest name I've ever seen. It's built tough and rugged. So, they named it The Gorilla Banana Printer.

Second, like many dot matrix printers, the letters g, j, p, q, and y are level with the other letters. Each letter is completely and perfectly formed, but each sits level with the rest of the alphabet.

Upper case letters and symbols are unaffected. So, if you don't want letters that look like they were printed by a computer, this printer isn't for you.

But for most letters, term papers or reports, programming and all the data bases and information you'll get through a modem, this printer is perfect.

COMPATIBLE COMPUTERS

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

FEAR OF INTERFACES?

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

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

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

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

There are two types of printer interfaces. The first allows you to do text word processing. For 99% of computer use, this is all that is needed. It translates all the possible letters and punctuation known as ASCII. This printer understands 116 characters and symbols.

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

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

With this printer you can alter your graphics as you desire. You can print normal or reversed (both shown above, reduced to fit in this catalog) and you can even print double size.

WHY SO CHEAP

A new model will emerge soon with a different name. Leading Edge had just 28,000 of these remarkable printers which have been selling at discount for as little as $199, left in stock.

DAK bought them all for cold hard cash. And now we're offering them to you for less than the original price we were quoted as wholesale.

The printer is approximately 16½" wide, 9" deep and 7" tall. It's backed by Leading Edge's standard limited warranty.

ADD PRINTING POWER TO YOUR COMPUTER RISK FREE

Now you can really make use of your computer. 50 characters per second printing on plain paper for just $129. Wow!

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

To order your 50 Character Per Second Dot Matrix, Plain Paper Printer with a built-in Centronics Parallel Interface, risk free with your credit card, call toll free, or send your check for the breakthrough close-out price of just **$129** plus **$8** for postage and handling to DAK. Order No. 4101. CA res add 6% sales tax.

Special Note: If you need a serial printer for a computer, such as the TRS80 Color Computer, order the identical printer with a built-in Serial Interface for the same price. Use Order No. 4102.

The Printer comes packaged with a long life ribbon. Extra ribbons are available at computer stores. DAK has them for **$4** each ($1 P&H) Order No. 4103.

Standard Centronics Interfaces for your computer are available at any computer store. This Printer has its receiving interface built in. You simply need one, complete with its cable, to plug into your computer 'to send' information. Below are our favorites for 5 of the most popular computers.

For your Apple. We have Practical Peripherals' text interface for just **$49** ($2 P&H) Order No. 9877. We have their graphics capable interface for just **$79** ($2 P&H) Order No. 4104. If you already have a Centronics Parallel Interface, we have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4105.

For your IBM PC, you don't need an interface. It's usually already built-in. But, you do need a cable. We have a cable, ready to connect this printer to your computer, for just **$19** ($2 P&H) Order No. 9879. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4106.

For your Atari 800, 800XL, 400, or 600XL, we have a text interface for just **$69** ($2 P&H) Order No. 9881. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4107.

For your Commodore VIC 20 or 64, we have a text interface for just **$39** ($2 P&H) Order No. 9883. We have a Graphics Interface for just **$54** ($2 P&H) Order No. 4108.

Special Bonus for Commodore 64 owners. We have a powerful word processing program with editing, including changing a line, a word, or moving a line. Once you've tried computer word processing, you'll never want to look at a typewriter again.

Plus, we have a super data base program that lets you use 8 fields of information on up to 200 subjects at a time. Then you can search for any part, sort alphabetically or numerically and print out an address book, a list of your stocks or anything you can imagine. They're both yours for just **$5** ($1 P&H) with purchase of the printer. Use Order No. 4122 for Disk, or Order No. 4123 for Cassette.

For most TRS 80 Computers, you don't need an interface, just a cable. For the Black and White Computers, we have a Parallel Cable for just **$18** ($2 P&H) Order No. 9885. For the Color Computers we have a Serial Cable (you need the Serial Printer as well) for just **$18** ($2 P&H) Order No. 4109.

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

Get hard copy print-outs of your programs or your graphics. Turn your computer into a powerful word processor. Forget retyping ever again. For just $129 you can make your computer complete.

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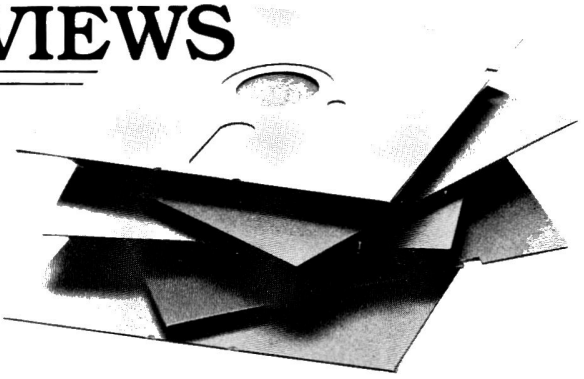


inCider's Ratings

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

Murder on the Zinderneuf

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403

Mystery game
Any Apple, 48K
$40

★★★

A murderer lurks aboard the luxury dirigible, Zinderneuf. You, a world-famous detective, must expose the villain in the 12 hours before the airship's scheduled arrival in New York. Witness Murder on the Zinderneuf, Electronic Arts' tantalizing first entry in the whodunit genre.

Choose a detective from a gallery of eight sleuths. Pick from the likes of Harry Hacksaw, Agatha Marbles, and Chief Inspector Emile Klutzeau. Next, you find out that one of the Zinderneuf's 16 passengers is dead.

The remaining passengers wander through the lounge, kitchen, cabins, and corridors pictured on screen in a structural diagram of the Zinderneuf. You may use a joystick or the keyboard to amble among the characters.

To uncover the murderer, it's necessary to extract information from the passengers. Each detective has five personality characteristics for interrogation. For example, detective Jethro Knight's bearing can be forceful, seductive, friendly, polite, or naive. Characters answer up to three questions, depending on the detective's demeanor.

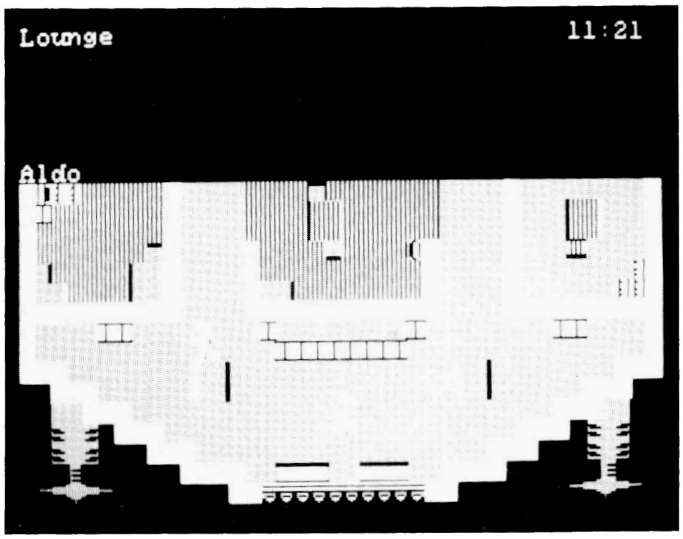
In one scenario, Harry Hacksaw's violent interrogation of librarian Hester Prymme revealed vital data about a sadistic cult. The same approach didn't work on Hungarian aristocrat Anton Peste, who responded, "Sir, I do not desire your company. Leave me."

After you enter a room, you may uncover a tuft of carpet, piece of hair, sample of dirt, Olympic gold medal, or other clues as evidence. Motive clues, like a plane ticket, diary, or insurance policy, are found in the same rooms as ordinary clues.

When you think you know the killer's identity, you may "bump" into that character and accuse him or her of murder. If the suspect is the murderer, and believes you have sufficient evidence, the character will confess to the deed. Otherwise, the character will refuse to answer questions for the rest of the game. If no one has confessed by the time you arrive in New York, you may advise the city police to apprehend one passenger in the "final accusation."

The game's superior quality is shadowed by the smoothly scrolling hi-res diagram of the Zinderneuf and its adequate graphics. Beneath the game's nondescript appearance lies a fascinating simulation that is different each time you play.

Murder on the Zinderneuf introduces a limited artificial intelligence not found in computerized derivations of the board game, Clue. The outcome depends not only on the player's deductive reasoning, but also his or her



Hunting for clues and suspects aboard the dirigible Zinderneuf.

verbal interaction with a host of suspects including a magician, evangelist, ballerina, industrialist, burlesque dancer, anthropologist, debutante, and soldier of fortune.

Electronic Arts' program support challenges that of Infocom, publisher of the Zork series. In the manual, a character silhouette and witty biographical sketch describe each detective and passenger. Thanks to the program, design, and story line, Murder on the Zinderneuf offers outstanding entertainment.■

Steven Williams
Chester, NJ

Dollars and $ense

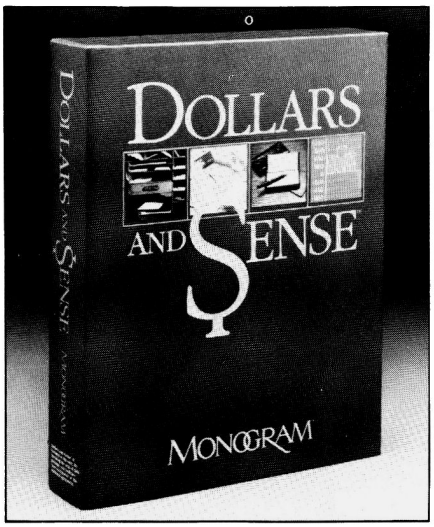
Monogram
8295 South La Cienega Boulevard
Inglewood, CA 90301

Financial management
Apple //c, or //e with 128K
$100

★★★★

Dollars and $ense is an excellent money-management system that helps you keep track of and make sense of your home or small-business finances. It's an electronic financial environment into which you can enter all kinds of money and credit transactions, and from which you can observe, using a variety of reporting and graphing capabilities, summaries and trends based on your entries. If you're willing to invest the time and effort necessary to master its many features, you'll find this package to be more than an automated checking account.

You can enter transactions into up to 12 separate checking accounts and 120 budget categories—more than adequate for general home use, but limiting to businesses tracking 100 or more clients. Dollars and $ense also provides three predefined account sets (household, business, and tax preparation) which can be used as is, changed, or added to. All other accounts are labelled by category—checking, asset, liability, income, expense, or miscellaneous. You can, if you prefer, prepare an account set from scratch. This program can also flag tax deductible expenses for later recall, apportion transactions over



several different account categories, edit or change information at almost any point, and reconcile your checking account records with the bank's.

The program stores account data on separate data disks. You can put additional data onto extension disks, and must do so if the number of transactions exceeds 2000 (the capacity of each disk), or when you are starting a new year. Every category must have a specified beginning balance; if you're creating a budget, the monthly amount you wish to budget for that account is optional.

Dollars and $ense uses several techniques to keep keyboard entry to a minimum: the arrow keys, a mouse, or menus. The program also tries to anticipate some of your choices. For instance, it displays checks sequentially, and dates are based on your last entry. Press the return key or click the mouse's button to accept the information and make the cursor jump to the next item. You will have to enter the transaction description and the check amount fields, however, from the keyboard.

To reduce confusion as you learn and experiment, an extensive help feature provides information on each option. Pressing the open-apple key with a particular key from the screen you are viewing will bring forth several lines of helpful text. If the on-line facility isn't sufficient, check the manual.

Using the report format you can track year-to-date totals or compare actual against budgeted expenditures. The graphics option lets you compare accounts using a variety of bar-chart presentations.

The entire program comes on a double-sided disk. The "Booter" side to start up the program is copy protected, but you can get a back-up copy by mailing in the registration card. The other side contains the system program, which can be copied. If you don't mind constantly flipping floppies, the program will run on single-drive systems. A second disk drive, though, is highly recommended.

The manual is easy to follow. The first section prompts you through the set-up procedures, and a 21-page tutorial helps the novice explore the program features. Another section suggests various applications for financial management tasks such as client billing and credit card management. The manual also explains how to use the various reporting and graphing capabilities. Rounding out the manual are a glossary and several appendices.■

Paul DiBara
Rockland, MA

Blazing Paddles Take 1

Baudville
1001 Medical Park Drive S.E.
Grand Rapids, MI 49506

Graphics and animation
Any Apple II
$50 Blazing Paddles, 48K, requires input device
$60 Take 1, 64K

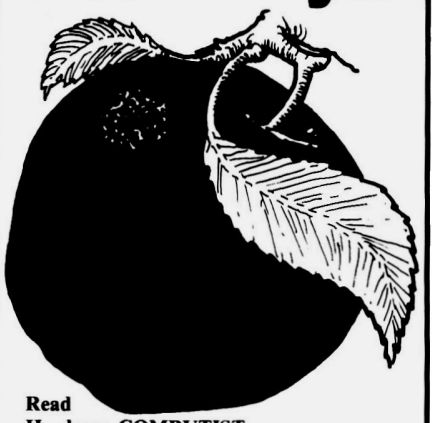
★★★

You oughtta be in pictures, and two new graphics tool kits are here to help you find your first big break. Blazing Paddles and Take 1 represent a new generation of software that draw illustrations and animated graphics on an Apple computer.

Commercial artists frequently use clip art when they construct an illustration; Blazing Paddles similarly uses your hi-res images as part of a drawing through a cut-and-paste operation. Ten shape-table files, each with about 12 images, make up a library of animals, trees, buildings, geometric shapes, music symbols, and musical instruments. A shape-table image may be rotated in 45-degree increments or flipped left or right before you include it in the drawing.

Circle 427 on Reader Service Card.

Not Piracy...



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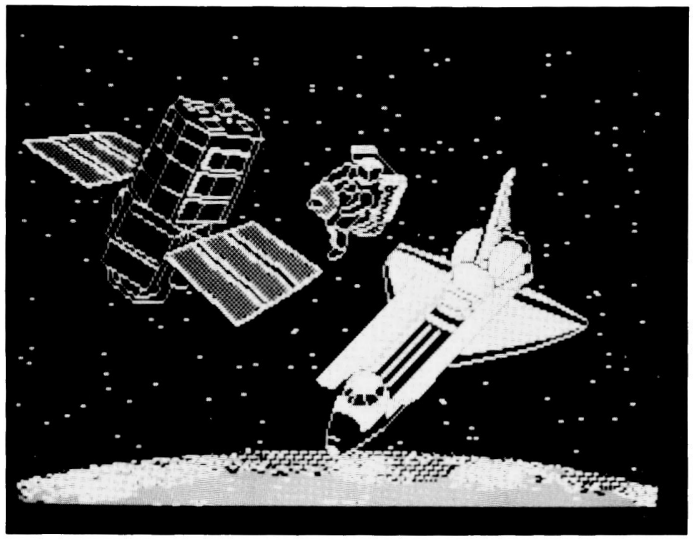

Fully animated shuttle mission demonstrates Take 1.

"Cutting" is done by enclosing part of your image within a rectangular window and then copying it into a memory buffer. "Pasting" involves recalling the image from the memory buffer and redrawing it at other locations, or copying it onto a disk as an Applesoft hi-res picture file for use in another picture.

Other features of Blazing Paddles are similar to the Micro Illustrator software which accompanies the Koala-Pad. Both programs draw dots, lines, circles, and boxes with several weight brushes and different colors. They also perform color fill, type text within a picture, and save or load picture files on disk. Blazing Paddles, however, can also handle spray painting, control variable width ovals, and mix colors to produce more than 200 colors and textured hues. The software includes an "Undo" command that cancels your last graphics operation and gives you the chance to experiment with various graphics effects.

This program can use any one of five graphics input devices: a mouse, a graphics tablet, a touch pad, a joystick, a trackball or similar paddle port device, or a light pen. You must use one of these devices because there is no provision to move the cursor with keyboard controls. Blazing Paddles includes printer drivers for 11 different printers and 15 printer interface cards.

The documentation is very well done, and the easy-to-use program contains useful, new features. For example, it can use a variety of graphics input and printing devices as well as cutting and pasting of graphics images.

Take 1, an animated film maker's tool kit, creates and shows a motion picture on your Apple. The procedures are similar to conventional animated film making: Individual picture frames are prepared with actors (animated objects) and a sequence of frames record each actor's actions. Action sequences combined with text, sound effects, and background graphics produce specific scenes. The scenes are then linked with special effects to make a movie. The finished version is shown using your computer as the projector and the CRT as the screen.

Take 1's art starts out as standard Apple hi-res pictures. You can create these pictures with Take 1, Blazing Paddles, or any program that produces standard Applesoft hi-res picture files. If you already have hi-res pictures or shape tables on disk, you have a head start in making animated movies.

Animated objects, called *actors*, are made by cutting out snapshots from hi-res pictures. An actor can be a single snapshot or a sequence of several snapshots that depict movement, such as someone walking. These movements may be recorded and saved as "actions" that are used repeatedly while shooting "frames."

A snapshot of an object may be saved as a *sprite*—an object without its background. The area between the

shape outline and the cut frame is transparent. You can also create sprites with transparent windows or holes inside the shape.

A *scene* is a series of frames that use one background, like in a play or film. Each scene may contain different elements: actors, text, sound effects, and pauses. Three type fonts print text which can be animated in scenes.

A "movie" is made from one or more scenes spliced together using fade-ins and fade-outs like sweeps, scrolls, splits, shrinks, dissolves, and checkerboard effects.

Menu-driven routines in Take 1 direct the required editing operations. Impressive animated films may be produced, but their length is limited to only a few minutes because of the Apple II's memory and disk storage limitations. A well-designed program, Take 1 can be used for teaching and demonstrating animation techniques as well as preparing brief, animated sequences.

Blazing Paddles and Take 1 offer significant improvements over earlier drawing and animation software for the Apple. Blazing Paddles, like a manual set of illustrator's tools, can be enjoyed by users of all ages. Take 1, however, requires greater patience and planning, because you must create and coordinate multiple images. It may be a long way from a set of tools to a finished graphics product, but Blazing Paddles and Take 1 provide realistic, useful tools. ■

Allan Schmidt
Concord, MA

Mind Prober

Human Edge Software
2445 Faber Place
Palo Alto, CA 94303

Personality evaluation
Any Apple II, 48K
$49.95

★

Those beautiful green eyes mesmerize, lure you. Mind Prober tastelessly promises to get you into her psyche. Touted as "personality software that lets you see people as they really are," Mind Prober does no such thing. Rather, it lets you see people as you see them. The program is based on your impressions of other people—fleeting glimpses that are at best partially correct; at worst, dangerously inaccurate.

The theory behind Mind Prober comes from the Human Edge school of pop psychology which advocates "I'm okay; I'm okay." Two-thirds of the manual is called Reading Others, a section that teaches you how to get what you want from someone.

If you glance at the extensive bibliography (77 references), you'll be impressed. Closer scrutiny reveals that all but a handful of the citations are written by one of Mind Prober's three developers. My confidence began to wane before I booted the disk.

