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August 1984, USA $2.95
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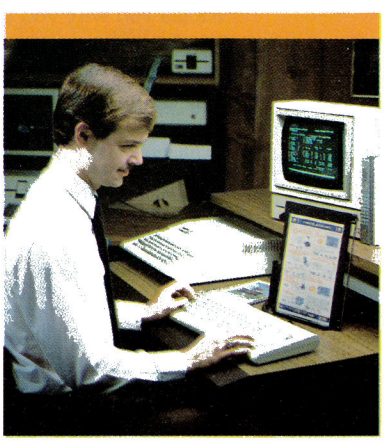

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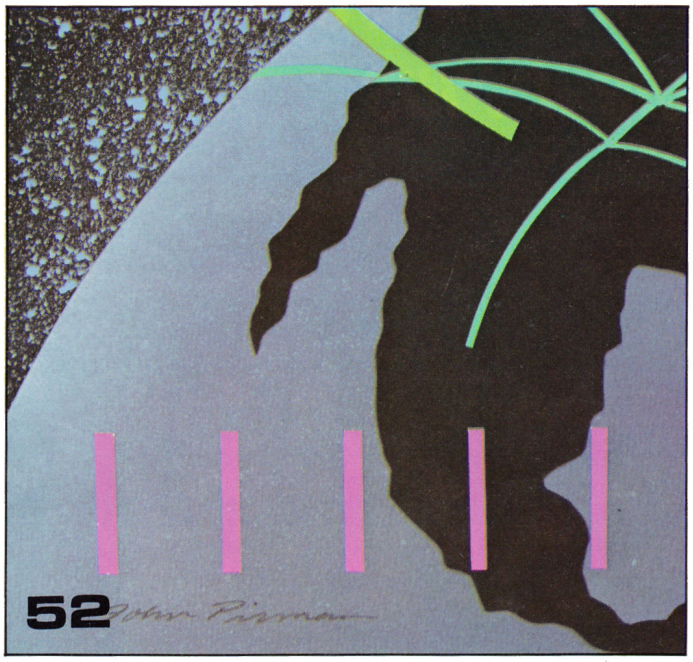

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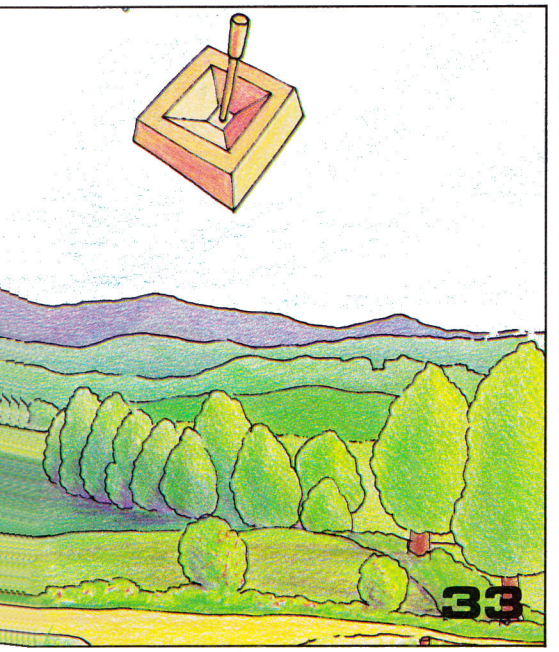

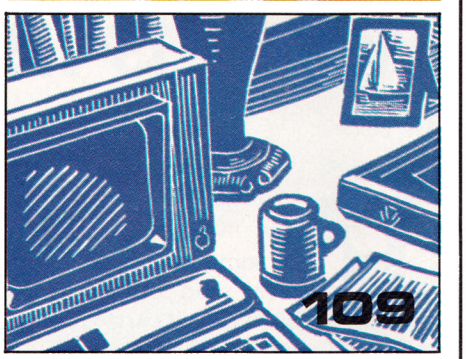

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inCider editorial offices
80 Pine Street
Peterborough, NH 03458
(603) 924-9471

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Paul C. Quinn

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DESIGN
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Cover art by Carl Wesley

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VICE PRESIDENT/GENERAL MANAGER
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Paul Boule, Sales Manager;
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(800) 441-4403
CW COMMUNICATIONS/PETERBOROUGH
WEST COAST OFFICE
1060 Marsh Road
Menlo Park, CA 94025
(415) 328-3470, (415) 328-3471
Giorgio Saluti, Sales Manager;
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The Home Computer—What Is Its Role?

For some odd reason the press and other media have gotten carried away with the concept of home computers. I've been grumbling about this right from the start, trying to explain that little of what we do at home can be made easier with computers. This is even more true of the average blue-collar working home, and that's where an industry aiming at the home market sets its sights.

A microprocessor in a TV set will fly, making it easier to operate the set. One in a microwave oven gives more flexibility. But how much need is there for a computer to index the home library? What does it take to keep track of the *National Enquirer* and a couple copies of *People*? And most families are able to make do without a computerized inventory of their beer supply.

Well, okay, the white-collar contingent is growing—maybe they're the market. Maybe, but several million of the more adventurous went for the Timex/Sinclair, the Atari, or the T.I. and found that, yep, they could be used for some crude games—crude compared to those in video game parlors. They never bought a printer, so the word processing wasn't used. Heck, not many families own a typewriter, so how can we expect them to shell out $500 or so for a printer? For what?

It might be nice to have an index to my library. But up until just the last year—maybe two—there weren't any programs to do that. Ditto my record collection and my 35mm slides. Besides, it would take weeks to get the data into a computer. Who wants to sit and type in the catalog information for 1000 LP albums, 6000 books, and 25,000 slides?

"How can we expect them to shell out $500 or so for a printer?"

A recent piece in *The Wall Street Journal* pointed out that Apple was aiming their //c at home use, an aim which IBM recently took and widely missed with the PCjr. Have the decision makers at the major computer firms gotten carried away with media hype about home computers? It sure looks that way. We really don't have many uses for computers at

by Wayne Green, inCider publisher

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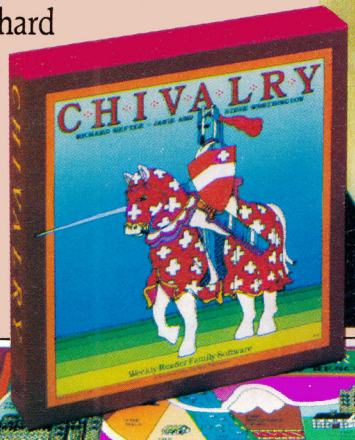

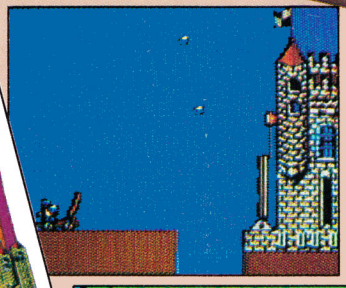

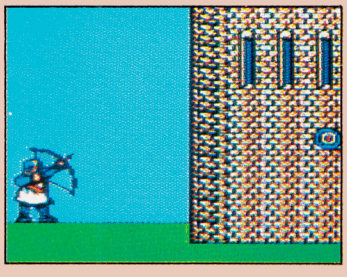

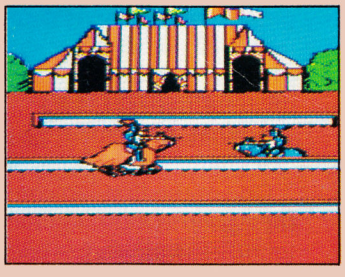

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home, no matter how dearly the press loves the term "home computer."

Actual Uses

If we ignore the fantasy of a home computer and think of the computer in terms of using it to save us time, we may get a better understanding of why some computers sell and why others, such as the PCjr, do not. Not many of us need an expensive Etch-A-Sketch, and our home accounting needs are best satisfied with a simple checkbook. So, if you're going to hook us for two or three thousand dollars for a computer, it must to be a very, very good typewriter and offer other benefits such as a simple-to-use address file, an appointment calendar, and maybe a spreadsheet—because we are going to use it mainly for business. That won't stop us from playing some games now and then, but that's a bonus. Oh yes, we're also going to expect this to be a business expense, not a personal one.

Now how does the Apple //c fit in? I'm not sure, but I'll give it a try and see how it does with my own needs. But I'm concerned. I've gotten used to my NEC-8201A—on my lap with no umbilical cords to worry about, into the charger at night, into my shoulder bag when I go anywhere. The //c has to have an external power supply or a five-pound set of batteries wired in. I'm not going to like that. It'll be twice as heavy and the LCD screen won't be along for months, so I'll have more wires to trip over.

These lightweight computers are, at least for me, the way to go. Oh, they can be improved considerably, and they will be. I saw the plans for a computer system about the same size as my 8201 which will have 256K, a disk, output to a hard disk, built-in ROM with the operating system, sophisticated word processing, spreadsheet, data base, and so on. It's a 16-bit system so the memory can be expanded to 16 MB as memory chips get smaller and cheaper, and it will run at 30 MHz. Yep, I'm talking about a lap computer which can run circles around a VAX or IBM 4330. Indeed, it could be a big nail in the coffin of mainframe computers.

Bill Zachman of IDC compared the wiping out of the dinosaurs by a meteor crashing into the Atlantic Ocean, chilling the entire earth, to the meteoric arrival of the microcomputer with its possible similar effect on Big Blue. It may not be quite time to unload your IBM stock, but if I had a lot of those blue chips I'd start looking around.

"These lightweight computers are, at least for me, the way to go."

If Lap Computers Are So Good . . .

Why haven't these little lap computers been much of a success so far? Well, let's look at the whole picture by first considering the individual pieces. I suspect that you'll see what happened, and why this can change quickly.

One of the first lap computers was the Epson HX-20. I got a loaner, but found I was right back where I started in 1975 with my Altair 8800 computer: no software. It also had a painfully small screen—a tiny window, so to speak. It sat on my coffee table for a few weeks, and then I returned it to Epson, mumbling muted thanks.

Grid showed their Compass computer at NCC. It was awfully expensive, but impressive. I tried talking with them about a loaner and they told me to get lost. I checked with the rest of the magazine folk and found that they, too, had gotten the stiff arm. I don't think any of the media people were surprised to see Grid getting nowhere.

Teleram showed up at Comdex Atlantic City. Well, the LCD display was still smaller than I liked, but it looked like a good system. I tried to get a loaner, but found them hostile to that idea. Again I checked with my confreres and found that I had not been singled out. Teleram, too, hasn't made much impact. Is there a lesson to be learned?

Next came Gavillan. Nice looking unit—friendly bunch. They didn't tell me to get lost, but they didn't make any effort to keep in touch. The media took the hint.

Radio Shack then came out with the 100. The first I heard about it was when it appeared in the local Radio Shack store—not exactly a hot introduction for the press. Oh, a few of the usual in-house prepared ads appeared, but that's about all. The Tandy boys should take a look at the way Apple unveils their new products. The splash they made with the Macintosh was so big that I chalk up at least 75 percent of their sales to that entry, not to the machine itself.

NEC came along later with their 8201A clone of the Tandy 100, and have managed to keep it almost a total secret from the buying public.

So perhaps you can understand why one of the more important microcomputer developments, the lap computer, has sold so few units—so far. Apple will do a good job of promoting the //c with their $15-million, one-hundred-day media blitz, and this could provide a lift for this business by generating interest in the more portable lap computers.

You might drop me a line once you have a //c and let me know how it does for you and which programs you're using the most. ■

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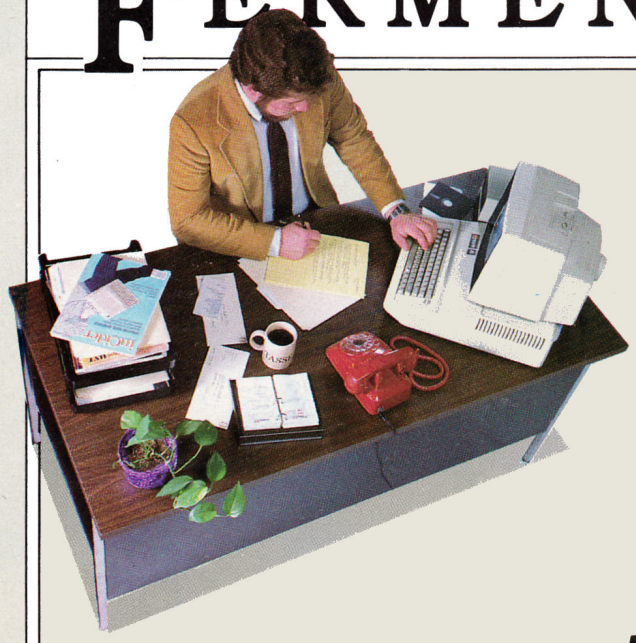


Be True to Your II

Let the other Apple magazines dally as they will, *inCider* is committed—heart, mind, and logo—to the machine that put computing on the map, the Apple II. But it's not an unreasoning kind of faith. We have more than ample reason to stand behind the II. Consider the following.

First and foremost, the II can do it all. No other computer comes even close to matching the wealth of software and peripherals available for this workhorse. Though estimates vary, there appears to be at least 10,000 programs out there for the II—16,000 if you go CP/M. And the list of Apple II-compatible add-ons goes on forever. You want versatility? You want a II.

Not only do Apple II's do many things, they seldom break down. (Our //e, for instance, has been performing yeoman service for well over a year now with nary a whimper.) Regardless of what you do with your computer, it's nice to know that the thing is going to boot up and boogie when it's supposed to.

The story continues. Despite the fact that everybody knows the current crop of II's is based on venerable eight-bit technology which, by normal industry standards, should have been supplanted long ago, there is a whole new generation of software support growing up around the machine. From a software company's point of view, writing programs for the Apple II makes sense. There is an installed base of happy, loyal users numbering in the millions and growing daily. There is a degree of compatibility between the various II products that is not found in any other family of microcomputers. And there is the knowledge that Apple Computer will not only be around for a long time, but that it is a progressive corporation. This last fact is critical and deserves a little amplification.

Apple is perhaps unique in its corporate posture toward outside software development. It realizes that the continued success of the II line will be influenced heavily by third party support. Apple has made it its business to foster this support through active cooperation with more than 100 top software manufacturers. As Bill O'Brien says elsewhere in this month's issue, "Without sufficient support from the manufacturer, software development can become a trial and error affair. Programs take longer to achieve substance and, in the long run, you must wait longer for better programs. It stands to reason, then, that the better the relationship between the manufacturer and the software developer, the better the programs will be and the sooner they will arrive."

Hard evidence that Apple Computer is committed to long-term support of the Apple II is found in the current marketing push they embarked upon with the //c. This summer they will be spending more on advertising for the //c than will Coca-Cola or Pepsi for their respective products. Sounds like they're serious about the II product line.

Well, so is *inCider*.

We believe that the Apple II is, quite simply, a classic. We also believe that Apple II owners expect more from their computers than do owners of other computers. And that, more than anything else, is the underlying philosophy of *inCider*. ■

by Paul Quinn

System Saver® didn't become the Apple's number one selling* peripheral by being just a fan.

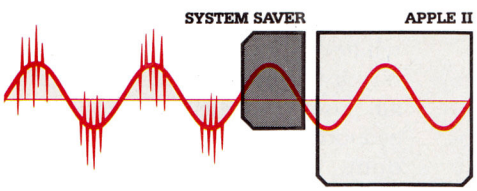
What made over 100,000 Apple® owners fall in love with System Saver? The answer is simple. It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

System Saver filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems.** Problems your System Saver guards against.

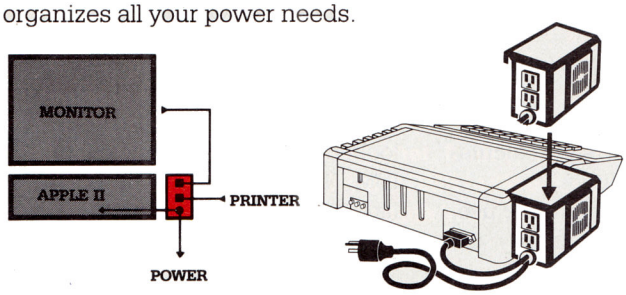
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

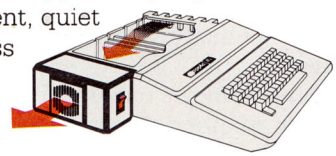


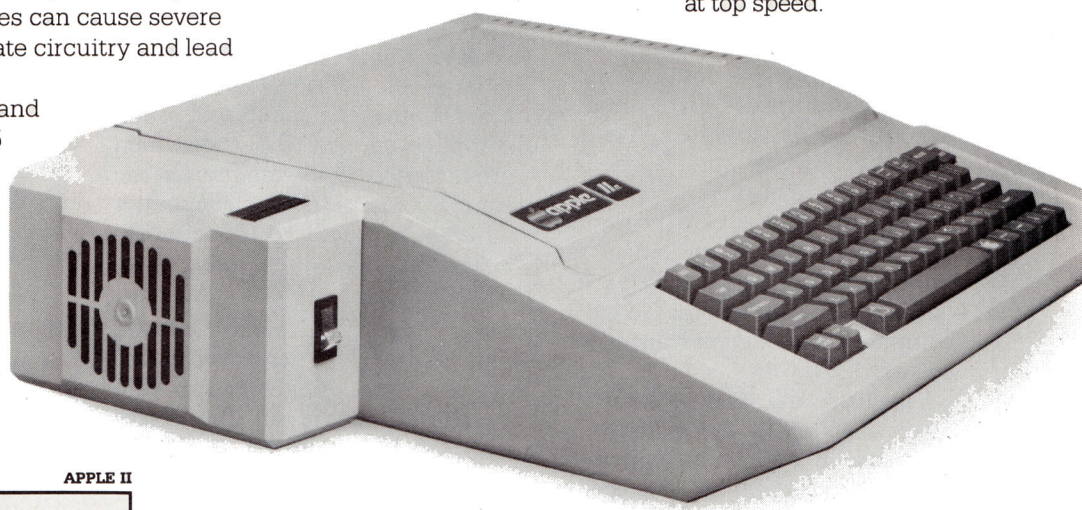
It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

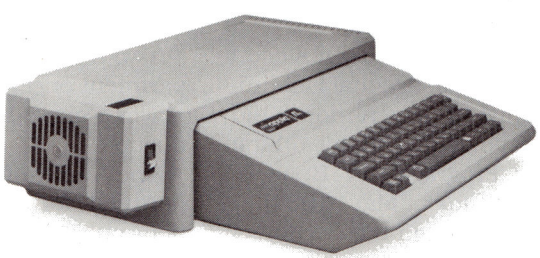
System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand



$89.95 at Apple dealers everywhere.

KENSINGTON MICROWARE

Circle 86 on Reader Service card.

251 Park Avenue South, New York, NY 10010
(212) 475-5200 Telex: 467383 KML NY

*Softsel Computer Products Hot List. **PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

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LETTERS

Babies and Computers

In the editor's comment section of Swain Pratt's article against computer use for children (May 1984), you referred to the article "Baby's First Computer Program" as a counterpoint to this subject. I do not see it as a counterpoint at all.

The question should not be whether children should use computers at all, but it should be whether they are using them in the proper manner. If computers are used as a tool to aid in their learning, such as a word processor to help develop writing skills or a baby having fun and learning cause/effect relationships, for example, then a computer is a great thing. If a computer is a better "pencil" (tool) for a writer than a regular pencil would be, then it should be used as that better tool. If computers are used as a replacement for human contact, such as to teach a child how to read Mother Goose by computer, then a great tragedy has occurred.

The basic question to examine, when deciding for or against computer use, is this: Is the computer, in any given circumstance, being used to do what only it can do, and can do better, than anything or anyone else? If the answer is yes, then use it!

Bradley D. Nasset
Carnation Co.
P.O. Box 1188
Kokomo, IN 46901

It has been long enough since I had a child of that age that I am uncertain how a seven-month-old would respond to "Baby's First Computer Program" by Brian J. Murphy (*inCider*, May 1984). I have a clear enough recollection of that age, however, to suspect that the child's parents might have some difficulty in finding time to type in the program. Therefore, I would suggest the following simplified version as a time-saver. For lines 500 through 545 substitute the following:

```
500 A = ASC(A$)
501 C = A - INT(A/15) * 15 + 1
502 COLOR = C
```

This does not assign the same colors to the same keys as the original program. I doubt that many seven-month-old children will notice the difference, but their parents will probably appreciate having 43 fewer lines to type.

Actually, though I am actively involved in the use of computers for education at the college level, I tend to share the concerns about possible adverse effects of too much computer use at an early age which are expressed by Swain Pratt in the same issue. This is a serious matter which would deserve in-depth consideration in a future issue of *inCider*.

Abram M. Plum
School of Music
College of Fine Arts
Illinois Wesleyan University
Bloomington, IL 61701

Chain Selling and More

You are right about an Apple owner's influence on selling Apples. I have influenced quite a few Apple purchases on my own, even before buying my own home Apple computer. I sold the following:

- One Apple for tracking production of over 50 orders of electronic keyboard assembly products.
- Two Apples to the accounting department once they had seen what power a micro had in tracking production.
- One Apple to the engineering department for doing design calculations on routine products.
- One Apple for my own home use.
- One Apple to a man in my department.

I am now convincing a couple of my relatives that Apple is the way to go. I am trying also to persuade the local library to buy an Apple.

And I continue because:

- Apple gives a person security by not outdating their computers with gimmicks.
- Apple is a stable product that works well.
- Apple will handle 99 percent of anything a person could possibly want to do.
- Apple can be upgraded for specific tasks without buying another computer by use of expansion slots.
- Apple has a lot of support by software accessories.
- Apple is created and expanded by users and not by people in white collars just doing their jobs.
- Apple is user friendly.
- Apple has just enough keyboard; not too much.

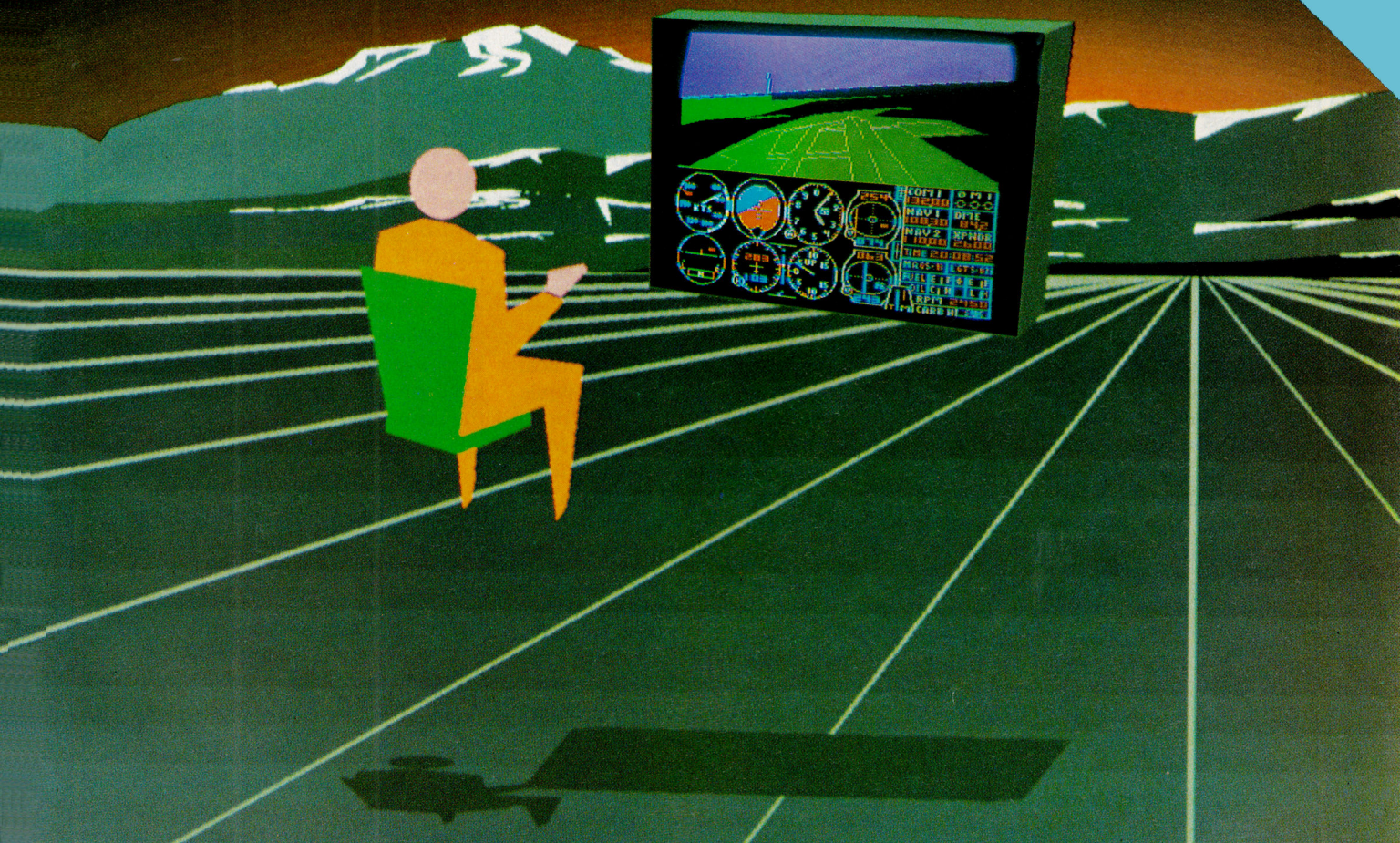
I work in a business where the feud between Apples and IBM PCs is an everyday occurrence. I have observed two kinds of people.

The IBM supporter is hung up on IBM as "Big Brother 1984." Whatever Big Brother wants to sell at whatever price, these people would buy it because it is IBM, master of all. There is little consideration of economics in what can get the job done for the least amount of money. When the IBM fans talk of success about their computers it is not so much about the machine itself as about the *software* packages, which are not even made by IBM. I hear plenty of complaints about the *hardware* and manuals for IBM. I have a used a few myself. The IBM types like some difficulty in what they do. They like to exercise their minds on all those overlooked design deficiencies of the IBM. To those people it is almost like an adventure game to crack the next clue on how the machine works. This greatly affects getting the job done.

Circle 156 on Reader Service card.

Flight Simulator II

For Apple II, Apple II+, & Apple IIe



Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

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LETTERS

The Apple fan generally knows he can get his job done for less. He won't have to spend days just trying to understand all those fancy keys on the keyboard knowing that once he had learned them he would not use most of them anyway. The Apple fan knows that his machine is not being designed out of existence, so even the latest software innovations can be used.

The number one factor I see holding Apple back substantially in the business world is IBM mainframe compatibility, I have seen more use of Apples in the business world held back by this one factor.

So what can Apple do? Build its own mainframe! Apple has to realize that it has already seeded the market for this by the thousands of young people destined to be our future executives. By the time this task could be accomplished, Apple would have all the industry support it would need from present Apple users. Think of it—a mainframe developed by the same people that built the best little micro in the world! Such simplicity it would be to use it! A network of Apples attached to an Apple tree!

Scott D. Kitzerow
25160 W. Monaville Road
Lake Villa, IL 60046

inCreasingly inSidious

The solution Mr. Ude gives for his inSidious inSoluble (April 1984) still does not make the program run properly if the message (A$) is over 40 characters long. With the corrections given, the message will be printed at the left hand side of line V+1 when the loop in lines 70–100 is executed, as an overflow to line V. The program therefore needs the following additional fix:

```
80 IF C = L OR C<L THEN PRINT
MID$(A$,H,C - H + 1)
```

This will confine the length of the printed message as defined by the third element of the MID$ function to 40 characters, and keep it on one line.

I enjoy these little exercises every month—they keep the gray cells exercised. Keep up the good work, Mr. Ude! The same goes for *inCider* as a whole. I find it an interesting magazine, and more importantly, a *useful* one. It's one of the few computer magazines I've found to be consistently worth the price.

Robert Dykeman
P.O. Box 98874
Tacoma, WA 98498

An Unanswered Question

I'm amazed at how technical equipment reviews can be while completely ignoring the most practical applications. I refer to the Macintosh review in the March *inCider*.

The Macintosh is obviously a tremendous machine. One of the most widely used functions of a personal computer is word processing, and while the Macintosh can process words, it apparently doesn't have the capability of transferring those words to a letter-quality printer.

I understand that since the letters are graphic creations they can only be reproduced in that manner, but surely Apple has a card up its sleeve to allow the Macintosh to transfer a standard set of letters to a pure letter-quality printer. I would have liked to have had your review answer that question or at least ask it of Apple. The Macintosh graphics are fine for notes or reports, but I certainly wouldn't send out business correspondence produced on the Imagewriter.

I'm sure you must know who you produce the magazine for and what their interests are, but many of us couldn't care less whether it's a 6502 or a 68000 under the hood. We want to know what it will do, and perhaps more importantly, what it will not do.

Jon H. Hunt
P.O. Box 280
Elberton, GA 30635

Alternative Arrows

Recent letters to the editor have dealt with the arrow keys. As a possible last word on the subject, I'll mention that it is possible to replicate the up and down arrows available on the //e on a II Plus. They are control-J for the down arrow and control-K for the up arrow. Combined with the control-U for the right arrow and control-H for the left arrow, they create a block of keys which make little sense on the keyboard but provide recourse for the desperate.

John Laney
Marymount Manhattan College
221 E. 71st Street
New York, NY 10021

Golf in Color

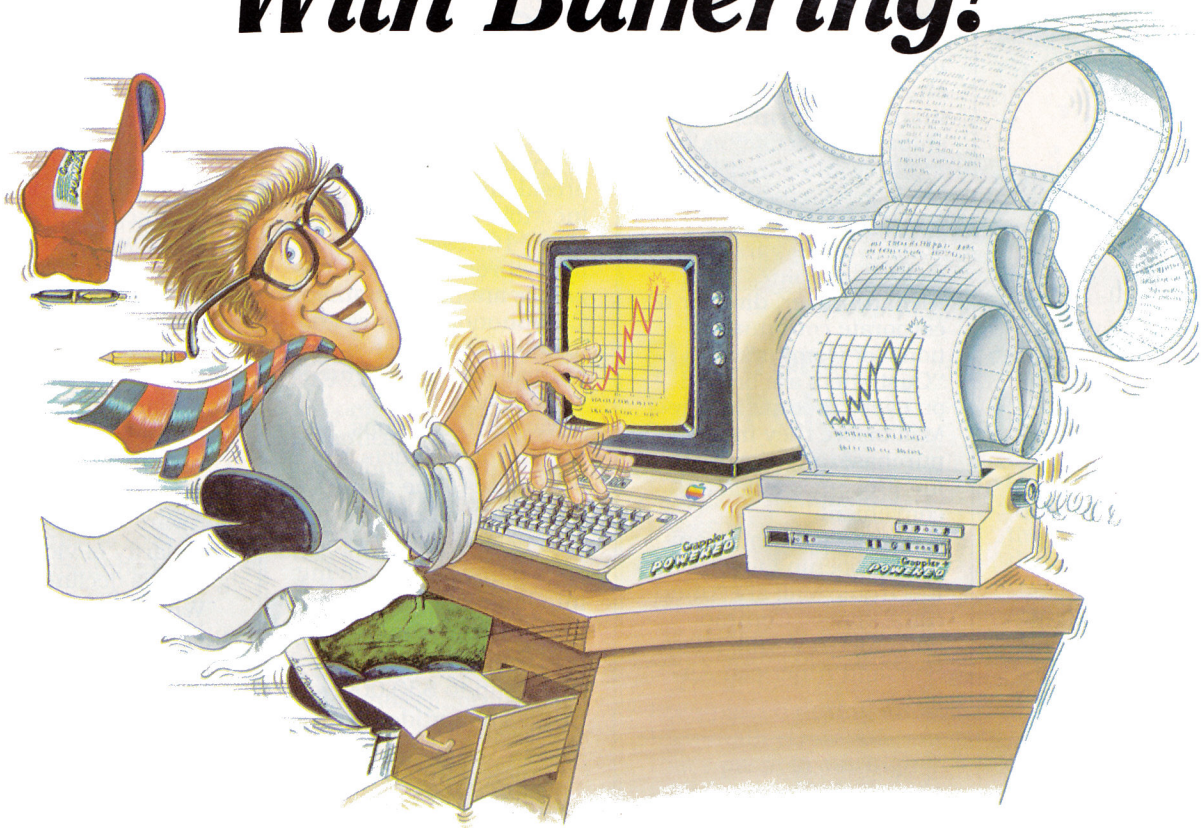
I have enjoyed "Golf Slice II" (April 1984). It has impressive graphics, yet is fairly short and easy to type in. For those of us who have color displays, these changes add a lot of life to the game:

```
10035 HCOLOR = 6
10055 HCOLOR = 5
10085 HCOLOR = 1
10133 HCOLOR = 3
```

I would like to thank Floyd Berghout for this program. My friends and I are having fun playing it.

Darrin Buchwald
2422 Rockhurst
Salina, KS 67401

Turbo Charge Your Apple® With Buffering!

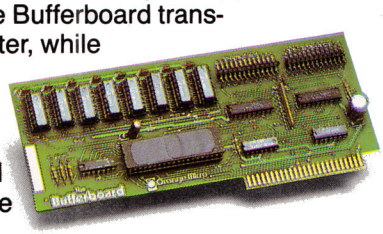


If you use a printer now...

Bufferboard™

For Apples and Printers

The Bufferboard is the original add-on buffer upgrade for existing interfaces. Easily installed, its memory power can store up to 20 pages of your Apple text data at a time. The Bufferboard accepts print data as fast as your Apple can send it. Then the Bufferboard transmits to your printer, while your computer races on to its next task.

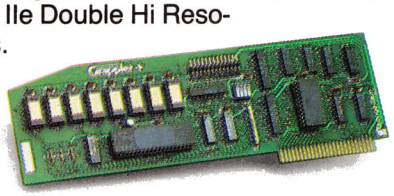


The Bufferboard uses an available Apple slot and "Docks" onto most popular interfaces, including Epson, Apple and Orange Micro Grappler configurations. No external power supplies, no clumsy boxes and cables. It's the easiest and most economical way to add buffering.

If you're just adding a printer...

Buffered Grappler+™

The Buffered Grappler + is the most powerful Apple printer interface you can buy. All the memory features of the Bufferboard have been merged with the smartest interface available... the Grappler + . The Buffered Grappler + now gives you over 27 different built-in features. Buffer expansion capability allows up to 20 full pages of text memory. Exclusive new features give you special support of IIe 80 column text, screen dumps for Epson graphic aspect ratios, and support of the new IIe Double Hi Resolution Graphics.



Other features you'll be using in no time include Dual HiRes Graphics, Mixed Mode Screen Dumps, Enhanced Graphics, text formatting and much, much more. The New Buffered Grappler + . So much interface power you'll never need anything else.

Orange Micro inc.

1400 N. LAKEVIEW AVE., ANAHEIM, CA 92807 U.S.A.
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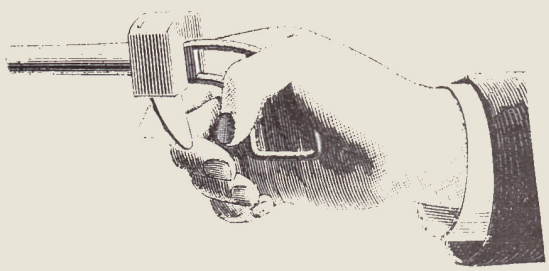
Open All Night

Convenience shopping was never so convenient. Never again worry about pushy sales clerks or crowded parking lots. Imagine browsing through Sears, Walden Books, or Eastman Kodak without leaving home. Just turn on your computer and enter The Electronic Mall, open 24 hours a day, seven days a week.

Developed by CompuServe, Inc., and L. M. Berry and Co., The Electronic Mall is open to the more than 115,000 customers who subscribe to CompuServe's Consumer Information Service. Once on-line, you receive product descriptions, merchant assistance, automatic order forms, and shipping information.

"We wanted to develop a service that was exceptionally trustworthy, while offering variety and significant value," said Richard Baker, director of corporate communications for CompuServe. "Customers are briefed on every product in The Mall before they make a purchase, and the ordering process is quick and convenient."

Among the other companies opening in The Electronic Mall are American Express, Commodore, McGraw-Hill, MicroSoft, and American Airlines.



Tag Lines

What's in a name? Aside from Juliet's preoccupation with Romeo, everything. Ira Bachrach, president of Namelab, Inc., told *Computerworld* (April 16, 1984) that many products and companies are poorly named. Cacophonous names confuse the consumer, and in turn, can be detrimental to product sales.

Namelab develops names for products and businesses. The name game isn't all play, either. The company formulates names after delving into linguistics, psychology, audience, and image research. Namelab's price—up to $30,000. But it's all for identity's sake.

Which companies sound like music to Bachrach's ear? Apple Computer, Inc., for simplicity; IBM Personal Computer for accuracy, and Lotus Development Corporation's Symphony for conveying intellectual superiority.

Closet Gamers

We know you're out there. Admit it. Tucked behind all those impressive educational, intellectual software packages skulks a copy of Pac-Man or Space Invaders. A gamer lurks in us all.

TALMIS, a marketing research company for the computer industry, released a study indicating consumers show an inreasing interest in leisure software even though the popularity of video arcade games is declining.

Why do people conceal their gaming habits? They don't want to admit they're interested in such frivolity, according to TALMIS Director of Research Dennis Pelak. But only 19 percent of the study's respondents who plan to purchase computers said they are not at all interested in arcade-style games. Frogger, anyone?

They Shoot Game Players, Don't They?

Playing computer games is not hazardous to your health. So says a medical research team at a recent Electron and BBC Micro User Show in London.

In order to determine if prolonged computer game playing could be harmful, the researchers studied 14-year-old Derek Creasey as he conducted a non-stop battle against the computer in an attempt to set a new world record.

The researchers hooked Creasey up to an EKG machine that monitored his progress. At regular intervals, he was also tested for disorientation and lack of concentration.

Creasey fell 55 minutes short of his 24-hour goal when he dropped off to sleep. He still set a world record, though.

"During the marathon, he showed no obvious signs of stress at all," a medical observer said. "In fact, the only symptom he displayed was what anyone else would have shown after 23 hours and five minutes of doing anything—just plain, old-fashioned tiredness."

edited by Cynthia Carr

Jobs On-Line

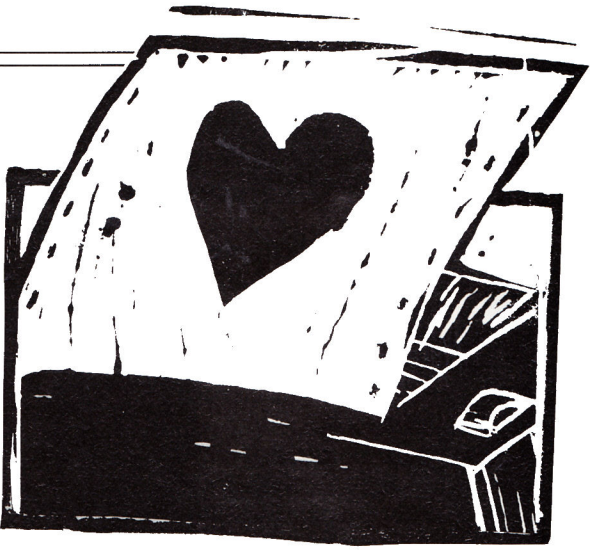
Tired of pounding the pavement looking for a job? Don't despair—at least if you're a computer professional. Forget about resumes and want ads. Turn on the computer instead for an on-line data base containing nationally advertised jobs in the computer, communications, and information fields.

The Computer Job Bank, from The Direct Connection Company, is high tech's answer to your newspaper's classified section. Available through CompuServe, the job service costs no more than the price of telephone on-line time for a CompuServe subscriber. This leading information utility reaches more than 115,000 subscribers, many of whom work in computer-related professions.

Implemented this past April, the Computer Job Bank "will have the potential to become one of the primary employment sources of the computer technological age," according to Bob Brown, president of The Direct Connection. For only $256.20, an employer can list a two-page, double-spaced job opening for six weeks, 24 hours a day. "It's as cheap as a local ad in any metropolitan center paper," Brown added.

Brown noted that the $256.20 figure was based not only on projected revenues and expenditures, but after flipping through *Computerworld*'s classified section and discovering that a one-time, two-column-inch ad cost—you guessed it—$256.20.

For more information, write to The Direct Connection Company, P.O. Box 3497, Honolulu, HI 96811.



Electronic Pen Pals

Dear Judy—If I can get tickets to see Michael Jackson, do you want to go? From, Scott.

Hey, Scott—Like, WOW, fer shure! Michael Jackson is, like, just it! I can't wait. Love, Judy.

These notes could have been passed during junior high math class, but that's passe in our high-tech society. Today's kids use an electronic bulletin board to share privileged information with one another.

Lee and Darlene Tydlaska started The Kids' Message System in February 1983, out of their San Diego home. Since then, there have been more than 21,000 calls to their free, 24-hour bulletin board. They average 750 calls each month. Their system consists of an Apple II Plus, two disk drives, DC Hayes Modem, and PMS software.

Response has been so great that "it has already worn out one Apple and two disk drives," Lee said. Because of the influx of callers, a message can only stay up a maximum of two days.

Most of the calls are made between as early as 5:30 a.m. and as late as 10 p.m., according to Lee. The youngest caller is six years old, but kids aren't the only ones using the system. Teachers call in and leave messages for students, and parents tell the Tydlaskas how much the bulletin board helps their children. Ten schools use The Kids' Message System in their classes.

"The teachers' only complaint is that they can't get on the system (because it's always busy)," Lee said. "Parents are fascinated with their kids' reading and writing improvement.

Special features of The Kids' Message System are Jokes Corner and Stories By Kids, which is a spot where children read stories written by their peers. Lee noted that while the system is fun, children learn about computer uses, data bases, grammar, and social interaction skills.

Care to leave a message? Call (619) 578-2646, or write to Computer Communications, 11419 Menkar Place, San Diego, CA 92126.

What's new? Fill us in on the details. Send your newsworthy notes to the Cider Press, inCider, *80 Pine Street, Peterborough, NH 03458.*

Orwellian Tactics

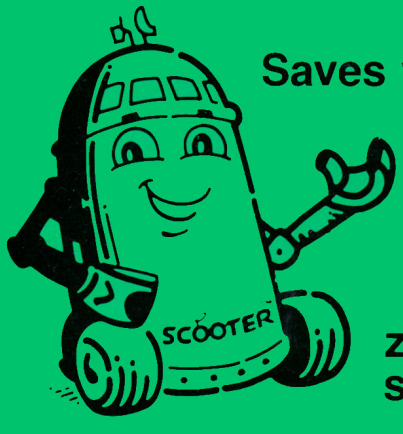
If you tend to direct abusive language at your computer or envision 1001 ways to kill it from time to time, you're not alone. A recent survey conducted by pollster Louis Harris indicates that the public has stopped looking at these technological marvels through rose-colored glasses.

The Harris report, released to Congress, states that 77 percent of adult Americans are concerned about the computer's "see-all-know-all" power to peer into otherwise private information such as credit records, employment background, and telephone calls.

Check the calendar. Orwell's 1984 is here.

SCOOTER™

Ø-FORCE TWIN PORT



Saves wear and tear on Apple* I/O game ports and accessories with TWO high grade zero-force insertion sockets.

Now, plugging into any Apple* I/O game port is faster, safer and more convenient than ever. With SCOOTER's Ø-FORCE TWIN PORT you can alternate access between port A and port B at the flick of a switch.

Fragile plug pins are easily and safely inserted with SCOOTER's zero-force sockets; just place the plug in position, then flip the levers for secure connection.

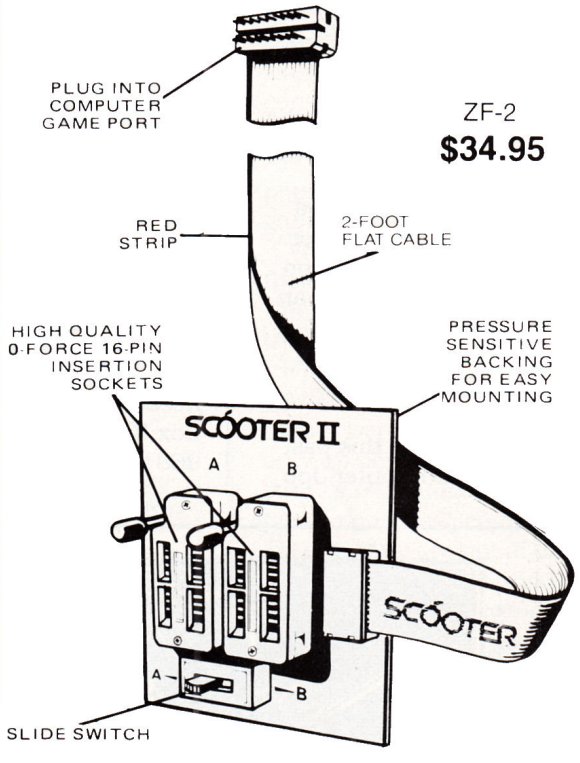
A pressure sensitive backing and 2-foot cable allow quick mounting of the Ø-FORCE TWIN PORT in almost any convenient external location.

Simple-to-follow instructions are included. In addition, the SCOOTER cable is color coded (red stripe) for quick identification of correct pin alignment.

Like all SCOOTER cable/connector products, Ø-FORCE TWIN PORTS are 100% tested before packaging.

So, let the Ø-Force be with you! See your favorite computer store today for SCOOTER's new Ø-FORCE TWIN PORT and the full line of SCOOTER High Grade Electronic Components.

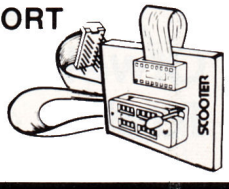
Let the Ø-Force be with you!



Also available:

SCOOTER Ø-FORCE X-PORT

External game port with single zero-force socket.
ZF-1
$22.50



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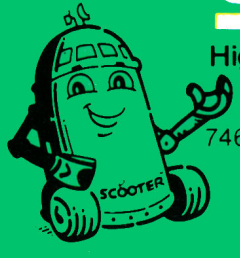

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Solutions to Your Hardware Problems

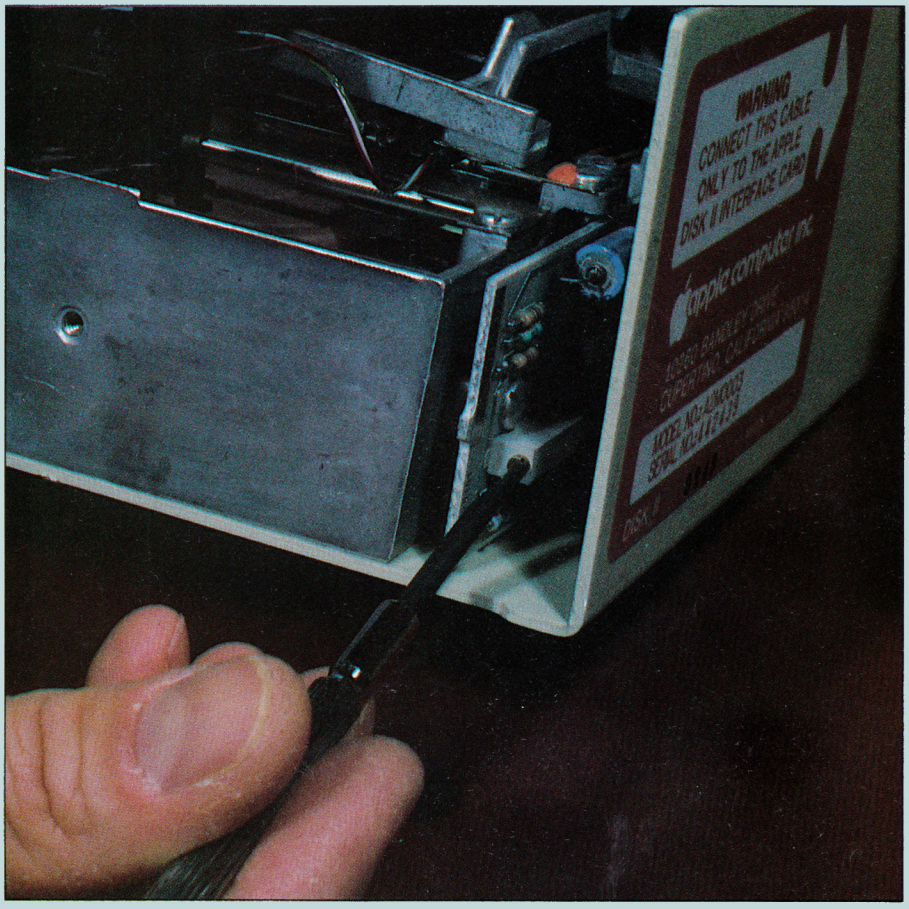


Photo 1. *Locating the disk speed trimmer pot.*

Q I own a Franklin Ace 1000 with the Franklin 80-column card. When the card is enabled, the text screen is not framed well on the monitor. I've tried adjusting the monitor to no avail. Is there a way to adjust the card itself?

When an inverse video character is displayed in the leftmost column, an ugly line appears on the line above or to the right. Is there any way to repair this?

Finally, how can the disk drive speed (Franklin Drive) be adjusted? Thank you for your help.

T. Sipples
Clinton, CT

A When Franklin Computer Corporation introduced its 80-column card many customers experienced problems similar to the ones you describe. The problem has been traced to the frequency of the reference crystal on the card. The original design called for a 15-megahertz crystal. The engineers at Franklin have found that a 17-megahertz crystal works better. Users report that the revised design works beautifully.

Ask your Franklin dealer about an upgrade or contact Franklin at 7030 Colonial Highway, Pennsauken, NJ 08109 (phone [609] 488-1700). In either case Franklin will issue an RMA (return authorization number) and you or the dealer can send the 80-column card to them for the free update.

Remember to have the RMA number prominently displayed on the outside of the package. Doing so greatly speeds up the "repair and return" procedure. Some companies will go so far as to ignore packages received without the RMA number showing.

The Apple Clinic receives several requests each month for the details of disk drive adjustments. Although we published disk drive adjustment instructions in November 1983, it seems appropriate to do so again. These procedures apply equally well to Apple, Ace and Micro Sci 5¼-inch drives.

The two most common adjustments are the disk speed and the 0 track alignment. Due to normal wear these settings move out of tolerance fairly often, every two or three months on a busy system.

Earle Hancock directs the microcomputing project at Minuteman Regional Vocational School, Lexington, MA. He has served as an advisor to the Massachusetts Association of Vocational Administrators, and belongs to a number of computer organizations. Write to him c/o inCider, *80 Pine Street, Peterborough, NH 03458.*

by Earle Hancock

The disk speed adjustment requires a special program or a 60 cycle strobe light. There are several reliable disk speed programs available. Usually they are sold as a part of a larger package, such as Locksmith by Omega Software, Copy II+ or Filer by Central Point Software, and XPS Diagnostics II and IIe by XPS, Inc. A strobe or florescent light will work, but you must remove the bottom cover to gain access to the pulley wheel with the strobe marks.

Remove the cover of the disk drive (remember to remove the bottom cover if using a strobe). The top cover is held in place by four Phillips screws. Remove them and slide the cover backwards until it's free. Four more Phillips screws will be exposed; these hold the bottom in place.

Locate the disk speed trimmer pot as shown in **Photo 1**. Boot the disk speed program and, using a nonconducting alignment tool or small screwdriver, adjust the drive speed to your satisfaction.

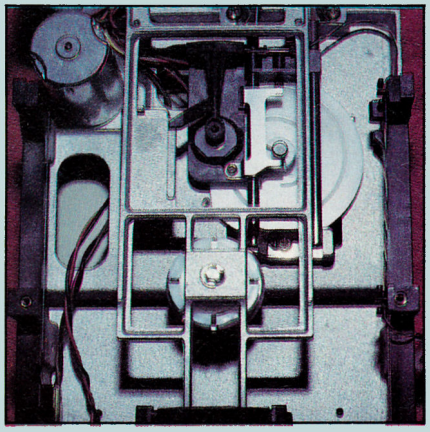


Photo 2. *Locating the alignment stopper.*

The adjustment of the 0 track stopper is considerably more difficult and sensitive. Do not attempt it if you are not completely comfortable with the directions that follow.

For the disk drive mechanism to correctly position the read/write head, it must have a reference point to work from. The 0 track alignment provides the calibration point. The alignment stopper (see **Photo 2** and the **Figure**) must be set to a gap of 20/1000 at the two places shown in the **Figure**. Remove the printed circuit board that covers the mechanism. This board must be out of the way but still remain connected so that the drive will operate. Boot the disk drive; this will cause the track stepping mechanism to return to the 0 track (you may stop the disk from spinning at this point by pressing RESET). To adjust the stopper, loosen the holding screw, set the gap, and retighten the screw. Re-boot and check the gap. Do not attempt any other adjustments inside the disk drive.

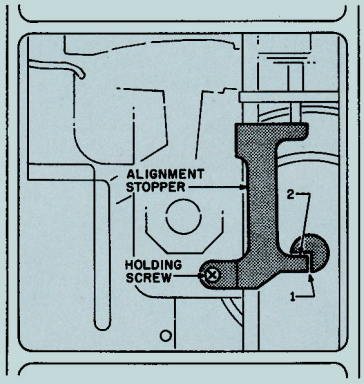


Figure. *Enlargement of alignment stopper pictured in Photo 2.*

Q I know *inCider* is probably the best magazine for Apple users. That is why I decided to write to you for help. This is my problem: For business reasons, my parents chose to put our hard disk in slot #6 and the floppy disk drive in slot #4. I didn't care until I tried to boot Apple Presents—Apple. I still didn't care until (gasp) I tried to boot Wizardry. It didn't work in slot #4 either. It has to boot from slot #6. I was allowed to switch slots a few times, but our Apple dealer says it could ruin our cards. Is this true? If so, how can I get around this?

Assembly language programs annoy me. I don't have an assembler and I don't know anyone who has an assembler. Can't you list Applesoft programs that create assembly language programs?

J. Hoyle
Kingston, WA

A Many disk-based programs require that the floppy disk drive be installed in slot #6. As you have found out, having the floppy disk drive in another slot is a real pain.

Your dealer is giving you sound advice when he says not to continually switch drive cards from slot to slot. The cards are vulnerable to damage from frequent handling and static electricity. Furthermore, all too often someone will remove or install a drive card when the computer is turned on. "Kapop!" There goes several dollars out the window—not to mention your parents' reaction when you tell them their "former son" destroyed the hard disk interface card.

So many people have encountered this problem that a product called *Slot Swappers* has been developed to solve the dilemma. Sold by Johnson Associates (in Phoenix, AZ 85100, phone [602] 979-4554), the Slot Swappers allow any two peripheral cards in slots 4 and 6 to be interchanged by flipping a switch instead of physically moving the cards. Unlike switch boxes advertised for running two printers from one computer or vice versa, the Slot Swappers can handle the speed of data flow necessary to operate disk drives. Be advised that this product has three versions, one for the Apple II, another for the Apple //e, and a version which deals with certain problems arising from using Pascal. The manufacturer suggests that you call the number above for assistance if you think you may require the special version. The price is approximately $60.

If you are serious about working with assembly language, it is worth the money to purchase an assembler. *Merlin* from Southwestern Data Systems is an excellent one. Get together with a friend and purchase it jointly. The price, $64.95, is low when compared to its usefulness.

Q For the past few months my Apple II Plus keyboard has made me look around corners for Rod Serling. Three times I have taken my II Plus to a technician and he has replaced a 74LSO chip for 75 cents, with a labor charge of $20. The fourth time it happened, I gave up.

A day after the fourth occurrence I prayed and turned it on. The keyboard worked! So now all I do is wait a bit and the keyboard functions properly.

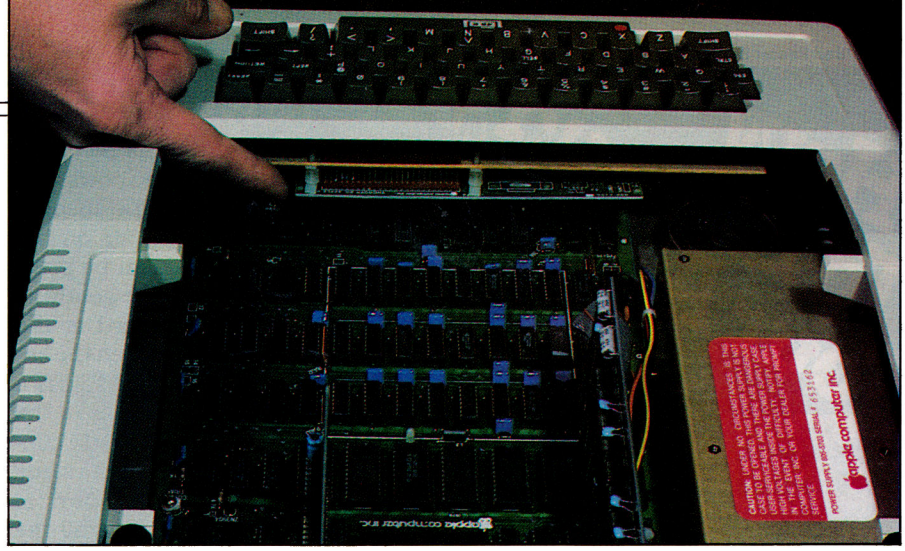


Photo 3. *The encoder board.*

Just as I was about to finish this letter the problem came back. Please help!

F. Stokes
Miami, FL

A Intermittent problems are the most frustrating to deal with because it's so difficult to know if what you've done solves the problem or if the computer just decided to work for awhile. The best resource for fixing intermittent failures is experience. The old "it sounds like..." or "I had one like that" can be words from Heaven ready made to defeat the demon.

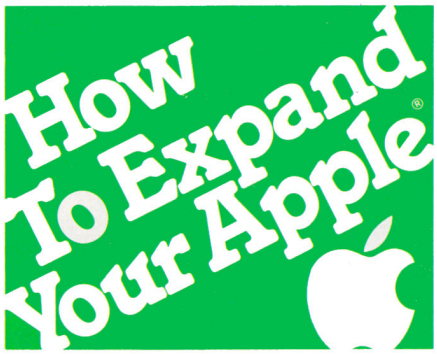
Your problem brought one of those phrases to my ear: "It sounds like the C2 capacitor." (green .022 micro farad on the keyboard encoder). Intermittent failures can often be traced to a bad cable as well. Since the encoder board has a cable attaching it to the main logic board, try replacing it first. The cable is a 16-wire jumper about eight inches long. Both ends have a 16 DIP (dual in-line pin) connector. These cables are available, already made up, from an electronics hobby store or an Apple dealer.

To replace the encoder board connecting cable, you must remove the ten screws that hold the case to the bottom. After doing so, but before separating the case from the bottom, turn the computer right side up and carefully lift up the front of the case, exposing the encoder cable and its connection to the main logic board. Remove the cable from the MLB. An IC extractor can help with the removal. The case with the keyboard attached can now be lifted free of the bottom.

Place the case upside down on a soft surface. The encoder board is the small board piggy-backed to the bottom of the keyboard (see **Photo 3**). To get at the connector at the other end of the cable, you must re-

Circle 323 on Reader Service card.

Circle 278 on Reader Service card.



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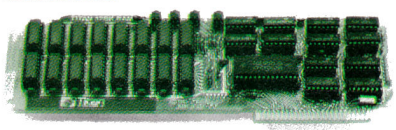

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move the encoder from its perch on the keyboard. Two plastic posts and a 25-pin connector hold the encoder in place. Squeeze the wings on the posts so that the board can be pried off. All of this must be done gently so as not to damage the board or the pins. Once you have removed the encoder board, replacing the cable is a snap. Compare the new cable to the old one, making sure that the connectors are installed in the same manner. Make a note of the number one wire so that you can install the connector with the pins in the correct orientation at the other end.