Mind Prober's theory should be taken with the proverbial grain of salt, but the software is well-written and easy to use. Before you use your computer to psychoanalyze your friend or boss, you must enter the person's sex, age, and name.

On the monitor, you'll see a seven-screen list of 66 adjectives that represent personality traits ranging from "achieving" to "kind" to "wary." You must indicate whether you agree or disagree with the qualities given your subject. If you agree, press the left-arrow key; if you disagree, press the right-arrow key. If you change your mind, press P to return to the unwanted answer. For assistance, press H to get limited help.

Once you complete the assessment process, the information is stored on the program disk, which has room for eight assessments. Afterward, you can eliminate one person and probe another.

Mind Prober's strength is its report generator. When you select the Reporting the Results option, the program seems to hang as it evaluates your responses to the descriptive words. The report concentrates on the following areas: relationships, attitudes toward work, coping with stress, personal interests, attitudes toward sex (attitudes toward school for those under 18), and what makes your subject tick.

Though the reports seem professional, objective, and convincing, remember that the software hasn't

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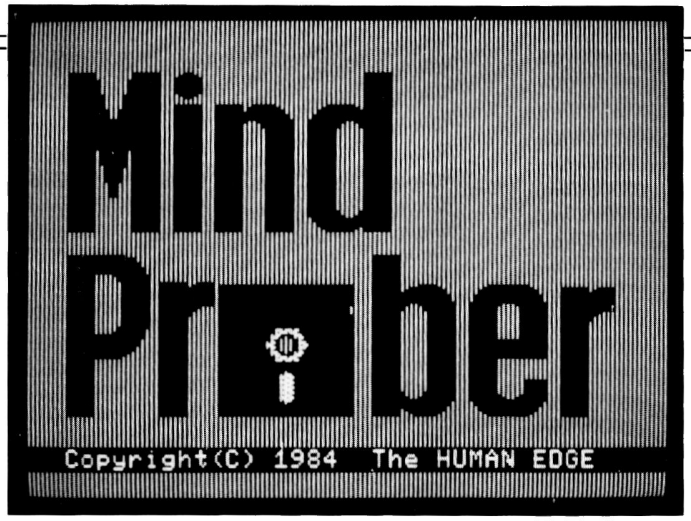

Mind Prober entertains, but don't take it seriously.

probed your subject's mind—you have. You'll find it uncanny that the reports don't contain the adjectives you indicated in the assessment section. Your inputs are conceptualized instead. The value of the program depends on how well you understand the person. You might ask why you need a program to tell you what you already know.

Still, Mind Prober is entertaining. My friends and I had fun when we analyzed ourselves, relatives, and mutual acquaintances.

Don't take Mind Prober seriously. This program, like a Ouija board, is best classified in the entertainment category.■

Cynthia Field
Wakefield, RI

The Incredible Laboratory

Sunburst Communications
39 Washington Avenue
Pleasantville, NY 10570

Logic game
$55
★★★

The Incredible Laboratory, one of a software series on problem-solving, is a fine program that develops children's note-taking skills. While designed for the young, adults will also find The Incredible Laboratory fun and worthwhile.

The program has three ability levels, each with two modes called Play and Challenge. In the lowest-level Play mode, you choose chemicals that go into a beaker to produce a colorful monster. Then you must figure out which chemical produced which body part. The chemical names, alien oil or fuzzy mold, for example, are descriptive and give clues to what parts of the monster they form.

In the Challenge mode, each of two players chooses chemicals and then must figure out which one of three monsters on-screen those chemicals created. When you pick the right monster, the imposters fade away to the sound of a fanfare.

The Apprentice and Scientist levels each have two sublevels, which have, in turn, their own Play and Challenge modes. As an apprentice, you must choose among more chemicals. When you're a scientist, the chemicals produce different monster parts each time.

The fascinating point about playing The Incredible Laboratory is that you don't realize you're learning skills. One 12-year-old first commented, "I consider The Incredible Laboratory more of a game than a learning tool." However, later on she observed, "When I created monsters I wrote down the mixtures I used and was able to discover what chemical did what." She increased her problem-solving skills while having fun. What better way is there to learn! Sunburst Communications has produced a winner.■

Bonnie Fox
Merrimack, NH

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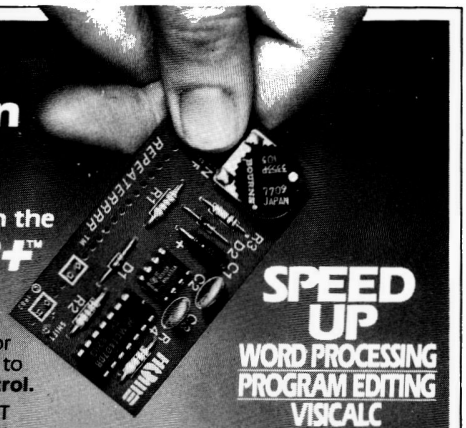

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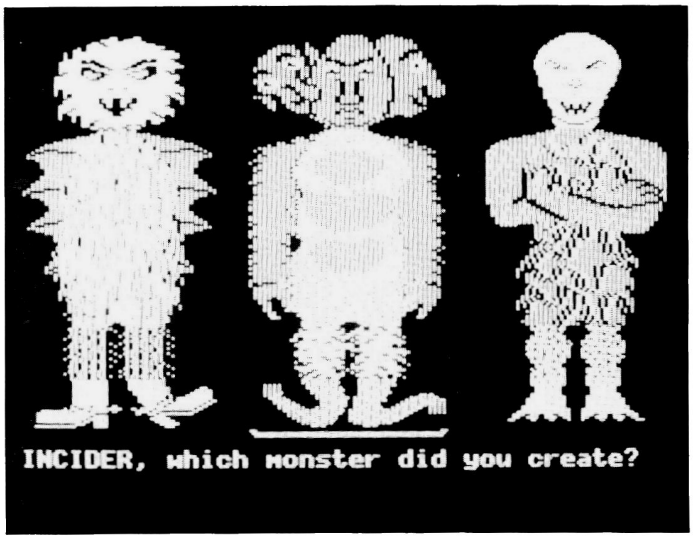

Learn cause and effect in The Incredible Laboratory.

Ramdrive e/c

Precision Software
6514 North Fresno Street
Milwaukee, WI 53224

Utility
Apple //e or //c
$29.95
★★

Disk drive emulation packages for the Apple //e and //c are programs that, when executed, let you use the auxiliary memory as you would a disk drive; that is, the memory card performs disk operations. But, instead of slot 6, slot 3 is specified for saving and loading programs. All other normal disk commands, except INIT, are active and will perform as always.

Ramdrive e/c is a no-frills program that performs the basic job of disk emulation adequately. BRUNing the program disk's short binary file called RAMDRIVE initializes your Ramdrive. Pressing the open-apple key while setting up the Ramdrive energizes the audio indicator and provides an audible click every time a disk sector is written to or read from the Ramdrive. I couldn't find a way to deactivate this indicator short of turning off the computer. If you don't use the audio indicator, a visual indicator—an inverse R or W—appears in a corner of the screen.

Several Pascal files, included with Ramdrive, let you use the auxiliary memory as a pseudo-drive with Pascal. While I don't use Pascal, the instructions for using Ramdrive with Pascal seemed simple and easy to execute. I do use CP/M, however, and was disappointed that the menu item "CP/M RAMDRIVE //e" wasn't present on the program disk, but must be bought separately from Precision Software.

The original disk, when booted, shows a product logo. Then it displays a nine-point menu: Most of the menu choices let you read the documentation file on the screen. One choice prints the documentation; another copies the Ramdrive program to another disk. One program on the disk, SPEEDOS, is a public-domain program. It speeds up disk operations, although the instructions point out some limitations (including the disabling of the INIT command) when SPEEDOS is enabled.

Another program, COPY ALL FILES, uses FID to automatically transfer all files on the disk to the Ramdrive. It works rapidly and, after the proper hello program gets it going, it performs without trouble. A third program, RAMCOPY, makes disk copies like the COPY-A program, but reduces disk swapping for single drive owners.

The instructions properly warn that using RAMCOPY disables Ramdrive and destroys any programs saved there, so, when you are done, you must copy any files on the Ramdrive that you want to save to a disk in one of the regular disk drives or else your file will be lost. FID is about the only way to do

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AMPERGRAPH

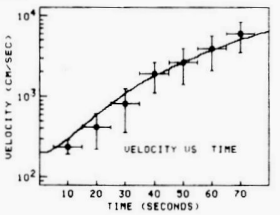
AMPERGRAPH is a powerful, easy-to-use relocatable graphics utility for the Apple II +/e/c. AMPERGRAPH adds twenty-two Applesoft commands that allow effortless generation of professional-looking plots of scientific or financial data. All of the necessary scaling and screen formatting is accomplished with just a few, simple Applesoft lines.

Unlike most other plotting systems for the Apple II which are stand-alone systems, the AMPERGRAPH utility provides extended BASIC graphics language macros that you can use directly in your own Applesoft programs. The additional commands are &SCALE, &LIMIT, &AXES, &GRID, &FRAME, &LOG X, &LOG Y, &LABEL AXES, &LABEL, &VLABEL, &CENTER LABEL, &CENTER VLABEL, &DRAW, &PENUP, &CROSS, &OPEN SQUARE, &CLOSED SQUARE, &OPEN CIRCLE, &CLOSED CIRCLE, &ERROR BARS, &DUMP (to dump the graph on a Silentype printer) and &*DUMP (to link with AMERDUMP, see below).

$45.00

SAMPLE AMPERGRAPH PROGRAM LISTING:

```
 10 &SCALE, 0, 80, 80, 13000
 15 LX$ = "TIME (SECONDS)":LY$ = "VELOCITY
    (CM/SEC)"
 20 &LOG Y: &LABEL AXES, 10, 10
 25 LABEL$ = "VELOCITY VS. TIME":&LABEL, 30,
    200
 30 FOR T = 0 TO 80:&DRAW, T, 150 + T12:NEXT T
 35 FOR T = 10 TO 70 STEP 10
 40 &CLOSED SQUARE, T,
    (150 + T12)*(.8 + .4*RND(3) )
 45 &ERROR BARS, 5, T12/2
 50 NEXT T:&DUMP
```



AMPERDUMP

AMPERDUMP is a high-resolution graphics dump utility which can be used either in menu-driven mode, or directly from your Applesoft program, with, or without AMPERGRAPH. The following printers will work with AMPERDUMP: Apple Dot Matrix, Imagewriter; Epson; Gemini; NEC PC-8023A-C; C. Itoh 1550, 8510A/B, 8600; Toshiba 1340, 1350. AMPERDUMP offers many features which are not available in other graphics dump routines:

- Horizontal magnifications: 3 to 12, depending on printer.
- Vertical magnifications: 2 to 9, depending on printer.
- Horizontal and vertical magnifications can be specified independently.
- Normal / Inverse dumps
- Adjustable horizontal tab
- Compatible with AMPERGRAPH
- Fast
- Easy to use
- Relocatable

$40.00

The AMPERGRAPH and AMPERDUMP graphics utilities require an Apple II +/e/c. The AMPERDUMP utility requires one of the following interface cards: Epson, Apple, Grappler, Interactive Structures, Mountain Computer, Epson Type2, Tymac, or Microbuffer II, Tackler, Microtek, Printerlink, Super Serial.

AMPERGRAPH and AMPERDUMP are available from your dealer or order direct. Include $2.00 for shipping and handling; Wisconsin residents add 5% sales tax.

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Madison, WI 53705
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this, but it's quite inconvenient, especially if you want to copy the files back onto the original working disk. If you use the global copy command without prompting, the program copies the files of the same name that it finds on the target disk, which includes all the files you started with. I tried using the COPY ALL FILES program in reverse but it didn't work.

Besides the obvious benefits of saving and loading program files, it's possible to EXEC files from Ramdrive and to access the drive from within a running program. Protected software won't work with Ramdrive, but any program you use that doesn't use a protection scheme would benefit from the disk access speed of Ramdrive.

The instructions for setting up a turnkey disk are adequate, and the turnkey disk works fine. Clearer steps could have been presented, however, for the new computer user.

Ramdrive e/c is the choice if you want to use a pseudo-drive with Pascal or if you have more than 64K of auxiliary memory that you want to use as your pseudo-disk drive. The extra memory cards that are sold, however, are different, and the Ramdrive e/c might not work with the card you have. Call the vendor to find out. ■

Kenneth S. Close
Cincinnati, OH

Value/Screen

Value Line
711 Third Avenue
New York, NY 10017

Stock analysis
Any Apple II Plus or //e, 64K, 80 columns, two disk drives
$95
★★★

Value Line is a well-known service that provides the investor with facts about companies worth investing in. It publishes a weekly booklet, crammed with opinion, history, trends, and the latest information. The booklet provides thousands of data points about each company, enabling in-depth research and informed decision-making.

Value Line has just introduced Value/Screen—an Apple investor's dream—to provide, in the software mode, monthly top-of-the-line data about 1650 companies. With Value/Screen you can access 32 items of key information on each company easily, winnowing down your investment possibilities step-by-step. A glossary, the ticker symbols, company name codes, and the industry classifications are included in the program.

The Value/Screen package contains three disks: the program disk, a portfolio disk (where you keep *your* information), and a data disk (mine was labelled "August 1984"). Every month for the next 12 after you purchase Value/Screen, you will get an updated data disk from Value Line. As soon as they receive proof of purchase, they send the current disk.

You hardly need the manual since the on-screen instructions are simple. The main menu displays your basic options. The menu of 32 criteria on file about each company is the other primary screen. You might ask which companies have annual sales greater than X. From the resulting list, you could narrow the field further to those that have a current price-earnings ratio greater than Y and less than Z. You can also combine up to nine criteria for each pass through the list. Value/Screen will tell you how many companies it has found that meet your criteria, storing their names in memory. Then you go back to the main menu to ask for a report.

The report can be as simple as an alphabetical listing of all the matching companies, or you can call for up to seven columns of data, from the 32 data points filed about each company, sorted by any one of the criteria. Display the data on the screen or on your printer. If you would like to see the same company list with different data points, just order it up.

A nice extra is the Portfolio Analysis and Management option. This lets you load your own portfolio (or up to 20 dummy ones, if you like to play "what if") and generate a status report every time you get the update disk from Value Line.

Value Line is an old and trusted name in both stock market reporting and opinion. The lists of selection criteria they chose to include in Value/

Screen are those that most experienced investors use as the top-line factors. Value/Screen is not for the "barber shop" investor, but offers much power to the beginning serious investor. Value/Screen is a good program, easy-to-use and well-presented, that may make your fortune. ■

Archie Mason
Stamford, CT

Halley's Comet

American Only
13361 Frati Lane
Sebastopol, CA 95472

Astronomy program
Any Apple II, 48K
$49.95

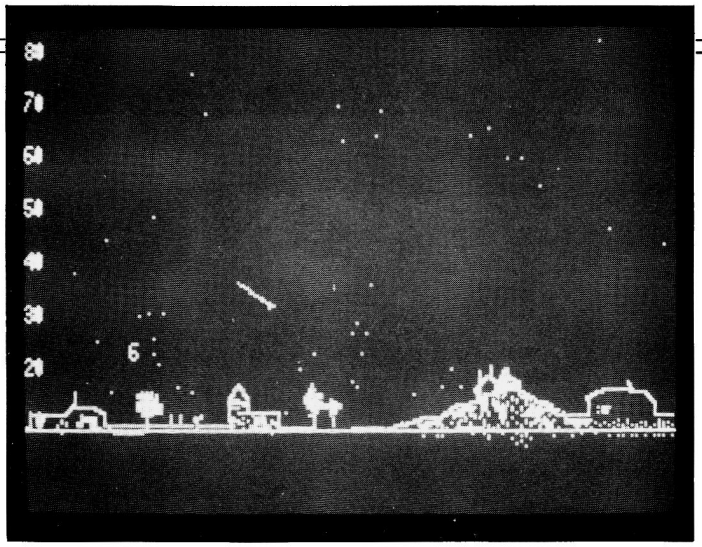
★★

The full moon brings on all sorts of reported craziness, but did you know that in 1910, an Oklahoma religious sect tried to sacrifice a virgin to Halley's comet? The comet returns early in 1986, and you should be prepared for more cosmic nuttiness. Bone up on your galactic knowledge with Halley's Comet, a software package that will help you locate and plot the comet's course. Serious stargazers, however, will want more detailed charts and information.

The menu-driven programs, on a single unprotected disk, run on the Apple II computers. Six menu selections let you read the comet's history, study its orbit, plot its path, and locate it among the stars or from any point on earth.

Unfortunately, like all too many educational programs, the first three options merely provide information. The history segment presents 16 screens of text. You can't back up to a previous screen and you can't escape from the series without pressing reset. The orbital information fills one text screen and one graphics screen. The third option, the list of past appearances, is two screens long. This material could have been condensed into four book pages for a much easier and portable guide.

Since the computer's power isn't in presenting information but in interacting with the user, the remaining three



Hi-res simulation from Halley's Comet.

options are an improvement over the first three.

Option 4 plots the orbit of Halley's comet. Through on-screen instruction, the program helps you calculate the comet's position, orbit, and celestial coordinates (right ascension and declination) on a given date. You may also choose one of three scales for your solar system diagram which will show the sun, Venus, Earth, and Mars, but not their respective orbits. Plotting the orbit can take up to four minutes, depending on the selected starting date, and you can't back out of the plot without pressing the reset key. Unfortunately, in this segment, a program bug produces an illegal quantity error message in line 53 if the program tries to plot near the edge of the screen.

Option 5 pinpoints Halley's comet among the stars. You may plot the path of the comet for the 1986 appearance on an all-sky star chart, or you may plot the comet's position in a smaller area of the sky. The all-sky plot takes three minutes, and you can't back out. This plot is always the same and there seems to be little reason to put it on a computer screen instead of on a printed chart.

The last option, and the most useful, requests that you specify a date, time, and location so the program will draw a diagram that shows the comet, sun, moon, and planets in position given your horizon. Drawing the diagram takes a few minutes if you want the program to include stars. This function can't be duplicated in any book and justifies the purchase if you journey to a different latitude to trail the comet.