Since 80 percent of the work of replacing the C2 capacitor is already done, you might as well replace that too. Remember the rules of soldering PC boards—go easy and work fast. Do not hold the iron to a PC board for more than three seconds at a time or you may ruin part of the circuit.

Q I own an Apple II Plus computer that is about a year and a half old. Ever since we moved, it won't work. When I turn it on, the disk drive light comes on and it spins forever. Even when I remove the disk card, it remains inoperable. The power light does not come on. I took the top cover off to check if any of the chips might have gotten jarred in moving, but none had. I did find that one of the chips got very hot when the Apple was turned on. The chip is labeled SN 74S 195 N and it is in location C2 on the motherboard. That is the only interior problem that I can find. Some water reached the bottom of the computer when I had a flood in my house once. One of my keys is broken as well.

G. Rudolph
Louisville, KY

A It would be easy to blame all your computer trouble on the flood and the resulting dampness that reached the equipment. My guess is that several unrelated factors are at work causing your problem and dampness is probably not one of them.

You did not mention whether the computer "beeped" on power-up or not. Since one of the chips got hot, I will assume that the power supply is functioning properly. The power light often does not work consistently and cannot be used as the only indicator of the computer being on. (See the February 1984 "Apple Clinic," page 114, for help with correcting faulty power lights.)

The chip at main logic board location C2 is part of the timing circuit. When it fails, and I think from your description it has, it is usually indicative of other failures on the MLB. You may wish to replace the chip and see if that takes care of the problem. During the test, be sure to have the disk controller card unplugged from the computer; the problem with your disk drive is probably separate from the problem with your computer. If all goes well after replacing the 74S195 (if the computer "beeps" and generates some text on the monitor when you turn it on), then pat yourself on the back—you're halfway home. If the chip heats up again, or you get no "beep" or video output, your dealer will have to replace the main logic board.

The problem with the disk drive is most likely the setting of the speed or the 0 track alignment. These adjustments have been covered elsewhere in this month's column. Follow the procedures outlined and verify the drive operation. If the drive still doesn't boot known good disks, try another disk controller card (perhaps a friend would loan one to you for the cause). A failure at this level usually indicates a problem with the analog card inside the disk drive; the most common problem there is a failed 74LS125 chip. These chips are very inexpensive (one or two dollars) and readily available from your dealer or an electronics hobby store. Replace the chip and try again. If the drive refuses to cooperate and work correctly, I recommend replacement of the disk analog card.

As for the broken key, please see the January 1984 "Apple Clinic," page 32, for details.

This column depends, for its energy and interesting problems, on you. If you have questions about maintenance, repair, or comments, send them to: "Apple Clinic," *inCider* magazine, 80 Pine Street, Peterborough, NH 03458.

A Parent's Guide to Early Childhood Software

Photographs: Richard Chase/Wheaton College

Introduce your preschooler to your Apple with forethought and care.

Depending upon how you look at it, preschool children learning to use a computer is either amazing and desirable (in the same realm as the Suzuki method of teaching preschoolers the violin) or a travesty. Psychologist and noted author David Elkind says in *People* magazine that we are hurrying our children too much and that the consequence is alcohol and drug abuse, increased suicide, and a mid-life crisis by the time they get to their teens. *inCider*'s May 1984 issue addressed both sides of this controversy in "Baby's First Computer Program" and "Your Child and Your Apple—Think Again!"

As a school principal I become irritated with parents who push their children. Yet my wife and I have been teaching our own preschoolers to use the computer and to read since they were one year old. Melody is now five and Dale is two.

There is a difference, however. Some children are ready at an early age. It is ridiculous to hold these children back when they are eager to learn. Just because they learn early, however, means virtually nothing. I know of no research that says children who learn to read or use a computer early are better off in school.

How Melody Got Started

The way Melody started on the computer was by sitting in Daddy's lap when he was working at his Apple. She found that when she touched the keys, something happened. Sometimes it was Daddy getting upset and telling her not to

Fred Huntington is a parent, educator, and former software entrepreneur who lives at 2020 Charles, Corcoran, CA 93212.

by Fred Huntington

touch. But usually she just made the pictures or colors change on the screen.

Her eagerness increased to the point that when DynaComp released a program called Hodge Podge, Daddy bought one for her. Anytime Melody pressed a key, something happened on the screen, sometimes with sound effects, sometimes without. If she pressed a D she got a picture of a dog with appropriate music. If she pressed V she got an erupting volcano, and so on.

Melody spent hours with Hodge Podge. But it was always at her request. She was the one who suggested we play, not me or my wife.

Part of the thrill of playing on the computer was that she saw Mom and Dad spend long hours at our Apple. She naturally wanted to imitate us. Mom and Dad also spend many hours reading instead of watching television. So, it's no surprise that Melody reads a lot, too. Of course, she still likes to watch some television.

The point is, if a child wants to play on the computer then it is fine. If the child has to be forced or cajoled into using the computer, then that child is simply not ready and should not be pushed into it.

So, if your preschooler is making noises about using your computer, go ahead and demonstrate what it is. Let him or her pound on the keys and explore the cause and effect relationships.

Not a Baby Sitter

There are two types of computer programs for the very young. One requires the parent to be with the child at all times and the other is easy enough for children to use by themselves.

However, if your child is simply given a program and told to "Go to it," that is no better than sitting the child in front of the television for long hours. It becomes another form of baby-sitting. *The computer must not be used as a baby sitter.*

What Should Your Child Be Learning?

The computer can be an effective tool in teaching the names of colors. In an electronic coloring book, the child uses a joystick to place the cursor and then pushes the button to fill in the color of his or her choice. Not only is this type of program good for learning the colors, it's great for developing fine motor coordination, and also fun to do.

The computer is also good for teaching differences, such as which one is larger or smaller. These are skills children need for school and are the foundation upon which other skills are based. Pre-reading skills such as above/below and left/right are also taught in some games.

"If your preschooler is making noises about using your computer, go ahead and demonstrate what it is."

Letter recognition is learned painlessly on a computer. Melody knew there were certain pictures she wanted to see and that the only way she could get to see them was to find the correct corresponding letters.

Other skills addressed in preschool software include counting, matching, and sequencing.

Choosing Software for the Preschooler

There are certain things to look for when choosing software for your preschooler. The ideal way to make a selection is to try out the package at your local dealer with your son or daughter.

First of all, it's important to find software that is positive for your child—that builds his or her self-esteem rather than tears it down. Don't choose a program that will be frustrating.

Make sure the program is age appropriate. Since all children have different learning rates, the recommended age on the outside of the packaging may not be accurate for your child.

One of the biggest mistakes I've seen in educational software is a program that inadvertently rewards a child for a wrong answer by some sort of display or sound. Although intended to be negative, the display or sound may actually be a treat. If a child makes a mistake, nothing spectacular should happen. Also, there should be no razzberry sounds that announce to everyone in the room that a mistake was made.

If the program is written for just one skill level, the child may quickly master it and lose interest. Software for preschoolers should provide an increasing challenge as the program is played. Sometimes the user is allowed to set the skill level, which is good, too.

Check for pacing. Often a program is paced too fast or too slow. Also, are there long pauses between segments of the game that make the child lose interest?

Will the program die if a wrong key is accidentally hit, and is there a way to get out of the program easily, for example, by hitting escape?

Sometimes the introduction to a program is long and tedious. The first time you see it, it's really cute. By the second time you're tired of it. It's good if a program lets you avoid the introduction by hitting escape.

Does the program make good use of color and sound? If you or your spouse is irritated by computer sounds, can you turn the sound off?

Our Favorites

At one time there was virtually no software for preschoolers. Now there are many programs for this age group. Included with this article is a buyer's guide on preschool software showing a partial list of what is available. Our favorites have a star (★).

Number Farm Review

One of the best educational software companies to come on the scene is DLM, who has 15 years in the education business. They are primarily educators who use sound

educational ideas to produce an educational tool—educational software.

Melody and I had a blast playing the games in one of their newest packages, Number Farm, for children 3 to 6 years old. There are six different games in the package, all teaching the preschooler how to count. The title game, Number Farm, is simply a counting program where you press a number and a corresponding number of animals appears on the screen. If you push the same number a second time, different animals appear.

Game two is Hen House, a game for two players in which you guess the number from one to nine. Each time you guess, the computer indicates if the secret number is higher or lower. Across the top of the screen appear the numbers one to nine in blue letters. If the computer tells you the number is higher than six, all the numbers six and below turn orange, marking them as no longer appropriate to choose. This can be a hard concept to master, even for first graders.

Game three is a variation of Old McDonald, complete with song, in which you count the number of animals on the screen and type the correct number on the keyboard. Melody loved this one except for its slow pace. When she plays it by herself for any length of time, she quickly tires of it.

Animal Quackers, game four, uses a different learning mode, the auditory mode. You are asked to identify the number of sounds various animals make. If you didn't hear one, press the letter A to get a replay. This is one of the few computer games I know that uses a multi-sensory approach. Other manufacturers should take note.

Horseshoes, game five, has some of the most incredible graphics I have ever seen on an Apple. For example, there is a picture of a man pitching horseshoes. After he throws the horseshoe, it turns end over end, with the shadow underneath it changing perfectly. The animation is extremely smooth and life-like. The object is to pitch the number of horseshoes indicated on the screen by pressing the space bar. Again, this is another mode of learning, the kinesthetic or tactile approach.

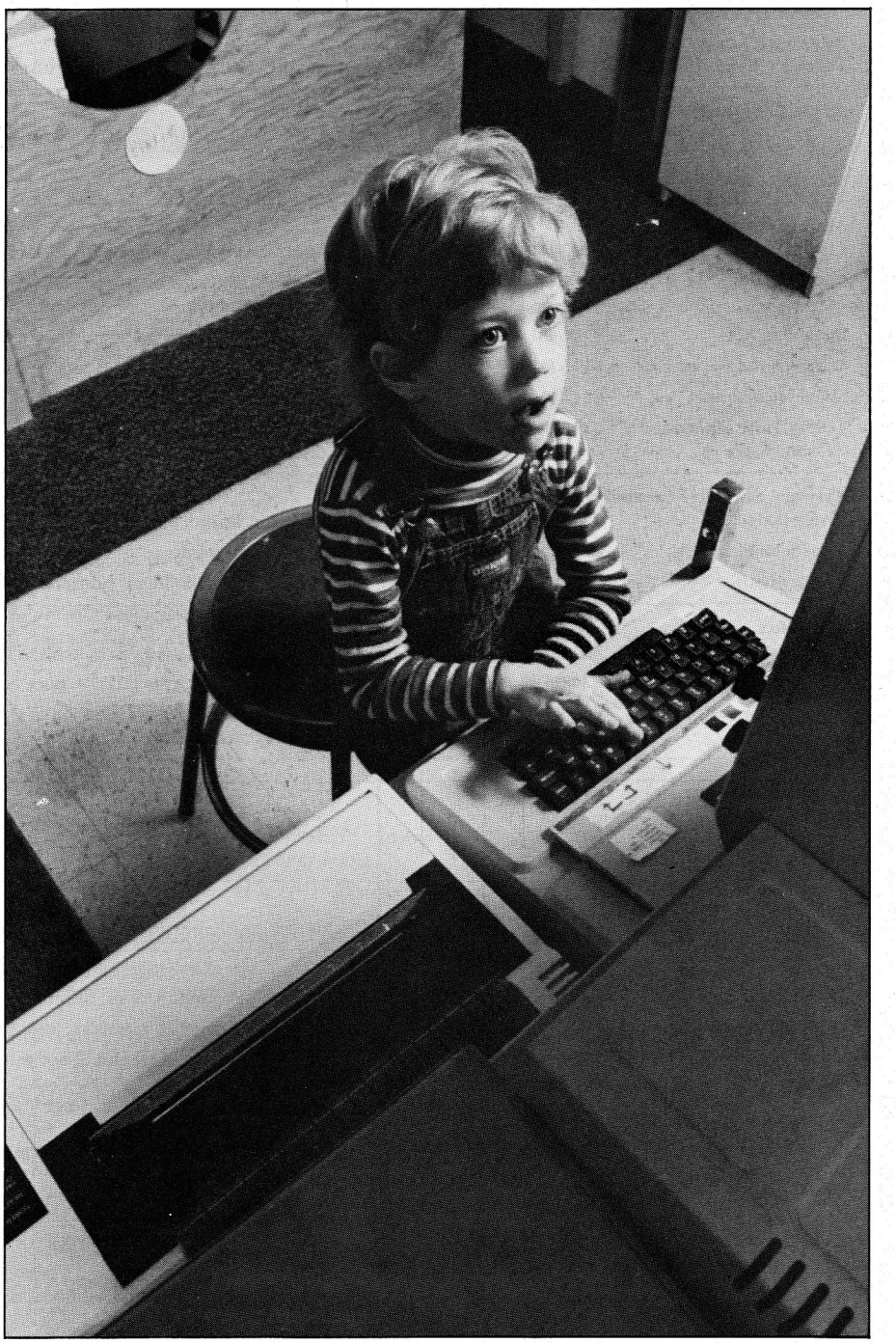
Game six, Crop Count, was my favorite. A number of farm crops (1–9) appears on the screen and you have to tell the computer how many there are. You get a point for each crop, trying to break your own record each time. Your time limit is the amount of time it takes the sun to set on the screen.

All six games are educationally sound. DLM is to be congratulated on turning out one of the best pieces of software ever produced for preschoolers.

If You Have Questions

Don't forget, if you have specific questions about educational software, write to me and I will try to find an answer. I won't be able to answer all queries, but will pick questions to answer in the column that are most representative.

Thanks for reading!■



Buyer's Guide to Early Childhood Softwar

	Price	Joystick/Paddle	Graphics	Sound	Comments
Advanced Ideas					
Basic Skills	$19.95		G		Used with $39.95 Master Match disk to teach general learning readiness skills.
Dinosaurs	$39.95		G		Visual recognition in matching, sorting, and counting objects.
Fun with Facts I	$19.95		G		Needs $39.95 Tic Tac Show disk. Math, language, social studies.
Lucky's Magic Hat	$39.95		G		Reading comprehension, sequential thinking, memory skills.
Wizard of Words	$39.95		G	S	Five letter and word pages with a 38,000-word dictionary.
Young Explorer	$19.95		G		Used with $39.95 Tic Tac Show disk. Hundreds of lessons to explore the world.
Advanced Logic Systems					
Toddler's Tutor	$24.95		G		Shows numbers and letters with pictures.
Apple Computer					
Ernie's Quiz	$25	P	G		Create faces, count jelly beans, guessing game.
Mix & Match	$25		G		Create creatures, practice logic, guess secret word.
Aquarius					
Classification	$145 (4)		G		Matching, sorting, forms and objects, familiar settings.
Counting Skills	$260 (9)		G		One to one, number recognition 5–10 and 10–20, beginning sets, assigning numbers, addition and subtraction.
Language Arts	$145 (5)		G		Letter recognition, letter matching, word families, beginning consonants, rhymes.
Ordering and Sequencing	$115 (4)		G		Serialization, patterning, complex patterns, size, time.
Spatial Relations	$213 (4)		G		Geometric shapes, left to right, letters, symmetry, rotation, 3D concepts.
Telling Time: Hands and Digital Faces	$29.95		G		Learn about digital and traditional time clocks.
Artworx Software Company					
★Hodge Podge	$21.95		G	S	Displays color, sound, pictures.
Monkeybuilder	$29.95	J	G	S	Combining word parts.
Monkeymath	$24.95	J	G	S	Number placement, addition, subtraction.
BertaMax					
Alphakey	$24.95		G	S	Needs Echo II speech synthesizer to teach computer key location and typing in ABC order.
Read Along	$24.95		G		Choices—listen to page read, press space bar for word, or just have one word pronounced.
Story Mix Series	$24.95 (6 for $125)		G	S	Students compose stories by listening to Echo II speech synthesizer, then choosing sections to combine.
C&C Software					
Learning about Numbers	$40		G		Count objects, tell time.
Letters and First Words	$40		G		Upper- and lowercase practice, consonant and vowel sounds, spelling simple words.
Chalkboard					
Bear Jam	$39.95		G	S	Distinguishing shapes and readiness for reading. Chalkboard needed.
Compu-Tations					
Early Elementary I	$34.95		G	S	Four programs: counting, color, number and shape matching.
Early Elementary II	$34.95		G	S	Four programs: alphabet, numbers, inside and outside concepts.
Special Skill Builders I & II	$34.95	J/P	G	S	Same as Early Elementary I and II, but with joystick or paddle.
Computing Adventures					
Talking Screen Textwriter	$159			S	Needs Echo II speech synthesizer. Talking word processor—reading, writing, spelling.
Counterpoint Software					
Early Games Alphabet Soup	$29.95	J	G		Four games that teach alphabet skills.
Early Games for Young Children	$29.95		G		Nine games covering counting, addition, subtraction, alphabet, names, drawing pictures.
Early Games Matchmaker	$29.95		G		Pre-reading skills: matching, discrimination of shapes, colors, lines, directions.

	Price	Joystick/Paddle	Graphics	Sound	Comments
DLM (Developmental Learning Materials)					
★ Alphabet Circus	$29.95		G	S	Letter identification, ABC order, missing letters.
★ Number Farm	$29.95		G	S	Number recognition and counting.
★ Shape and Color Rodeo	$29.95		G	S	Shape recognition and matching, mixing and matching colors.
Dynacomp					
Children's Carousel	$19.95		G	S	Nine games covering matching shapes, counting, letter recognition.
Serendipity	$19.95		G		Letter and number matching, counting, estimation.
EduSoft					
Alphabet Song and Count	$29.95		G	S	Alphabet ordering, keyboard placement, counting.
Count and Add	$29.95		G	S	Counting and adding numbers.
EMC Publishing					
Changing Times Education Service					
Alpha Teach	$39.95				Alphabet.
Critter Count	$39.95				Numbers and arithmetic.
Reading Readiness	$21.95				Discriminating symbols, letters, numbers.
Floppy Enterprises					
Floppy Teaches How to Print Letters and Numerals	$34.95				Letter formation.
Floppy Teaches Letter and Numeral Recognition	$29.95				Match upper- and lowercase letters and numbers.
Floppy Teaches Match-Ups in Mazes	$32.95		G	S	Matching game.
Floppy Teaches Same and Different	$29.95		G	S	Distinguish differences between objects.
Floppy Teaches What Is Missing	$29.95		G	S	Identification of missing parts.
Hartley Courseware					
Colors and Shapes	$35.95		G	S	Color discrimination, part to whole relationships.
Patterns and Sequences	$35.95		G	S	Simple to complex patterns and sequences.
Island Software					
Letter Games	$25		G		Letter matching.
Milk Bottles	$25		G		Most, least, almost full, almost empty, differences.
Puss in Boot	$25		G		Teaches in, out, left, right, on, off, over, under, above, below, beside, next.
Kangaroo					
Jeepers Creatures	$34.95		G	S	Twenty interchangeable animal forms and names (26,000 combinations).
My House, My Home	$34.95		G	S	Computerized doll house.
Laureate Learning Systems					
First Words	$185		G	S	Learn 50 nouns with 100 pictures, using the Echo II speech synthesizer.
Lawrence Hall of Science					
Micros for Micros	$34.95 (four for $134.95)		G	S	Music patterns, numbers (sorting, etc.), estimation, guess hidden words.
Learning Well					
Body Awareness	$49.95		G	S	Body parts names and locations, appropriate dress.
Knowing Numbers	$49.95		G	S	Less and greater, match objects with numbers, add and subtract.
Letters and Words	$49.95		G	S	Alphabet sequence, upper- and lowercase letters, sight word vocabulary.

See page 30 for vendor addresses

★ *The author's favorites.*

Buyer's Guide to Early Childhood Softwar

	Price	Joystick/Paddle	Graphics	Sound	Comments
Management Science America					
Introduction to Counting	$29.95				Counting.
Learning to Read: Letters, Words and Sentences	$39.93				Needs Street Electronics speech synthesizer. Sounds out letters and words, gives clues on reading.
Spelling Bee Games	$39.95	J	G	S	Four games that teach spelling skills.
Webster's Numbers	$39.95	J/P	G	S	Number recognition, order and pattern recognition, hand-eye coordination.
MECC					
Blissymbolics: Blissymbol Concepts	$44				Left and right, in and out, size and quantity.
Early Addition	$44				Whole number addition.
Elementary Volume 7—Pre-reading/Counting	$46				Nine programs that teach pre-reading and counting skills.
EX Logo	$48				Use Logo to control and explore the computer.
The Friendly Computer	$48				Locate keyboard keys, computer components displayed. The child can create drawings.
Getting Ready to Read and Add (French version)	$45				Letter recognition, consonant identification, three math programs, for French-speaking children.
Milliken Publishing					
Alien Counter/Face Flash	$39.93		G		Counting, numeral recognition, visual memory, base-10 numeration.
Chaos/Jar Game	$39.95		G		Problem solving, probability, directionality, shape and color recognition.
Letter Recognition and Alphabetization	$75		G		Two disks: upper- and lowercase letters, alphabetical sequence.
Number Readiness—Addition, Subtraction	$40 each				Addition and subtraction.
Mindscape					
Mister Pixel Series	$40 each (6)	J	G	S	Six programs that teach creativity and programming skills through drawing, cartoon making, music composition, animation, sound effects.
Tink's Adventure	$40		G	S	ABC order, keyboard placement.
Tinka's Mazes	$40		G	S	Basic math concepts, counting, addition.
Tonk in the Land of Buddy-Bops	$40		G	S	Visual discrimination, concentration, critical thinking.
Tuk Goes to Town	$40		G	S	Pre-reading and concentration, spelling, vocabulary building, critical thinking, computer literacy.
Moses Engineering					
Alphabet	$9		G		See and type correct letter.
Match Me	$9		G		Letter and shape recognition and identification.
Numbers One–Ten	$9				Recognize and count numbers 1–10.
NTS Software					
Starting Out—Set 1	$129		G	S	Five programs: counting, how many, sequences, adding, dice and dominoes.
Program Design					
Preschool IQ Builder 1	$24.95		G		Same and different figures, letters.
Preschool IQ Builder 2	$24.95		G		Letter, symbol, number, and word discrimination.
Reader's Digest Software					
Alphabet Beasts & Co.	$34.95		G	S	Animated letters and numbers.
Little People's Puzzles—Things That Go	$39.95		G	S	Puzzles.
Little People's Puzzles—Nursery Rhymes	$39.95		G	S	Nursery rhymes.
Micro Habitats	$39.95		G	S	Construct environments.
Right On Programs					
Ready-Set-Go-Numbers	$25		G	S	Matching numbers.
Ready-Set-Go-Letters	$25		G	S	Matching letters.
Ready-Set-Go-Shapes	$25		G	S	Matching shapes.

	Price	Joystick/Paddle	Graphics	Sound	Comments
Scholastic					
SpellDiver	$39.95	J	G		Letter recognition and spelling. You can add your own words.
Sierra On-Line					
Learning with Fuzzywomp	$29.95		G		Pattern matching, counting, number sequencing, creative play.
Learning with Leeper	$29.95		G		Four games: shape matching, counting, eye-hand coordination, creative play.
SouthWest Ed Psych Services					
The Math Machine	$79.95		G	S	Pre-math through division skills.
The Reading Machine	$59.95		G	S	Pre-reading and reading skills.
Spinnaker Software					
Alphabet Zoo	$29.95		G	S	Letter recognition and sounds.
Delta Drawing	$49.95		G		Create and color a picture.
★ Facemaker	$34.95		G		Create and animate a funny face to improve creativity, memory, concentration.
Hey Diddle Diddle	$29.95		G	S	Presents rhymes with pictures, music, text.
Kids on Keys	$29.95		G	S	Match letters, numbers, and words to pictures.
Kindercomp	$29.95		G	S	Match shapes and letters, fill in missing numbers, draw pictures, type names.
Rhymes and Riddles	$29.95		G	S	Letter guess—vocabulary, key locations, spelling readiness.
Story Machine	$34.95		G	S	Write simple sentences, paragraphs, stories to go with pictures.
Sunburst					
Counters	$49		G	S	Counting, addition, subtraction.
Getting Ready to Read and Add	$49		G		Identify and match shapes, upper- and lowercase letters, numbers.
T.H.E.S.I.S.					
Math Facts Level I	$25		G	S	Numbers, number words, placement, simple addition and subtraction.
Preschool Fun	$25		G	S	Teaches color, shape discrimination, numbers to 9, letters.
The Learning Company					
Bumble Games	$39.95		G	S	Six programs teach numbers using plotting.
Gertrude's Secrets	$44.95		G		Learn logical thinking using colors and shapes.
★ Juggle's Rainbow	$29.95		G	S	Nine games that teach colors, left and right, making letters, more.
Reader Rabbit and the Fabulous Word Factory	$39.95		G		Pre-reading and early reading skills.
The Little Professor					
Counting Plus			G		Counting and addition.
Unicorn Software					
Funbunch Elementary	$39.95		G		Five games that teach pre-reading, letter recognition, counting, addition.
Ten Little Robots	$39.95		G	S	Counting, upper- and lowercase letters, addition and subtraction, reading a simple story, drawing.
Versa Computing					
Alphabet Squares	$29.95		G	S	ABC's, letter recognition.
★ Color Me	$29.95	J	G	S	Electronic coloring book with 25 pictures.
Weekly Reader Family Software					
★ Stickybear ABC	$39.95		G	S	Letter recognition.
Stickybear Numbers	$39.95		G	S	Number recognition, counting.
Stickybear Opposites	$39.95		G	S	Opposite words taught with colorful, animated pictures.
Stickybear Shapes	$39.95		G	S	Naming, picking, finding shapes.

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Elephant #1 SS/SD Soft	**$ 15.95**
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Koala Graphics Tablet	$ 78.00
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(408) 730-0306

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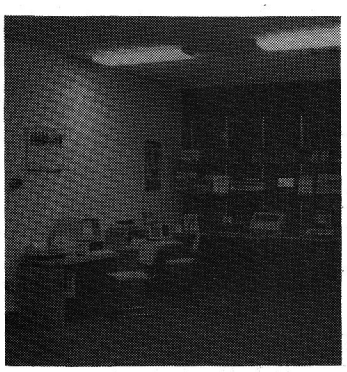

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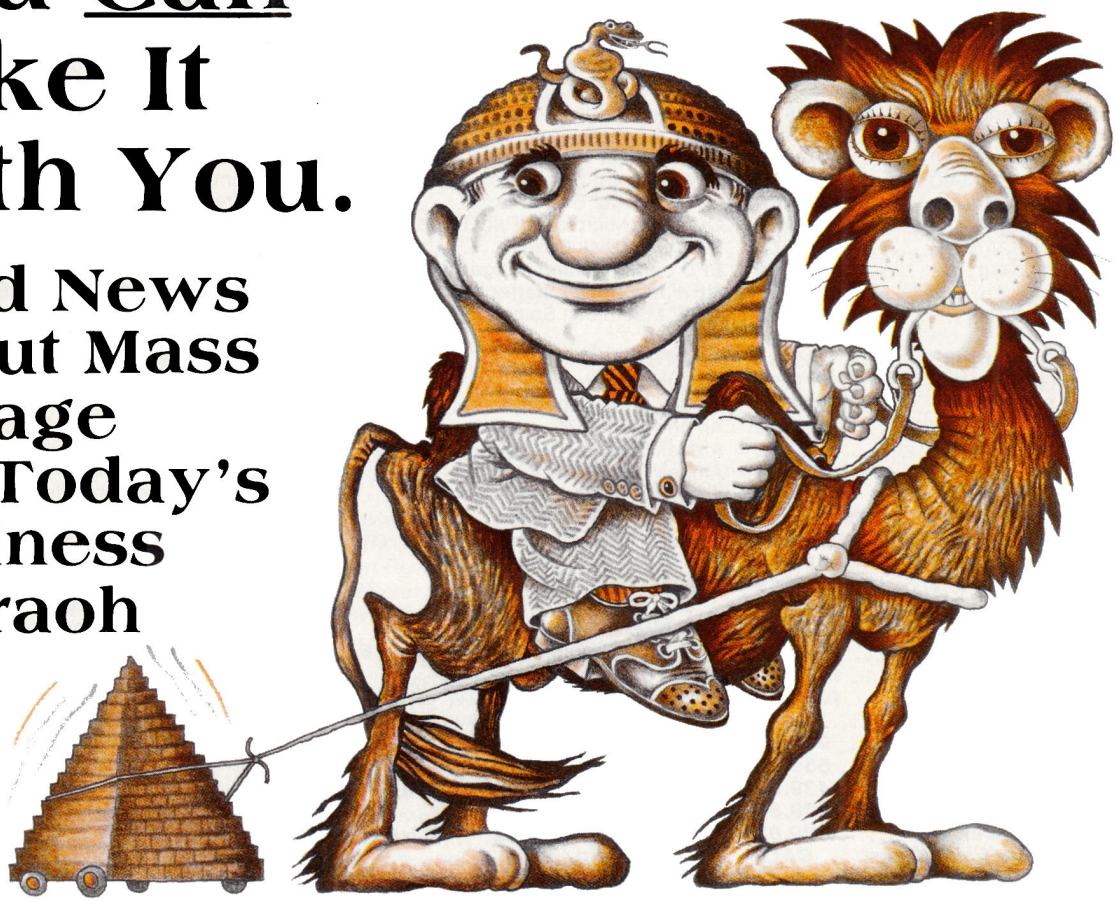

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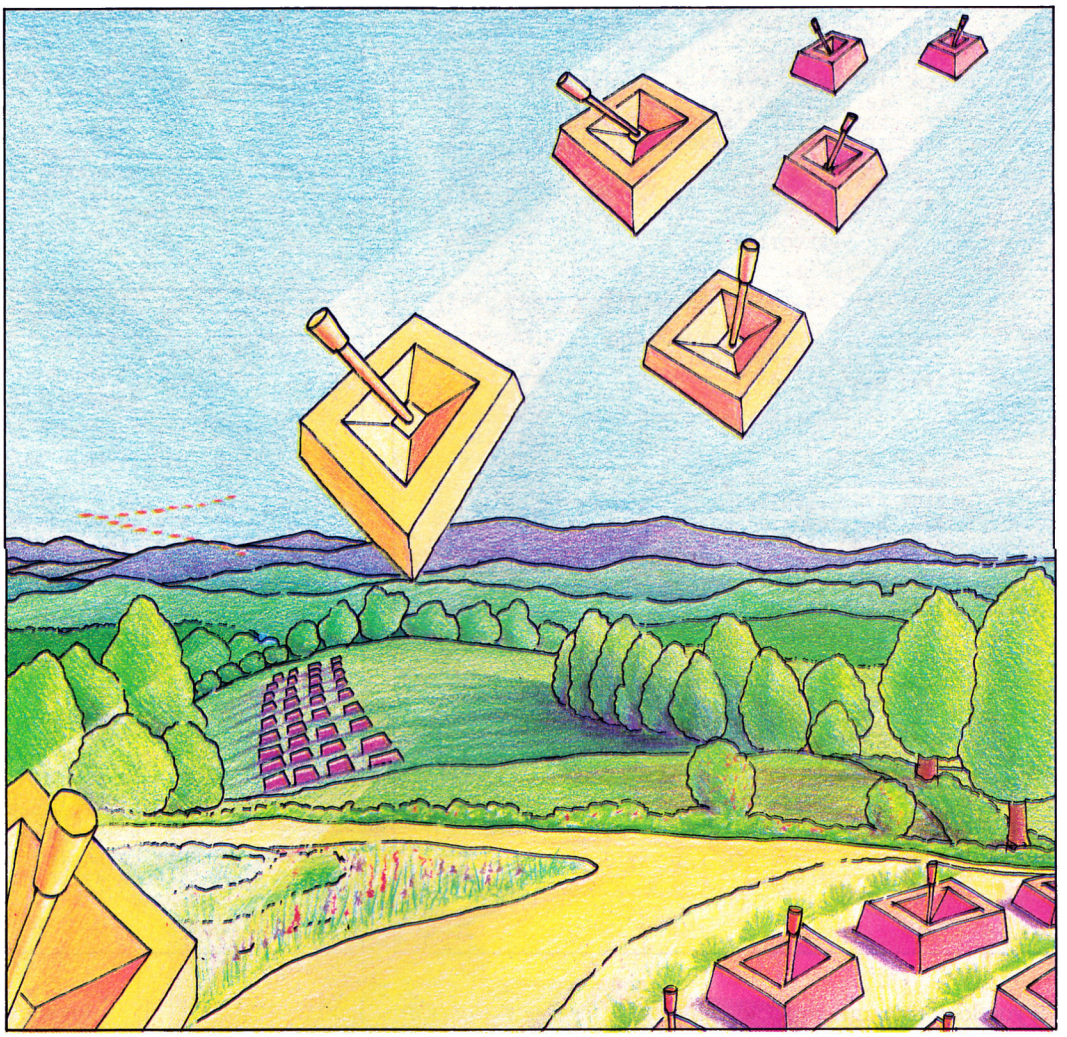
Joysticking



With these child-size programs your youngster can use a joystick to draw and make "music."