Dabblers in astronomy may want Halley's Comet, but if you're serious about observing Halley's comet you'd do better to read books and magazines that have been recently published on the subject, especially if your supply of $50 bills is limited. ■

Mike Seeds
Lancaster, PA

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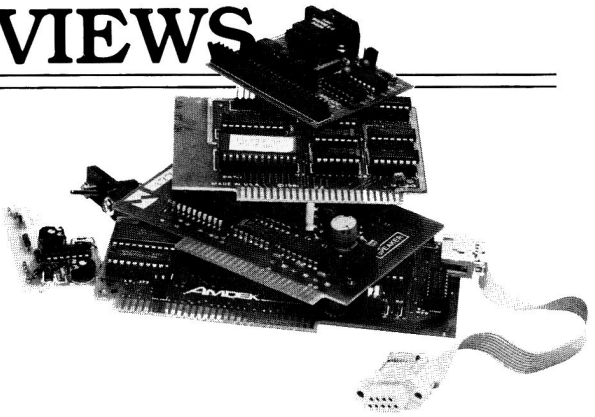


inCider's Ratings

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

The Sider

First Class Peripherals
P.O. Box 6187
Lehigh Valley, PA 18001

Hard disk drive
Apple II Plus and //e
$695

★★★★

The Sider, a high-capacity mass-storage system for the Apple II, provides outstanding performance at a very reasonable price. Anyone limited by the Apple's modest, 143K-per-disk storage capacity will appreciate having The Sider's 10 megabytes of storage (the equivalent of 70 standard floppies) at his fingertips. In addition, The Sider supports the most popular operating systems and programming languages used on the Apple, so almost any application can use this extra storage. Best of all, the system is priced less than most dual floppy-disk units, and far less than comparable mass-storage devices.

Installation and Set-up

When The Sider was delivered to me, it was suspended by foam blocks, safely isolated from the outer carton. It was refreshing to see that the manufacturer took a few extra steps to assure the product's safe arrival.

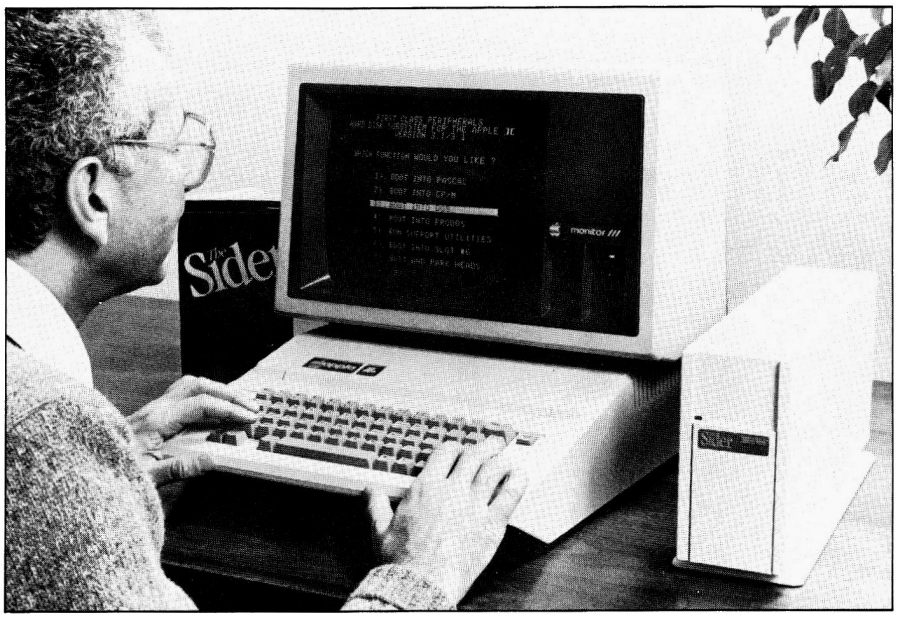
A circuit card installed in slot 7 connects the unit to the Apple. A ribbon cable leads from this card to a connector box, which you mount onto the computer's rear panel, and The Sider's main cable attaches to this box—the complete connector assembly protruding about 5 inches from the rear of the computer. If you require extra storage, you can chain two Siders together. In that case, a cable is routed from the rear of the first Sider and attached to the second.

The unit stands just 7½ inches high, with a width of only 3½ inches. Lengthwise, though, The Sider needs a bit of room, measuring 16 inches front-to-back, with another 5 inches necessary for the cable assembly on the rear. Its white, textured cabinet is vented along the top and bottom for cooling. Aside from a rear-mounted power switch, the unit has no adjustments or controls. A single lamp on the front panel indicates the unit is reading or writing data, and the motor produces only a soft whirring sound.

Every part of the system—The Sider itself, the controller card, and connecting cable—has an unmistakable feel of quality. First Class Peripherals chose premium-grade parts for everything from hardware on up. When small things look this good, you feel confident about the components inside the case, which you can't see.

Operating Systems

The Sider supports four of the Apple's most popular operating environments: DOS 3.3, ProDOS, CP/M, and Pascal. You can set aside as much, or as little, disk space as you wish for each system, or you can choose the default settings—roughly one quarter (about 2.5 megabytes) of the disk's



storage capacity for each system.

The DOS area is broken down into three large volumes of 1600 blocks each (the size of three standard floppies), and nine smaller volumes of 560 blocks each. All of The Sider's DOS 3.3 data is accessed through slot 7, drive 1 of the Apple. Although the storage capacity of each large volume is much greater than that of a floppy disk, the maximum number of files per volume, 106, remains the same. You can change the number of large and small volumes during the set-up process to suit specific needs.

The ProDOS portion appears as two separate volumes—/Hard1 and /Hard2—each with 2432 blocks; this default size can be increased or decreased. You can access the volumes either by name or as slot 7, drive 1 and slot 7, drive 2. The directory and subdirectory structure of ProDOS is especially helpful when using mass storage devices.

I loaded AppleWorks into the ProDOS portion of The Sider and found the two to be an ideal combination. There is enough room for any data files you're likely to need, and The Sider's speed enhances many of AppleWorks' normally sluggish commands.

Four volumes—4, 5, 11, and 12—comprise The Sider's Pascal area. The unit treats the floppy disks (normally volumes 4 and 5) as volumes 9 and 10. Pascal installation is more involved than that for DOS or ProDOS, and requires careful adherence to the manual's step-by-step instructions.

"With the right software, you can do almost any task without touching a floppy disk."

I was disappointed when I tried to install CP/M onto The Sider. Even though I had allocated space on the disk for that system, the installation utility supports only Microsoft CP/M 2.23 and PCPI CP/M. My system uses a Microsoft Premium Softcard //e, which requires CP/M 80, version 2.25. I called First Class Peripherals to see if there was some way around the problem, and was informed that an installation driver for the newer version of CP/M was in development but not available as yet. When CP/M is installed properly, The Sider promises four volumes—addressed as disks A:, B:, C:, and D:—of 608K each in its default configuration. The floppy drives in slot 6 will be seen as drives E: and F:.

Operation

Once the system is installed and configured, it's delightful to use. The computer boots directly into the hard disk; no floppy disk is required. In fact, with the right choice of software, you can do almost any task without ever touching a floppy disk, and in a fraction of the time. I loaded a 115-block BASIC program from The Sider in just under ten seconds; the same program takes 29 seconds to load from floppy. Catalog listings appear almost immediately, and text files move on and off the hard disk swiftly.

For initial start-up, First Class Peripherals recommends that you wait a few seconds after you first turn on The Sider, then apply power to the computer itself. Almost immediately, a menu appears from which you select the desired operation: proceed into any one of the four operating systems, boot a disk in slot 6, run The Sider's support utilities, or quit and park the heads for transport. The start-up menu also appears whenever you re-boot the computer from the keyboard.

Software Utilities and Support

The software utilities supplied with the unit include FCP's FID, a version of Apple's File Developer routine enhanced to support The Sider's multiple-volume structure. This program makes it easy to transfer programs and data files between different DOS volumes on the hard disk, as well as to and from a floppy. The Sider also provides a complete diagnostic routine to check out all parts of its system.

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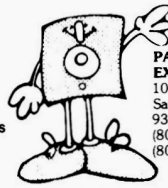

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A back-up utility makes archival records and restores data to The Sider if necessary. This routine supports all but the ProDOS section; back-up there is done with ProDOS' own file utilities.

FCP provides toll-free telephone support for Sider users. I called the number several times for technical information, and found the staff to be friendly and informative. Support like this is an important fact to consider whenever buying a product by mail order.

The Sider carries a one-year warranty on both parts and labor. After the first year, FCP will repair the unit for a fixed rate of $150. The manual provides a very thorough diagnostic checklist to help you locate the cause of any trouble that may arise.

Overall Impression

The Sider is one of the nicest accessories I've ever used with an Apple II. I operate an electronic bulletin board, so my equipment remains on 24 hours a day; through four full weeks of nonstop operation, The Sider never let me down.

The Sider's $695 retail price is less than the cost of an Apple DuoDisk. Comparing The Sider to Apple's 5-megabyte ProFile hard disk is no contest: The Sider costs half as much, stores twice the data, supports more operating systems, and is much more convenient to use.

In short, First Class Peripherals' Sider *is* a first-class peripheral by anyone's standards. It has that rare combination of modest price and top-rate performance. I recommend it highly for any serious user. ■

W. Charles Doherty
South Dartmouth, MA

SpeeDemon

McT
1745 21st Street
Santa Monica, CA 90404

Speedup card
Apple II, II Plus, //e
$295
★★★

If you'd like to put your Apple in the fast lane, McT offers SpeeDemon, a peripheral board that makes the Apple II Plus and //e run up to 3½ times faster than normal.

This compact unit occupies less space in your computer than many printer-interface and modem cards. Among the 26 integrated circuits on SpeeDemon's 7½-by-3-inch real estate, you'll find the expected complement of gates, buffers, and latches, along with 8K of fast static RAM, 2K of PROM, programmable array logic (PAL) chips, and a 65SC02 microprocessor—a faster (4 MHz) version of the standard 6502 Apple microprocessor.

SpeeDemon, unlike other peripherals, affects your Apple's performance on a global scale. However, fitting it into a II Plus or //e system is surprisingly painless. Any slot will do, except for the II Plus slot 0 and //e slot 3.

How do you run a 32K program with only 8K of fast RAM, you may ask. McT's solution is to move code, as it's encountered, from Apple memory into SpeeDemon RAM and execute it there. (When reading from or writing to Apple memory, SpeeDemon slows down to 1 MHz.) PAL circuitry partitions fast RAM so the code (which may hop from one end of Apple memory to the other) can occupy adjacent bytes in fast RAM.

I tested SpeeDemon on two sample systems. One was a II Plus equipped with a disk controller, printer interface, RAM card, and Mockingboard. The other was a //e similarly configured, except for an extended 80-column card in the expansion slot and the addition of modem cards.

Because SpeeDemon is incompatible with some peripheral cards, McT has provided a self-test (a series of checks including one for memory compatibility) that works on systems with some form of game button 1. If you have the game-button capability, activate it within two seconds of turning the computer on. If all is well, in a few minutes SpeeDemon will proceed to a standard disk boot. (A II Plus without a RAM card in slot 0 will hang at test address $D000. This is normal, but you must turn off the computer to exit the test sequence.)

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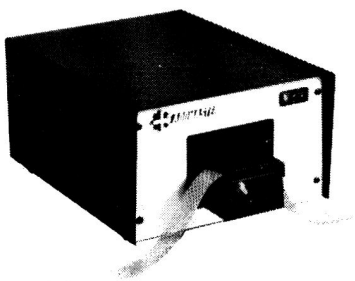

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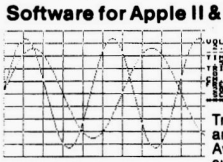

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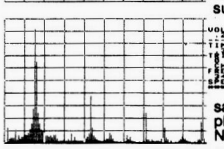

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The board's designers have supplied two "off buttons." If you press the escape key within two seconds of turning the computer on, or later use a single POKE to the board, SpeeDemon will release the bus and lock itself in a loop. Unfortunately, there is no way to switch in and out of SpeeDemon's control during program execution.

Zipping Along

I verified McT's speed claims by running the code sequence:

```
$0F00:A9 00 4C 00 90
$9000:A9 00 4C 00 0F
```

A frequency-counter tap on the microprocessor-clock output read the maximum possible speed of 3½ times normal. However, this simple loop requires only one group of fetches. Large BASIC programs will operate at only 2½ to 3 times the normal speed.

SpeeDemon always slows down for disk access to preserve critical timing relationships. Other input/output block ($C080–$C0DF and $C0F0–$C0FF) access occurs at maximum speed. Fortunately, most peripherals either do not use the I/O area or employ circuitry that works easily at the higher speed.

When a slowdown is necessary, SpeeDemon provides a "speed jumper." With the jumper plugged in, access to slot 4 and slot 5 input/output occurs at normal Apple speed.

Hardware Considerations

The peripherals in my test systems worked fine under SpeeDemon's control in a number of applications. Problems arise, however, when correct functioning depends on critical timing loops, such as in communications and music applications. For example, modem/phone dialer utilities must run at normal speed. Programs that use the Mockingboard will run, but the music or speech is usually speeded up or absent. Joystick input, unfortunately, is also a timing-loop function. Consequently, games and utilities that require a joystick, a graphics tablet, or paddles can't run with SpeeDemon.

SpeeDemon's current drain measures 1.2 amps (whether or not the board is active). While //e users don't need to worry, II Plus owners using peripherals such as an 80-column card or a modem board should check present usage before taking the plunge.

Since PAL chips tend to run hotter than most integrated circuits, I checked SpeeDemon's effect on the Apple's operating temperature. After one hour with the cover on, the temperature inside the case was five degrees higher than usual.

Performance

If time is money, then SpeeDemon should top the Apple business user's wish list. It is valuable with word processors, spreadsheets, and data bases, as well as disk-filer and copy utilities. I found that, with SpeeDemon, Screenwriter II replaces a word 2.6 times faster than usual; Incredible Jack performs calculations 2.6 times faster; AppleWorks sorts 679 records 1.8 times faster; Disk Vector II sorts 97 entries 3.5 times faster; and Locksmith 5.0 copies disks 1.8 times faster. The lower figures reflect disk accesses.

For those who regularly program in machine code, note that by executing under SpeeDemon you acquire eight powerful new instructions (27 new opcodes). Fast screens (both hi-res and text) and improved keyboard response are additional benefits guaranteed to spoil programmers and business users alike.

Because of its alacrity, SpeeDemon makes most fast-paced arcade games unplayable. But it improves the performance of adventure games written in hi-res and double-hi-res graphics. Chess fanatics will especially appreciate playing against a higher-level computer opponent with less delay.

SpeeDemon suffers from having no documentation. However, its virtually transparent operation minimizes the problem. All in all, it's a very attractive package, ranking, at $295, among the better bargains on the peripherals scene. Even where normal task execution time is only a few seconds, SpeeDemon contributes to the subtle, yet significant, difference between waiting for the computer and having the computer wait for you. ■

Jeff Hurlburt
Houston, TX

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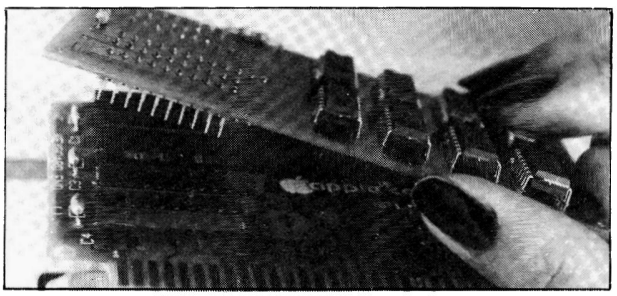

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Wordstar w/Z-Card	169.00
Wordstar Pro w/Z-Card	229.00
PRACTICORP	
Practicalc II	43.00
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Microsoft Budget	95.00
Multiplan	75.00
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Word Juggler & Lexicheck	119.00
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The Sensible Speller	74.00
SIERRA ON-LINE	
The General Manager II	132.00
The Screenwriter //e	78.00
SILICON VALLEY	
List Handler (II+, //e, //c)	48.00
The Handlers (II+, //e, //c)	103.00
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Stock Portfolio System	75.00
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TK! Solver	179.00
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PFS: Report	73.00
PFS: Write (//e, //c)	73.00
PFS: Proof (//e, //c)	43.00
PFS: Access (//e, //c)	43.00
STONEWARE	
DB Master Business Team	219.00
DB Master Business Writer	98.00
DB Master Version Four Plus	210.00
DB Master (Corvus)	299.00
VISICORP	
Flashcalc II+, //e, //c	62.00
Visitrend/Visiplot	62.00

Educational Software

	Our Price
APPLE	
Apple Logo // (//e, //c)	84.00
BARON'S	
Computer SAT	54.00
GMAT	54.00
CBS	
Career Planning	55.00
Coast To Coast	34.00
Goren's Bridge	49.00
Mastering the SAT	93.00
Micro Speed Reading	78.00
Success w/Math (ea.)	15.50
DAVIDSON & ASSOCIATES	
Classmate	30.00
Math Blaster	30.00
Speed Reader II	42.00
Speed Reader Data A,B,C, or D	15.00
Spell-It	30.00
Word Attack!	30.00
DESIGNWARE	
Grammer Examiner	28.00
Math Maze	24.00
Mission Algebra	28.00
Spellagraph	24.00
Spellakazam	19.00
States & Traits	28.00
DLM	
Alligator Mix	21.00
Alphabet Circus	19.00
Demolition Division	21.00
Number Farm	19.00
Spelling Wiz	21.00
EDU-WARE/PEACHTREE	
Algebra 1, 2, 3, or 4	23.00
Algebra 5 or 6	28.00
Compu-Read	17.00
Compu-Math: Arithmetic Skills	29.00
Hands-on BASIC Programming	45.00
Introduction to Counting	25.00
Learning To Read 1,2,3, or 4	25.00
PSAT Word Attack Skills	28.00
SAT Word Attack Skills	28.00
Spelling Bee w/Reading Primer	23.00
Writing Skills 1,2,3 or 4	25.00
EINSTEIN CORP.	
Einstein Memory Trainer	55.00
HARCOURT, BRACE	
Computer SAT	48.00
KRELL	
Adventure in Flesh	39.00
Krell Logo	65.00
Krell SAT - Gold	225.00
LEARNING COMPANY	
Addition Magician	22.00
Bumble Plot	24.50
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Magic Spell	22.00
Reader Rabbit	24.50
Robot Odyssey I	30.50
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Chivalry	32.00
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Accessories

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Applied Engineering Cards	Call
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Cool+Time	69.00
Hayes Microcomodem //e	220.00
Hayes 300 Baud Smartmodem	199.00
Hayes 1200 Baud Smartmodem	459.00
Novation Apple Cat II	195.00
Novation 212 Apple Cat II	375.00
Pro Modem 1200 (External)	Call
Pro Model 1200A (Internal)	Call
Popcom X-100 (1200 Baud)	Call
ERA 2 by Microcom	375.00
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Apricorn 16K Ramcard	68.00
Microsoft Premium Softcard //e	295.00
Extend 80 (Carib. Computer)	115.00
MCT Speed Demon	219.00
Saturn 128K Ram	215.00
Neptune 80 Col. 64K Card	185.00
Accelerator //e	245.00
Videx Videoterm w/SS Inv.	199.00
Videx Ultraterm	245.00
Corvus Hard Disks	Call
Mockingboard A Board	78.00
Mockingboard C Board	145.00
Mockingboard D Board (//c)	145.00
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The Cricket (//c)	120.00
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Hayes Mach III Joystick //e	37.00
Kraft Joystick	33.00
TG Select-A-Port	28.00
Apple Super Serial Card	129.00
SeriAll Interface Card	129.00
Alpha Bits Interface	85.00
Pkaso/U Interface	119.00
Grappler+	99.00
Buffered Grappler+	149.00
Nice Print (Spies Labs)	129.00
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Print-It	139.00
Thunderclock+	109.00
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Muppet Learning Keys	45.00
Koala Pad	75.00
Key Tronic Keyboard	245.00
Trackhouse Key Pad	110.00

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ImageWriter	495.00
ImageWriter (Wide Carriage)	565.00
Scribe Printer	245.00
BROTHER	
HR-35	859.00
DYNAX	
DX-15XL	379.00
DM-40	949.00
EPSON	
FX-80+ ..... Call	379.00
FX-100+ ..... For	Call
RX-80 F/T+ .... Most	Call
RX-100 ..... Recent	Call
LQ-1500 ..... LOW LOW	Call
JX-80 ..... Prices!	Call
JUKI	
6100	399.00
6300	769.00
OKIDATA	
Microline 82A	309.00
Microline 83A	549.00
Microline 92S //c/Mac/Lisa	429.00
Microline 92P	359.00
Microline 93P	599.00
Microline 84P	669.00
PANASONIC	
KPX-1090	219.00
KPX-1091	299.00
KPX-1092	439.00
KPX-1093	619.00
PROWRITER (C. Itoh)	
ProWriter 8510 AP	299.00
ProWriter 1550 AP	449.00
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SR-15 (200 cps)	609.00
Powertype	329.00
TOSHIBA	
P-1340	719.00
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Disk Drives

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Disk II Drive	299.00
Duo Disc w/Acc. Kit	639.00
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Apple //c External Drive	269.00
Macintosh External Drive	399.00
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Rana Disk Controller	79.00
QUENTIN	
AP 100A Full Height	199.00
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Color 300 (Composite)	239.00
Color 600 (RGB)	419.00
Video 300G Green	129.00
Video 300A Amber	139.00
PANASONIC	
Hi—Res Green	149.00
Hi—Res Amber	155.00
10" Dual Mode Comp. Color	259.00
TEKNICA	
MJ-22 RGB Color	345.00
SAKATA	
SC-100 Color	245.00
SC-200 RGB Color	455.00
SG-1000 Green	95.00
SA-1000 Amber	110.00
STS-1 Stand	35.00
TAXAN	
RGB Vision III (Hi-Res)	399.00
210 12" Color (Lo-Res)	264.00
Green (Hi-Res)	120.00
Amber (Hi-Res)	130.00
410-64 RGB-2 Interface	185.00

Home

	Our Price
Home Accountant	43.00
Dollars and Sense (II+, //e)	60.00
Dollars and Sense (//c)	71.00
Monogram Forecast	39.00
The Accountant	60.00
Time is Money	62.00
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Networth	48.00
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Bank Street Writer	42.00
Bank Street Speller	42.00
Homeword	43.00
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Homeword Filer	43.00
ASCII Express Professional	79.00
Softerm II	128.00
Compuserve Starter Kit	25.00
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Muppet Learning Keys

Koala Technologies
3100 Patrick Henry Drive
Santa Clara, CA 95052

Alternative keyboard
Preschool software
Apple //e and //c
$79.95
★★★

Young children have difficulty finding letters on the standard computer keyboard. So, Muppet Learning Keys, a 14-inch square touch tablet, positions letters in the order in which kids learn them, sequentially, with the alphabet appearing in a five-row grid. This piece of hardware is a well-designed number- and letter-learning toy for preschoolers. The child who will use it to best advantage is one who has already learned the alphabet, but who does not yet consider it old hat. However, the accompanying software doesn't fully exploit the keyboard's potential.

The keyboard—designed by Muppets' New York art director Michael Frith, a master of classy form—looks great. The board, measuring 1 inch thick and weighing less than a pound, resembles a school desk top. Colorful membrane-type keys represent items on the desk. Along the top lies a realistic-looking 9-inch ruler, and directly beneath is a set of plastic water colors spanning the spectrum and including black and white. Then come the letters: capital letters on a slate-green board, each letter slightly raised. It reminds me of the alphabet cards that used to line the upper rim of school blackboards.

A hard, blue plastic case surrounds the keys and forms a handle for easy portability. The board is also easy to clean and should be able to withstand some rough-and-tumble handling. A cord-wrap on the back takes care of the wire. To plug it in, just attach the 9-pin connector to the game port at the back of the computer. The only glitch is that you must internally disconnect any joystick.

Thought and care went into the concept of this keyboard, resulting in a non-threatening introduction to the world of computers. The problem is that the program is strictly an alphabet- and number-learning tool: Once the child has mastered the alphabet and counting to nine, there's nothing left to do except look at the funny pictures.

The software doesn't let the child spell words or perform arithmetic operations, even though function signs (+ = − × ÷ space) are keys on the board. The child can only watch these signs move. The equal sign jumps back and forth and the division sign up and down. Punctuation keys can be used only for identification, and the color keys, while providing fun as you change walruses from green to red, fail to offer the child an opportunity for creativity.

Program Operation

The menu gives you a choice of three options: Discovery, Letters, or Numbers. Pressing the arrows on the Official Frog Scout compass moves an on-screen arrow from one choice to the next. When you press the Go button, a green traffic sign above Kermit, you get the selection.

With Discovery, a stage a la Muppet Show appears. If you touch a number, that number appears on the side of the screen and in the center will be little blobs, as many as the number you hit. You can change their colors by pressing the appropriate water-color key. The pink Eraser button clears the stage for more fun.

Press a letter and you see that letter and an animal or object beginning with that letter. If you touch a number right after a letter, instead of one alligator (for A), you'll get as many as the number you hit. Change the traditional green with the water-color keys. Want to see an alligator do a soft shoe? Hit Go. To the tune of "Camp Town Races," the alligator, with cane in hand, begins to shuffle. Is he driving you nuts? Press Stop, Fozzie Bear holding a stop sign. I and the children who played with me had the most fun in the Discovery mode watching each animal or object perform.

The other two activity choices, Letters and Numbers, offer fairly standard fare, except the Eraser and color keys don't work here. Numbers and letters appear randomly and the child must hit the correct corresponding

key. In the Letters mode, when the child hits the correct letter, the same moving animal or object seen in the Discovery mode appears. Numbers shows a collection of those objects, and the child must hit the numeral for the correct number. A Parent mode lets you modify the letters and numbers that appear on the screen. The documentation clearly explains what to do but offers no additional activities.

Help!—Miss Piggy tied to a railroad track—is available at any step of the way. On the Oops! key, Gonzo, fired from a cannon, is headed for a brick wall. This key takes you back one step from where you currently are—not one of the more exciting buttons. Zap! takes you to the original menu.

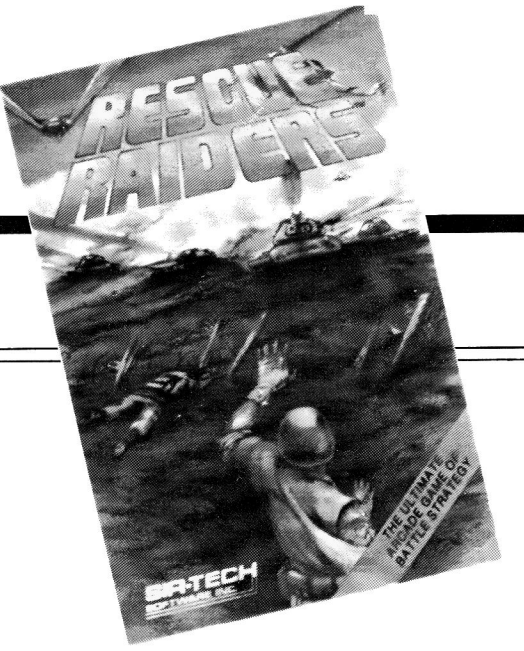
Conclusions

Overall, the keyboard is a cheerful alphabet-learning toy. Its handsome design will attract kids as well as adults; fun and humor do pop right off the board, and the graphics and sound are terrific. However, I think it's a tremendous limitation that a child cannot spell words with this keyboard no matter how many fire-breathing dragons or popping jack-in-the-boxes can fill the screen at once.

It does look as if the board has spelling and math potential, since Koala informs me that new software (hopefully for those purposes) is being developed. For the moment, though, I can't find much longevity here, and for $79.95 any hardware or software for children has to offer extended use. Also, at some point the child will have to graduate to a standard keyboard—and then what? This Muppet keyboard will have contributed nothing to adjusting to the real one.■

Anita Malnig
San Francisco, CA

NEW SOFTWARE



Rescue Raider features land and air battles.

New from Sir-Tech

From your command helicopter high over the battlefield, you direct the action in **Rescue Raiders**. This hi-res game runs on any 64K Apple II, requires a joystick, and is priced at $34.95. Raiders combines arcade skills with strategic planning to produce a wargamer's delight. It comes from the wizards at Sir-Tech Software, 6 Main Street, Ogdensburg, NY 13669. Use number 475 on the Reader Service card.

Music to My Keys

Your Apple can become a **Magic Piano** ($49.95) with help from EduSoft. Learn more about music fundamentals, write your own music, and print out your masterpiece on many popular dot-matrix printers. Magic Piano includes two skill-building exercises, the Rhythm Game and the Melody Game. For all the details, send a note to EduSoft, P.O. Box 2560, Berkeley, CA 94702. Circle number 474 on the Reader Service card.

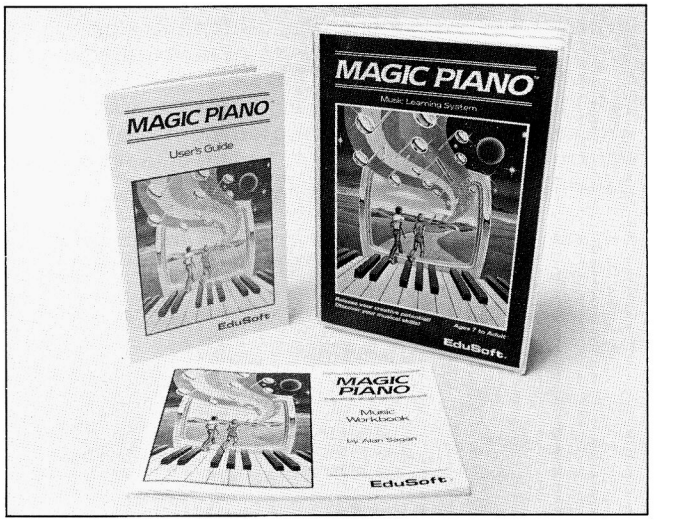
Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute endorsement by inCider *of any given product.*

Bridge Tutorial

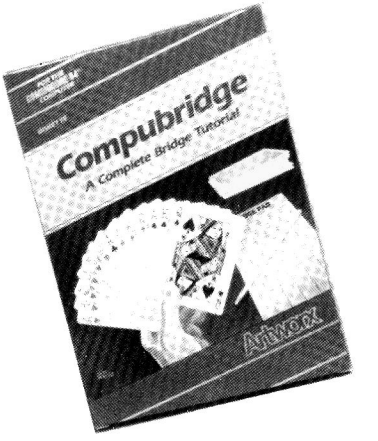
Compubridge ($24.95) ends the frustration of learning how to play bridge. The ten chapters and eight quizzes teach you the basics, while the computer randomly generates practice hands. As you play, Compubridge evaluates your moves, corrects mistakes, and suggests alternatives. It runs on any Apple II and is published by Artworx, 150 North Main Street, Fairport, NY 14450. The Reader Service number for Compubridge is 482.

AppleWorks Templates

Save hours of work by loading these templates into your AppleWorks. **Accountant** ($29.95) monitors income and expenses for your home or small business. **Portfolio** ($29.95) tracks your stocks, bonds, and other investments. For $39.95, **Payroll** figures employee pay, overtime, days off, and taxes. **Financial Calculator**, at $29.95, puts many financial formulas at your fingertips. These programs require AppleWorks and an Apple //c or 128K //e. Contact Rocky Mountain Research Group, 416 Arnold, Bozeman, MT 59715. The Reader Service number is 476.



Write, play, and print music with Magic Piano.



Compubridge, your complete bridge tutor.

edited by Kerry J. Lanz

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Articles set off by quotation marks are published complete with type-in program listings.

New Software

Call the Ghostbusters, care of Activision.

Computerized Health Education

Developed by a practicing family doctor, **Home Doc** ($49.95) gives you answers to the most-often asked questions and complaints brought to a doctor's office. Data ranges from common colds to cancer prevention. It also keeps medical records for all members of your family. Available for any Apple II, the Doc's office is located at Comp Doc, 6538 South Jungfrau Way, Evergreen, CO 80439. The Reader Service number is 485.

Education from Hayden

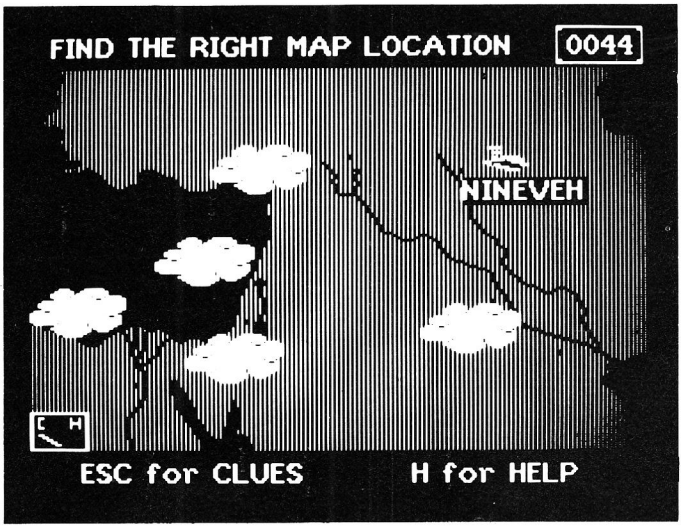
Space Sagas helps children aged 6–10 write and illustrate their own adventure stories. **Telly Turtle** is a Logo-based graphics language that uses icons instead of typed commands. **Learn How to Program in Basic** includes sound, color graphics, and animation. All these programs work on any Apple II computer and cost $29.95. They come from Hayden Software, 600 Suffolk Street, Lowell, MA 01854. Use number 483 on the Reader Service card.

Meet the Ghostbusters

Who're you gonna call? Call your local dealer for **Ghostbusters** ($39.95). Join the battle against slime in the world as operator of a Ghostbuster franchise, struggling through a series of arcade-style screens to capture Zuul, titan of the netherworld. You can bust on any Apple II and you need a trusty joystick. The game comes from Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043. The Reader Service number is 479.

Beagle Strikes Again

Get the bugs and bytes out of your programs with **D Code** ($39.95). This utility works on any Apple II to analyze your programs and combine program lines, shorten variable names, and check syntax while you type. On the lighter side, **I.O. Silver** ($29.95) combines strategy and arcade action into one fast-moving game. Both come from those crafty devils at Beagle Bros, 3990 Old Town Avenue, Suite 102C, San Diego, CA 92110. Use Reader Service number 470.



Right Again helps you learn more about the Bible.

Computer Helps Bible Studies

Learn more about the Bible from **Right Again**, an educational game designed for ages 8–12. Priced at $39.95, this program features several hires games that help you identify a person, place, or thing from the Bible. Right Again works on the whole Apple II family of computers. Get more information from Ascension Designs, 6108 North Western, Oklahoma City, OK 73118, or check number 473 on the Reader Service card.

Graphing AppleWorks

Add full-featured graphing to your AppleWorks spreadsheet files. **GraphWorks** ($79.95) is a standalone ProDOS utility for an Apple //c or //e. It draws line, bar, stacked bar, and pie charts from AppleWorks files. The final graph can be sent to many popular printers, including Imagewriter, Scribe, and Epson. Get the complete picture from PBI Software, 1155B-H Chess Drive, Foster City, CA 94404. Use number 486 on the Reader Service card.

Milliken's New Adventure

You may want your home to be a castle, but **Lantern of D'Gamma** ($34.95) leaves you just outside. Logic, problem solving, and creative thinking will get you across the moat and inside, then help you locate the hidden treasure. This is part of a series of adventures from Milliken Publishing, 1100 Research Boulevard, St. Louis, MO 63132. The Reader Service number is 477.

Utility for Apple Writer

Your Apple Writer needs a **Companion** ($30.95) for sophisticated mailing projects. Companion creates and edits mailing lists, merges a letter with your list, makes labels, and converts existing lists from AppleWorks and QuickFile. You need Apple Writer and an Apple //e or //c, and it comes in DOS 3.3 or ProDOS. For details write to Companion Software, 1956 McCollum Street, San Luis Obispo, CA 93401. Mark number 478 on the Reader Service card.

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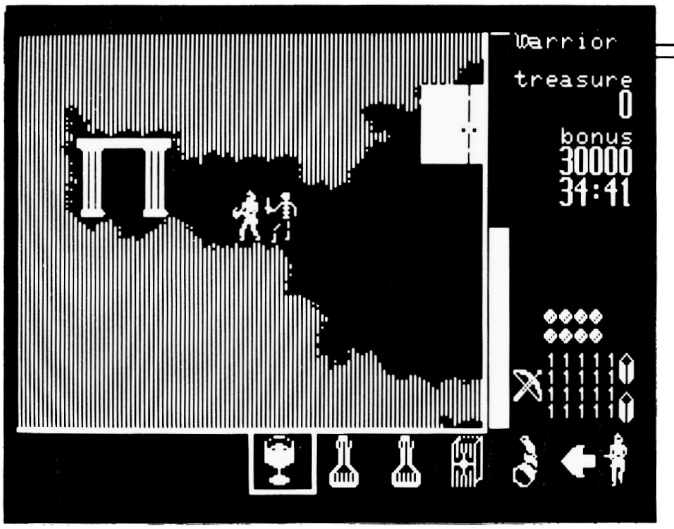


Become the Gemstone Warrior seeking treasure.

Real-Time Adventure

The newest game from SSI is **Gemstone Warrior**, a fast-action strategy game. With real-time combat and hi-res display, Warrior ($34.95) is different each time you battle monsters and the clock to find the missing Gemstone. This challenge comes from Strategic Simulations, 883 Stierlin Road, Building A-200, Mountain View, CA 94043. Mark number 481 on the Reader Service card.

Help with Career Planning

Examine your job skills and your career objectives with **Career Planning** ($79.95). Compatible with any Apple II computer, this four-disk package analyzes your current and ideal work environment, job responsibilities, and salary. Planning could help you develop an effective career path. Check with CBS Software, One Fawcett Place, Greenwich, CT 06836, or circle number 480 on the Reader Service card.