Contrary to popular belief, joysticks are good for more than piloting helicopters or running little men up and down ladders. In fact, I have found there is a certain magic associated with the joystick for the young computer user who likes highly visual, easy-to-operate, and fast-acting programs.

So, just for fun, I created a disk-full of joystick programs for children, all designed to be used without a single keypress. In fact, the keyboard is nonfunctional in almost all cases. They include three drawing programs, a music (I use the term very loosely) program, and even a menu to drive them all. And, for those of you who type with two or three fingers, most of the programs are very short!

First, a couple of notes about your joystick. If you look in your *Applesoft II Basic Programming Reference Manual* you'll find the term "joystick" is never used. The *Apple //e Owner's Manual* is not much better. There is a quick reference to the joystick on page 97, but just how to plug it into the back of the computer.

Bill Rowland is an assistant high school principal, as well as the father of two young boys. Address correspondence to him at 22W 420 Teakwood Drive, Glen Ellyn, IL 60137.

by Bill Rowland

Listing 1. *Menu.*

```
10  TEXT : HOME
20  DIM PROG$(10)
30 OP = 1
40  GOSUB 300
99  REM

        MAIN LOOP


100  FOR LOOP = 1 TO 2 STEP 0
110 P =  INT ( PDL (1) / 56) + 1
120  IF P = OP THEN 160
130  VTAB 4 + OP: HTAB 10: PRINT
     OP;".............";PROG$(OP)
140 OP = P
150  INVERSE : VTAB 4 + OP: HTAB
     10: PRINT OP;".............";
     PROG$(OP): NORMAL
160  IF  PEEK ( - 16287) > 127 THEN
     LOOP = 2
170  NEXT
199  REM

         SELECTION


200  IF PROG$(OP) = "END" THEN  HOME
     : END
210  PRINT  CHR$ (13) +  CHR$ (4)
     ;"RUN ";PROG$(OP)
299  REM

         INITIALIZE


300  FOR N = 1 TO 5
310  READ PROG$(N)
320  NEXT
340  VTAB 2: HTAB 15: INVERSE : PRINT
     " JOYSTICK ": NORMAL
350  FOR N = 1 TO 5
360  VTAB 4 + N: HTAB 10: PRINT N
     ;".............";PROG$(N)
370  NEXT
380  VTAB 20: PRINT "Move the joy
     stick to  highlight program
     options. Press the red butto
     n to select an option."
390  RETURN
399  REM

         PROGRAM NAMES


400  DATA  JOYSTICK 1,JOYSTICK 2,
     JOYSTICK 3
410  DATA  JOY TONE,END
```

Listing 2. *Joystick 1.*

```
10  HGR2 : HCOLOR= 3:X1 = 100:Y1 =
     X1
20  FOR LOOP = 1 TO 2 STEP 0
30 X =  INT (1.09411765 *  PDL (0
    ))
40  FOR PAUSE = 1 TO 10: NEXT
50 Y =  INT (.749019608 *  PDL (1
    ))
60  HPLOT X1,Y1 TO X,Y
70  IF  PEEK ( - 16287) > 127 THEN
     HGR2
80  IF  PEEK ( - 16286) > 127 THEN
     PRINT  CHR$ (13) +  CHR$ (4
    );"RUN MENU"
90 X1 = X:Y1 = Y
100  NEXT
```

Listing 3. *Joystick 2.*

```
10  HGR2 :YES = 3:NO = 0: HCOLOR=
     YES
20 X = 100:Y = X
30  FOR LOOP = 1 TO 2 STEP 0
40 PX =  INT (1.09411765 *  PDL (
    0))
50  FOR PAUSE = 1 TO 10: NEXT
60 PY =  INT (.749019608 *  PDL (
    1))
70  HPLOT PX,PY
80  FOR PAUSE = 1 TO 20: NEXT
90  HCOLOR= NO
100  HPLOT PX,PY
110  HCOLOR= YES
120  IF  PEEK ( - 16287) > 127 THEN
     HPLOT X,Y TO PX,PY:X = PX:Y
     = PY
130  IF  PEEK ( - 16286) > 127 THEN
     PRINT  CHR$ (13) +  CHR$ (4
    );"RUN MENU"
140  IF  PEEK (49152) > 127 THEN
     POKE 49168,0: HGR2
150  NEXT
```

If you look through your old copies of Apple magazines, I think you'll be hard pressed to find hints on how to use a joystick. So here are a couple of pointers.

Joystick Pointers

The joystick uses the same PDL(0) and PDL(1) locations as your paddles, with a range of 0 to 255. PDL(0) provides vertical, y-axis, movement, while PDL(1) is associated with horizontal, x-axis, movement. If you have a centering adjustment on your joystick, I suggest you use the following one-liner to properly adjust it before using any of the programs listed here:

```
HOME:FOR LOOP = 1 TO 2 STEP 0
:VTAB 10:CALL 64668;:PRINT PDL(0),
:FOR X = 1 TO 10:NEXT:PRINT PDL
(1):NEXT
```

Why the embedded loop? According to the *Applesoft Basic Programming Reference Manual* (page 90), a short delay needs to be inserted between paddle reads to guarantee a more accurate reading of the second paddle referenced.

Just because the joystick is associated with the hi-res graphics mode does not mean lo-res and the text screens are off limits. All you need to do is send PDL values through an interpreter to provide meaningful data for a lo-res or text display.

Joysticks usually have two buttons. (My Kraft has them color-coded, red and black.) The PDL(0) button affects memory location 49249 (–16287) and the PDL(1) button affects location 49250 (–16286). If either of these two locations has a value greater than 127, then the corresponding button has been pushed. Thus, you will see many IF PEEK (–16286)>127 THEN... statements in the programs listed; these are the primary decision-making components of the programs.

A Menu

Menu, **Listing 1**, is a 25-line program that provides a format for

Listing 4. *Joystick 3.*

```
10 X = 100:Y = 100
20  HGR2 :YES = 3:NO = 0
30  HCOLOR= YES
40  FOR L = 1 TO 2 STEP 0
50 PX =  INT (1.09411765 *  PDL (
     0)): FOR PAUSE = 1 TO 10: NEXT

60 PY =  INT (.749019608 *  PDL (
     1))
70  HPLOT PX,PY
80  FOR P = 1 TO 20: NEXT
90  HCOLOR= NO
100  HPLOT PX,PY
110  HCOLOR= YES
120  IF  PEEK ( - 16287) > 127 THEN
      HPLOT X,Y TO PX,PY:X = PX:Y
      = PY
130  IF  PEEK ( - 16286) > 127 THEN
     X = PX:Y = PY: HPLOT X,Y
140  FOR P = 1 TO 50: NEXT
150  IF  PEEK (49152) = 160 THEN
      POKE 49168,0: HGR2
160  IF  PEEK (49152) = 155 THEN
      PRINT  CHR$ (13) +  CHR$ (4
     );"RUN MENU"
170  NEXT
```

choosing any number of programs. Use the data line to reflect the actual names of the programs to be driven by the menu. You will note that Menu provides for no keyboard input; options are determined by the PDL(1) location. As you move the joystick up and down, the PDL(1) value is keyed to its movement and displays the currently designated option in inverse. If you are curious about the purpose of program line 120, I suggest you try the program both with and without it to see the difference. You may prefer the display without this line. Pressing the joystick button runs the program currently inversed. One word of caution: Save the program before you run it, just in case you inadvertently "test" an option and lose your menu.

Drawing Pictures

Listing 2 is a ten-line program called Joystick 1. (My sons BJ and Mark call it "Scribble.") With this program you move the joystick to draw pictures on the hi-res screen. The pictures come from connecting points determined by the PDL(0) and PDL(1) locations. Pressing the PDL(0) button clears the screen and pressing the PDL(1) button returns you to the menu.

Remember, the hi-res screen is divided into 192 vertical points (0–191) and 280 horizontal points (0–279) and the PDL's provide a range of 0–255. You must "reinterpret" PDL(1) so its value will not be out of range. You also must reinter-

Listing 5. *Joy Tone.*

```
10  HOME
20  GOSUB 200
29  REM

        MAIN LOOP
30  FOR LOOP = 1 TO 2 STEP 0
40 X =  PDL (0): FOR P = 1 TO 10:
     NEXT :Y =  PDL (1)
50  POKE 768,X: POKE 769,Y
60 X =  INT (1.09411765 * X):Y =
     INT (.749019608 * Y)
70  HPLOT X,Y
80  IF  PEEK ( - 16287) > 127 THEN
     LOOP = 2
90  CALL 770
100  NEXT
110  PRINT  CHR$ (13) +  CHR$ (4)
     ;"RUN MENU"
199  REM

        POKE SOUND/INITIALIZE
200  FOR Z = 770 TO 790: READ D: POKE
     Z,D: NEXT
210  VTAB 2: PRINT "AUXILLARY SPE
     AKER? (Y/N) ";: GET SP$
220  IF SP$ = "Y" THEN  POKE 771,
     32
230  HGR2 : HCOLOR= 3
240  RETURN
299  REM

        DATA
300  DATA  173,48,192,136,208,5,2
     06,1,3,240,9,202,208,245,174
     ,0,3,76,2,3,96
```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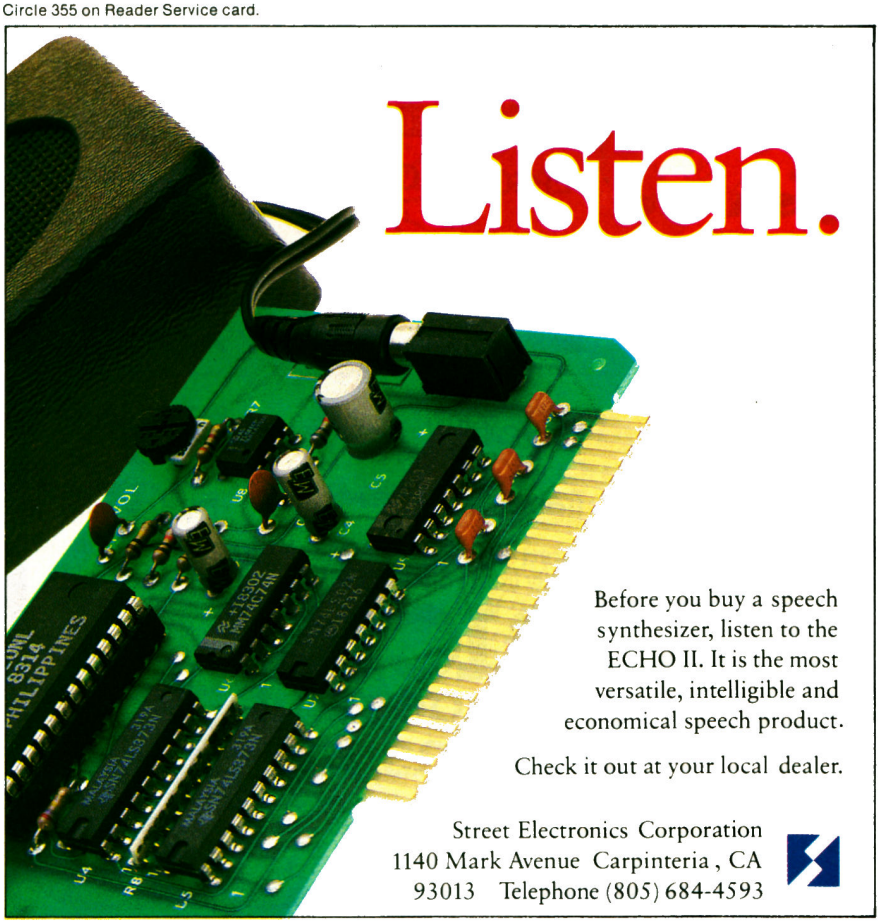

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pret PDL(0) for full access to the hi-res screen. These operations occur in program lines 30 and 50.

Listing 3, called Joystick 2, is a slight modification of Listing 2. Here, instead of lines automatically connecting the PDL(0) and PDL(1) points, you determine a point with the joystick and then plot a line by pressing the PDL(0) button. When you press the button, program line 120 draws a line connecting the current joystick position to the last plotted location. I've included a second pause (program line 80) for a little more control over the flashing plotted point, as well as a keyboard function (program line 140) to clear the screen on any keypress.

Joystick 3 in **Listing 4** is also a line plotter. It is a little program that permits you to determine the starting and ending points of each plotted line by use of the PDL(0) button. This button toggles the memory variables (X and Y) for the last plotted point. Pressing PDL(0) enables you to move the end point of your line to the desired screen location before actually plotting the line. (See program line 130.) A press of PDL(1) activates program line 120 and plots the line. Two keys are used in this program: The space bar clears the screen and the escape key ends the program and returns you to the menu.

Music

Listing 5 is the "music" program, called Joy Tone. It replicates the monitor bell routine at 770 (decimal), pokes two variables—tone/PDL(0) and duration/PDL(1)—into locations 768 and 769, and then calls the routine. To add some visuals, I've included an HPLOT within the primary loop so each sound can be associated with a screen location. As with all of my sound-producing programs, I've included an external speaker option. (I use an old Heathkit amplifier and a speaker from my stereo.) You may want to delete program lines 210 and 220 if you do not intend to use this option. To get back to the menu, simply hit the PDL(0) button.

These programs should not only give your children new fun with that joystick, but also open up a whole new world of simple programs for you to create for them. ■

The GAME RESERVE

Pooyan by Konami, B.C.'s Quest for Tires, and Oil's Well are our intrepid adventurer's picks for the month.

It's been an unusual month for Warden Shiftky here on the Game Reserve. I sat down around the first to play a little David's Midnight Magic, and when I finally glanced up from the screen it was three weeks later—time to make my monthly report on the denizens of the Reserve.

Grabbing my pith helmet and heavy-duty joystick, I ventured into the wilderness to see what I could find. As it turned out, the first beasts I encountered were nothing more than wolves and pigs—but wolves and pigs as much fun as a barrel of monkeys.

Pooyan

I first discovered this dizzy batch of creatures in the wilds of a coin arcade in New England, in the ROMs of a game called Pooyan by Konami. In this, its natural habitat, Pooyan is a wild and woolly game with a silly premise and big entertainment value. The Apple II version is just as much fun—more, actually, since you don't have to keep feeding quarters into your Apple to keep playing.

The premise, as already noted, is silly—pleasingly silly. The Pooyan are a tribe of forest pigs oppressed by hundreds of hungry wolves. The Pooyan live in a little valley at the bottom of a steep cliff. At the other side of the

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with Warden Shiftky

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Pooyan, screen 1

Pooyan, screen 2

valley is a mighty oak that reaches to the top of the opposite cliff. This is the primary chink in the Pooyan defenses. The wolves walk off the cliff into the top of the oak, and then float down to the valley floor on helium balloons (not the balloons with baskets, like *Around the World in 80 Days*, but balloons on a string).

To counter the airborne wolf attack, the Pooyan have devised a pulley system at the top of their own cliff. They raise and lower a basket containing the Pooyan chosen to defend the tribe. As the wolves float down, the pig is raised and lowered by his assistants and shoots arrows at the helium balloons. It isn't the MX missile system, but it seems to work.

The wolves' counter-counter-measure is to fling those horrors of the battlefield, death dealing acorns, at the Pooyan basket, knocking the pig from his perch. If a wolf makes it safely to the bottom of the valley, it's a sure thing he'll climb the Pooyan cliff and bite the defending pig, forcing him to jump out of his basket.

This brings us to the Pooyan's trump card, their deadly ultimate weapon, the dreaded slab of meat! The wolves, while clever enough to think of using the helium balloons, are not smart enough to realize that if they let go of the balloon to grab for the meat they will fall to the valley floor. When the pulley crew hands the pig in the basket a steak, he launches it with deadly accuracy, killing as many as four of the wolves with a well-timed throw.

If your Pooyan can clear out all 38 of the attacking wolves, the scene shifts to the wolves' lair, a valley where the predators grab rising balloons to set out on their raids. Your Pooyan pulley pig sits in his basket at the edge of the cliff overlooking the valley, attempting to pick off the ascending wolves. Quite a few balloons rise at the same time, not all of them carrying wolves. Your archer has to fire very quickly to hit the wolf balloons. If seven wolves escape, they form a team capable of pushing a *very* big boulder onto the Pooyan archer.

That's the story line. It's up to you to shoot down all those wolves and to prevent them from knocking your pig out of his basket. Points are allocated for every balloon hit (with or without attached wolf), for grabbing the meat from the pulley crew, for hitting multiple wolves with the meat, and for hitting a thrown acorn with your arrows. If you kill off all the wolves in the first two scenes, you go to a bonus scene at the wolves' lair with extra meats to fatten up your score. After that, you cycle through the scenes again, this time with the level of difficulty raised (the balloons require multiple arrow hits before they pop).

So much for Pooyan. The Warden rates it above average in looks and sound effects, exceptional in ease of play, and high in challenge. Above all, it's addictive, which is all you can expect for your $29.95.

It's so much fun to play with the piggies and the wolves that it was quite late before the old Warden shouldered his trusty joystick and went searching for big games. It was the Dawn of Time when he encountered one, a sure winner.

B.C.'s Quest for Tires

Unless you've been living in a cave, you should know all about the world of B.C., as created by Johnny Hart. It's a world where a sucker *never* gets an even break, unless it's the Snake, who regularly has every bone in his

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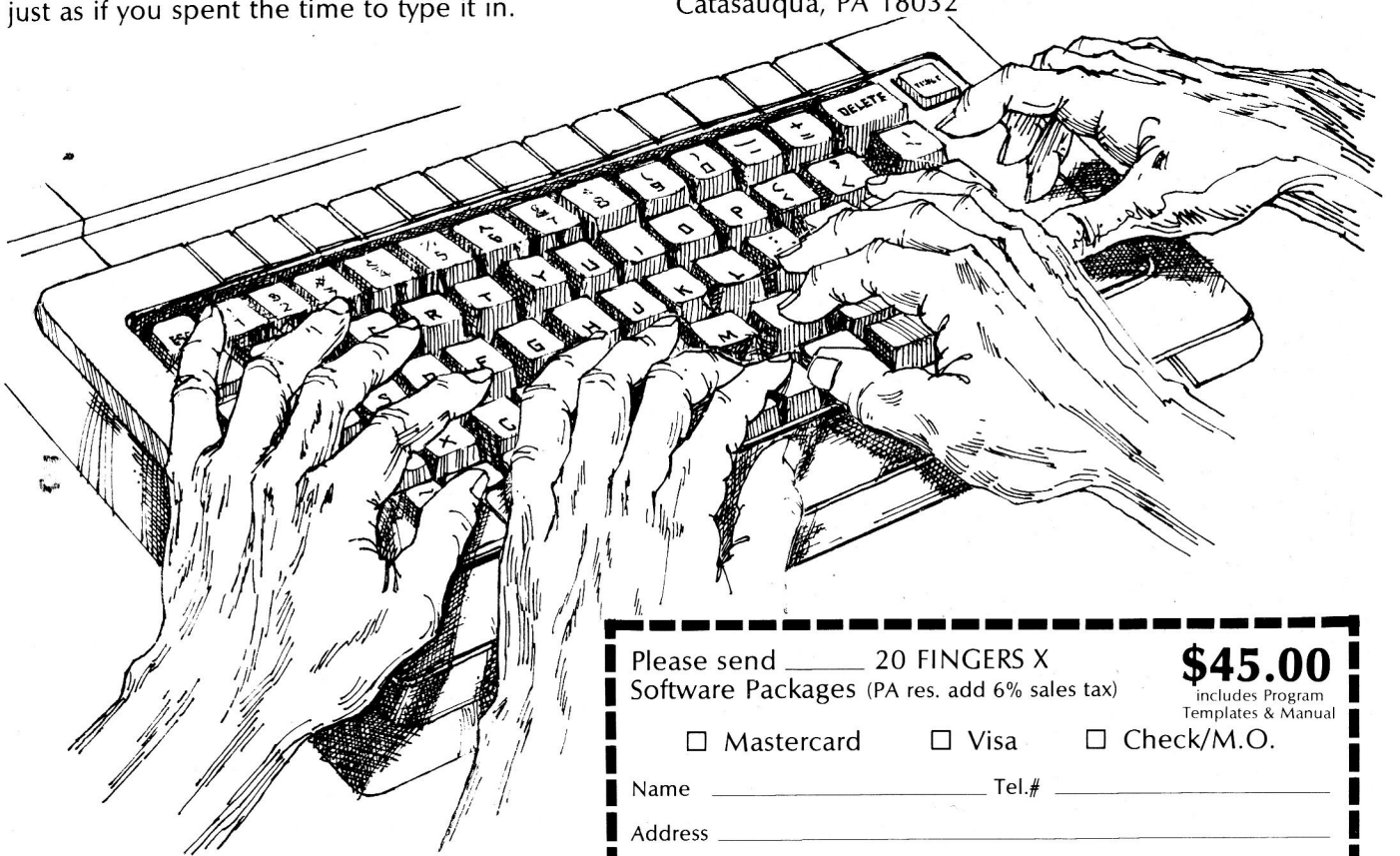

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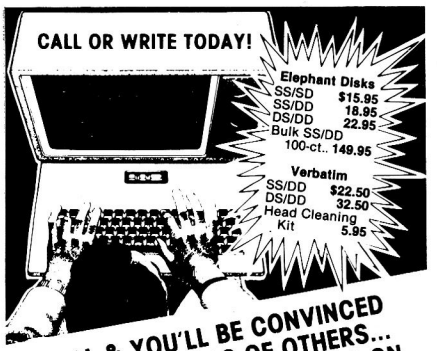

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B.C.'s Quest for Tires

body broken by the Fat Broad. (Pardon the sexist name—it's Hart's, not mine.) As Hart depicts it, there are still taxes, the battle of the sexes (and that's battle with a capital "B"), neuroses, and love!

Love is always good as a motivator. In the prehistoric world of B.C.'s Quest for Tires it leads the heroic Thor, perched atop his stone unicycle, on a perilous journey to rescue the Cute Chick from the clutches of the Dinosaur, whose tastes in women are exactly the same as Thor's—with a difference. Where Thor is likely to devour a girl with his eyes, the Dinosaur uses his many rows of razor-sharp teeth. So, spurred on by the cries of the Cute Chick, Thor speeds off in a desperate attempt to save her from certain main course-ship.

As Thor's guiding spirit, you control his movements using a joystick. A push up makes Thor leap; a push down and he ducks. Pressing button 1 makes the unicycle go faster (speeds are from 10 to 80 mph); pressing button 0 reduces its speed. Got it? Great! Now let's explore the world of B.C.

As the Quest for Tires begins, Thor is crossing a plain studded with pits and boulders. Hitting one of these obstacles results in a great big "ZOT," reducing the original store of four wheels by one. Thor needs to jump these obstacles. The question is, at what speed to do it. If he tools along at 25 mph, you'll find that the spacing of the obstacles is easy to figure out and that jumping the pits and rocks is a snap.

However, if you're not doing at least 30 mph, you're getting a minimum score. Raising your speed to 30, you get 20 points per pothole and rock as opposed to ten. On the other hand, it's more difficult to judge those jumps. At 30 mph you might clear a pothole/rock combination only to land in another hole or on top of another rock. ZOT! In the final analysis, you've got to decide whether a big point total or the Cute Chick is what you're after. (Make mine the Cute Chick.)

One final thought on speed. It's possible that at a very high speed, like 80 mph, you might actually find the game easier than at a slower speed. The reason is that your jumps get longer as speed increases. At 80, if you time it right, you might be able to jump over two obstacles at once—at four times the scoring value.

Assuming you get Thor safely through these obstacles, the next barrier is the river—the river that's too deep to cross. Fortunately for Thor, this stream is heavily populated by a species of cooperative turtles. Periodically they bob up, creating a sort of stepping-stone bridge for Thor's unicycle to hop over. Four or five bounces and he's across!

Having forded the river, Thor arrives on the slopes of a volcano. As he climbs, he must continually dodge rolling boulders that the volcano pops free, and the ever-present potholes. At the summit of the volcano he has two options. One is to do nothing and roll into the molten lava (ZOT!). The other is to jump high and hope that a Dookey Bird will be there to grab onto for an airlift over the cauldron of white-hot rock.

On the far side of the volcano are more problems, including rocks that fall from the sky, a river with the club-wielding Fat Broad on the other side (duck!), a dinosaur (maybe he'll be out for a stroll), and a cave with stalactites to duck and stalagmites to jump (or is it the other way around?).

Assuming he clears all these obstacles, Thor wins two prizes: the Cute Chick (ho-hum) and an extra wheel (oh, boy!). Then you can start the game all over.

Warden Shiftky really likes this game, but, brother, is it ever hard! Quest for Tires is the hardest game I've played since Star Blazer, to give you a point of reference. For this reason, I rate it very high in challenge.

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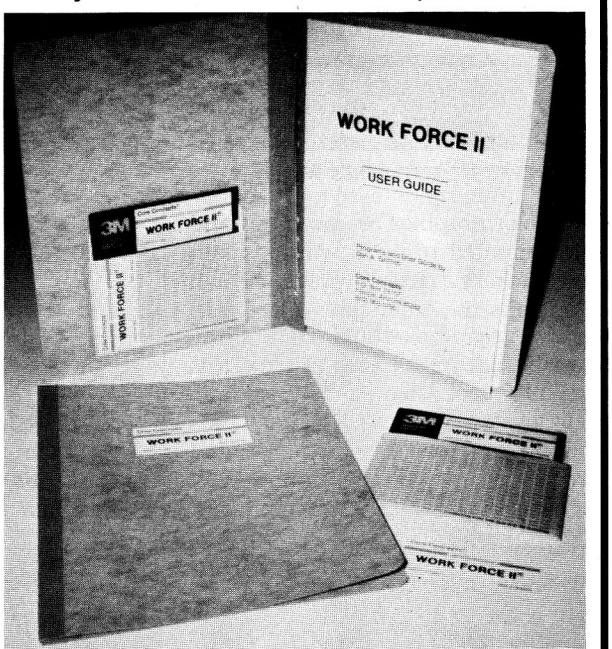

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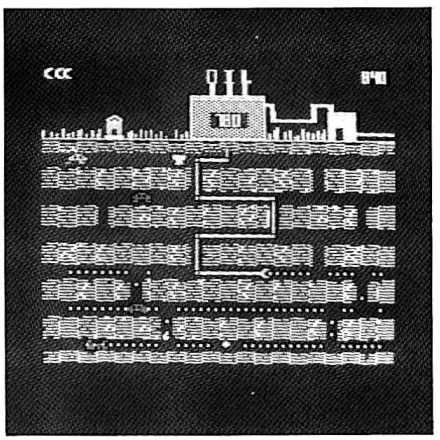
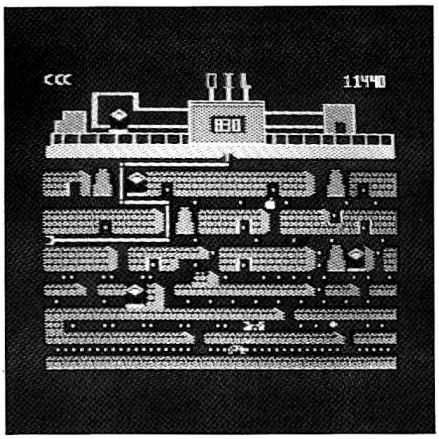


Oil's Well, screen 1



Oil's Well, screen 3

The color graphics are excellent and the animated scrolling effect is fair, but flickery. The graphic design maintains the true spirit of the B.C. comic strip and would do Johnny Hart proud. As for ease of play, it is very high too. After all, there are only four joystick controls to master. It's the timing that comes hard, and keeps the old Warden coming back for more and more.