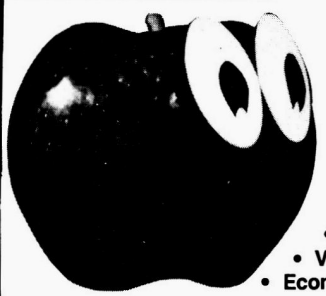
Arcade Word Game

Children learn word recognition and spelling when they play **Boppie's Great Word Chase** ($29.95). Chase has a 256-word list in eight levels of difficulty and works on any 64K Apple II. You guide Boppie around the screen, avoiding hazards as you build words. The chase begins at DLM, One DLM Park, Allen, TX 75002. Use Reader Service number 484.

Applesoft Editor

Edit your Applesoft programs with word-processor-style commands using **DAS Editor** ($39.95). This ProDOS editor works on the Apple //e and //c and adds such editing features as search, replace, and macros. Write and debug your program as easily as you write a letter. Contact Night Owl Productions, 5734 Lamar Avenue, Mission, KS 66202. Circle number 489 on the Reader Service card.

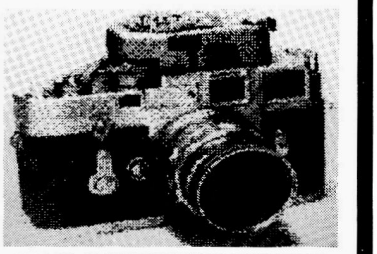
Circle 204 on Reader Service Card.



LET YOUR APPLE SEE THE WORLD!

The DS-65 Digisector® opens up a whole new world for your Apple II. Your computer can now be a part of the action, taking pictures to amuse your friends, watching your house while you're away, taking computer portraits . . . the applications abound! The DS-65 is a random access video digitizer. It converts a TV camera's output into digital information your computer can process. The DS-65 features:

- **High Resolution** — a 256 × 256 picture element scan
- **Precision** — 64 levels of grey scale
- **Versatility** — Accepts either NTSC or industrial video input
- **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
- Line-scan digitizing for reading charts or tracking objects
- 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

*Paper Tiger is a trademark of Integral Data Systems, Inc.

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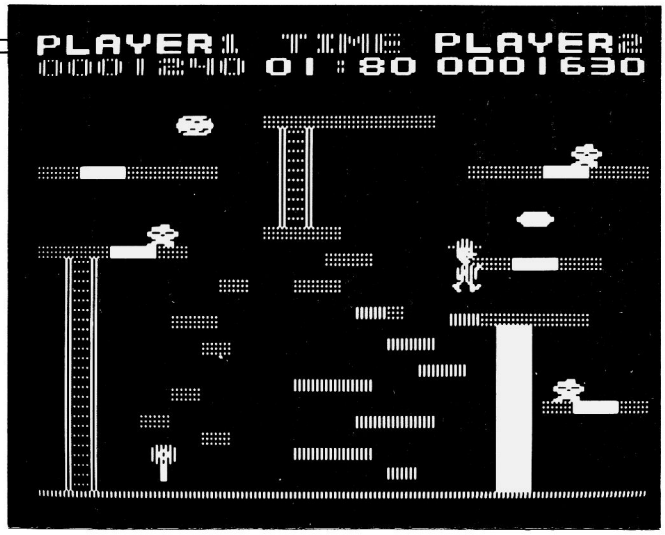
Mailing Lists Made Easy

Rolodex, a company synonymous with address lists, has published **Label Express**, priced at $49.95, for the Apple //e and //c. Create your own labels, maintain mailing lists, address envelopes, and print name badges. You can even merge two mailing lists into one. The address for more details is Rolodex, 245 Secaucus Road, Secaucus, NJ 07094. The Reader Service number is 487.

Haunting Adventure

Do you dare explore the Count's castle in the illustrated and animated game **Werewolf** ($36.95 for any Apple II)? Try your hand at solving the mystery, set in a castle full of danger, suspense, and the unexpected. Keyboard commands guide your character as you avoid hazards that literally leap at you. If you dare, contact Gambit, P.O. Box 70858, Houston, TX 77270. Use number 472 on the Reader Service card.



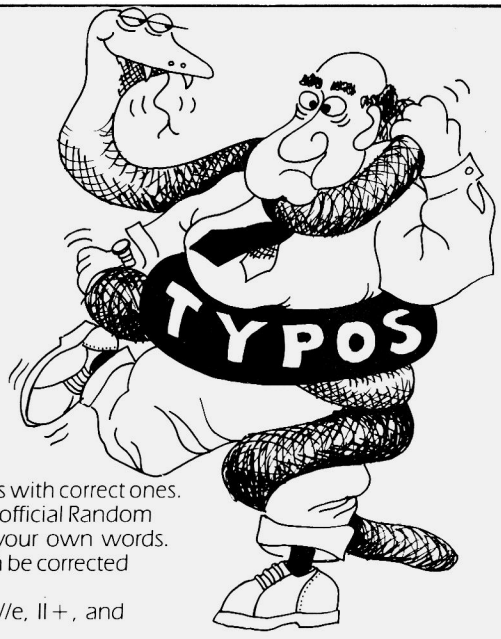
Bounty Bob tries again in Miner 2049er II.

Return of Bounty Bob

Just when Bounty Bob got out of the radioactive mine, along comes **Miner 2049er II** ($40) with ten new screens. Chutes, ladders, transporters, and conveyors challenge even the most experienced prospector. The game works on any Apple II and requires a joystick. Get this treasure from Micro-Lab, 2699 Skokie Valley Road, Highland Park, IL 60035. The Reader Service number is 471.

Circle 353 on Reader Service Card.

It takes only One Spelling Mistake to blow your image



No matter how much work you've put into that report, no matter how accurate your references and sound your conclusions, a single spelling mistake can destroy its credibility.

HOW CAN YOU GUARD AGAINST THIS? Simply check your paper with Sensible Speller™, the software program that is a virtual electronic dictionary. With tireless, efficient detachment, it will catch mistakes you would not notice. It will in fact display misspelled words in context, suggest the correct spelling, and allow immediate replacement of misspelled words with correct ones.

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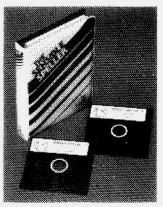
WHERE MAY SENSIBLE SPELLER BE PURCHASED? It is available at your dealer for $125 in either the "IV" or ProDOS version.* It may also be ordered direct, enclosing $1.25 for shipping. Visa/MasterCard/Check/COD welcome.



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KENSINGTON, System Saver Fan	$ 90	$ 65
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RCA, Monitor Cable	$ 15	$ 9

ACCESSORIES

CURTIS, Diamond, 6 outlets, switched	$ 50	$ 29
Emerald, 6 outlets, 6' cord	$ 60	$ 35
Ruby, 6 outlets, 6' cord, filter	$ 90	$ 52
Sapphire, 3 outlets, w/filter	$ 80	$ 46
EPD, Lemon, 6 outlets/wall	$ 60	$ 29
Lime, 6 outlets/cord	$ 90	$ 45
Orange, 6 outlets/cord	$ 140	$ 60
Peach, 3 outlets/wall	$ 98	$ 39
Kiwi, 1 outlet/wall		CALL

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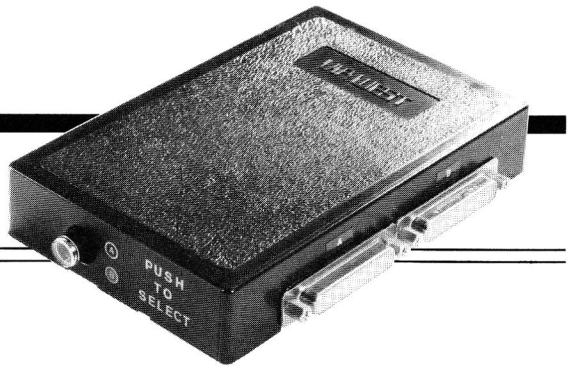


Two peripherals on one serial port with DSS.

Sharing the Port

Share one RS-232 port between two peripherals with the **DSS** ($42). Press the button to switch between two modems, printers, or other serial applications that require access to your Apple's serial port. This product comes from Via West, 534 North Stone Avenue, Tucson, AZ 85705. Mark number 454 on the Reader Service card.

Alphacom's Daisy Wheel

The **Alphapro 101** daisy-wheel printer ($399.95) gives letter-quality printing at 20 cps. Designed for high reliability, this rugged printer offers proportional spacing, boldface, super- and subscripts, and reverse line feed. You will also need an interface cartridge and cable ($49.95 for the Apple //c, $69.95 for the //e and II Plus). Write to Alphacom, 2323 South Bascom Avenue, Campbell, CA 95008. Mark Reader Service number 459.

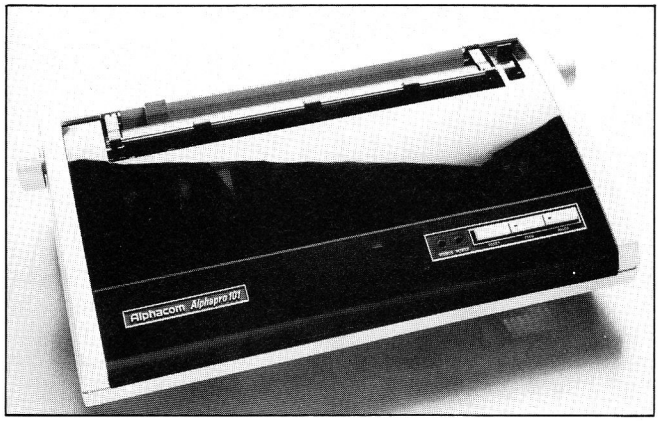
Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute endorsement by inCider *of any given product.*

Transparencies from Your Printer

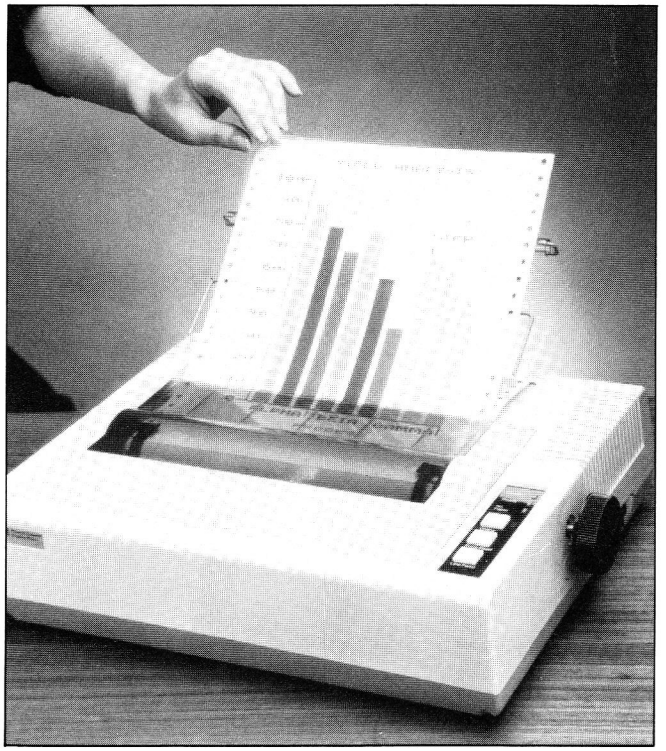
Charts and graphs speed from monitor screen to projection screen with **Dot Matrix Printer Film**. Each sheet is clear, coated polyester that accepts an image from fabric ribbon. The result is a projectable transparency generated by your business-graphics program. With a color printer, you get full-color transparencies. Ten sheets cost $10 from Arkwright, Main Street, Fiskeville, RI 02823. The Reader Service number is 451.

Big News in Small Drives

Add the convenience of 3½-inch disks to your Apple with the **HabaDisk**. This drive stores 320K on each disk and plugs into your Apple //e controller card or //c external drive port. Along with the drive you get four utilities: HabaMemoryManager, HabaMerge (mail merge for AppleWorks), HabaTemplates (AppleWorks formats), and HabaCom (telecommunications). The package costs $449.95 and comes from Haba Systems, 15154 Stagg Street, Van Nuys, CA 91405. Use Reader Service number 450.

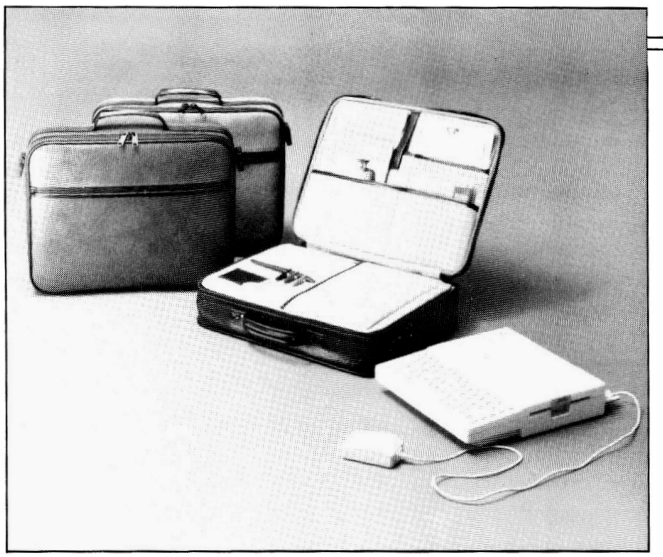


Alphacom's low-cost letter-quality Alphapro 101.



Transparencies from your printer with Dot Matrix Printer Film.

edited by Kerry J. Lanz



World-Wide's case protects your Apple //c.

Carrying Case for Your //c

Pack up your Apple //c and take it on spring break. The **Computer Carry Case** ($99) surrounds your computer with shock-absorbent foam. Each case comes with adjustable shoulder strap, lock, and outside storage pockets. For more information, write World-Wide Case, 648 North College Street, South Bend, IN 46628. The Reader Service number is 460.

Double Your Drive

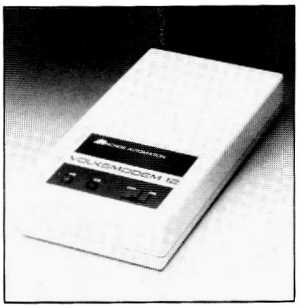
Add a slim-line external drive to any Apple II with the **FD 100c**. Priced at $179.95, this unit comes with an adapter plug to fit any Apple II computer, including the //c. The drive runs all Apple-compatible software, yet measures only half the height of standard drives. The FD 100c is from Video Technology, 2633 Greenleaf, Elk Grove Village, IL 60007. The Reader Service number is 467.

Microcom's 2400

Microcom accepts the challenge of 2400 baud with the **PC/2400**, a modem with all the features you expect and a fast, new speed. For $899 you get the modem and Era 2 error-correcting software. Hook it to your Apple through an RS-232 interface. Learn more from Microcom, 1400A Providence Highway, Norwood, MA 02062. Check off number 465 on the Reader Service card.

Volksmodem 12

The 300/1200-baud **Volksmodem 12** provides data transportation for $299. Features include auto-dial and auto-answer, RS-232 interface, and tone



Intelligent 300/1200-baud Volksmodem 12.

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***Warning:** EDD is sold for the sole purpose of making archival copies ONLY.*

$79.95 Ask for EDD at your local computer store, or, *to order direct;* send **$79.95** plus $2 shipping ($5 foreign). Mastercard/Visa accepted. *Prepayment required.*

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or pulse dialing. Fully Hayes compatible, the Volksmodem can operate unattended. Contact Anchor Automation, 6913 Valjean Avenue, Van Nuys, CA 91406. Use number 461 on the Reader Service card.

Voice Control

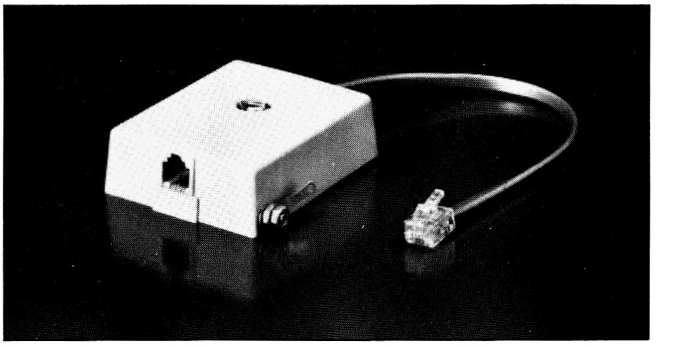
Add sophisticated speech recognition to your Apple II Plus or //e with **IntroVoice**. Once the unit learns your voice, it works with any Apple operating system and all software that accepts keyboard input. IntroVoice I ($460–$625) remembers 80 words, while IntroVoice II ($1045–$1225) holds 160 words. Learn more from The Voice Connection, 17835 Skypark Circle, Suite C, Irvine, CA 92714, or mark Reader Service number 462.

Modem Protection

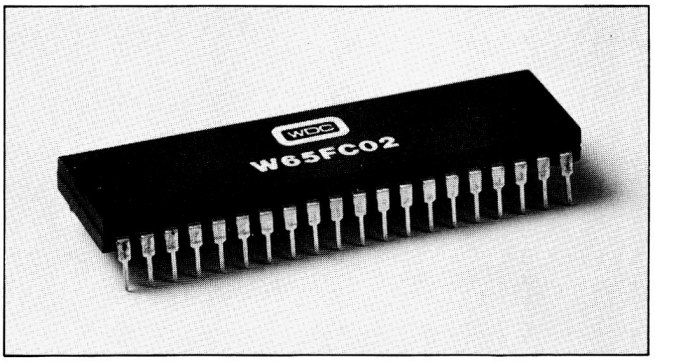
Data transmitted by modem can be garbled by interferences but the **Modem Spike Protector** guards your modem from phone-line voltage spikes. This easy-to-install protection is priced at $59.95 by Indus-Tool, 325 West Huron, Chicago, IL 60610. Circle number 455 on the Reader Service card.

Latest in 6502 Chips

Try the **W65FC02** ($6.55) from Western Design Center. This CMOS 8-bit chip is fully compatible with the 6502 chip in your Apple II, but adds eight new instructions and a new address mode. Get technical details from Western Design Center, 2166 East Brown Road, Mesa, AZ 85203. The Reader Service number is 458.



Modem Spike Protector guards data transfer.



New CMOS microprocessor from Western Design Center.

The Truth About inCider

You probably already know that **inCider** is the fastest-growing Apple*-specific magazine on the market today.

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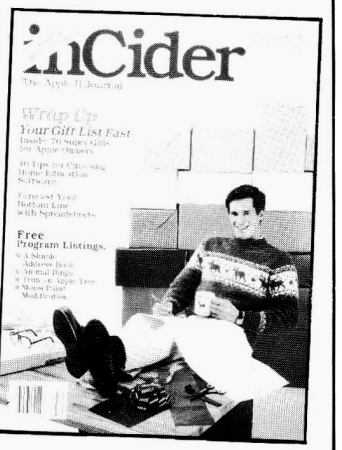

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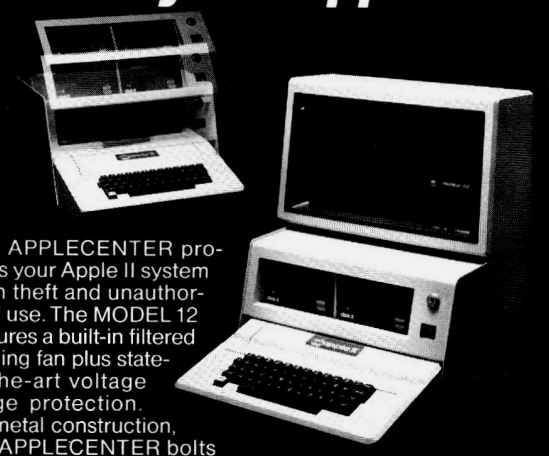
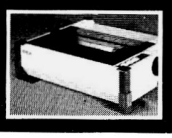


The APPLECENTER protects your Apple II system from theft and unauthorized use. The MODEL 12 features a built-in filtered cooling fan plus state-of-the-art voltage surge protection. All metal construction, the APPLECENTER bolts easily to the worksurface (or use optional adhesive plate) to secure your Apple II or IIe, 2 disk drives or Duodisk. You control the use of your Apple with the key locking on/off switch. Our MODEL 10 is compatible with side mounted fans.

Our EMBLEM secures your IBM PC from theft.

Our SECURITY CORNERS are designed to secure printers, hard disks, and other computers.



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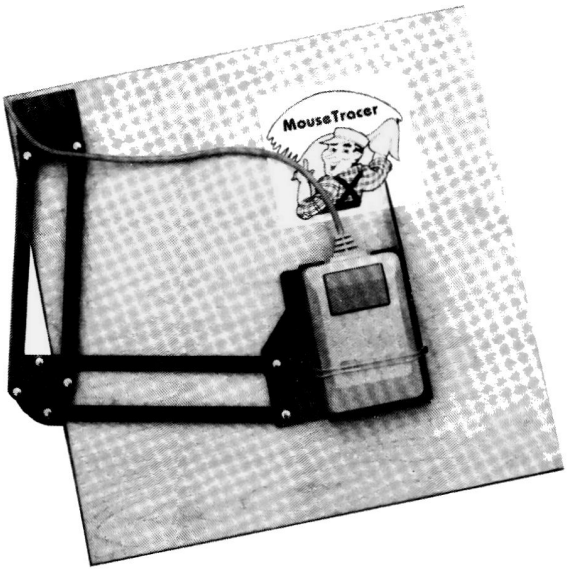
NEW PRODUCTS



You can draw a masterpiece with MouseTracer.

Receive TV on Your Monitor

After several hours of processing words and basing data, relax with TV on your computer's monitor. The **RMT 300** ($149.95) converts your composite color monitor into a remote-control, high-resolution TV. There are plugs for cable and antenna, audio input and output, and video input and output. Get more details from Kette Group, 13895 Industrial Park Boulevard, Minneapolis, MN 55441. Use number 452 on the Reader Service card.

Hi-Res Oscilloscope

The **Digital Oscilloscope Peripheral** turns your Apple into a valuable lab instrument. The interface is a 4-channel oscilloscope and the results are seen in hi-res color. For $499, you get interface, cables, and software for any Apple II computer. Get the graphic details from Rapid Systems, 5415 136th Place S.E., Bellevue, WA 98006, or check number 468 on our Reader Service card.

Help Your Artistic Mouse

Draw like the pros or just trace their work with **MouseTracer**. Mounted on a 12-by-12-inch drawing board, this heavy-gauge metal holder lets you trace with your mouse. Use it with any available drawing software to copy sketches, photos, and art classics. Priced at $36.95, MouseTracer comes from Brimark Innovations, 9821 Yolanda Avenue, Northridge, CA 91324. Reader Service number is 453.

Pascal Tutor

Teach Pascal the painless way with **Pascal: A Modern Programming Language**. At $125, this package, designed for classroom use, includes five full-color filmstrips, five audio cassettes, and a teacher's handbook. The series covers introduction to Pascal, loops, decision making, and procedures. Write to Educational Activities, P.O. Box 392, Freeport, NY 11520. The Reader Service number is 464.

Panasonic Modems

This new family of modems begins with the **KX-D401** ($99.95), featuring auto-answer and 300 baud. The **KX-D4130** is a 300-baud modem combined with a phone, offering auto-answer and auto-dial, for $199.95. Model **KX-D402** ($299.95) works at either 300- or 1200-baud. All these modems use an RS-232C port to interface with your Apple. Get information from Panasonic, One Panasonic Way, Secaucus, NJ 07094. Reader Service number is 456.

Networking Hard Disk

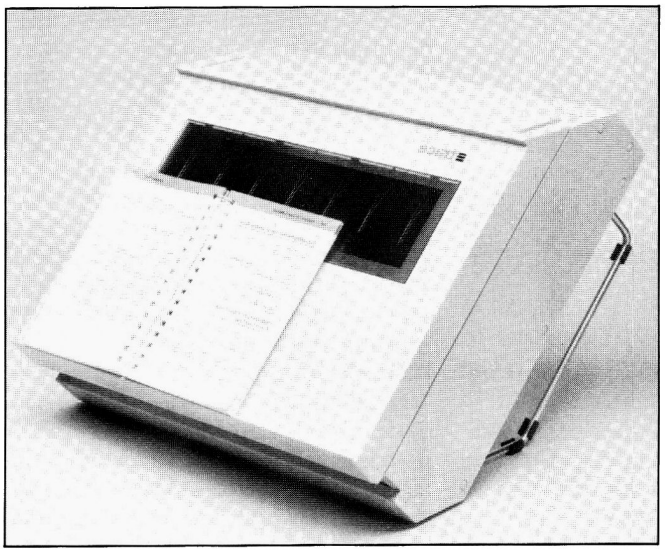
The **Big Tree** hard disk supports up to eight different operating systems, including DOS 3.3, ProDOS, CP/M, and Apple Pascal. With 63 levels of access protection, the disk is a single-computer, multi-user system. Available models include: 10-Mbyte ($1795), 20-Mbyte ($2495), and 5-Mbyte removable disk ($2295). For details, write to Micro-Design, 6301 B Manchaca Road, Austin, TX 78745, or circle Reader Service number 457.

Mouse Mat

Give your mouse a place to roam with **Mouse MATe-2**. This 10-by-12-inch foam pad ($9.95) provides sure footing for your mouse, with no scraping or wear on your polished desk by moving parts. With an open foam-cell underside, the mat does not slide on smooth surfaces. It comes from The Mouse MATe Company, P.O. Box 623, Derby, KS 67037. The Reader Service number is 469.

Quiet Printing

Ever try to use the phone while your printer is doing mailing labels? **SoundTrap** encloses your printer in a sound-deadening shell of plastic and foam. SoundTrap 80 ($149) works with most 80-column dot-matrix printers. SoundTrap 136 ($269) holds wide-carriage printers. For large office printers, try SoundTrap XL ($449). Get all the quiet details from Trace Systems, 900 Stierlin Road, Mountain View, CA 94043. Circle number 466 on the Reader Service card.



Silence your printer with SoundTrap 80.

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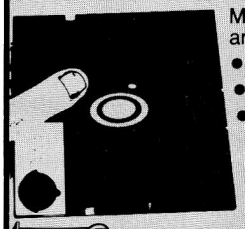

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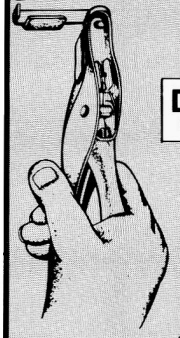

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Beginner's Cookbook
(or)
How to Type in inCider Program Listings

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

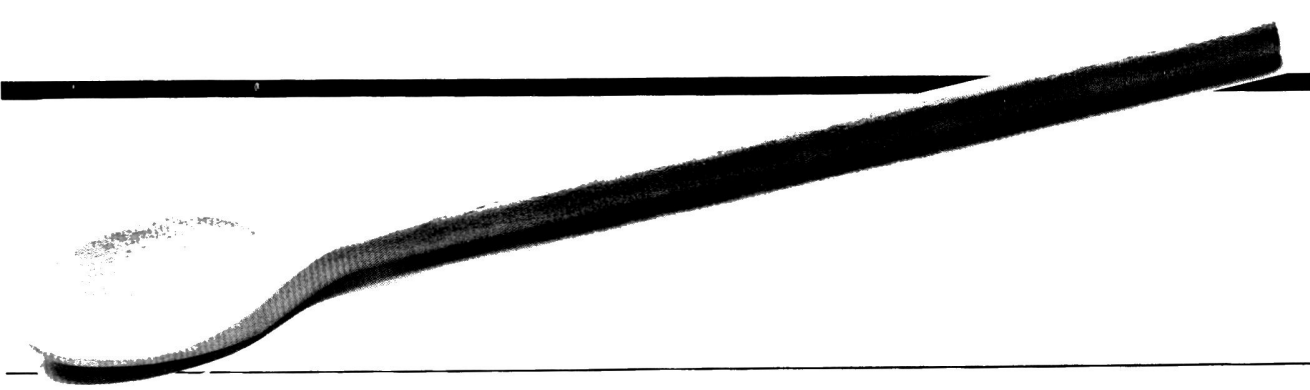
1) Insert the ProDOS User's Disk into drive 1.
2) Turn on your monitor or TV set.
3) Turn on your computer.
4) When the first menu comes up (after the disk stops working), hit the F key.
5) At the next menu, tap the V key.
6) Hit the F key, then press the return key twice.
7) Remove the User's Disk.
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 "]" 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 "]" 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 3D0G 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. ■

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- ☐ 5. 4
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- ☐ 2. Apple IIc
- ☐ 3. Macintosh
- ☐ 4. Apple compatible
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78 83 88 93 98	228 233 238 243 248	378 383 388 393 398	528 533 538 543 548
79 84 89 94 99	229 234 239 244 249	379 384 389 394 399	529 534 539 544 549
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Data Bases for Kids

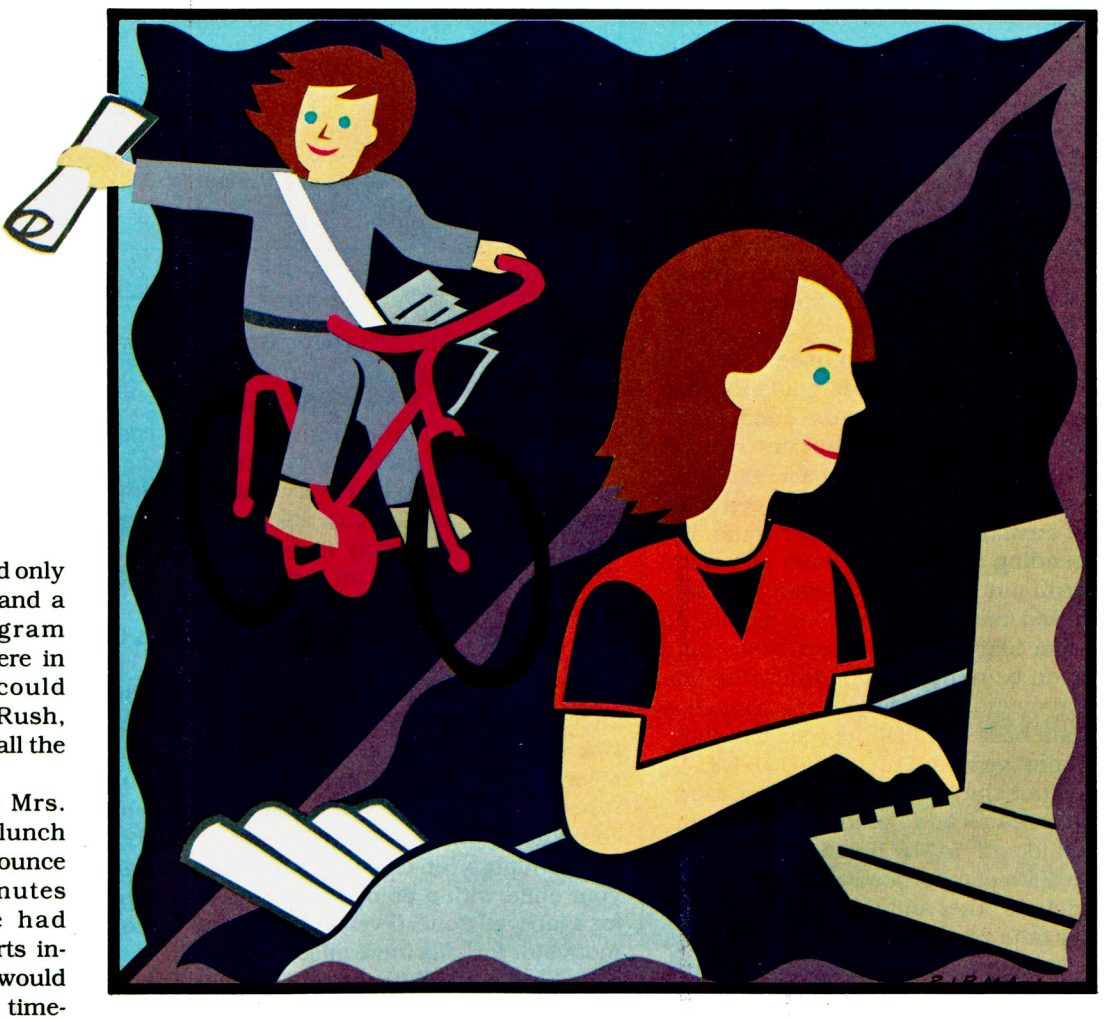

Illustration by John Pirman

If Eddie Langer had only had a computer and a data-base program when the two of us were in school together, we could have tormented Mrs. Rush, our fifth grade teacher, all the more.

Eddie used to time Mrs. Rush's breaks during lunch or recess and then announce to her how many minutes and/or seconds she had stayed away. His reports infuriated her, but Eddie would just smile and halt his time-keeping practice—until the next day.

If Eddie were in the fifth grade now, he'd probably be using a data base to track the teacher. He could get his record-keeping down to a fine science, noting which days she took the most breaks, whether she was gone longer in the morning or in the afternoon, if there were a correlation between the kind of food being served in the cafeteria and the duration of her breaks, and so on *ad infinitum*.

Obviously, I don't recommend you buy your child a data base so he or she can emulate Eddie's tactics. What I do recommend is that you buy your fifth grader or older student a data base to help him or her develop higher-level thinking skills. I guarantee it will keep your child occupied longer than Lode Runner or Space Invaders ever will.

Your child can "get organized" while having fun with a data base.

The Data Base: A Definition

A data base is simply a program that lets you gather information easily and put that information into a useful order. If you used a data base to keep track of your money, you'd create categories for your various kinds of expenses. Depending on how it was set up, the data base could then help you determine which purchases made on a given day exceeded $15, and which of these were tax-deductible.

by Fred Huntington

Had Eddie Langer kept his data on a computer through a data base, he could have been learning averaging skills, graphing and charting, and perhaps even some higher-level thinking skills—making comparisons, analyzing data, drawing conclusions, and even problem-solving (especially if he were trying to determine the best time to pull off one of his pranks).

A Data Base for Your Child: A Rationale

You're probably not thinking of buying your child a data base as you walk down the rows of educational software in your local software store. But you should be.

A data base, when used correctly with a parent's gentle guidance, can open up new worlds to a child. It can help make the mundane interesting. For example, a data base can help your enterprising daughter keep track of customers on her paper route. Depending on the data base, she could print out monthly bills with a personalized message—great for helping to earn bigger tips. A data base could even be handy in documenting late payments. More important, though, a data base can help her develop those cognitive skills I mentioned above.

Your child's data-base project, moreover, can lead to other things. A project identifying by breed all of the dogs in the neighborhood could expand to include other animals, and from there become a school or science fair project.

Using a data base can result in other forms of learning. For example, have your daughter chart the amount of time everyone in the family watches television, and you both might be surprised. Then have her ascertain the days of heaviest viewing, and analyze the kind of programs watched as well as the genre of commercials for individual programs. Her findings will probably pique the whole family's interest.

If nothing else, your daughter will be so busy working on her data base she won't have time to *watch* television.

Household Inventory

Among the more constructive data-base projects your child can pursue is a household inventory—a list of valuable possessions you can refer to, particularly in case of fire or theft. Most data bases can make a quick job of this chore. Set up a file called INVENTORY with fields for the name of the item, brand name, its location, the serial number (if any), and current value or original purchase price (see **Figure 1**).

Figure 1. *With a simple data-base program, your child can create a household inventory like this one.*

HOUSEHOLD INVENTORY DATA BASE
INV. REPORT FOR ALL RECORDS
2/2/85 PAGE 1

ITEM	BRAND/MODEL	LOCATION	SERIAL #	PUR. DATE	PUR. PRICE
COMPUTER	APPLE +	DEN	A64321	7/2/79	1150
KEYBOARD	EPS	DEN	42434T	6/23/82	300
PRINTER	JUKI 6100	DEN	LKF43K34	9/23/83	500
TYPEWRITER	OLYMPIA ES100	DEN	424343	3/28/84	600
GUITAR	MARTIN D-18	FAMILY ROOM	MG4234	12/20/72	495
STEREO	PHASE LINEAR AMP	FAMILY ROOM	XRB41232	2/24/82	800
GUITAR	MOZRITE	FAMILY ROOM	424343	5/30/68	325
TELEVISION	SONY 19"	FAMILY ROOM	45354	5/13/81	499
					4669

Ask your child to inventory the entire house for anything of value. (It's better to have too many items rather than too few.) Print out multiple copies of the list and store them in several secure places, including your safe deposit box. Should disaster strike, you'll be able to settle with your insurance company quickly and efficiently. Don't make the mistake of keeping the record on floppy disk only. If you're robbed, chances are you'll lose your computer system.

You might even consider rewarding your child with a $5 or $10 payment for a job well done. (I've never found a motivator for kids more effective than cold, hard cash.) After all, should you ever need the information, you'll have saved yourself a lot of money and grief through being prepared. And make sure your child knows that he or she is providing a useful service for the whole family.

Unless your child is unusually precocious, he'll need you to set up the data base the first time. Keep the fields down to four or five to begin with. Ask him to catalogue all the software you both use. Give him an example (see **Figure 2**) to get him started.

A Gardening Calendar

The next project could entail scheduling garden maintenance. For example, have your child set up a calendar to show when to prune the roses and fruit trees, when to spray each plant, when to sow seeds, and so on. Then he should draw up lists showing you all the tasks to be accomplished in both alphabetical and chronological order. An additional field could break the lists down into front-yard chores and backyard chores. Leave a blank column for noting when each chore was accomplished—handy for analyzing next year why the Elberta peach tree didn't do so well this year.