Oil's Well

Warden Shiftky has a confession to make. I have a fear of geology—not because I was buried in a landslide or trapped in a mine shaft, but because I flunked "Rocks for Jocks."

If you went to warden school or college, then you probably know the course. It's the science course you take when you're not only not a science major, but in college just to play football. (The young Warden was actually there to play pinball, but there were no pinball scholarships.)

I didn't actually flunk Rocks for Jocks. I got a D, which is worse. An F means you never went to class; a D means you went to class but didn't learn anything. Ever since then, if it's below ground, the old Warden doesn't want to know about it.

Atarisoft's Dig Dug (see the July '84 "Game Reserve") started to change the Warden's mind. A very clever new arcade game called Oil's Well has turned me into a confirmed troglodyte.

In this game, you're in charge of an automatic oil drilling rig that is capable of searching through six strata (the one term I learned in geology) for deposits of oil. All you have to do is to guide it with your joystick. The stick directs the drill bit up, down, right, and left, and the fire buttons retract the pipe for as long as you hold them down.

You have three drill bits, unlimited amounts of drill pipe, and 990 ticks of the clock to clear out six layers of oil. The oil is represented by little dots lining the caverns. They are worth ten points each. Every so often you'll notice a large deposit of oil oozing along a passageway. If you intercept one of these Goblets you're in luck to the tune of 1000 points. With every 10,000 points you receive an extra drill bit. This makes the Goblets an important part of your game strategy.

Barring the way of your explorations are the Oozies. These creatures roam the subterranean passageways looking for drill pipes to destroy. If you run into one with your drill bit, fine. Nothing will happen to your pipe and you'll even collect from 20 to 170 points for disposing of the Oozie. If your pipe is intercepted by one anywhere else besides the drill bit, then you lose one of your three drill bits. Oozies come very frequently on every level, even levels from which you've removed all the oil pellets. You'll have to withdraw your rig frequently to keep the Oozies from chewing it up.

Another hazard is the rolling land mines. These explosive charges are harmless if only passing lengths of pipe, but if they run into a drill bit they explode, shattering the bit. The

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best strategy is to avoid them and not worry about them if they are passing a few levels above.

Another helpful idea is to find the petromins. Deep within the lower levels of each oil field is one such flashing oil nugget. If your drill bit eats it up, it will severely slow the progress of the Oozies, allowing you to gobble up the last oil pellets and move on to the next level.

There are eight oil fields in all, each topographically harder to explore. If you manage to clear out all eight, you win the game (a rare thing for arcade games)!

Warden Shiftky finds this is a fast-paced and very challenging game that I rate excellent in graphics, sound effects, level of challenge, and ease of play. In fact, if I wind up goofing off for another month, it's likely I'll be doing so with Oil's Well.

Just for the record, here's where you can find these games (in case you never visit the Reserve in person):

Oil's Well and B.C.'s Quest for Tires are both manufactured by Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614. They are priced at $29.95 and $34.95, respectively, and both are played with a joystick using any 48K Apple II or //e. B.C. accommodates two players.

Pooyan is produced by Datasoft, Inc., 9421 Winnetka Avenue, Chatsworth, CA 91311. The list price is $29.95 and the game may be played on any Apple II or //e. A joystick is optional. One or two players may compete.

The Warden's Non-Taxing Poll

Remember to join in the Warden Shiftky Poll of the best and worst games in the history of the Apple II. Pick the three best in the categories of arcade game, strategy/fantasy games (this category includes simulations like Flight Simulator II), and adventure games. You may also vote for the three worst in each category, accompanying your choices with suitably pithy comments. Send you picks to Warden Shiftky, c/o *inCider*, 80 Pine Street, Peterborough, NH 03458.

The Shiftky "Player of the Month"

Starting around the first of the year, I'll be announcing the name and home town of a player of the month who has, in my opinion, achieved the most impressive score (without cheating) on an Apple II arcade game. To qualify for the honor you must send in a photograph of the game screen with the score clearly legible. Paste a label on the back of the picture with your name and address, the name of the game, and the score written out. Send the entry to the same address as for the Shiftky Poll.

"There's no prize as yet, only glory."

There's no prize as yet, only glory. Warden S. is working on getting the editors to pay for a worthy prize to give away as a badge of honor. When it comes through, all past and present winners will receive one. In the meantime, you'll have to settle for the fame.

Bye for now. If I don't run into you stalking around the Reserve, I'll see you here in *inCider*'s pages next month.■

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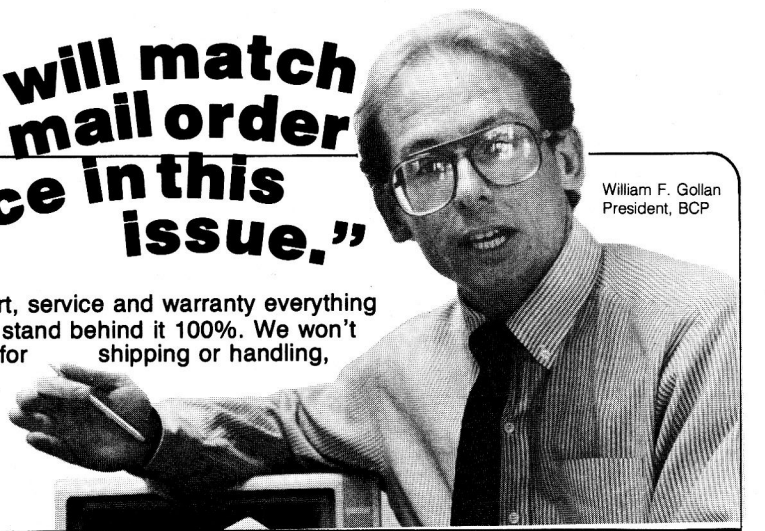

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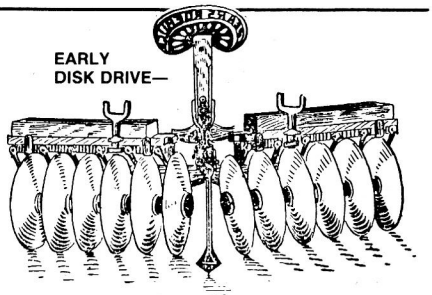

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X=3.14159 all of a program's strings and vari-
Y=255 ables with their current values.

A$: 100 200 250 ← **CROSS-REFERENCE:** Sorts
X: 10 20 3000 & displays line numbers where
Y: 10 40 55 60 each variable & string appears.

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

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COMPATIBLE with all normal DOS procedures.

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

AD #18L

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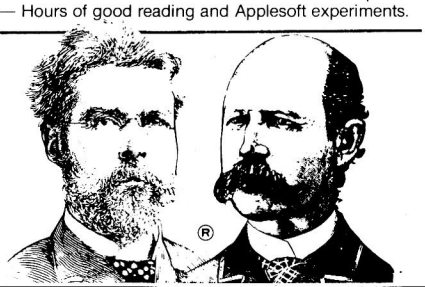

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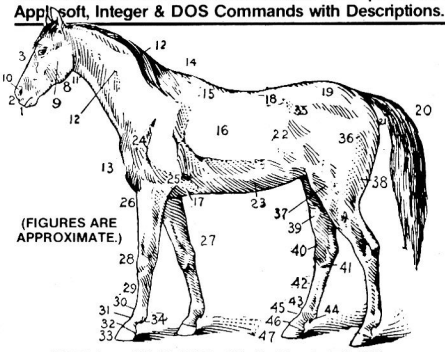

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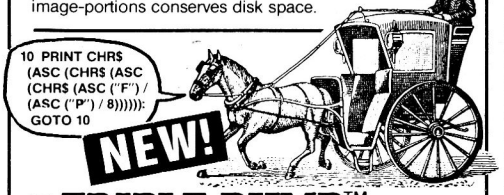

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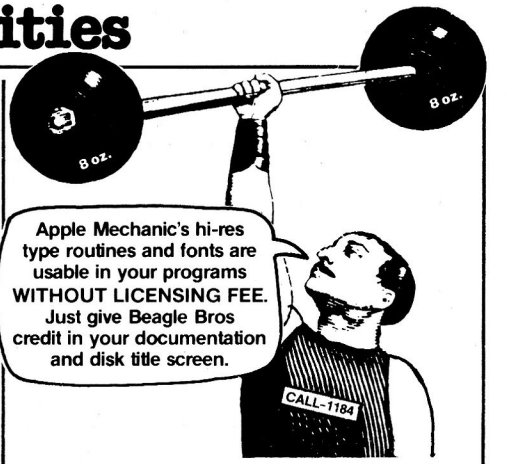

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SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Easy "List & Learn" Applesoft demos teach how to do hi-res animation as well as professional-looking hi-res Charts and Graphs.

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APPLE MECHANIC HI-RES

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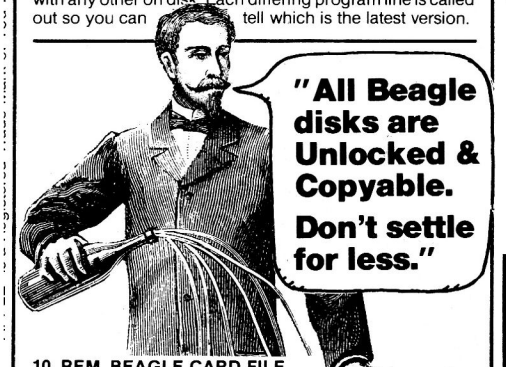
COMPARE FILES: Compare any program in memory with any other on disk. Each differing program line is called out so you can tell which is the latest version.




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

Beagle Bag!

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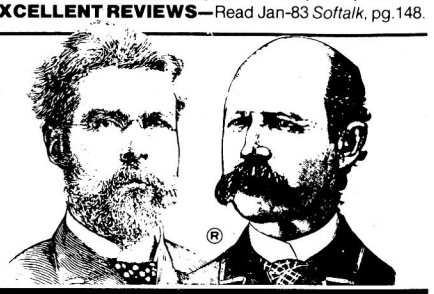

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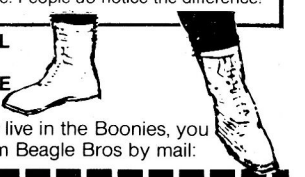

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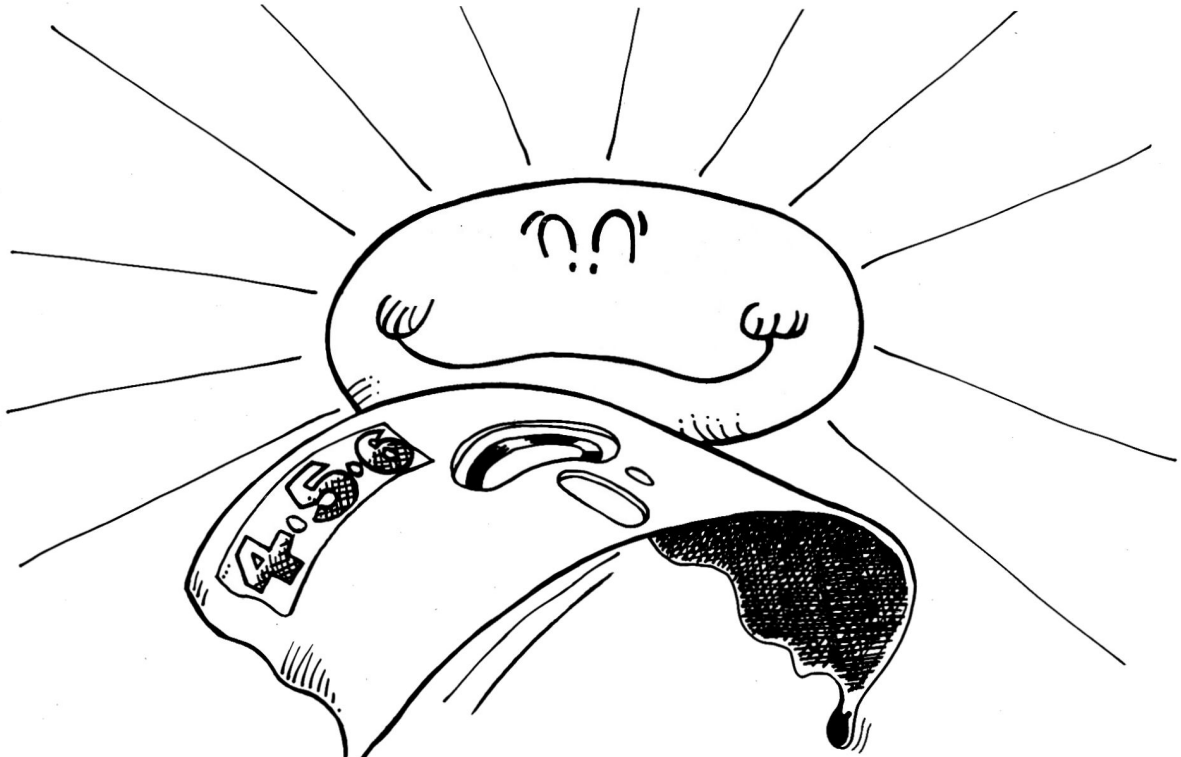

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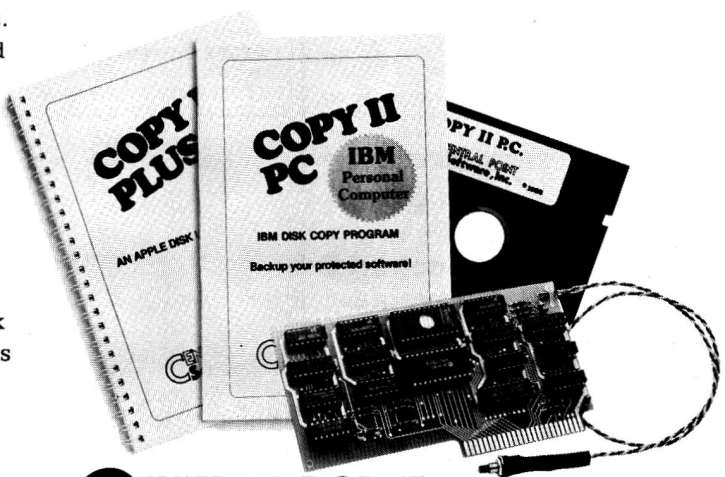

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Word Processor Bargains

With many things, *style* is often as important as *substance*. Sure, any product must do what you need it to, but especially with something as personal as a word processor, *how* a program interacts with you can be just as significant as its capabilities. You obviously need to know if a text-handling system will allow block moves, search for and replace pieces of text, take you easily from one part of your work to another, and so on. But at the same time, it's vital to consider how you might interface with any particular program.

I'm going to look at three excellent word processing packages that—for their power and simplicity—are surprisingly low in price. I want to tell you what each can (and can't) do, and also will try to impart a sense of how the programs function in terms of actual, real world writing. As someone who makes a large percentage of his income from putting words on paper, form is as dear as function to me, so I'll look at both for these three inexpensive packages: Bank Street Writer ($59.95), Homeword ($69.95), and Word Handler II ($79.95).

Hardware

Word Handler and Bank Street Writer require only 48K of memory; Homeword needs 64K. All three packages can work with one disk drive, although since Homeword goes to the disk often for instructions (a bit surprising considering its memory requirements), two disk drives really improve its performance.

Word Handler is the only one of these programs that can access and use an 80-column card, so you get a good idea of how your document will end up as you enter it. Homeword has an excellent screen preview mode, where you see your text as it will print. Bank Street Writer is weak in this area, as the only way it can give you an idea of what your final work will look like is to show you the *end* of each page before it's printed.

You write with Bank Street Writer inside a rectangle that shows you 38 characters across, with a maximum of 18 lines of text. With Homeword, you see your work in a 40-character, 15-line display. Word Handler gives you 11 lines of text on your screen in its 40-column display, 10 in its 66-character mode, and 20 lines with an 80-column card.

Documentation

Bank Street Writer comes with a 33-page indexed manual that isn't nearly as helpful as the on-screen tu-

Greg Glau processes words at P.O. Box 1627, Prescott, AZ 86302.

by Gregory R. Glau

torial on the backside of one of its two program disks. It isn't that the information isn't in the abbreviated documentation, but rather that the program is simple enough that it makes the manual seem complex. I always read through a program's manual before I sit down to work with the package, and found this difficult to do with Bank Street Writer. It's easier to simply *use* the program.

Homeword's manual is filled with sample screens and drawings, although it too checks in at only 33 pages, including an index. Unfortunately, Homeword suffers from something of a simplicity complex and doesn't cover all the bases. There are, for example, no instructions on how to use the tab function, or on control key commands. To be sure, tab is mentioned (without explanation) on the quick reference card (the control key commands are shown there, too), but I'd have preferred a slightly longer manual with all functions detailed.

As you might expect, the more expensive Word Handler weighs in with a 102-page indexed manual. It leads you in a tutorial manner through editing a sample file that comes with the system, and follows with a reference section. Everything is explained well, although too often the manual pats itself on the back with congratulations on how Word Handler can handle all that it does. Word Handler is a more complex package than the other two and the manual really must be read and understood before you can do any serious writing with the system. For instance, you work with Bank Street Writer without using any control key commands; Word Handler requires you learn 20, and I count 19 for Homeword.

The price you pay for more power and flexibility in a program is at least partly measured by its difficulty in terms of initial learning. Once you have required commands down pat, any system gets easy.

Writing and Working

Each of these three packages gives you a different on-screen picture, with the latest version of Word Handler being the most flexible. It lets you work on a 40-character screen, or the program will create its own hi-res characters and give you a 66-character display. Unfortunately, while Word Handler's character set is readable, it gets tiring after not too long a time. Even with a good monitor, I wouldn't want to spend a lot of time in Word Handler's 66-character mode. However, the system will let you write with the larger characters you're accustomed to on your Apple's screen, and then examine and edit your work in the 66-character display. This lets you see almost what your pages will look like once they're printed.

Word Handler has the distinction—in its 40- and 66-column modes—of changing its on-screen display to show bold, underlined, or superscripted text. These special effects don't help the readability of its character sets, but show exactly what your final result will be. This display is partly diluted by the appearance of a left-edge marker for each line, which indicates the current line spacing.

The current version of Word Handler is designed to work with the Apple //e (and, I suspect, the //c); on the back of the system disk you get an 80-character program that will use the Apple //e's 80-column text card. It also worked with my Videx card in an Apple II Plus, but requires that any Apple II or II Plus have a shift key modification (or you don't get capital letters and cannot merge one document into another). In its 80-column version, you don't get the special effects of underlining, superscripts, and so on, but see this text as inverse characters.

Once you learn its commands, Word Handler is easy to use and move around in, although there are often lots of command sequences to get you from one place to another. Oddly, there's no way to go instantly to the start or end of your document.

Homeword thinks it's a miniature Macintosh. It uses icons (pictures that represent functions) for all its operations. When you want to save your work or retrieve a document, you move (with the right and left arrow keys) a box over a drawing of a file cabinet. To print, move the box over a picture of a printer. All these pictures come with names, in case you can't figure them out. All icon functions can be called with control characters, which speeds things up a bit.

It's surprisingly fast and easy to move from section to section inside Homeword, and everything is logically arranged. Your text appears on a tiny display to show where you are on a particular page. If you have an Apple without a shift key modification, you must press control-S for capital letters. (This two-key sequence isn't as easy, for example, as Word Handler's use of the escape key for the same purpose.)

Inside Moves

Bank Street Writer lets you move quickly and easily to the start or end of your text and around inside it. You always have a clear writing area to work in. The program will search and replace a word or phrase from your location in the text forward, but to get a match, the case must be exactly the same (*The* is not the same as *the*). Once the program finds the word or phrase you requested, it asks if you want to replace it.

The largest block of text Bank Street Writer lets you move (or erase) is 15 lines long. If you delete a block of your writing, you can undelete it. The system paints the words you want to move or delete, so you see exactly what text you're manipulating. You can merge one document into another. It's the only program that lets you save all or just part of your work. The system warns you of available remaining space; you're allowed about 1300 words in memory with a 48K Apple, and about 3200 words with 64K of memory. (You can get about 500 words on a single-spaced page.) If you move a section of text, you have a MOVEBACK command that does just what you'd expect.

Homeword can retrieve any text you dump into its trash icon, even in another location. It also has a move function, where the system "paints" the text you're working on to indicate that's what you'll move. Homeword seemed happy to move whatever amount of text I asked it to. A helpful dual bar graph constantly advises you of both available disk and memory space. I managed to enter about 2500 words (roughly 5½ pages of single-spaced text) into Homeword before it beeped and warned I'd better save my work.

Homeword gives you two options for including another document in the one you're working on. The first doesn't show the text of that work on your screen; you see a note that it'll be included when you print your current file. The advantage here is that you don't have to wade through the new text as you work and you don't create huge documents that won't fit in memory. The other way actually inserts the new text inside your current work. The system will (if you ask it) automatically save a backup copy of your file, so you can edit to your heart's content and still have an original version of the document on disk.

It's very quick and easy to move around in your text with Homeword. This system, like Bank Street Writer, will search and replace a word or phrase from your current position in your text forward. There's no case control with the replace function. Homeword also provides a unique outline format to help you design outlines with a minimum of work.

In terms of actual writing area, Word Handler is much more impressive than either of the other programs. This system uses your disk as a virtual storage file, so you can simply type away and the program will save your work as it needs to, in sections.

Word Handler lets you move blocks of text by copying them into a buffer on your data disk. The program lets you copy into this buffer and still leave your text where it is (essentially making a mirror image of that section of your work). It, like the other packages, "paints" the section of your text that you want to move. Word Handler lets you search for a word or phrase in either direction, and you're asked to confirm each replacement. The search is not sensitive to case, but must be an exact match in order to be found. You can merge one document with another, but you must specify both the document name and the lines you'd like to put into your current text. This isn't a bad idea, but you find yourself guessing line numbers. Word Handler also interfaces with *List Handler*, a good file management system put out by the same people.

Printing

The end result of anything you type on your Apple's screen is what you get on paper, and as you might expect, the more expensive Word Handler gives you more options here. Both Bank Street Writer and Word Handler let you print all of your pages or just a specific sequence of pages. Homeword prints all of whatever document is in memory, unless you manually halt it.

Each program lets you change the slot your printer is in. Word Handler lets you send a sequence of control codes to your printer to tell it the type of output you want (emphasized print, for example), but the process is somewhat complex. Homeword allows three types of print—standard, boldface (on my Epson, this was the double-strike mode), and underlined. Its underline and boldface prints don't look that way on your screen. (The word UNDERLINE or BOLDFACE precedes the text you want in that form.) Homeword can also chain files together for printing, using its INCLUDE function. Homeword and Word Handler allow both headers and footers; Bank Street Writer lets you enter a header. The version of Bank Street Writer I had didn't allow anything but standard print. You can tell Bank Street Writer not to eject the page it stops printing on, that you'll be loading another file and you'd like it to print immediately after the current one is completed.

Bank Street Writer and Homeword let you format the output of your text as single-, double-, or triple-spaced. Word Handler will print your work in half-space increments, from one to two and a half spaces. Homeword and Word Handler also let you change your line spacing inside your documents (print this section as single-spaced, this other section double-spaced, and so on).

Weaknesses

Word Handler requires that you save a document before you can print it. This wastes all sorts of time if you send the same letter to a number of people; each must first be saved on disk before the system prints a copy for you. It partly overcomes this by letting you create a letter "form" that will prompt you for the name, address, and so on, for each letter, but still insists on saving the text before printing.

Word Handler uses Apple's hi-res graphics to create its characters for both its 40- and 66-column display. The 40-column characters are not as clear as Homeword and Bank Street Writer's are. Also, Word Handler uses a hollow cursor to indicate where you're working, but this partly covers the character immediately to its left. When you tell this system that you want to insert some text in the middle of your existing work, the screen from the cursor on goes blank. You get a lot of room for writing, but it is difficult to make any kind of transition from your new text to the old.

Reset stops Homeword and loses what you have in memory. (It doesn't have any effect on either Bank Street Writer or Word Handler.) Homeword also suffers from a lack of mnemonics in its control key functions. (Control-J, for example, moves the cursor down, and control-K moves it up.) You can set your margins too close together so your text won't display for a screen preview. The system automatically numbers your document pages and the manual doesn't make it clear how to eliminate them.

References

Bank Street Writer
Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
$59.95

Homeword
Sierra On-Line
Sierra On-Line Building
Coarsegold, CA 93614
(209) 683-6858
$69.95

Word Handler II
Silicon Valley Systems
Distributed by:
Advanced Logic Systems
1195 East Arquez
Sunnyvale, CA 94086
(408) 730-0307
$79.95

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(You must turn off the header or footer where the page number is.) Homeword also slows down text entry from time to time as it updates the miniature representation of the page you're on and its two bar graphs.

Bank Street Writer has a draft printing mode; this prints your work just as you see it on-screen, as 38-character lines. You can edit your writing this way, but it is impossible to picture the finished product. Its lack of a screen preview compounds this weakness. This program doesn't provide a tab function. To indent the first line of a paragraph, you must manually space over however many spaces you'd like. To edit your work, you press the escape key to move into the edit mode; however, the more text you have in memory, the longer this transition takes.

Bank Street Writer doesn't have any way to justify your text, while the other two packages can justify either in sections or for your entire document. None of these three programs are copyable.

Style

Homeword comes with a cassette tape that takes you through the system. The combination of seeing what you're doing as you hear about it is terrific; you can produce work with this program very quickly. You can always get back to your main writing area by using the escape key, so you'll never get lost inside the program. The icon approach is truly the wave of the future and, while it might make the package seem overly simplistic, Homeword is really a powerful, useful system. It's a friendly program for both home and business, designed primarily for short documents such as letters and specification sheets. You'll feel very comfortable with Homeword (again, mainly because of the icons).

Bank Street Writer is the easiest of the three programs to get started with; as noted, forget the manual and just start to use the system. It, too, is designed for short documents. I found it annoying that I couldn't send control codes to my printer (especially since the manual says that *some* copies of the program will let you), but for what you'd expect to do with the package, this isn't a major problem.

Both Homeword and Bank Street Writer share one major limitation: the inability to access and use an 80-column card. If you don't mind more work in learning the system, there's no question that Word Handler is a more powerful and flexible package than either of the other two. It's nice to see bold or underlined text on your screen, but even more important to see a full-width display in truly readable characters. If your Apple doesn't have one, Word Handler lets you upgrade to an 80-column card in the future.

What to Buy

If you want the easiest possible program for your work or home, Bank Street Writer will serve you well. You might grow out of the program after a time, but if you and your people need a package that's truly simple to use, it's the one to buy. You can hand this program to someone and they'll be up and working with it in just a few minutes.

A step up (if you have a 64K system) is Homeword: slightly more complex and considerably more powerful. It'll take you a bit longer to learn its operation, but makes up for the increased difficulty with additional flexibility.

If you don't have and never plan to get an 80-column card, buy either Bank Street Writer or Homeword. Their 40-column display is better than Word Handler's. You also don't want to buy Word Handler unless you (and whoever will use the system) will spend the time to read the manual and learn program commands.

However, if your Apple has an 80-column card (or if you have an inclination to buy one), and you're not put off by having to spend some time learning a more complex package, Word Handler gives you much more power and flexibility than either of the other two programs.

All three of these are good programs; if you can determine the right blend of ease and power your work needs, one might be perfect for you. ■

Circle 355 on Reader Service card.

Telecomputing

One of the hottest buzz words in personal computing is telecommunications. In this special section, **inCider** presents what you have to know in order to get on-line. The four articles in the section describe why it's worth your while to buy a modem, what to look for when purchasing telecommunications hardware and software, where to find in-depth information about modems, and how one typical Apple owner survived his first weeks in telecomputing. If you're ready to take the on-line plunge, read on.

WHY ***bother with telecommunications?***

Don't Hang Up!, a guide to the wide world of telecomputing, tells you why. . . . . Page 54

WHAT ***should you look for in a modem?***

Buying Your First Modem has the answers. . . . . Page 57

WHERE ***can you go for more information?***

inCider's **Directory of Modem Manufacturers** points the way. . . . . Page 61

HOW ***do you get on-line?***

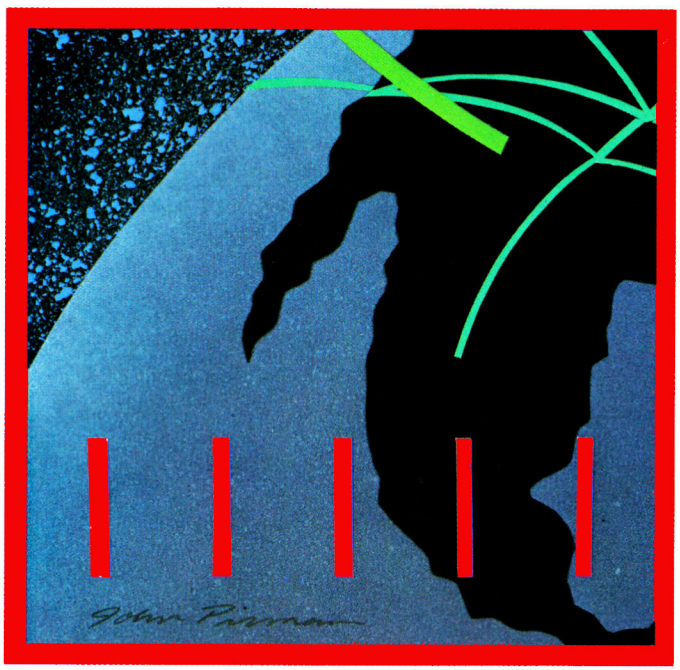
Direct Connect Diary relates one person's experiences. . . . . Page 64

T E L E

WHY Don't Hang Up!