Figure 2. *A software-inventory data base, with just a few fields, can introduce children to cataloguing and record-keeping.*

SOFTWARE INVENTORY DATA BASE
SW REPORT FOR ALL RECORDS
2/2/85 PAGE 1

NAME	PUBLISHER	TYPE	NUMBER	FILE
ALIEN RAIN	BRODERBUND	GAME	84	B
DATA FACTORY	MICRO LAB	DATA BASE	88	A
DOSS BOSS	BEAGLE BROS.	UTILITY	90	D
MASK OF THE SUN	ULTRASOFT	ADV. GAME	86	B
PLE	SYNERGISTIC	UTILITY	89	D
WORDSTAR	MICROPRO	WORD PROCESSING	83	A
WURST OF HUNTINGTON	HC	ENTERTAINMENT	87	C

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This project isn't simple; it involves more than the computer itself. Creating a garden maintenance schedule means getting out a reference book to learn plant names, individual plant care, the use of pesticides, and so forth. You child will need to do some reading and research—skills naturally carried over into schoolwork.

More Applications

A data base can help your high schooler get organized for term paper assignments. My own method of term-paper research used to involve stacks of 3-by-5 file cards with various bits of information on a subject summarized from encyclopedias, magazines, books, and journals. I'd lay these cards on the living-room floor (hoping my younger brother didn't come through in a playful mood) and look for matches among the various cards. As I found matching items I'd arrange them in some sort of order and then refer to them as I wrote my report. Does that sound familiar?

If that same information were put into a data base, the computer would make the matches much more quickly and efficiently, and would, no doubt, suggest matches I never considered. Such a data base could make writing the bibliography (the worst part of a term paper) a breeze.

Another use for a data base at home is to have your child enter references to the magazines he or she reads. The budding photographer might want to go back and find out where she read that article on how to shoot sunsets. The computer could find it in a hurry, and the data base itself is easily kept up to date.

Keeping track of articles in computer magazines could be especially helpful to both of you. Consider setting up such fields as Name of Magazine (*inCider*), Type (Computer), Date (April 1985), Article Title ("Data Bases for Kids"), and content (data-base programs). Periodically (no pun intended), your child can sort this list according to content, and then print it out.

The stamp, coin, or record collectors in your family will find data bases useful for classification. Using Ashton-Tate's dBase II, for example, I grouped my records according to artist, title, instrument played, medium (tape, record, or compact disc), and an identification number. I marked each album with that number and filed them in ascending order. Now I have a handy 32-page printout of the 1500 jazz records in my collection.

Which Data Base?

You may want your child to have the "best" data base and be tempted to rush out and buy him or her a copy of dBase II. But to start off, what you really need is the simplest data base you can find. Inexpensive, or even free, copies of Apple File Cabinet are still floating around. Consult your local Apple user group for further suggestions, too.

The data base I used to print the figures in this month's column is a modified Apple File Cabinet from Apple Corps, Dallas, Texas. And chances are, on your System Master disk you already have a simple data base—Phone List—that you can modify easily.

For a more sophisticated data base that won't cost you a fortune, I recommend Software Publishing's PFS:File. It's powerful yet simple to use. Later, you may want to add PFS:Report. If you already own dBase II, don't buy another data base for your child; instead, set up the fields for him or her the first few times. Scholastic's *Microzine* (Volume 1, Number 4) once published a data base specifically for children aged 10 and up, and if you can find a copy in your local computer store's close-out bin, it might be a good buy.

Friendly Filer

A new data-base program for children was recently issued by Grolier (the publishers of encyclopedias and children's books). Friendly Filer, one of the first packages in Grolier's new line of educational software, is an easy-to-use data base appropriate for ages 8 (and perhaps even younger) and up. I'd recommend it to adults as a training course in data bases.

Friendly Filer is the easiest data base—both to learn and to use—on the market today. I found I could work with it almost immediately and had pretty well mastered the program before consulting directions. A sample data-base file of U.S. presidents accompanies the main program.

Searching by up to seven fields is simple. Like dBase II, Friendly Filer sorts only one field at a time.

Adults will find the program's introduction slow and boring, while children might enjoy the InfoImp character who guides them through data base functions. Both a tutorial and a practice program will help anyone new to data-base operations.

My one complaint is that on neither of my Apple II Pluses (with upper/lowercase chip and shift key adapter) are lowercase letters displayed. Everything prints out as lowercase, though, unless I use a shift key, in which case all letters are displayed as uppercase.

Don't confuse this program with dBase II or one of the other powerful data bases. It takes a maximum of 360 records, seven fields per record, and 37 characters per field. The sort won't win any speed records, but it's adequate. On the other hand, there are no commands to memorize. The documentation is clear and offers several good applications suggestions.

Conclusion

No matter which data-base program you choose, finally, you'll be doing your child a favor by exposing him or her to vital skills often neglected in a standard curriculum.

Thanks for reading. ■

You can address correspondence to Fred Huntington at 21721 Marjorie Street, Apt. 223, Torrance, CA 90503.

Product Information

dBase II
Ashton-Tate
9929 West Jefferson Boulevard
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Friendly Filer
Grolier Electronic Publishing
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New York, NY 10016
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$39.95

PFS:File
Software Publishing
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Mountain View, CA 94043
(415) 962-8910
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APPLE CLINIC

The Apple Clinic is a forum for discussing Apple II hardware and related subjects. If you have questions or answers, or wish to make a statement, write to Jim Sather, Apple Clinic,* inCider, *80 Pine Street, Peterborough, NH 03458.

A 4-Pin Video Adapter

My Franklin ACE 1200 came with the ACE 80 CPU Card (essentially the PCPI Applicard) and two half-height 40-track drives. I recently purchased an RF modulator called SUP'R MOD II. My problem arose when I attempted to have both a monochrome monitor for 80-column text and a color TV for color graphics on-line at the same time. As you are aware, both the four-wire cable from my 80-column card (ACE Display Card) and the four-wire cable from the modem have designs upon the same single set of pins.

I attempted to circumvent the problem by using an RCA cord to go from the video output at the rear of the Franklin up to the auxiliary video input on the modulator. This arrangement produced no signal at all on the TV. I've attempted to get a connector that would fit on my set of pins and split the signal, giving me two sets of pins to which I could then connect both the monitor and the modulator for the TV, but again to no avail. Your assistance in this matter will be greatly appreciated.

Kenneth E. Lavoie
APO NY, NY

It isn't enough just to connect video to the modulator, Kenneth; the modulator also requires DC power, normally obtained (in addition to video) from the 4-pin video connector. I suggest that you build an adapter that will extend the 4-pin connector, so you can connect more than one device to it.

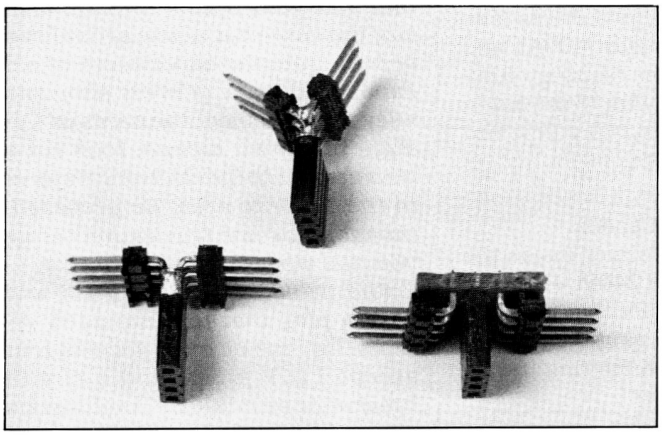
The photographs below of three adapters I built should give readers some ideas for building their own. These adapters are constructed from single-row headers with .1-inch pin separation (such as the AP Products 929974-01-36-R female, 929834-01-36-R straight male, and 929835-01-36-R right-angle male headers). One of the pictured adapters also uses a small piece of hobbyist PC board, but as the other adapters illustrate, the PC board isn't necessary. All of the required parts are available in many computer-oriented electronics stores. One mail-order house that carries them is Digi-Key Corp., P.O. Box 677, Thief River Falls, MN 56701; (800) 344-4539. You can contact them to obtain their catalog.

The single-row headers come in 36-pin sections that can be broken off. You only need a 4-pin female section and two 4-pin male sections to build an Apple II adapter. The one that uses a PC board is stronger than the other two, but all three are surprisingly strong. You can make them even stronger by filling the gaps between the soldered pins with hot glue or epoxy cement.

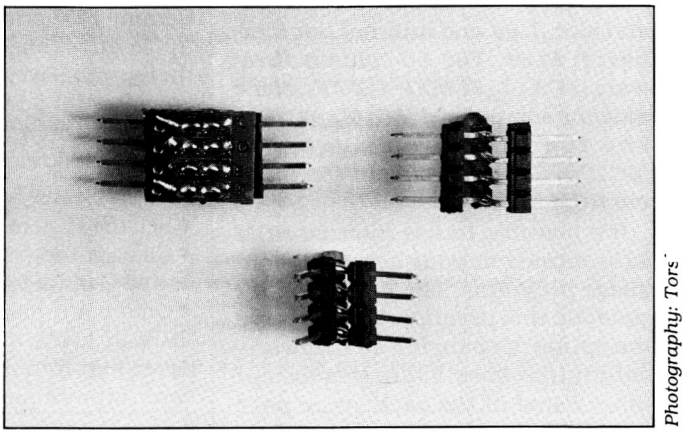
Bank-Switching Blues

I'm sure you receive a lot of questions on Apple //e memory management; here's one more for the heap. I've pored over the Apple reference manual trying to understand what's happening, and why, with that upper-bank switched memory.

- Why is there an extra 4K of RAM from $D000–$DFFF, and what's it used for?
- In the *Apple //e Reference Manual*, page 132, the illustration of I/O memory raises more questions than it answers. What do they mean by "internal" ROM?
- In the reference manual addendum, there's a listing of the 80-column firmware, addressed at $C100–$C3FF. Is



Three-quarter view of adapters.



Bird's-eye view of adapters.

Photography: Tors

by Jim Sather

this firmware in "internal ROM" except for the $C300 page or what?

- How much memory is being addressed altogether?

A big bank-switched thanks for your help!

Ray Geschke
Cleveland, OH

Good answers to your questions would take more space than I have here, Ray. I've explained Apple //e memory management at length in my book,* Understanding the Apple IIe, *but I can only touch briefly here on the subjects you raise.

The Apple //e memory map is a modified version of the memory map of the Apple II with 16K RAM card in slot 0. A peripheral card in the Apple II can steal response to $D000–$FFFF from motherboard ROM by pulling INHIBIT' low; that's how the 16K RAM card works. Since 16K of RAM is accessed at a 12K address range, there is 4K left over. Apple solved this problem in their 16K RAM card by bank switching the $DXXX range, and all imitations (including the Apple //e high RAM) followed suit. Some Apple programs use the secondary $DXXX bank for data storage, and a few (such as Beagle Bros' GPLE) actually reside in the secondary $DXXX bank.

In the Apple II, $D000–$DFFF is assigned to motherboard ROM and $C100–$CFFF is assigned to peripheral slot ROM. In the Apple //e, $D000–$FFFF is switched between ROM and high RAM, and $C100–$CFFF is switched between peripheral* slot *ROM and* internal *(motherboard) ROM. The 80-column firmware ($C3XX, $C800–$CFFF), some monitor subroutines ($C100–$C2FF), and the firmware diagnostics ($C400–$C7FF) reside in the internal ROM space.

It's possible to use internal ROM subroutines in your assembly-language programs, but Apple doesn't condone this practice. They reserve the option of changing all firmware-subroutine base addresses except those listed in the back, or on page 76, of the //e reference manual. Programs that call unlisted subroutines may become obsolete when Apple releases future upgrades to Apple //e firmware. The only internal ROM subroutines listed are AUXMOVE ($C311) and XFER ($C314); calling other internal ROM subroutines is risky. If these consequences don't bother you, call an internal ROM subroutine by setting the INTCXROM soft switch (W$C007) and calling the subroutine via JSR.

In answer to your final question, the Apple //e MMU (Memory Management Unit custom IC) supports MPU access to 64K of motherboard RAM, 64K of auxiliary card RAM, and 16K of motherboard ROM. Since the 6502 has only a 64K addressing range, the memory is heavily bank switched. Through use of state-of-the-art ICs and bank-switching schemes, auxiliary cards or peripheral cards can be designed that extend Apple //e memory beyond a megabyte.

"It's much easier to find a conversion transformer in Kuwait or in Japan than it is over here."

Taking Apples Overseas

My computing system includes a //e, Gemini 10X printer, two drives (one Apple drive, one Shugart 400A), and the System Saver from Kensington Microware. I'll be moving to an Asian country which uses 240 volts, and have the following options for my beloved computer:

- Sell the system in Canada.
- Change the transformer inside the //e and Gemini to suit 240V.
- Obtain a transformer that converts 240V to 110V, then plug the System Saver into it to avoid altering the innards of any equipment.

I'm no electronics expert, so the third option seems the most secure.

I'd like to have your advice, and if you agree with my conclusion, please suggest a transformer I can purchase in North America. (I don't trust cheap oriental imitations, and, heck, my Apple deserves the best, right?)

Oliver Hui
Scarborough, Ontario

Since you referred to your Apple as "beloved," you'd better take it with you. You will, however, be faced with two problems: power incompatibility and video incompatibility. As you suggest in your final option, an external transformer should solve the power problem. Bringing your own monitor or television with you should solve the video problem.

You didn't say which country you were going to, but from the 240V household power, I'll guess it's a country that uses the PAL (Phase Alternating Line) television system. Your Canadian Apple //e has an NTSC (National Television Systems Committee) motherboard whose video output isn't compatible in scanning rate or color representation with any monitor or television easily accessible in the country you are going to live in.

I recommend that you purchase a 115V/240V transformer when you arrive at your destination. I've operated a multitude of American electronic gadgets in Kuwait and in Japan, and my experience is that it's much easier to find a conversion transformer over there than it is over here. Even if the country is off the beaten path, you'll probably find a variety of well-made transformers that suit your needs. It's also usually the case that a new arrival can benefit from the experiences of old hands who know of every shop and alley that can meet the needs of foreigners. By all means, look for a transformer in the electronics stores in the Toronto area. Be prepared, though, for some frustration before you find what you're looking for.

The transformer you want will have a plug that fits into 240V receptacles, one or more sockets that accept 115V plugs, and a circuit breaker or switch/fuse combination that protects the transformer from current overload and lets you switch power on and off. I recommend a 400-watt (same as 400W, 400V-A,

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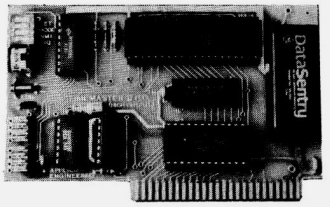

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BRAND A	NO	NO	YES	NO	NO	NO	NO	NO
BRAND C	NO	NO	NO	NO	NO	NO	NO	NO
BRAND M	NO	NO	NO	NO	NO	NO	NO	NO
BRAND P	YES	YES	NO	YES	NO	NO	NO	NO
BRAND S	NO	NO	NO	YES	NO	NO	NO	NO
BRAND T	YES	NO	NO	NO	NO	NO	YES	NO

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SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD 80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION 80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX 80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
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or 400 volt-ampere) transformer, since it will be feeding a computer, fan, printer, and television or monitor. You probably could get by with 300W if your television or monitor draws 100W or less, but you'll have no room for expansion. Transformers are a little expensive, so I wouldn't blame you for trying to cut corners. Just remember that burning up 200W transformers won't make you rich.

Be sure to take along a 115V multiple outlet extension cord to plug into the 115V receptacle of the transformer. In fact, take two of them. You'll be dearly pressed to find such an extension cord where you are going.

I was startled by your expressed opinion of the quality of oriental electrical and electronic components, Oliver, and I strongly disagree. Any country is capable of manufacturing shoddy goods, but I believe the electrical and electronic goods that come from places like Japan, Taiwan, Hong Kong, and Thailand are, on the whole, as well made as anything being produced in the West.

Undocumented 6502 Op Codes

I recall reading that the 6502 MPU has some unsupported and undocumented (officially) op codes and addressing modes. Have these ever been documented by any hackers? I'm not yet into assembly language, but I'm eager to start soon.