Plugging your Apple into the world's biggest communications network can take you places you've never dreamed of.

by Bob Ryan, inCider staff



Robert Heinlein, the dean of American science fiction writers, has spent the better part of his life entertaining and enlightening an entire generation (or two) of readers. One of his stories concerns a couple of kids growing up on Mars. In the story, each of the kids has a portable device that puts what seems like the entire contents of the Library of Congress at their fingertips. In other words, they have instantaneous access to a lot of information. Since reading that story, I've been enchanted by the idea of such a device. Now, although Heinlein's portable library is still beyond the reach of current technology, the promise of a world of information at your fingertips is fast becoming a reality. This is the promise of telecommunications.

Telecommunications is an intimidating word. People who have been involved with computers for years have been known to quake at the mention of it. While getting on-line may have been a chore a couple of years ago, most of the bother has been eliminated by the current generation of microcomputer communications products. Today, you don't have to worry about how you can communicate with other computers over the phone lines. You only have to decide if you want to communicate with them.

Before the advent of personal computers, modems were used to tie large computers together or to access a large computer with a dumb terminal. You can still use a modem for these purposes. In fact, you can buy software for your Apple that will let it emulate a number of computer terminals, including the DEC VT-100's, which are a *de facto* industry standard. These days, however, you can do a lot more with a modem and a personal computer than work at home on your company's VAX-11/780. You can dial up the world.

A Telecommunications Primer

Telecommunications is a general term which describes tying two computers together using standard phone lines and using the computers to exchange data. The fact that phone lines are used to tie computers together is significant. It means that anyone with a phone has the potential to communicate with computers all over the country. The phone system is simply the largest communications network in existence.

Using phone lines to tie computers together also has some disadvantages. The main drawback is that computers are digital devices. They output data in a stream of bits. Each bit is either a high or a low voltage (represented by the binary numbers 1 and 0). The signal from a computer, therefore, is a square wave which corresponds to the voltages of the bits being sent out. Phone lines are not equipped to handle digital signals. The primary purpose of phone lines is, of course, voice communication. Sound, such as your voice, is not a digital signal but an analog one. In other words, it doesn't consist of a series of discrete pulses, like a digital signal. Rather, sound is a continuous wave, like a sine wave (remember your high school algebra?) that changes in amplitude and frequency as your voice changes volume and pitch.

So how do you go about sending computer generated digital signals over the analog telephone system? The solution is to convert the computer output into an analog signal that can be carried over the phone lines. The device that performs this conversion is called a modem. It MOdulates the output of your computer into an analog signal and DEModulates analog signals being sent to your computer into the digital signals that your computer can understand. Of course, it isn't necessary to know any of this if you want to use a modem. That's the beauty of modern telecommunications hardware: As long as you know how to use it, you don't have to know how it works.

It is important to distinguish between telecomputing and a local area network (LAN). Computers in an LAN are not linked with telephone lines but with a specially designed cable that handles digital signals. LAN's, therefore, do not require modems and the transmission speeds are hundreds or thousands of times faster than tele-

Write to Bob Ryan c/o inCider, *80 Pine Street, Peterborough, NH 03458.*

computing transmissions. The negative side of the equation is that all the computers in an LAN must be relatively close to each other. Computers using telecommunications, on the other hand, can be a continent apart.

Starting Small

Even though over 1.5 million Apple II computers have been sold over the years, Apple owners still exhibit a strong feeling of community with one another. Experienced users are usually willing to help the inexperienced, and everyone is always willing to swap war stories about their triumphs and tribulations. Perhaps the most concrete manifestations of the Apple community are the Apple bulletin board systems that can be found all over the country. Bulletin boards consist of an Apple computer that is connected to a dedicated phone line via a modem and the necessary software to answer incoming phone calls and regulate the functions of the bulletin board.

Just what are the functions of a bulletin board? Well, the answer to that depends upon the SYSOP (SYStem OPerator), the person who sets up the bulletin board and makes it available free of charge to anyone who wants to access it. Bulletin boards are pretty standard, however. They usually allow callers to read and write messages and to download public domain software. Most also encourage callers to contribute interesting software or comments by uploading them to the bulletin board. This sharing of resources is an important ingredient in the glue that holds the Apple community together.

The important thing to remember about bulletin board systems is that you are expected to contribute to any board that you log onto. Your contribution doesn't have to be large—a simple thank you to the SYSOP would be enough, but you should avoid the selfish inclination to download everything on the bulletin board and leave nothing in return.

To a beginner, bulletin boards can be an invaluable resource. If you have a problem with some hardware or software, you can leave a message on a bulletin board asking for advice. The next time you log onto the board, you will find most likely that someone has left an answer for you. This kind of interaction is what makes bulletin boards such great systems.

If you really get hooked on bulletin boards, you can set one up yourself. You have to be willing to dedicate a phone line and a computer to the board on at least a part-time basis. Software for running a bulletin board is available commercially from a company called Software Sorcery, Inc.

The Information Services

The next step up in sophistication and price from the bulletin boards are the on-line information services. These services, such as The Source, CompuServe, and Delphi, make mountains of information available to subscribers.

The information services employ mainframe and supermini computers and are thus able to service hundreds of users at one time. They also have gigabytes (billions of bytes) of direct access storage that is used to house the various data bases and utilities of the service. Through an information service you can get access to the latest headlines, airline schedules, movie reviews, or stock quotations. The information services let you chat with other users who are on-line and to leave messages for those who are not. You can even go shopping with your computer, or check out the latest restaurant ratings.

The information services can also be a great source of entertainment. I especially like the multiplayer games that are available. Where else can you lock horns simultaneously with a dozen players from all over the country in a battle for mastery of the universe?

Unlike bulletin boards, the information services are not free. They charge an initiation fee and a fee each time you log on. The rates depend upon when you use the service (evening use is usually about 75% cheaper than daytime) and the baud rate of your modem (1200 baud is more expensive than 300 baud). There are even special charges to use selected data bases. Before joining any service, be sure to check the features that are available and the rate schedule.

Although it is beyond the scope of this article to provide a comprehensive list of all of the features of all of the information services, you can check the **Figure** to get an idea of what a major information service offers. This is a listing of the CompuServe subject index on May 14, 1984.

In addition to the general information services, there are also a number of specialized information services. These services are usually more expensive than the general ones. Among the specialized services are the Dow Jones News/Retrieval Service, Dialog (an information retrieval service run by Lockheed), NewsNet (another business based service), and a number of medical and legal data bases. In fact, no matter what your information needs, you can probably find a data base that will satisfy them.

Nor Rain, Nor Sleet, Nor Dark of Night . . .

One of the more interesting telecommunications applications that has surfaced recently is electronic mail. Quite simply, electronic mail consists of sending messages to remote locations using your computer. Electronic mail can take a number of different forms.

The most direct form of electronic mail is a computer-to-computer hookup. You use your Apple to send a message directly to another personal computer. Until recently, the receiving computer would have had to have been an Apple. Now, however, Microcom has introduced ERA 2, a combined software and hardware product that permits communication between different kinds of personal computers. For example, an ERA 2-equipped Apple can communicate with an ERA 2-equipped IBM-PC.

The information services provide another type of electronic mail service. You can send a message to any other subscriber of the service. When the recipient next logs on, the service informs him that he has received some electronic mail and he can retrieve it from his mailbox.

The third type of electronic mail comes closest to what we think of as mail. MCI, the long distance phone company, is providing a service called MCI Mail. With MCI Mail, you send your message via your Apple to the MCI system. If the person you're sending a message to is also an MCI subscriber, then your mail will be delivered immediately. If not, then the MCI system will produce a hard copy in the nearest facility it has to your addressee and put it in the mail for next day delivery by the U.S. Postal Service.

MCI is not the only company that is providing electronic mail service. Even the Postal Service has its own electronic mail system. However, MCI Mail is more accessible to personal computer users. Some new communications packages, like PFS:Access, provide automatic log-on procedures for MCI Mail. This makes accessing the service very easy.

The Next Big Thing

The major limitation of present day telecommunications is that only text data can be exchanged between com-

Figure. *The CompuServe subject index on May 14, 1984.*

AAMSI Communications
AAMSI SIG
AP Datastream
AP Videotex, Business
AP Videotex, Entertainment
AP Videotex, Politics
AP Videotex, Weather
AP Videotex, World News
ASCMD SIG
ASI Flight Operations
ASI Monitor
ASI Service Difficulty
Academic Amer. Encyclopedia
Access Phone Numbers
Adventure
Aircraft Insurance
Alternative Educ. Services
Alternative Educational Svcs
Altertext Report
American Ski Association
Apple User Group SIG
Arcade SIG
Astrology
Atari SIG
Athlete's Outfitter
Aunt Nettie
AutoNet
Aviation Rules & Reg.
Aviation SIG (AVSIG
Aviation Safety Institute
Aviation Weather

Bacchus Data Services
Backgammon
Banking Services
Banshi
Belmont Golf Association
Biorhythms
Blackjack
Bridge
Bulletin Board
Business & Law Review

CB
CB Interest Group SIG
CB Society
CEMSIG SIG
CP Business Info Wire
CP/M Users Group SIG
Calculate A Raise
Calculate Net Worth
Changing Password
Changing Terminal Type
Checkbook balancer
Children's Games
Civil War
Clarke School for the Deaf
CoalScoop
College Press Service
Color Computer SIG
Color Graphics
Columbus Chamber of Commerce
Command Summary
Commodore
Commodore 64 SIG
Commodore Pet SIG
Commodore VIC20 SIG
Communication Industry
Comp-U-Store
CompuServe Rates
CompuServe logon instruct
CompuServe's Softex
Computer Art SIG
Computer Job Bank
Computer Periodical Guide
Computer Resume Bank
Computer Wire, The
Computing Across America
Computing Tutorials
Concentration
Cook's Underground
Cross Assemblers

DataPac logon instruct
Department of State
Dice
Digital Research Inc.
Direct Connection, The

EMAIL
EMI Flight Planning
Economic News
Educational Research
Educators' SIG
Edutech
Election '84
Electronic Bounce Back
Electronic Gourmet
Entertainment SIG
Environmental SIG
EpsOnLine

FOI Newsline - FDA Info.
Family Matters SIG
Fantasy
FasterMind
Fedwatch Newsletter
Feedback to CompuServe
Fifth Avenue Shopper
Financial Forecasts
Financial Services
Fire Fighters' SIG
Firstworld Travel Club
Food Buyline SIG
Football
Fur trader

GameSIG Archives
Gandolf's Reports
Golf
Golf SIG
Gomoku
Good Earth SIG
Government Publications

HamNet SIG
Hammurabi
Handicapped Users' Database
Hangman
Heath User Group SIG
Heathkit Catalog
Hi-Tech Forum SIG
Hollywood Hotline
Home Management
Horizon Home Banking
Howard Sams' Books
Human Sexuality
Huntington National Bank

IBM-PC SIG
Incorporating Guide
Index
Industry Standard Databases
InfoText
InfoWorld
Information on Demand
Intelligence Test
Internal Revenue Services

Kaypro Users Forum
Kesmai

LSI SIG
Legal SIG
Literary SIG
Loan Amortization
Lunar Lander

MNET-11 SIG
MNET80 SIG
MUSUS SIG
Magazine Entree
Magic Cube Solution
Maze
MegaWars I
MegaWars II
MegaWars III
MicroQuote
MicroShoppe
Microsoft SIG
Mine-Equip
Miner's Underground
Monthly Charges
Mugwump
Multi-Player GameSIG
Music Information Service
Music SIG

NOAA Weather Wire
NWS Aviation Weather
Narrow-Gage Scout
National Issues SIG
National Water Well Assoc
Netwits Database
Netwits SIG
New Adventure
News-A-Tron
Newspapers
Node Abbreviations

OS9 SIG
Official Airline Guide
Ohio Scientific SIG
Orch-90 Archives
Orch-90 SIG
Outdoor SIG

PGA Official Tour Guide
PR and Marketing Forum
Pan Am Travel Guide
Panasonic SIG
Parenting & Family Life
Pascal SIG
Peak Delay Guide
Personal Computing
Personal File Area
Personality Profile
Popular Science, Autos
Popular Science, Energy
Popular Science, New Product
PowerSoft's XTRA-80
Primetime Radio Classics
Product Ordering
Programmer's SIG

Quick Quote

RCA Newsletter
RCA SIG
RCA Newsletter
RCA SIG
Rapaport Diamond Broker
Religion SIG
Reversi
Rick Brough's Movie Reviews
Rick's Arcade Center
Roulette

SAVINGS-SCAN
SHO-TIME Movie Catalog
Scott Adams' Games
Scramble
SeaWar
Shareholders Freebies
Shawmut Bank of Boston
Shop-at-home
Ski SIG
Social Security Administration
Society of Mining Engineers
Software Author's SIG
Space SIG

Figure continued.

```
Space Trek
Space War
Sports SIG
StL Post-Dispatch, Autos
StL Post-Dispatch, Business
StL Post-Dispatch, Jobs
StL Post-Dispatch, Real Est.
StL Post-Dispatch, Sports
StL Post-Dispatch, U.S. News
StL Post-Dispatch,Classified
Standard & Poor's
State Capital Quiz
Stevens Business Reports

TRS-80 Professional Forum
TRS80 Model 100 SIG
TYMNET logon instructions
Tandy Newsletter
TeleComm SIG
Telenet logon instruct
Terminal Software
Texas Instruments Forum
Text Editors
The Business Wire
The College Board
The Electronic Mall
The Multiple Choice
The National Satirist
The New Tech Times
Travel Fax
Travel SIG
TravelVision
Trivia Test

Unified Management
United American Bank
User Directory

VAX SIG
VIDTEX Information
Value Line Financials
Value Line Projections
Veterinarians Forum
Victory Garden
Video Information

Washington Post, Business
Washington Post, Editorials
Washington Post, Financial
Washington Post, Gov't News
Washington Post, Politics
Washington Post, Sports
Washington Post, U.S. News
Washington Post, World News
West Coast Travel
What's New
Whole Earth Software SIG
Work-at-home SIG
Worldwide Exchange
Wumpus
```

puters. All information that is sent over the phone lines is sent in ASCII (American Standard Code for Information Interchange), the standard method for representing alphanumeric characters as a series of bits that a computer can understand. ASCII code has no provisions, however, for handling graphics.

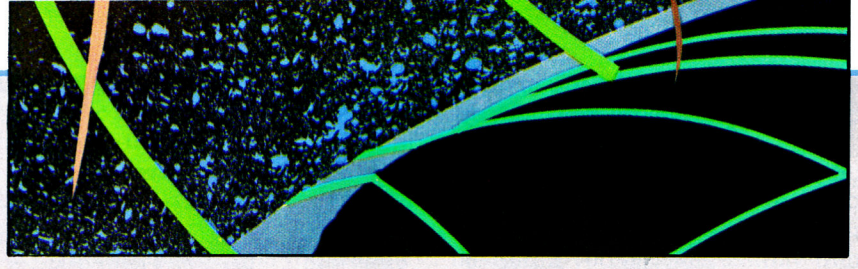
Why do we need to send graphics over the phone line anyway? The answer is videotex. A videotex service combines the functions of the information services with powerful graphics images that enhance greatly the information display. Videotex could revolutionize on-line shopping by letting potential customers see what they are buying. Videotex is a reality, but you require a special terminal to access it.

Videotex services use communications protocols that permit the transmission of graphics data. The most common protocol is NAPLPS (North American Presentation Level Protocol Syntax). Since personal computers only understand information encoded in ASCII, they can't access videotex services. Until recently, it looked as though they never would. It was assumed that people who wanted to access videotex services would buy a dedicated videotex terminal. That perception, however, is changing. It is now felt that personal computer users will object to buying an expensive dedicated terminal when their computer functions already as a very intelligent terminal. In response to this resistance, the videotex industry is starting to develop software that will convert NAPLPS data into a form understandable by ASCII-based personal computers. Specifically, the NAPLPS encoded graphics information is converted into a form that is understandable to the graphics system of the target personal computer.

What this all means to you, the Apple user, is this: When videotex services become common, you won't have to buy an expensive terminal to take advantage of them. Your Apple will be your videotex terminal.

The Next Step

Although I've tried to give you some idea of what you can do with a modem-equipped Apple, there is no substitute for hands-on experience. Check out a friend's modem, or try one at your local Apple dealer. Be forewarned, however, that telecommunications can be addicting. And, although modems are wonderful devices, they can't pay your phone bill. ■



Sources of Services and Products

Apple Bulletin Board Systems
Software Sorcery, Inc.
7927 Jones Branch Drive
Suite 400
McLean, VA 22102
(703) 471-0610

CompuServe
CompuServe Information Service
5000 Arlington Centre Boulevard
Columbus, OH 43220
(614) 457-8650

Delphi
General Videotex Corporation
3 Blackstone Street
Cambridge, MA 01803
(617) 491-3393

Dialog
Dialog Information Services, Inc.
3460 Hillview Avenue
Palo Alto, CA 94304
(415) 858-2700

Dow Jones News/Retrieval Service
P.O. Box 300
Princeton, NJ 08540
(800) 257-5114

Era 2
Microcom
1400A Providence Highway
Norwood, MA 02062
(617) 762-9310

MCI Mail
MCI Communications
1133 19th Street, N.W.
Washington, DC 20036
(202) 872-1600

NewsNet
945 Haverford Road
Bryn Mawr, PA 19010
(215) 527-8030

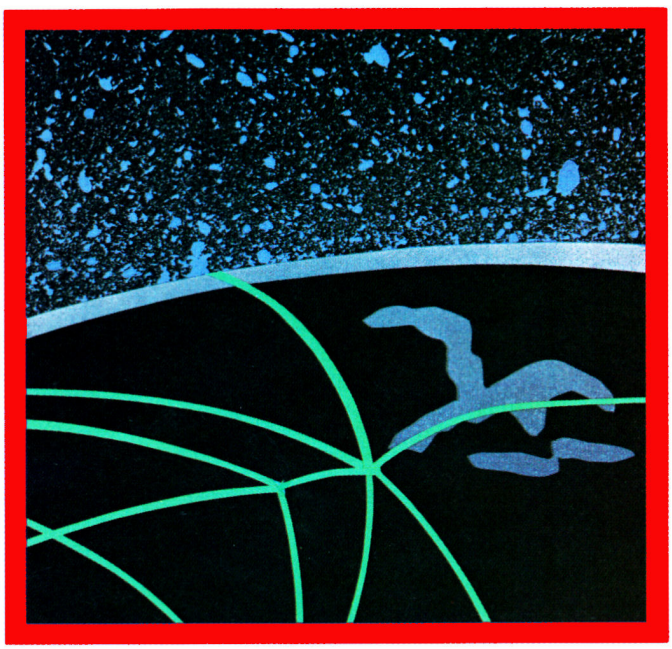
PFS:Access
Software Publishing Corporation
1901 Landings Drive
Mountain View, CA 94043
(415) 962-8910

The Source
Source Telecomputing Corporation
1616 Anderson Road
McLean, VA 22102
(800) 336-3366

WHAT Buying Your First Modem

Here is your guide through the maze of technical jargon that makes such a mystery out of modems.

by John Granfield



So you want to join the telecommunications revolution and connect your Apple to the big world outside? Well, what are you waiting for?

Moving from a stand-alone system to one that's connected to the big wide world is not only a natural progression as you explore the possibilities of your Apple, but a wise move as well. One of the most interesting and satisfying things you and your Apple can do together is to communicate with other computer users, via information utilities such as CompuServe, Delphi, The Source, and electronic bulletin board services (BBS). These utilities provide news, shopping services, information, and the simplest yet most precious of all commodities, human companionship. You'll find that your modem opens up a new world for you. The question is, how do you do it?

Modems

The first step is to connect your Apple to a phone line. You need an interface device called a modem. The word modem is short for MOdulator-DEModulator, which describes the electronic function of the device.

A modem modulates the electronic signal of the computer (which is in serial bits representing the values 1 and 0) into an audio analog signal the phone lines will accept. At the other end of the phone line, the modem that receives the signal will demodulate it back into serial bits which the computer it interfaces with will understand.

Modems come in two basic forms: acoustic coupler and direct connection or DAA (Direct Access Arrangement).

Acoustic Modems

With an acoustic system, you use a standard (not a Trimline) telephone handset. You place the phone in a special cradle, equipped with a microphone and speaker, which transmits the analog signal to and from the modem. All you have to do is make the call, listen for an electronic tone instead of a voice transmission, drop the handset into the cradle, and let the modem do the rest.

Acoustic modems are inexpensive because they do not have to include a telephone receiver in their circuitry. There are drawbacks, however.

One is a little problem technicians call "signal-to-noise ratio." The sound from your telephone receiver has to make the jump in physical space from the handset speaker to the mike in the coupler. The mike can pick up room noise resulting in loss of data. Acoustic manufacturers try to insulate the mike and speaker, but any acoustic system will pick up some noise. If there is static on the line, or if the analog signal is very faint, or even if there is a mild background hiss, you're in signal-to-noise difficulties again. Since re-transmitting garbled data is expensive (because of long distance charges), frustrating, and time-consuming, I can't recommend an acoustic coupler for business or commercial use. For non-business uses, an acoustic is fine.

The biggest drawback for an Apple II owner is that most acoustic couplers for the Apple do not have an RS-232 serial interface card included in the package. This means an additional $80 to $150 expense to provide the card yourself.

Direct-Connect Modems

Direct-connect modems are aptly named because they connect directly to the modular phone jack and require no acoustic cradle or phone handset.

These modems offer better performance with regard to the signal-to-noise ratio, since there is no acoustic mike. Also, a direct-connect modem is better suited for unattended call answering. You can set the modem and forget it. If a call comes in at 3 a.m., you may slumber while the modem automatically answers the phone and transfers the data to your disk drive for storage and retrieval at your leisure. (A drawback is that you must

You can write to John Granfield c/o inCider, 80 Pine Street, Peterborough, NH 03458.

dedicate a phone line or an extension jack to the modem.)

There are a few modems on the market which incorporate an Apple II-compatible serial interface, eliminating the need for a separate RS-232 serial interface card. Some very sophisticated units, such as the Hayes Smartmodem, require the separate interface card.

Direct connection modems tend to be expensive. Prices range from $300 to $400 and go up, depending on the features you select and whether or not a separate interface card is required. Considering the overall superiority of the direct-connect modem, however, price becomes a secondary concern when compared to performance. That's why my recommendation is to spend the extra dollars and go with a direct connection modem.

Consumer Checklist

Before you buy a modem, you must evaluate what it does and how well it performs. The first thing to know is how rapidly your prospective modem can send data. The unit of measure to describe this is called a baud. This is a rough measure of the number of bits per second your data is traveling.

If you were to recite the alphabet slowly, one letter per second, you'd be transmitting at about eight baud, give or take a few decimal places. How did I figure that? A single ASCII character takes seven data bits plus a stop bit to construct. That's eight bits. Eight bits per second equals eight baud, approximately. (This imprecision will drive technicians nuts, but I'm only trying to give you a feel for this unit of measurement.)

The three baud used most in modem operation are 110 baud (the rate at which teletypes transmit), 300 baud, and 1200 baud. The characters per second (cps) equivalents are approximately 10 cps for 110 baud, 29 for 300 baud, and just under 120 cps for 1200 baud.

Using those numbers, here is a fun example that may help you decide how fast a modem you need. Suppose all the words a secretary typed were five letters long. If that secretary were typing two words a second, 120 words per minute, her speed would be 110 baud. A secretary typing at 300 baud, and again using only words five letters long, would be typing at 5.8 words a second, about 348 words per minute. At 1200 baud a secretary, frantically typing five letter words, would be cruising at 24 words per second, about 1440 words per minute, making her the fastest, if not the best-paid, secretary in the world.

Now the question is, how fast does your modem have to transmit and receive?

Look at the applications you'll apply to your modem. If, for example, you're a business user who must transmit large quantities of data when the most expensive long distance rates apply, you'll want a 1200 baud modem. The speed will save you long distance bucks.

Home users just don't need 1200 baud capability. The 300 baud speed is fast enough for most private users and is the standard for all BBS and information utility systems. (Although some offer 1200 baud service, 300 is the norm.)

Modem Features

Now let's go over a couple of the other features you should be looking for in a modem.

The number of directions signals can travel simultaneously in a modem is described as either *full duplex* or *half duplex*. Full duplex is simultaneous, two-way transmission. Half duplex is one-way transmission. Which system is better? Full duplex modems—especially ones that switch to half duplex—are the best. When you're chatting with another computerist or using a bulletin board system or an information utility, the value of full duplex becomes obvious. A nice feature of full duplex is that what you type and subsequently see on your monitor is actually an echo from the receiving terminal. You therefore have a continuous self-check of the modem working for you.

Another good feature is conversion between Touch Tone and rotary pulse dialing. Rotary is the old system of dialing many people still use. A drawback of rotary-only modems is that you can't use your modem with a long distance service such as Sprint or MCI, which require Touch Tone. If you want to use a discount long distance network (which occurs when the nearest network connection to an information utility or BBS requires a long distance call), you'll have to dump your rotary-only unit in favor of one compatible to Touch Tone. Otherwise, rotary only is perfectly okay for telecommunications.

Automatic answering, as mentioned, is another good function and so is automatic calling. The two features are commonly called originate/answer. The better grade modems can be programmed for these functions.

It's also useful to have an audible monitoring system to let you know whether or not you're receiving a signal and if you are successfully transmitting.

The Top Two Apple Modems

The two best-known modems designed especially for the Apple II are the Hayes Micromodem IIe and the Novation Apple-Cat II. Many computer experts consider the Micromodem as the industry standard which all other Apple II modems are judged against. It has its own interface card ready to plug right into Apple I/O slots 1 through 7. This saves the expense of buying an RS-232 serial interface card. Installation is quick and easy. All you do is plug in a wire connecting the interface card to the external microcoupler box and then another wire from the box to your modular phone jack, and you're in business.

The Micromodem IIe works with Pascal and CP/M systems. It transmits and receives at 110 and 300 baud, but does not operate at 1200 baud. The Micromodem IIe also supports either full or half duplex operation. It allows you to dial numbers manually and automatically. Dialing is exclusively by rotary pulse, which means that the unit will successfully operate on rotary or Touch Tone systems. It cannot be used with long distance services such as Sprint or MCI.

A ROM chip comes with the Micromodem IIe allowing you to see it in what's called the BASIC immediate mode. That means you can use the unit after booting the system master without additional software. If you want it to do all the amazing things it's capable of, however, you will need either to write the appropriate routines yourself or to buy a good communications software program. Luckily, one comes with the unit, the Hayes Smartcom I program.

The Micromodem IIe, bundled with Smartcom I, lists for $329. Last year the system cost $409, complete. This $80 reduction makes the Micromodem a great buy, especially considering its features, quality workmanship, and reliability.

Rivaling the Micromodem IIe is the Novation Apple-Cat II. It's an all-in-one unit, even more self-contained than the Micromodem IIe. All the electronics of the basic unit are on one plug-in board; there is no external

Circle 263 on Reader Service card.

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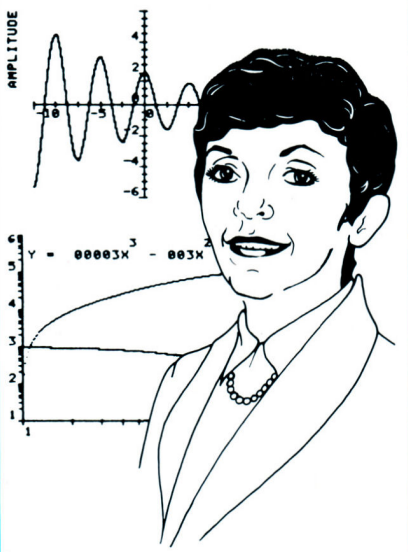
—Virginia Lawrence, Ph.D.
Chief Executive Officer



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module. The connection to the modular jack is made right on the board. Installation is as simple as with the Micromodem IIe.

The Apple-Cat supports baud rates of 50, 75, 110, 150, and 300. Half duplex communications are available at 1200 baud on the basic modem. (An upgrade to full duplex, 1200 baud is $349. A 300/1200 system is $595.)

The Apple-Cat works with many of the popular communications programs, but the unit comes with its own excellent software, the Com-Ware II program. This program features single keystroke commands to initiate auto dialing, manual dialing, automatic answering, a high-speed data transfer routine, and conversion to voice phone.

The basic unit costs $319, list price. Various system extras and upgrades available at extra cost include a handset, a ROM chip that allows you to operate the Cat without the disk-loaded Com-Ware program, an optional Expansion Module to connect a cassette, a printer, and a microphone to the modem, and BSR connection, so you can use your Apple II to control devices such as light switches and appliances. Using the system to its limit, Novation says, you can connect up to 256 BSR control modules with the Cat.

Decisions, decisions. If you want a modem, pure and simple, you couldn't do better than the Micromodem IIe. If you like extra features and expandability, there's no beating the Apple-Cat II.

There are, of course, less costly units. Some sell for as little as $150 and apparently work just fine. They don't always come with software at that price, but if you can program your modem yourself, the prices are attractive.

Software

The software is the most vital part of your system, because it really operates your modem. If you wind up buying the Micromodem IIe or the Apple-Cat, the issue of software is debatable, because both units come bundled with superb communications programs. If you have older, unbundled versions of these modems or other makes without included software, here are some functions you might want to look for:

- Printer On/Off. This dumps the transmission to your printer.
- Upload/Download capability. A function which allows you to send programs from your memory storage device (ie: disk or tape) to the computer at the other end of the line and to receive and store programs downloaded from a host computer.
- Macros. This is when a program stores a frequently called number and then dials it automatically, giving the host computer your identification and password. Some programs offer macros that go into action once you boot up the software.
- Speaker On/Off. This allows you to listen to the signal on an audio speaker or handset.
- Unattended Answer. As stated above, it allows the modem to answer the phone and store messages to disk while you're away.
- Select Full/Half Duplex.
- Automatic Handshake. When the host computer answers your call, this routine connects the two modems automatically.

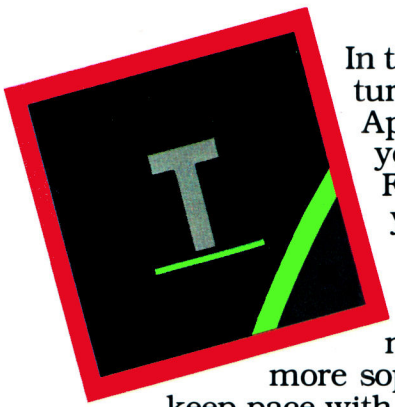
Three more of the popular communications software programs have some or all of these functions and are worth exploring. They include:

- ASCII Express The Professional. Widely regarded as one of the best and most versatile communications programs, it supports the major Apple II modems. Cost: $129.95. Roger Wagner Publications, 10761 Woodside Avenue, Suite E, Santee, CA 92071.
- TermExec. Ninety-five percent of all Apple II modems work with the newest, 1.2 version, including Apple-Cat. It's good for sending and capturing long files, even in auto-answer mode. Accompanied by good documentation, TermExec is easy to learn and very versatile. Cost: $79.95. Exec Software, 201 Waltham Street, Lexington, MA 02173.
- Apple Link. An alternative to Hayes' communications program. Excellent for handling text files. Cost: $59.95. Computer Applications, 13300 S.W. 108 Street Circle, Miami, FL 33186.

One of these programs should provide you with the features you need to join the telecommunications revolution. You can start with a phone call to the People's Message System of Santee, California. They keep an up-to-date list of bulletin board systems throughout the country. The number is (619) 561-7277. Have the printer on and you'll be able to dump the entire list—hundreds of numbers—right to your printer. Then wait until dark (when long distance rates go down) and start telecommunicating! ■

Directory of Modem Manufacturers

If you're looking for the right modem to plug into your Apple, then one of the companies here makes it.



In the next few pages, **inCider** lists the scores of manufacturers who produce telecommunications hardware for Apple computers. How can you use this directory to help you make intelligent purchasing decisions?

First, if you have a limited budget, this guide will help you zero in on the less expensive modems. These modems don't have all of the features of the expensive models, but they can be just right for someone who wants only to connect with bulletin boards on an information service. If your telecommunications needs are more sophisticated, or if you're looking for a product that will keep pace with your growing needs, then you will want to contact the makers of the more expensive, full featured modems listed here. Whatever your situation, there is a modem that is right for you.

compiled by Joan Witham, inCider staff

Anchor Automation
6913 Valjean Avenue
Van Nuys, CA 91406
(818) 997-6493

Volksmodem
300 baud
$79

Mark X
300 baud
$169

Mark 12 Apple
1200 baud
$499

Anderson Jacobson
521 Charcot Avenue
San Jose, CA 95131
(408) 263-8520

1212-ST
300/1200 baud
$495

1212-AD1
300/1200 baud
$595

1211 (RM & AD)
300/1200 baud
$625–$675

1212-AD2
300/1200 baud
$695

1259 (AD & RM)
300/1200 baud
$695–$775

Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014
(408) 973-2042

Apple 300
300 baud
$225 ($299 with serial interface card)

Apple 1200
300/1200 baud
$495 ($570 with serial interface card)

Arctic Data
1839 1st Avenue
Prince George, B.C.
Canada V2L 2Y8
(604) 562-5240

Icebox 1
110/300/1200 baud
$950

Backus Data Systems
1440 Koll Circle
San Jose, CA 95112
(408) 279-8711

AC 312
300 baud
$199

BIZCOMP
532 Weddell Drive
Sunnyvale, CA 94089
(408) 745-1616

1022 IntelModem
300 baud
$279

2120
300/1200 baud
$499

1012 IntelModem
300/1200 baud
$549

Bytcom
2169 Francisco Boulevard
Suite H
San Rafael, CA 94901
(800) 227-3254

212AD
300/1200 baud
$495

Campbell Scientific
P.O. Box 551
Logan, UT 84321
(801) 753-2342

SC95A/SC95C
no set baud
$405

DC-103A
300 baud
$450

DC-103C
300 baud
$475

DC-95
1200 baud
$600

Cermetek Microelectronics
1308 Borregas Avenue
P.O. Box 3565
Sunnyvale, CA 94088
(408) 752-5000

Info-Mate 212A
110/300/1200 baud
$595

Codex
20 Cabot Boulevard
Mansfield, MA 02048
(617) 364-2000

5103 Modem
300 baud
$425

5202 Modem
300/1200 baud
$475

5212 Modem
300/1200 baud
$646

Coherent Communications Systems
60 Commerce Drive
Hauppauge, NY 11788
(516) 231-1550

Linemate 192
300 baud
$450

SPM-94A
300 baud
$475

SPM-94B
300 baud
$575

COMDATA
7900 N. Nagle Avenue
Morton Grove, IL 60053
(312) 470-9600

305E2–12
300/1200 baud
$117

370E2–42
300 baud
$217

P–1130
300 baud
$260

212E2–32
1200 baud
$337

P–212
300 baud
$495

Concord Data Systems
303 Bear Hill Road
Waltham, MA 02154
(617) 890-1394

CDS 212
1200 baud
$745–$770

CDS 224
1200 baud
$995

DeVelcon Electronics
4037 Swamp Road
Doylestown, PA 18901
(215) 443-5450

6212 Smartmodem
1200 baud
$495

7212
300/1200 baud
$575

8212
300/1200 baud
$650

Emtrol Systems
123 Locust Street
Lancaster, PA 17602
(717) 291-1116

Apple Lynx
300 baud
$229.95

Gandalf Data
10195 Noel Avenue
Wheeling, IL 60090
(312) 541-6060

SAM 212A
300/1200 baud
$618

Hayes Microcomputer Products
5923 Peachtree Industrial Boulevard
Norcross, GA 30092
(404) 449-8792

Smartmodem 300
300 baud
$289

Micromodem //e
300 baud
$329

Micromodem 100
110/300 baud
$399

Smartmodem 1200
1200 baud
$699

INMAC
130 South Wolfe Road
Sunnyvale, CA 94086
(408) 737-7777

8065
300 baud
$125

8063
300 baud
$149

8045
300 baud
$179

8070
1200 baud
$445

Password 8077
300/1200 baud
$449

212A Smartmodem
300/1200 baud
$595

8074
300/1200 baud
$595

MICOM Systems
20151 Nordhoff Street
Chatsworth, CA 91311
(408) 727-5275

3024
2400 baud
$195

3012
300/1200 baud
$495

Microcom
1400A Providence Highway
Norwood, MA 02062
(800) 322-ERA2

ERA 2
300/1200 baud
$499

SX/1200 (ERA family)
300/1200 baud
$519–$699

Microperipheral
2565 152nd Avenue, N.E.
Redmond, WA 98052
(206) 881-7544

A1
300 baud
149.95

Micro-Connection R1
300 baud
$159

A1A
300 baud
$179.95

Auto Print
300 baud
$179.95

R1A
300 baud
$199

Misco
One Misco Plaza
Holmdel, NJ 07733
(201) 264-8200

1003
300 baud
$139

1001
300 baud
$179

Multi-Tech Systems
82 Second Avenue S.E.
New Brighton, MN 55112
(612) 631-3550

MT 113D–S
300 baud
$275

MultiModem HC3
300 baud
$289

MultiModem //e
110/300 baud
$329

MT 212 AH MultiModem
300/1200 baud
$549

MultiModem HC
300/1200 baud
$549

NEC America
1012 Steward Avenue
Sunnyvale, CA 94086
(408) 737-7711

N103 JR
300 baud
$460

N212 (BR or AR)
300/1200 baud
$795

Novation
20409 Prairie Street
Chatsworth, CA 91311
(800) 423-5419

J-Cat
300 baud
$149

D-Cat
300 baud
$199103 Smart Cat
300 baud
$249

Apple-Cat II
110/300/1200 baud
$595

103 212 Smart Cat
1200 baud
$595

212 Auto Cat
300/1200 baud
$695

Prentice
266 Caspian Drive
P.O. Box 3544
Sunnyvale, CA 94088
(408) 734-9855

Star Accoustic
300 baud
$199

POPCOM Model X100
1200 baud
$475

Prometheus
45277 Fremont Boulevard
Fremont, CA 04538
(415) 490-2370

Promodem 1200
300/1200
$495

Racal-Vadic
1525 McCarthy Boulevard
Milpitas, CA 95035
(408) 744-0810

VA 317
300 baud
$250

VA 103 Modemphone
300 baud
$250–$380

VA 315
300 baud
$375

VA 355
300 baud
$375

VA 1250/SS
300/1200 baud
$425

VA 212LC
300/1200 baud
$495

VA 212 PA
100/1200 baud
$550

VA 3413
300/1200 baud
$695

VA 212 PA
300/1200 baud
$695

Rixon
2120 Industrial Parkway
Silver Spring, MD 20904
(301) 622-2121

R103J
300 baud
$249

R212A Intelligent Modem
300/1200 baud
$499

Teneron
6700 S.W. 105th
Suite 200
Beaverton, OR 97005
(503) 646-1599

T-2112
300/1200 baud
$695

TC-2112
300/1200 baud
$995

T.I.M.E.C.O.R.
Four Longfellow Place
P.O. Box 8928
Boston, MA 02114
(617) 720-4090

The Operator
110/300 baud
$159.95

TNW
3444 Hancock Street
San Diego, CA 92110
(619) 296-2115

Operator 103
300 baud
$169

Transend
2190 Paragon Drive
San Jose, CA 95131
(408) 946-7400

Apple Modem Card
300 baud
$275

TransModem
300/1200 baud
$695

U.S. Robotics
1123 West Washington Boulevard
Chicago, IL 60607
(312) 733-0497

Password 300
300 baud
$199

Password
300/1200 baud
$449

Universal Data Systems
5000 Bradford Drive
Huntsville, AL 35805
(205) 837-8100

UDS 103 O/A LP
300 baud
$145

UDS 103 JLP
300 baud
$195

UDS 212 LP
1200 baud
$445

UDS 212 A/D Data Modem
300/1200 baud
$645

UDS 224
1200/2400 baud
$995

Ven-Tel
1390 Walsh Avenue
Santa Clara, CA 95051
(408) 727-5721

Smart Modem 1200 Plus
1200 baud
$499

Western Datacom
5083 Market Street
Youngstown, OH 44512
(216) 788-6583

212 Autodial
300/1200 baud
$625

Zoom Telephonics
207 South Street
Boston, MA 02111
800-631-3116

Networker
300 baud
$129

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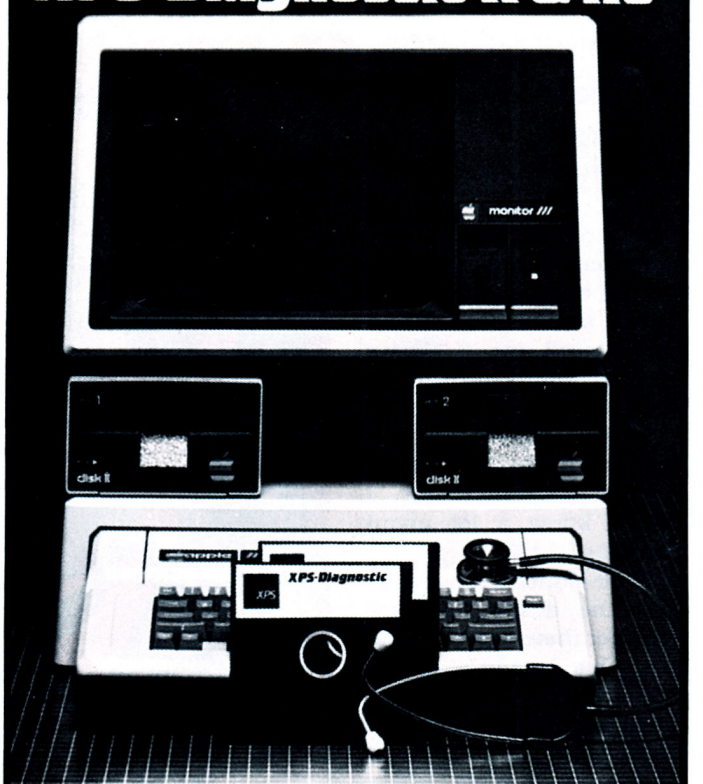

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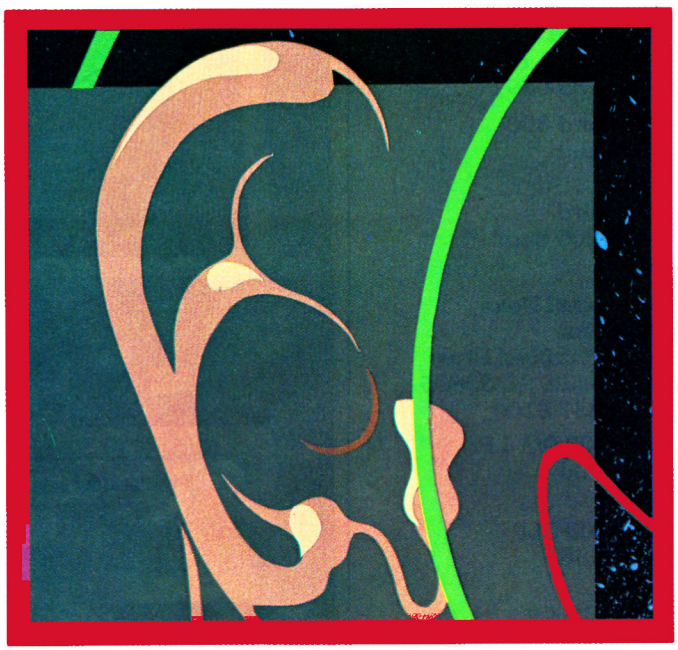
Direct Connect Diary

Afraid of taking the on-line plunge? Here are the experiences of an Apple owner who jumped right in.

by Scott Kitzerow



First, you must understand that I was a rookie when it came to modems. I had read a few articles about modems, but never understood why I would need one. It always seemed that the various modem information services were expensive compared to the local library or newspaper. Obviously, I didn't know a lot about modems.

What piqued my curiosity was the desire to know whether there was more out there than I could imagine. I remember the precise moment my impulse to buy a modem led me to the store. Let me share my humble telecommunications beginnings with you.

Dear Diary

December 30, 1983

This is the day I purchased my modem. I went into a new store, Save On Software, to see what they had. Quite a good choice of software at that. They had all the latest *good* programs. After looking around, I decided to check one more new software store, since this store had no modems. Just before I left, I asked the manager when he might be getting the Hayes Micromodem IIe. It just so happened that he had one on a shelf hidden behind a magazine rack.

I looked it over and noticed a price tag of $329. I hesitated, since some mail order base prices were about $260. The manager, almost reading my mind, said that was the listed retail price and I should deduct 20 percent. This brought the total down to $277.02, including tax.

What a deal! This was comparable to the mail order prices and included the Smartcom I terminal program. I needed no further prompting, but I did need to call my wife to secure her blessing—or rather her approval. The offertory rite involved new carpeting for the house.

On the way home, I couldn't stop thinking about how to hook up the telephone line since there is no receptacle near my computer station. Wanting to get started as soon as possible, I went to the local Radio Shack store and picked up telephone cord. It was a rather hasty decision. I really did not know what I needed. I just had this vision of not being able to use my modem!

I opened the modem box at home and found everything I needed was there for hookup:

1) modem board to plug into the Apple
2) telephone connector sub-assembly
3) about ten feet of telephone cable
4) FCC label to affix to the computer
5) owner's manual
6) Smartcom I disk

Easy Installation

I encountered no difficulty in installing the modem board. It was easier, however, to assemble the modular phone connector on back of the computer and then the modem board. This gave me a little more room to work with inside. For the modem installation I chose slot 2, although 3, 4, 5, or 7 could have been used. (The modem manual indicated that slot 2 was the most used.)

What concerned me was that many programs assume cards to be in specific slots, and I didn't want to install the components a second time. The less you pick up these electronic devices the less chance you have of destroying them with static electricity. This is very important! Many people do not understand that static electricity can destroy a computer.

Now that I'm started, I want to hook up the telephone lines right away, but the Smartcom I manual warns me to call the telephone company first. This being the weekend, I guess I will have to wait. All I can do is read the manual first. Even if I hooked up, I wouldn't have anyone to call anyway. Remember, I am quite a rookie.

The documentation listed offers for some of the special services: CompuServe, Official Airline Guide, Dow Jones News/Retrieval, The Source, Tymnet, and Telenet.

These services interest me, but I am concerned about connect time costs once I'm used to the service. This is one of the key reasons why I held back on buying a modem. Based on what I've read, the most reasonable service is The Source.

Scott Kitzerow logged his journal at 25160 W. Monaville Road, Lake Villa, IL 60046.

January 1, 1984

During the past couple of days, I've skimmed over the Hayes owner's manual in hopes of understanding the modem. There is little information to guide a rookie through step-by-step examples. The manual is written in definition form, and rather technical at that. If someone wrote a Hayes user guide we would all have something to cheer about.

January 3, 1984

I bought another phone jack at the hardware store to connect the modem. When I got home I found that this was not what I wanted, either. So, I cut the end of the Radio Shack cord and wired the telephone connector block direct by the color-coded wires. If you aren't a handyman, I would not recommend doing the hook-up yourself with bare wires. You shouldn't have any problem, though, connecting the phone jack.

January 4, 1984

With the modem finally hooked up, I decided to give it a test spin. I tried dialing some numbers I found in a magazine article about modems. Most numbers were busy and some would not answer. Finally, I tried one for a local library that had a public bulletin board set up at no charge.

The library's bulletin board listed 100 systems to call in the Chicago area. I tried to do what you call in computer lingo "downloading" the telephone listing onto one of my disks by telephone. Playing around a little bit, I found the RECEIVING FILE choice on the Smartcom software menu would actually do the job for me. Now I was getting the hang of things.

January 6, 1984

I started to get into some of the telephone numbers I received from the library for bulletin board systems. I called a local number and all they took was my name and gave me a temporary password. They said I would be approved in 24 hours for further access.

The other telephone numbers were busy except for one, and that turned out to be a matchmaker service. They gave me a password, too. The reason is that each time you call, they monitor your activity, number of requests, and time on the system.

I was curious about this matchmaker bulletin board. I started answering all the questions the system asked, and voila!, I was presented with

"Being married and having a nice family life, I decided not to continue."

a list of several female companions matched to my interests. Being married and having a nice family life, I decided it would not be in my best interests to continue. But, if I were single I would buy a computer and a modem just for the fun of meeting people.

Telephone Call Packs

The time I spent on this modem tonight has got me thinking about my telephone bill. You see, the last few days I have used the modem were billed as straight telephone charges. Someone said the solution is to get an unlimited telephone call pack if you *really* want to use a modem. I met one person who used more than 15,000 units in one month. I will let you know what the telephone company says about call packs. Until then, I will have to stay off my modem for a few days.

January 9, 1984

Today I called the phone company about call packs. Unlimited call packs were too steep for my budget. I ended up going for a 300 unit call pack, which added only $9 to my monthly phone bill.

I dialed only one number tonight and requested another one of those darn passwords. It is still the only way to get on one of these systems. Plan on keeping a notebook if you start hopping around bulletin boards.

Help Is on the Way

January 19, 1984

It has been a hectic week. I managed to access a bulletin board that has software to download to callers' computers by modem. I tried twice to download a couple of programs to my //e, but with little success. This is where I find out how modem people help each other out. I am going to leave help messages on some of the boards. Let you know how it turns out.

January 26, 1984

Tremendous! I found out earlier this week that my Apple //e can communicate with a Commodore 64 using straight ASCII code. That is the "American Standard Code for Information Interchange."

I am finding out that it isn't easy to download a program to my computer from another—at least not without instruction. I tried using my Smartcom I, but I cannot find an explanation. So, once again I am leaving S.O.S. notes for my modem friends.

February 22, 1984

Has a month gone by already? It has taken time to understand downloading programs to my computer. I ended up downloading all my files as text files, not Applesoft files, and cleaning up the front with a word processor such as Apple Writer. The programs in text would look like **Figure 1**, and cleaned up like **Figure 2**.

The only difference between EXECing the Applesoft or machine language program is the first line that tells the computer what follows afterward. FP indicates that Applesoft follows, while CALL – 151 indicates that a machine language program follows. It isn't all that simple in technical terms, but it will get you as far with downloading as you will probably need to go.

To run the program from text to one of the languages, just boot up the system master and EXEC the title of your text file program. It takes longer for a program to load as a text file than it does for Applesoft or machine language, so be patient. When you get a blinking cursor at the end of the loading, hit return once or twice and then list the program as you normally would for the language. Unless there is a bug in your program or computer, you should see a proper listing. When you have the listing and it runs all right, save it according to the language requirements. It really is easier than I thought.

It's Your Turn

April 1, 1984

This is the day I wrap up my diary. Maybe my story will answer the questions or misgivings you have about using a modem.

If you're leaning toward buying a modem, but can't quite make that final commitment, remember these basic remarks about modems:

1) They really are quite easy to use.
2) Buy a modem that is popular for your computer. If you do have a problem, you may find a local user who

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can help you solve it.

3) Check the specifications. Some modems lack features you will want once you learn what a modem can do.

4) You don't have to join an electronic service to use a modem. You can communicate with anyone who has a modem just as if you were making a standard telephone call.

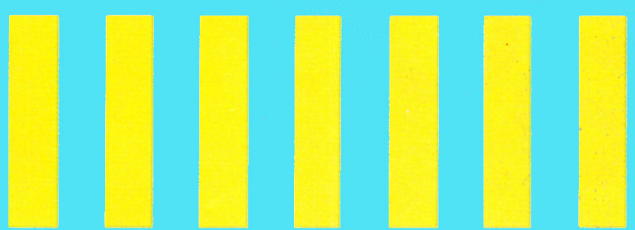
As with any computer equipment, it takes a lot of research to decide which modem you want. If you do not want to wade through the research, I would recommend a Hayes Micromodem IIe. A top-of-the-line product, it is one of the best modems for your Apple II Plus or //e. The Micromodem IIe sells for $329, list price, and is manufactured by Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Boulevard, Norcross, GA 30092. ■

Figure 1. *Downloading programs into text files.*

```
*** 2 Downloads per call maximum ***

Ready to begin download? Y

[Use Spacebar to abort]

*** 10 seconds until transmission ***

FP

10REM
20REM
30REM
40REM DEPARSES AND PRINTS
50REM APPLESOFT PROGRAMS
60REM FROM DISK TO PR#1
70REM
80REM
90REM
100TEXT:NORMAL:HOME
110PRINT"<< APPLESOFT DEPARSING PRINT PROGRAM >>"

*** Transmission aborted ***
```

Figure 2. *Text cleaned up at front to EXEC it into memory and convert it into Applesoft or machine language.*

```
FP

10REM
20REM APPLESOFT FILE PRINT
30REM
40REM DEPARSES AND PRINTS
50REM APPLESOFT PROGRAMS
60REM FROM DISK TO PR#1
70REM
80REM
90REM
100TEXT:NORMAL:HOME
110PRINT"<< APPLESOFT DEPARSING PRINT PROGRAM >>"
```



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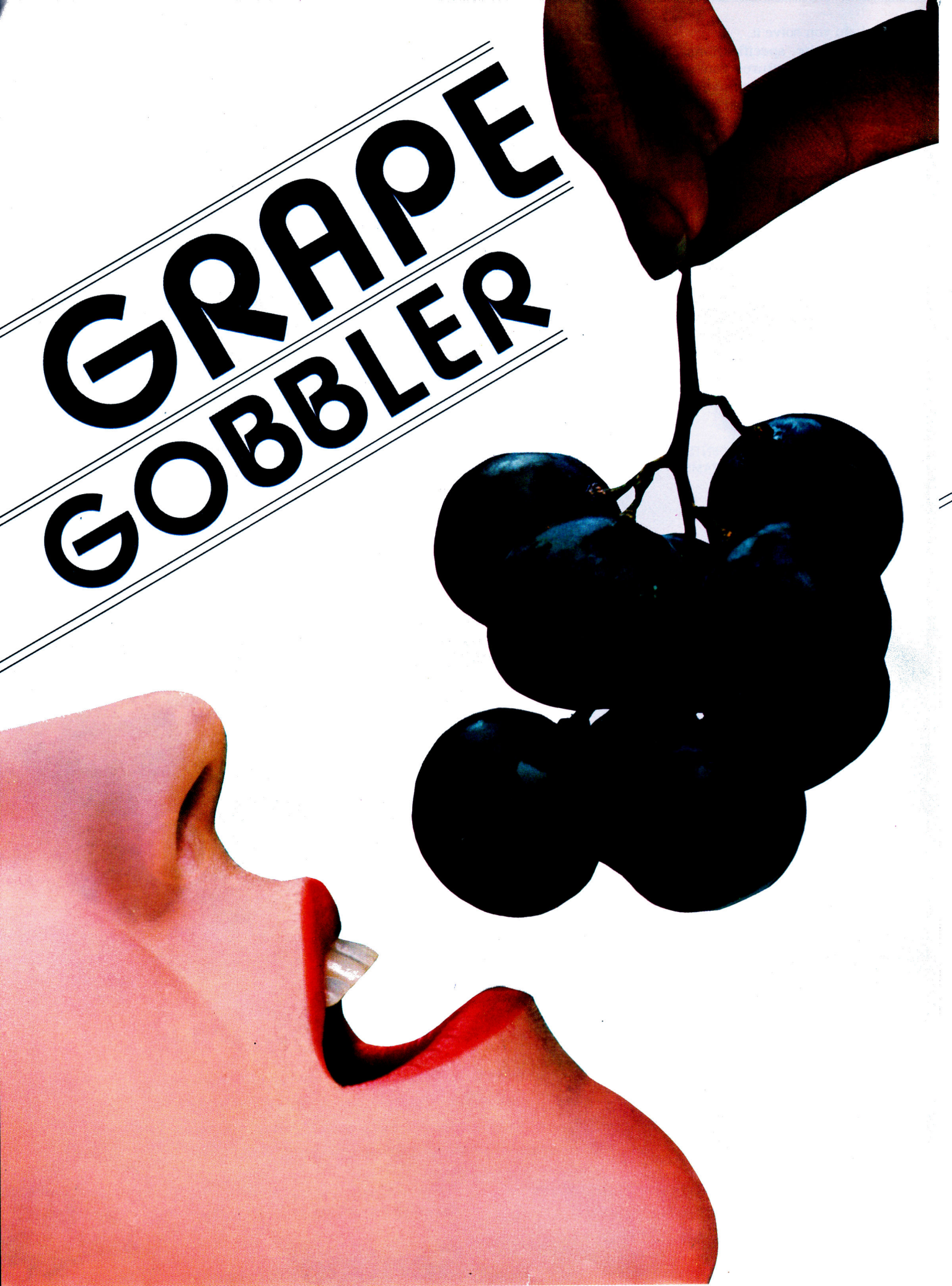
GRAPE GOBBLER



No sour grapes—just good fun—as you and the elusive fruits pursue each other about the screen.

by Damien Lindauer

Grape Gobbler is a high-resolution arcade-style game. Despite being written in BASIC it is surprisingly quick. One exciting feature of Grape Gobbler, often left out of arcade-type games, is that the more you play the harder it gets. This keeps you interested longer as you try to attain that elusive high score.

In this game you are the Grape Gobbler. Your main goal in life is to eat grapes by moving around the screen using the A, Z, and arrow keys. (Any other key stops the Gobbler's movement.)

But it's not that easy. While you are trying to eat grapes a few are mutating. These mutants chase you around and try to eat you. They also like to eat your grapes.

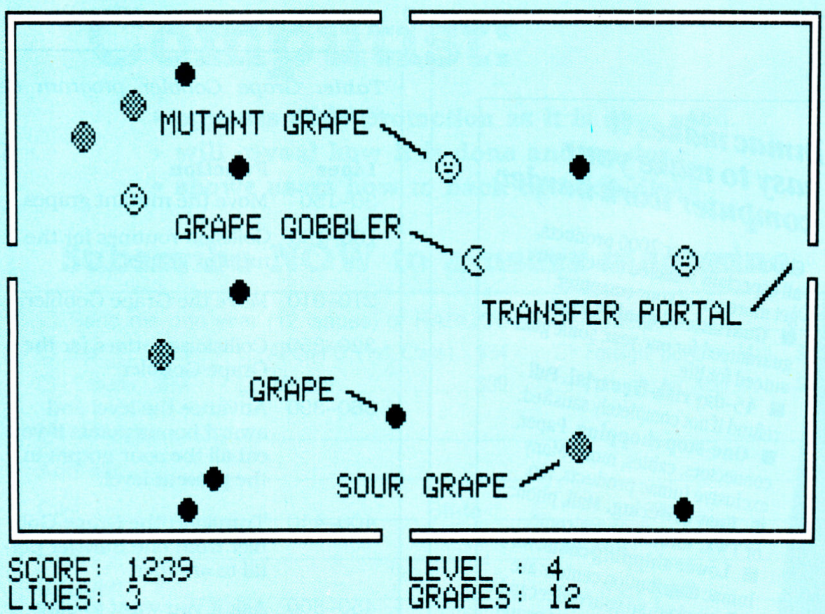
Every once in a while a few grapes go sour. Eating these gives you extra points. If you eat all the sour grapes in a level you receive a bonus.