Ralph C. Moredock
Campbell, CA

They probably have been documented, but I don't know where or when. I've never paid much attention to them myself. Your letter stimulated my curiosity, however, and I decided to spend a short time investigating. Short time, my eye! The accompanying **Table** *is the result of several days' investigation of a Synertek 6502 (marked 8307, S10891, 370-6502) operating in an Apple //e with all slots occupied. These results may not apply to other manufacturers' 6502s, other Synertek 6502s, or 6502s operating in different environments. They are, as you say, merely the results of a hacker's tinkering, not to be confused with reliable engineering data. I welcome corrections and further information on the subject from Apple Clinic readers.*

I found that the undocumented op codes resulted in several classes of instructions: NOPs in several addressing modes, instructions that hang the 6502 at $FFFF, combinations of two valid instructions, storing instructions, and loose ends. The combination instructions are generally the equivalent of performing two valid instructions in sequence. For example, the $03 (ASL ORA ind,X) op code performs the equivalent of ASL ind,X followed by ORA ind,X with carry, minus, and zero flags set as if the two valid instructions were performed in sequence. Note that $X3 op codes are combinations of $X6 and $X1 op codes, $X7 op codes are combinations of $X6 and $X5 op codes, and $XF op codes are combinations of $XE and $XD op codes. $XB op codes are fairly unpredictable, although they sometimes seem to be a combination of $XA and $X9 op codes. ■

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Table. *Synertek 6502 op-code matrix. Unused op codes are shaded.*

n	Ø	1	2	3	4	5	6	7	8	9	A	(3) B	C	D	E	F
Øn	BRK	ORA ind,X	(1)	ASL ORA ind,X	NOP zpg	ORA zpg	ASL zpg	ASL ORA zpg	PHP	ORA imm	ASL A	AND imm	NOP abs	ORA abs	ASL abs	ASL ORA abs
1n	BPL	ORA ind,Y	(1)	ASL ORA ind,Y	NOP zpg,X	ORA zpg,X	ASL zpg,X	ASL ORA zpg,X	CLC	ORA abs,Y	NOP A	ASL ORA abs,Y	NOP abs,X	ORA abs,X	ASL abs,X	ASL ORA abs,X
2n	JSR	AND ind,X	(1)	ROL AND ind,X	BIT zpg	AND zpg	ROL zpg	ROL AND zpg	PLP	AND imm	ROL A	AND imm	BIT abs	AND abs	ROL abs	ROL AND abs
3n	BMI	AND ind,Y	(1)	ROL AND ind,Y	NOP zpg,X	AND zpg,X	ROL zpg,X	ROL AND zpg,X	SEC	AND abs,Y	NOP A	ROL AND abs,Y	NOP abs,X	AND abs,X	ROL abs,X	ROL AND abs,X
4n	RTI	EOR ind,X	(1)	LSR EOR ind,X	NOP zpg	EOR zpg	LSR zpg	LSR EOR zpg	PHA	EOR imm	LSR A	AND LSR imm A	JMP abs	EOR abs	LSR abs	LSR EOR abs
5n	BVC	EOR ind,Y	(1)	LSR EOR ind,Y	NOP zpg,X	EOR zpg,X	LSR zpg,X	LSR EOR zpg,X	CLI	EOR abs,Y	NOP A	LSR EOR abs,Y	NOP abs,X	EOR abs,X	LSR abs,X	LSR EOR abs,X
6n	RTS	ADC ind,X	(1)	ROR ADC ind,X	NOP zpg	ADC zpg	ROR zpg	ROR ADC zpg	PLA	ADC imm	ROR A	AND ROR imm A	JMP (abs)	ADC abs	ROR abs	ROR ADC abs
7n	BVS	ADC ind,Y	(1)	ROR ADC ind,Y	NOP zpg,X	ADC zpg,X	ROR zpg,X	ROR ADC zpg,X	SEI	ADC abs,Y	NOP A	ROR ADC abs,Y	NOP abs,X	ADC abs,X	ROR abs,X	ROR ADC abs,X
8n	NOP imm	STA ind,X	NOP imm	ST(A•X) ind,X	STY zpg	STA zpg	STX zpg	ST(A•X) zpg	DEY	NOP imm	TXA	TXA AND imm	STY abs	STA abs	STX abs	ST(A•X) abs
9n (2)	BCC	STA ind,Y	(1)	ST(A•X) ind,Y	STY zpg,X	STA zpg,X	STX zpg,Y	ST(A•X) zpg,Y	TYA	STA abs,Y	TXS	ST(A•X) abs,Y	STY abs,X	STA abs,X	STX abs,Y	ST(A•X) abs,Y
An	LDY imm	LDA ind,X	LDX imm	LDX LDA ind,X	LDY zpg	LDA zpg	LDX zpg	LDX LDA zpg	TAY	LDA imm	TAX	LDA LDX imm	LDY abs	LDA abs	LDX abs	LDX LDA abs
Bn	BCS	LDA ind,Y	(1)	LDX LDA ind,Y	LDY zpg,X	LDA zpg,X	LDX zpg,Y	LDX LDA zpg,Y	CLV	LDA abs,Y	TSX	(4) abs,Y	LDY abs,X	LDA abs,X	LDX abs,Y	LDX LDA abs,Y
Cn	CPY imm	CMP ind,X	NOP imm	DEC CMP ind,X	CPY zpg	CMP zpg	DEC zpg	DEC CMP zpg	INY	CMP imm	DEX	(5) imm	CPY abs	CMP abs	DEC abs	DEC CMP abs
Dn	BNE	CMP ind,Y	(1)	DEC CMP ind,Y	NOP zpg,X	CMP zpg,X	DEC zpg,X	DEC CMP zpg,X	CLD	CMP abs,Y	NOP	DEC CMP abs,Y	NOP abs,X	CMP abs,X	DEC abs,X	DEC CMP abs,X
En	CPX imm	SBC ind,X	NOP imm	INC SBC ind,X	CPX zpg	SBC zpg	INC zpg	INC SBC zpg	INX	SBC imm	NOP	SBC imm	CPX abs	SBC abs	INC abs	INC SBC abs
Fn	BEQ	SBC ind,Y	(1)	INC SBC ind,Y	NOP zpg,X	SBC zpg,X	INC zpg,X	INC SBC zpg,X	SED	SBC abs,Y	NOP	DEC SBC abs,Y	NOP abs,X	SBC abs,X	INC abs,X	INC SBC abs,X

Notes:

(1) Five-cycle instruction which ends with 6502 hung at $FFFF. Must reset 6502 to escape.

(2) If indexing across page boundary with op codes $93, $9B, $9C, $9E, or $9F, resulting ADH is expected ADH ANDed with stored data.

(3) $XB op codes are hard to predict. Programmers beware.

(4) Transfer stack pointer ANDed with operand at abs,Y to accumulator and X-register.

(5) X = (A•X) – imm, where imm is the immediate operand. The carry flag is not a subtraction input. The carry, minus, and zero flags are affected, but the overflow flag is not affected.

(6) Op codes $0B and $2B: MSB of accumulator shifted to carry after AND imm performed.

(7) Op code $6B: Carry and overflow flags affected strangely.

(8) Op codes $8B and $AB: Result in accumulator sometimes ANDed with $EE. This may vary with data bus loading.

(9) Unused op codes are shaded.

(10) A•X indicates the logical AND of the accumulator and X-register.

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If you have a question, our technical editor has the answer. Send your queries about Apple computing to Bob Ryan, Ask inCider, *80 Pine Street, Peterborough, NH 03458.*

T + EXEC = Applesoft

Dear *inCider*:

I have an Apple II Plus equipped with a Networker modem. I have tried twice to download a BASIC program from your bulletin board system. However, all I get on disk is a T file. How can I download programs?

David Duember
2402 Riverview Drive
Chesterton, IN 46304

Dear David:

You already know how to download from the inCider *BBS; you should get a T (for text) file. To translate the file back into Applesoft, boot your Apple and insert the disk containing the text file into your disk drive. Then type in EXEC filename, where filename is the name of the text file.*

A column of Applesoft prompts will appear on the left of your screen, and the disk drive will repeatedly go on and off. When this stops, enter SAVE filename, where filename is the Applesoft program's name. Don't give it the same name as the text file. Now you'll have the program on disk in a proper Applesoft file, none the worse for wear after its journey over the phone lines.

Just a reminder—the telephone number for the inCider *BBS is (603) 924-9801.*

Singing the ProDOS Compiler Blues

Dear *inCider*:

I recently purchased an Apple //c and I'm interested in a ProDOS-compatible Applesoft BASIC compiler. I inquired at Microsoft (makers of TASC-ed.) and was informed that their compiler wasn't ProDOS-compatible. Do you know of any company that makes a ProDOS-compatible Applesoft compiler?

"Enhance program speed by employing machine-language subroutines."

Joseph M. Thomas
314 North Neville #4
Pittsburgh, PA 15213

Dear Joseph:

Right now, there aren't any Applesoft compilers on the market that are compatible with ProDOS. This leaves you with three options: wait for someone to build the compiler; purchase a DOS 3.3-based compiler, develop and compile your programs with it, and then use your System Utilities disk conversion program to convert the object file from DOS to ProDOS; or continue to use interpreted BASIC, but enhance the speed of your programs by employing machine-language subroutines.

For the uninitiated, there are major differences between a compiled program and an interpreted program. A compiler translates an Applesoft program into the machine code that the Apple understands. It then stores the results in a binary file. To run the program, you BRUN the binary file.

Your Apple comes with a built-in Applesoft interpreter. Whenever you RUN an Applesoft program, the interpreter (which is stored in ROM) translates the program into machine language and executes it, one line at a time.

This isn't very efficient. For example, if you have a loop in your program that increments a variable COUNT ten thousand times, the Applesoft interpreter translates the line COUNT = COUNT + 1 ten thousand times. A compiler translates that line just once.

Speed is the compiler's advantage. A compiled program runs three to ten times faster than an interpreted one. Its disadvantages are that its machine-code files are much larger than the translated source (Applesoft) program, and compiled programs are harder to debug and modify. The optimal situation is to develop your program with an interpreter, then compile the program in its final form.

CP/M in a Box

Dear *inCider*:

A recent article on the Apple //c mentioned that some companies plan to use the //c's external disk drive port for boxes containing a Z-80 microprocessor to let the //c run the CP/M operating system and applications. Are you aware of any such devices?

Bob Soule
1113 North Pitt Street 1A
Alexandria, VA 22314

Dear Bob:

I know of only one such device, and it's not on the market yet. Personal Computer Products, 11590 West Bernardo Court, San Diego, CA 92127, demonstrated a CP/M box for the //c at COMDEX last fall in Las Vegas. I don't know when it will be available, but PCPI is shooting for a spring release date.

Bridge Over Troubled Waters

Last July I wrote about a product that lets you access PFS files using Apple Writer. Recently a reader pointed out another product that does the same thing. It's called The Bridge, and it's from Sun Microsystems, P.O. Box 1388, Fort Lauderdale, FL 33302. The telephone number is (305) 486-6115.■

by Bob Ryan, inCider Technical Editor

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- Behind the scenes at Delphi
- Enter our Second Annual Two-Line Game Contest

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inCider's

DATA-GRAM

A COLLECTION OF FREE OR INEXPENSIVE DATA BASES AND MONEY-SAVING TIPS FOR GOING ON-LINE.

by Matthew Lesko

Magazine Bibliographies

The Central Washington RBBS (Remote Bulletin Board System) offers bibliographies of many of the popular personal computer magazines including *PC World*, *PC Week*, *InfoWorld*, and *Personal Computing*, as well as downloading of communications software. This free data base is available weekdays between 6 p.m. and 7 a.m. Pacific Standard Time and 24 hours on weekends and holidays. Once you're on-line, the system tells you how to get a free password. Use your modem to call (509) 697-7298, or contact Patrick E. O'Farrell, The Central Washington RBBS System, P.O. Box 538, Sehal, WA 98942, (509) 697-7296.

Stop Waiting On-line

If your data-transmission line has a call-waiting feature that you also use for incoming phone calls, your modem will be interrupted each time the call-waiting feature is activated. To avoid this, use the call-forwarding service (usually available with call-waiting) to transfer incoming calls to another phone—or perhaps to a pre-recorded message—while you're using the modem.

Are You Covered?

The Risk and Insurance Management Society in San Francisco and Atlanta operates a free bulletin board that will keep you up-to-date with articles on the insurance industry. Along with information on job openings and new developments in business-related hardware and software, the system will also format insurance data for popular hardware and software like Lotus 1-2-3 and dBase II and III.

With your modem, call (415) 793-9983 in San Francisco or (404) 231-2271 in Atlanta. For more information, contact Robert Herrick at the Fred S. James Company, P.O. Box 7601, San Francisco, CA 94120, (415) 983-5682, or Weymouth Walker, Anistics Corporation, 3 Piedmont Center, 3565 Piedmont Road NE, Atlanta, GA 30363, (404) 233-2590.

The Gospel Preacher

Computer for Christ, a free on-line bulletin board, examines different aspects of Christianity. It lets you study the Bible and other religions, and by posting questions and comments on the board, you can participate in on-line discussions. Call (408) 997-2790 on your modem, or get in touch with Trinity Solutions, 5340 Thornwood Drive, San Jose, CA 95123, (408) 578-3162.

Down on the Farm

A professional bulletin board for those concerned with agriculture, Purdue University's on-line service provides access to producer and consumer information. Agricultural newsletters, produced by the university and available through the bulletin board, offer news on research developments and answer your agricultural questions. Modem users call (317) 494-6643. For details, write to Purdue University, Cooperative Extension Service, Smith Hall, Room 105, West Lafayette, IN 47907, or call (317) 494-8333.

Cosmic!

Gas Net, a bulletin board sponsored by the National Aeronautics and Space Administration (NASA), provides information on how to include an experiment on a space shuttle. The experiments, called Get Away Special Payloads, cost between $3000 and $10,000. Gas Net tells about the latest experiment results, who will be included in the next experiments, experiment requirements, and conference information. Use your modem to call (301) 344-9156, or Bob Pincus will answer specific questions at NASA, Goddard Space Flight Center, Code 743, Greenbelt, MD 20771, (301) 344-5874.

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.*

Editors' CHOICE

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 have personally evaluated and feel is a significant addition to the Apple II family of products.*

This month, the Editors' Choice is the latest game from Infocom, **The Hitchhiker's Guide to the Galaxy**, created by Douglas Adams and Steve Meretzky.

"Few computer games can make me laugh out loud," our games columnist says, "but this one does." Adams, one-time writer for Monty Python and Dr. Who, creates hilarious satire. His *Hichhiker's Guide* started out as a radio script, then evolved into a book series and a PBS TV series.

If you're familiar with the four books in the *Hitchhiker* "trilogy," then you'll be pleased to learn that Infocom has managed to infuse the spirit of the books into the game. If you've never heard of *The Hitchhiker's Guide*, then you're in for a surprise. Science fiction has never been this much fun.

You don't have to know the books to enjoy the game, although it will help you get off Earth in the opening sequence. From there, the game has a life of its own, with its own unique puzzles. While not as difficult to solve as Infocom's *Zork* games, *Hitchhiker's Guide* is still an intermediate-level adventure that takes 40–60 hours to complete. You get a lot of entertainment hours for your dollar.

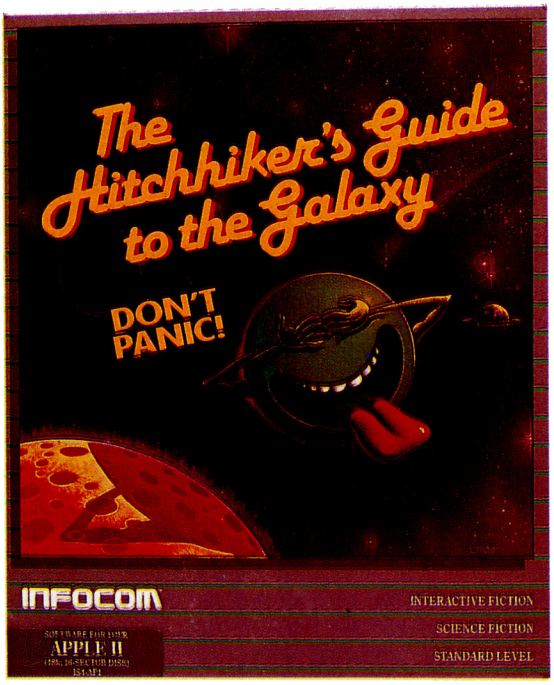
In the game, you become Arthur Dent, a somewhat boring Englishman who is fortunate enough to escape from Earth just before the planet is destroyed (to make room for a hyperspace bypass). Your travelling companion is Ford Prefect, who you thought was just a slightly eccentric human, but who is, in fact, a very eccentric alien from a small planet near Betelgeuse. He is also a contributor to the best-selling book in Creation, *The Hitchhiker's Guide to the Galaxy*.

Together, you and Ford explore the wonders of the universe and, if you're lucky enough, accumulate 400 points before these wonders conspire to end your existence. You meet up with such luminaries as Zaphod Beeblebrox, the larcenous and delinquent President of the Galaxy, and Marvin, the paranoid android. You even get to experience the joys (?) of Vogon poetry.

There are no graphics or sound effects in this all-text adventure. It's all in your head, but that proves to be the product's strength. The images are fashioned by your own imagination and have the power to haunt you.

Infocom sells a hint book, but we have a few clues for you, too. Don't leave your mail lying around. Look up Brownian motion. Don't drink strange tea. Somedays you won't feel like yourself. Be sure to save game positions often.

The Hitchhiker's Guide to the Galaxy will appeal to a broad range of people, just as the books and PBS series have. You don't have to be a science-fiction buff or an adventure game aficionado to enjoy this program. All you need is a (slightly offbeat) sense of humor, a towel, and $39.95.



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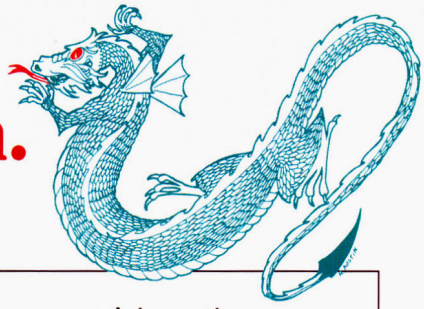
Big Game Hunting? Try Baggin' Our Dragon.



It's the biggest game in town

Our dragon, of course, is Wizardry—that unique series of computer recreation programs designed for Apple users who are seeking the ultimate "big game" challenge.

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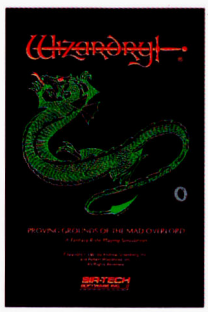

Proving Grounds of the Mad Overlord

The First Scenario

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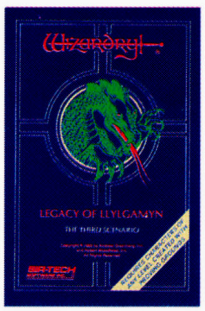

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The Third Scenario

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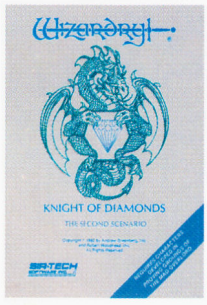

Knight of Diamonds

The Second Scenario

This classic journey should only be attempted with those Wizardry heroes who have attained the 13th level of ability in PROVING GROUNDS. Their challenge—and yours—to adventure through a six-level maze and become the Knight of Diamonds. First-rate fantasy!

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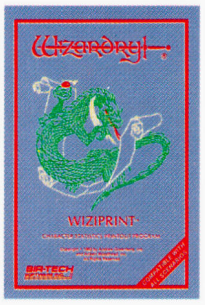

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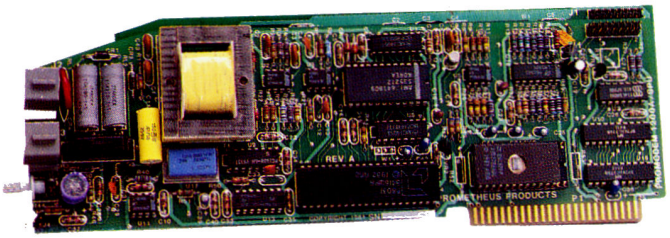

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```
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```

```
1) COMMUNICATIONS
2) FILE TRANSFER
3) OPTIONS
            USE ESC TO EXIT
            ENTER SELECTION
```

```
1) BAUD RATE  1200  300
2) DATA BITS  8  7
3) PARITY NONE ODD EVEN MARK SPACE
            USE ESC TO EXIT
            ENTER SELECTION
```

```
1) TYPE       XMODEM  LINE
2) DIRECTION  SEND  RECEIVE
3) FILE NAME
            USE ESC TO EXIT
            ENTER SELECTION
```

```
1) PRINTER      ON  OFF
2) CLOCK        ON  OFF
3) STATUS LINE  ON  OFF
4) KEYBOARD     ON  OFF
5) CAP LOCK     ON  OFF
6) ECHO         ON  OFF
7) LF AFTER CR  ON  OFF
            USE ESC TO EXIT
            ENTER SELECTION
```

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