To escape from a mutant grape you may want to enter a transfer portal. When you do that you are transported to another portal at a different side of the screen.

See the **Figure** for an illustration of the Grape Gobbler graphics. I have also included, in the **Table**, a description of the sections of the program to help you understand how it works. ■

Write to Damien Lindauer at P.O. Box 592, Oroville, WA 98844.

Figure. *Illustration of the Grape Gobbler graphics.*



Program listing. *Grape Gobbler.*

```
10  GOSUB 710
20  GOSUB 530
30  FOR L = 1 TO NM%
40  XDRAW MT% AT MH%(L),MV%(L)
50  IF  INT (NG% *  RND (1) + 1) <  = LE% THEN  GOTO 100
60  IF MH%(L) < HP% THEN MH%(L) = MH%(L) + IN%: GOTO 150
70  IF MH%(L) > HP% THEN MH%(L) = MH%(L) - IN%: GOTO 150
```

Listing continued.

"One exciting feature is that the more you play the harder it gets."

```
80  IF MV%(L) < VP% THEN MV%(L) = MV%(L) +
    IN%: GOTO 150
90  IF MV%(L) > VP% THEN MV%(L) = MV%(L) -
    IN%: GOTO 150
100 R1% =  INT (4 *  RND (1) + 1)
110  IF R1% = 1 AND MH%(L) > 9 THEN MH%(L)
     = MH%(L) - IN%: GOTO 150
120  IF R1% = 2 AND MH%(L) < 270 THEN MH%(
    L) = MH%(L) + IN%: GOTO 150
130  IF R1% = 3 AND MV%(L) > 9 THEN MV%(L)
     = MV%(L) - IN%: GOTO 150
140  IF R1% = 4 AND MV%(L) < 144 THEN MV%(
    L) = MV%(L) + IN%
150  DRAW MT% AT MH%(L),MV%(L):CL% =  PEEK
    (234): IF CL% = 0 THEN 200
160  IF MH%(L) = HP% AND MV%(L) = VP% THEN
    450
170  IF CL% = 25 THEN  XDRAW MT% AT MH%(L)
    ,MV%(L): GOTO 200
180  IF CL% = 21 THEN  HCOLOR= 0: DRAW SG%
     AT MH%(L),MV%(L): DRAW MT% AT MH%(L)
    ,MV%(L): HCOLOR= 3:GE% = GE% + 1: GOSUB
    510: GOTO 150
190  IF CL% = 5 THEN  HCOLOR= 0: DRAW GP% AT
    MH%(L),MV%(L): DRAW MT% AT MH%(L),MV%
    (L): HCOLOR= 3:GE% = GE% + 1: GOSUB 5
    10: GOTO 150
200  NEXT
210  IF  PEEK ( - 16384) < 128 THEN 30
220 KY% =  PEEK ( - 16384)
230  ROT= RT%: XDRAW GG% AT HP%,VP%
240  IF KY% = 149 AND HP% < 270 THEN RT% =
    0:HP% = HP% + IN%: GOTO 290
250  IF KY% = 193 AND VP% > 9 THEN RT% = 4
    8:VP% = VP% - IN%: GOTO 290
260  IF KY% = 136 AND HP% > 9 THEN RT% = 3
    2:HP% = HP% - IN%: GOTO 290
270  IF KY% = 218 AND VP% < 144 THEN RT% =
    16:VP% = VP% + IN%: GOTO 290
280  IF (KY% = 149 AND HP% = 270 AND VP% =
    72) OR (KY% = 136 AND HP% = 9 AND VP%
     = 72) OR (KY% = 193 AND HP% = 135 AND
    VP% = 9) OR (KY% = 218 AND HP% = 135
    VP% = 144) THEN 400
290  ROT= RT%: DRAW GG% AT HP%,VP%: ROT= 0

300 CL% =  PEEK (234): IF CL% > 0 THEN 320

310  GOTO 30
320  IF CL% = 15 THEN 450
330  HCOLOR= 0: ROT= RT%: DRAW GG% AT HP%,
    VP%: ROT= 0: DRAW GP% AT HP%,VP%: DRAW
    SG% AT HP%,VP%: HCOLOR= 3
340  IF CL% = 5 THEN  POKE 768,50: POKE 76
    9,10: CALL 770:SC% = SC% + LE%:GE% =
    GE% + 1: GOSUB 510: GOTO 290
350  IF CL% = 13 THEN  FOR L = 20 TO 30: POKE
    768,L: POKE 769,2: CALL 770: NEXT L:S
    C% = SC% + (10 * LE%):GE% = GE% + 1:S
    E% = SE% + 1: GOSUB 510: GOTO 290
360  HOME : FLASH : VTAB 21: PRINT "LEVEL
    ";LE%;" COMPLETED.": NORMAL
```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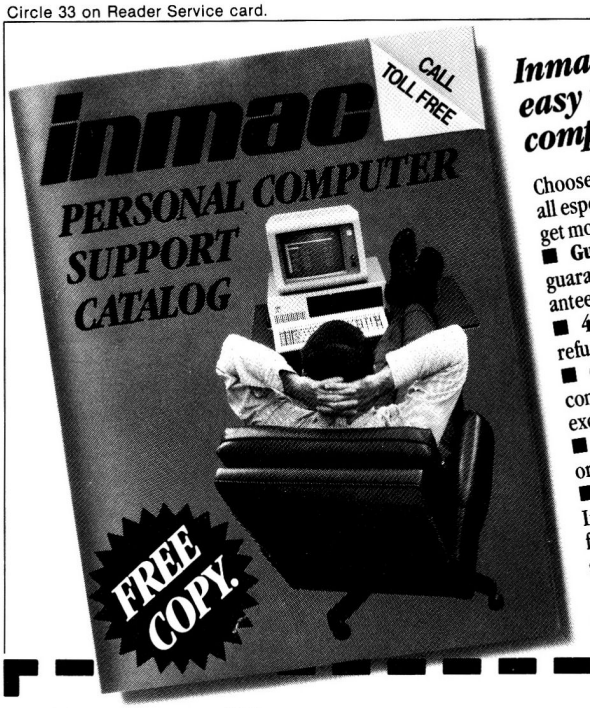

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Table. *Grape Gobbler program description.*

Lines	Function
30–150	Move the mutant grapes.
160–190	Collision routines for the mutant grapes.
210–310	Move the Grape Gobbler.
320–350	Collision routines for the Grape Gobbler.
360–390	Advance the level and award bonus points if you eat all the sour grapes in the present level.
400–440	Transport the Grape Gobbler from one transfer portal to another.
450–500	Ask if you want to play another game when you are eaten by a mutant grape and it is your last life.
510–520	Update the score and the number of grapes.
530–700	Set up and place the grapes on the screen.
710–800	Initialization routines and introduction.
810–850	Data for the music and shape table.

Forbidden Fruit. . .

Think about it . . .

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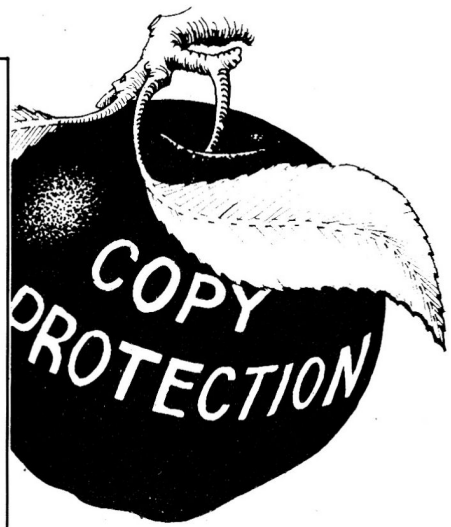

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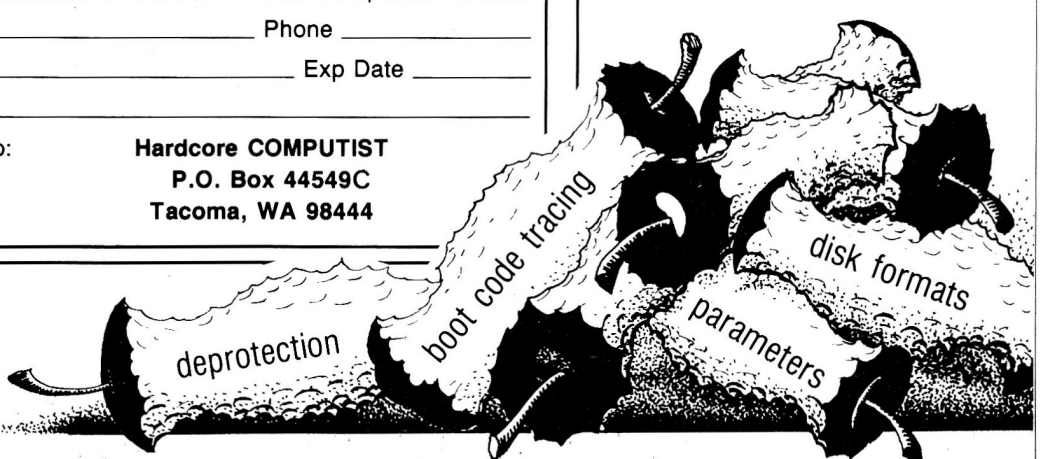

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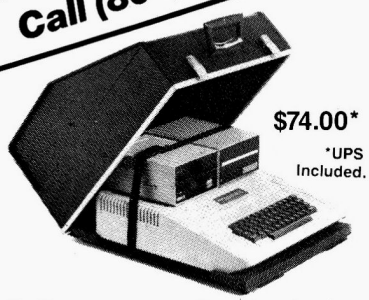

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Listing continued.

```
370  IF SE% = NS% AND NS% > 0 THEN  VTAB 22: PRINT "ALL SOU
     R GRAPES GOBBLED. BONUS: 10 X ";NS%:SC% = SC% + (10 *
     NS%)
380  FOR L = 1 TO 3: FOR L2 = 1 TO 250 STEP 5: POKE 768,L2:
      POKE 769,5: CALL 770: NEXT L2: NEXT L
390 LE% = LE% + 1: GOTO 20
400 R1% =  INT (4 *  RND (1) + 1)
410  IF R1% = 1 THEN RT% = 0:HP% = 9:VP% = 72: GOTO 290
420  IF R1% = 2 THEN RT% = 48:HP% = 135:VP% = 144: GOTO 290

430  IF R1% = 3 THEN RT% = 32:HP% = 270:VP% = 72: GOTO 290
440 RT% = 16:HP% = 135:VP% = 9: GOTO 290
450 LI% = LI% - 1
460  FOR L = 1 TO 3: POKE 768,200: POKE 769,100: CALL 770: NEXT
     L: POKE 768,250: POKE 769,250: CALL 770
470  IF LI% >  - 1 THEN  GOTO 20
480  HTAB 1: VTAB 23: PRINT "ANOTHER GAME(Y/N)? ";: GET A$:
      IF A$ = "N" THEN  TEXT : HOME : VTAB 22: END
490  IF A$ <  > "Y" THEN  GOTO 480
500 SC% = 0:LI% = 3:LE% = 1: GOTO 20
510  VTAB 21: HTAB 8: PRINT SC%: VTAB 21: HTAB 29: PRINT LE
     %: HTAB 8: PRINT LI%: VTAB 22: HTAB 29: CALL  - 868: VTAB
     22: HTAB 29: PRINT NG% - GE%: IF GE% = NG% THEN  POP :
      GOTO 360
520  RETURN
530  HGR :NS% = 0:SE% = 0:GE% = 0
540  HOME : VTAB 21: PRINT "SCORE:"; TAB( 21);"LEVEL :": PRINT
     "LIVES:"; TAB( 21);"GRAPES:"
550  HPLOT 130,3 TO 130,0 TO 0,0 TO 0,67 TO 3,67 TO 3,3 TO
     130,3: HPLOT 3,77 TO 0,77 TO 0,153 TO 130,153 TO 130,1
     50 TO 3,150 TO 3,77
560  HPLOT 140,3 TO 140,0 TO 279,0 TO 279,67 TO 276,67 TO 2
     76,3 TO 140,3: HPLOT 140,150 TO 140,153 TO 279,153 TO
     279,77 TO 276,77 TO 276,150 TO 140,150
570 NG% = LE% * 3: IF NG% > 90 THEN NG% = 90
580  FOR L = 1 TO NG%
590 R1% = 9 * ( INT (30 *  RND (1) + 1)):R2% = 9 * ( INT (1
     6 *  RND (1) + 1))
600  IF (R1% = 135 AND R2% = 72) OR (R1% = 9 AND R2% = 72) OR
     (R1% = 270 AND R2% = 72) OR (R1% = 135 AND R2% = 9) OR
     (R1% = 135 AND R2% = 144) THEN  GOTO 590
610  FOR L2 = 1 TO L - 1
620  IF GH%(L2) = R1% AND GV%(L2) = R2% THEN 590
630  NEXT L2
640 GH%(L) = R1%:GV%(L) = R2%
650  IF  INT (10 *  RND (1) + 1) = 5 THEN NS% = NS% + 1: DRAW
     SG% AT R1%,R2%: GOTO 670
660  DRAW GP% AT R1%,R2%
670  NEXT L
680  GOSUB 510:HP% = 135:VP% = 72:RT% = 0: DRAW GG% AT HP%,
     VP%
690 MH%(1) = 9:MV%(1) = 72:MH%(2) = 270:MV%(2) = 72:MH%(3) =
     135:MV%(3) = 9:NM% =  INT (3 *  RND (1) + 1): FOR L =
     1 TO NM%: DRAW MT% AT MH%(L),MV%(L): NEXT L
700  RETURN
710  TEXT : NORMAL : HOME
720  POKE 233,3: POKE 232,32
730  HCOLOR= 3: SCALE= 1: ROT= 0
740  DIM GH%(90),GV%(90)
750 IN% = 9:LI% = 3:LE% = 1:GG% = 1:GP% = 2:SG% = 4:MT% = 3
760  FOR L = 0 TO 23: READ L2: POKE 770 + L,L2: NEXT L
770  FOR L = 0 TO 191: READ L2: POKE 800 + L,L2: NEXT L
780 A$ = "GRAPE GOBBLER ": FOR L = 1 TO 240: POKE 768,L: POKE
     769,7: CALL 770: PRINT A$;: NEXT L
790  FOR L = 10 TO 14: VTAB L: HTAB 9: PRINT "
               ": NEXT L: VTAB 12: HTAB 9: PRINT "  BY DAMIE
     N LINDAUER  ": FOR L = 1 TO 3000: NEXT L
800  HOME : RETURN
810  DATA  174,0,3,173,48,192,136,208,5,206,1,3,240,9,202,2
     08,245,174,0,3,76,5,3,96
820  DATA 4,0,10,0,32,0,55,0,155,0,146,10,63,28,28,28,36,19
     7,41,40,40,45,21,30,30,30,21,21,21,30,4,0,146,57,231,4
     5,45,12,63,63,63,44,45,45,37,63,63,63,12,45,45,28
830  DATA 63,7,0,146,10,63,28,28,28,36,197,41,40,40,173,21,
     21,54,30,30,199,193,57,39,104,6,0,0,12,0,146,57,231,28
     ,36,12,12,45,21,14,54,30,255,28,45,45,28,31,199,41,45,
     229
840  DATA  31,7,0,255,255,12,12,45,21,14,54,30,255,28,45,45
     ,28,31,199,41,45,229,31,7,0,255,255,231,28,36,12,12,45
     ,21,14,54,30,255,28,45,45,28,31,199,41,45,229,31,7,0,2
     55
850  DATA  146,10,63,28,28,28,36,12,12,12,45,21,14,14,54,30
     ,30,31,199,105,197,249,31,199,105,13,13,28,31,31,12,13
     ,28,7,0,255,255
```

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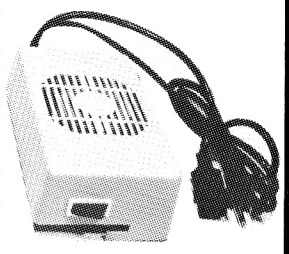

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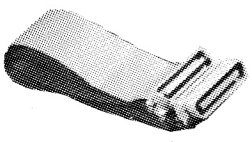

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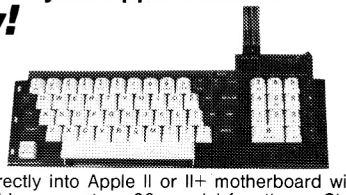

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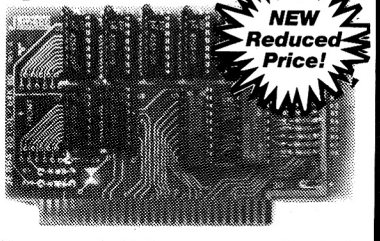

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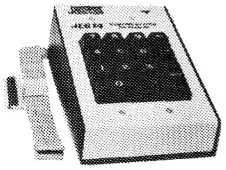

The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE *//e.** It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen manipulating functions make word processing a snap and cursor controls make the keypad ideal for VisiCalc** users. The JE614 Keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE *//e* computer. Operation of the keypad can begin within minutes from unpacking. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat. Size: 5⅞" L x 4-3/16" W x 1¼" to 2½" Slope.

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Apple's Talkative

Get to know the latest telecommunications products

After many years of letting other manufacturers provide the communications peripherals for their machines, Apple has now released a pair of intelligent modems. Two speed combinations are available: 300 baud (Bell 103) single-speed and 300 baud/1200 baud (Bell 212A) dual-speed.

These modems are definitely standalone devices. In the now familiar off-white Apple color, they are designed to act as a base for a standard desk telephone. For those of you interested in portable equipment, the Apple modem is surprisingly lightweight and compact, partially attributable to its heavy use of LSI components.

There is a conspicuous lack of function switches or status indicators anywhere on the case. According to the Apple user's manual, these status indicators were intentionally left out to make the modems as "friendly" as possible by not concerning the user with any extra controls. This "friendly" lack of status information, it turns out, can at times be confusing.

Hardware

The Apple 300/1200 modem is actually a combination 300 baud (Bell 103) and 1200 baud (Bell 212) intelligent modem. It employs an internal INTEL 8049 microprocessor to control all external input/output and internal modem status functions via an RS-232 data bus. The low-speed 300 baud unit is identical to the combination unit less the 1200-baud capabilities. We can't recommend purchasing the 300-baud unit if long distance communication or connection to one of the information services is planned. (See **Figure 1** for a cost comparison.)

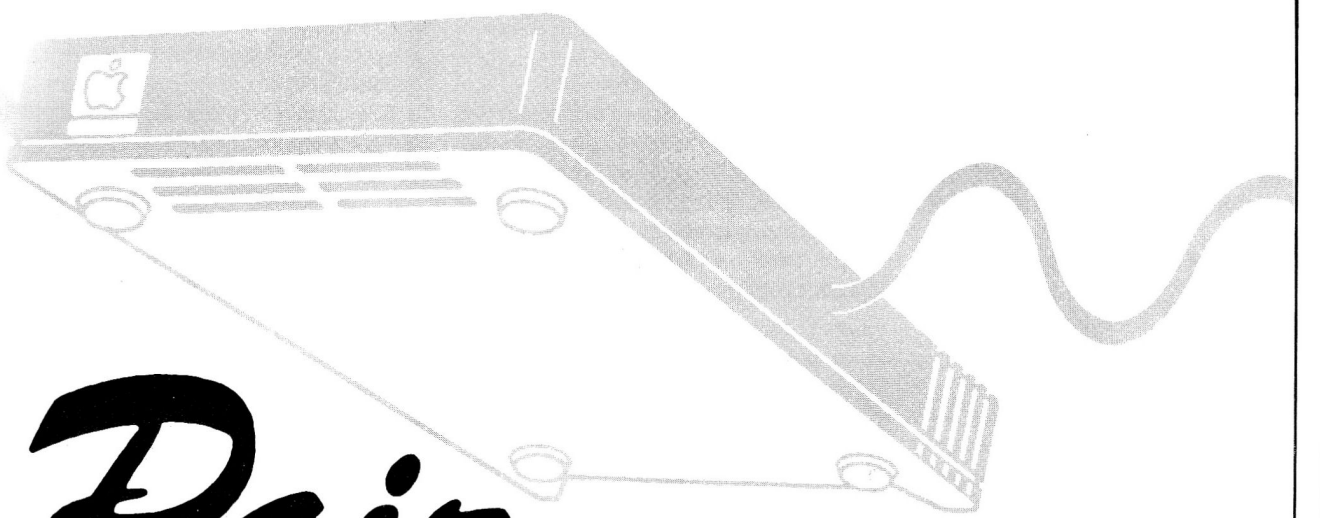
Either modem comes complete with all the hardware you will need to get started. It includes a power supply, a 14-foot modular telephone cord, and an RS-232 data cable. It also includes two excellent user's manuals, a disk containing the Apple terminal program, Apple.Term, a free demonstration of CompuServe, and a free subscription to The Source.

Apple has been able to remove all the switches and indicators from the front panel because the modems are intelligent. In effect, they replaced these switches with software commands (**Figure 2**), thereby enabling the terminal program to configure the operating parameters of the modem with little operator intervention. These commands are quite versatile and offer many options for the operation of the modem. The command codes include the prefix AT, for "attention," followed by the command itself, to communicate with the modem. The modem responds to a command with a numeric or string code to confirm operation.

Along the back panel are two RJ11C modular telephone jacks connected in parallel. One jack connects to your telephone, while the other connects to the phone line. The connection, a DB-9, for the RS-232 data cable is also on the rear panel. Apple has included a connecting cable that terminates with the regular DB-25p connector, maintaining compatibility with other computers and terminals. This is substantiated by the fact that we have connected the Apple modem directly to a TRS-80 Model 100 and a Heathkit H-89 with no cable changes, jumpers, or adapters.

The power switch is also located on the rear panel. You will appreciate its importance the first time you leave it on and the modem answers every phone call you get! Next to the power switch is a very fragile-looking power cord connector that would probably be damaged by any repeated connecting and reconnecting.

Finally, recessed in a small niche on the back panel, are three DIP (dual in-line package) switches used to set up the RS-232 parameters, carrier detect, data terminal ready, and special PBX compensations. We consider these switches, along with the 14 on the Su-



Pair

by Albert A. Alexy, Jr. and Darrell L. Zwemke

from Apple: The Apple Modem 1200 and Access //

per Serial Card, configuration parameters to be set when the equipment is installed and then probably never changed.

In talking about modems, baud rate is usually a popular subject. The user's manual mentions very little about it, probably because it is not directly accessible for change. The Apple modem, being intelligent, senses the baud rate on its input data line and not only picks the appropriate tone pair (Bell 103/212), but also sets its internal baud rate for the input command decoder. Therefore, no switch selection is necessary.

Since the modem does not physically detect dialing failures such as no dial tone, busy signal, and connection failures, it uses a built-in speaker as an integral part of its status indicating system. As can be seen from **Figure 2**, the speaker can be configured in a variety of different ways to alert the user to the status of the phone line. Additionally, the modem can communicate status to the user (via the RS-232 data link) as six respond codes. These codes, in the form of strings such as CONNECT, RING, NO CARRIER, etc., are displayed on the user's screen, but only if you are in the terminal mode and you have requested the modem to respond.

To indicate off-line conditions such as the test mode, the power indicator flashes. Perhaps this could have been used for a more important function such as carrier detect or an off-hook indicator. Speaking of carrier detect, while the AT command S7 = allows you to set the length of time the modem will wait for the carrier upon answering, there is no comparable command for a disconnect delay. This can be a problem when changing from modem to voice and your partner stops his or her carrier before you pick up your phone.

Although the Apple modem is considered a stand-alone device, it still requires another device to communicate to it through the RS-232 protocol. All Apple computers have this capability built-in except the II Plus and //e. To ensure compatibility with Apple software, the Super Serial Card has been made the standard RS-232 interface for the II Plus and //e. Apple provides a Modem/Super Serial Interface Card package at a reduced price that will save you about $70.

Software: Apple.Term

In order to do useful work, any modem, intelligent or not, needs some form of controlling program. Apple has included with its modems a rather rudimentary terminal program called Apple.Term. Upon trying to boot the program, you will discover it requires 64K of memory and runs under ProDOS 1.0 (Apple's new disk operating system). Those of you with an Apple II Plus and no language card will be unable to boot or run this system.

Once into the terminal program, you will be confronted with the main menu (**Figure 3**). As you can see, Apple.Term supplies you with only the barest essentials for using your modem. Through the configure option you can specify standard protocol parameters such as parity, stop bits, baud rate, and either pulse or tone dialing. Both the printer and modem slot can also be selected.

Since no way is provided to save incoming data to memory, Apple.Term simultaneously sends incoming information to your screen and printer. This, however, does not seem to be the optimal solution. With a standard Apple serial card in slot one, an Apple II Plus would just lock up, necessitating a reset every time the printer option was typed. Perhaps this is just a compatibility problem between Apple's older serial card and ProDOS 1.0, as suggested by the quick-fix list on page 29 of the user's manual.

While Apple.Term does provide the

You can write to Albert Alexy and Darrell Zwemke at 1230 Palisades Way, Rock Springs, WY 82901.

user with the capability to test the modem's internal functions, and in the terminal mode to connect to local bulletin boards, etc., its lack of a file handling system makes it unsuitable for much more. Since, at 1200 baud, the screen scrolls faster than you can read, having to stop the data to read it negates the advantages of using 1200 baud.

Since the modem is intelligent, software programming for it is extremely simple. The **Program listing** shows just how easy it would be to use the Apple modem as a telephone dialer.

Software: ACCESS II

ACCESS II is a more sophisticated data communications program intended for the Apple modem but not included in the package. It must be purchased separately for $75. Unlike Apple.Term, ACCESS II is a full-featured program incorporating remote terminal emulation, file transfer capabilities, auto dialing, and various ProDOS utilities. This makes possible access to many different information services and remote computers. ACCESS II is also versatile enough to be adapted to other modems. As seems to be the trend now, it is written using Apple's new ProDOS operating system.

ACCESS II is designed to run on an Apple //e or //c. It is not compatible with the older II or II Plus, due to their

Figure 1. *Sample 1200-baud savings.*

Rates: $10.00 / hr. Connect charges
$ 2.00 / hr. 1200-baud surcharge
$ .25 / min. WATS surcharge
$ .30 / min. Phone charges

300 baud for 1 hour:

	long distance	local
Connect charges	$10.00	$10.00
Phone charges	$18.00	—
Total	$28.00	$10.00

1200 baud for 15 minutes (same amount of data as 300 baud):

Connect charges	$2.50	$2.50
Phone charges	$4.50	—
1200 baud surcharge	$ .50	$ .50
Total	$7.50	$3.00

Total savings 73 percent by using 1200 baud, or
$ 7.00 / hr. local
$21.50 / hr. long distance

Figure 2. *Apple modem commands.*

AT (Attention) Commands

A	Answer mode—off hook
L	Loop back test mode
D	Dial mode (originate—off hook)
T	Tone dialing
P	Pulse dialing
X	Set response type—length
V	Set response type—code or string
M	Monitor speaker control
Q	Quiets response codes
E	Echo command codes
F	Full/half duplex (really local remote echo)
S0 =	Number of rings before answering
S2 =	Sets ASCII escape character
S7 =	Carrier timeout timer (only on answer)

Stand Alone Commands

A/	Repeat last command
+ + +	Escape sequence—set by S2 =

Figure 3. *Apple.Term commands.*

E	Enter terminal mode—talk or chat
C	Configure—set defaults and active operating characteristics
D	Dial—auto dial a number, no more no less
Q	Quit

Figure 4. *ACCESS II commands.*

MAIN MENU	Dial a Service
	Terminal Mode
	Set Up Communications
	Transmit a File
	Receive a File
	Utilities
	Help
	Quit
TERMINAL MODE	Open Apple-B / Break
	Open Apple-C / Command File
	Open Apple-D / Data Scope
	Open Apple-F / Record Filter
	Open Apple-P / Save a Page
	Open Apple-R / Record Mode
	Open Apple-? / Help

Program listing. *A Sample program that makes an Apple modem a telephone dialer.*

```
10 INPUT "NUMBER ";N$    GET NUMBER TO DIAL
20 N$ = "ATTD" + N$      ADD TONE + DIAL COMMAND
30 PR#1                  OUTPUT THROUGH SLOT 1
40 PRINT N$              SEND TO MODEM
50 PR#0                  NORMAL VIDEO
60 GOTO 10               GET NEXT NUMBER
```

"This nice feature keeps the operator informed of where he or she is in the program and how to escape."

"unenhanced" keyboard and the need for the extra 64K available on the extended 80-column card. This doesn't explain how the program can operate in the 40-column mode without the 80-column card, which it does quite well.

The system also requires, at minimum, one Super Serial Card for communication with the modem, to be located in slot 2 only. Slot 1 is assigned to the printer and must have a peripheral card compatible with the Apple II Pascal 1.1 Peripheral ROM Protocol—that is, you guessed it, a Super Serial Card or Apple Parallel Interface Card.

As mentioned before, the program will run either in the 40- or 80-column mode, provided an 80-column card is available. The 80-column mode uses a file card type of display reminiscent of Apple's Lisa and Macintosh icons. This nice feature keeps the operator informed of where he or she is in the program and how to escape.

As is usual for Apple, the documentation for this product is excellent. It includes a very informative and amusing tutorial disk to acquaint the user with its operation, as well as a 180-page manual covering almost any problem or question that might arise.

ACCESS II provides both the first-time and experienced operator with several options. The menu-driven program will lead even the most inexperienced user easily through its operation. The major menu choices are listed in **Figure 4**.

In the set-up mode, the user can reconfigure speed, parity, terminal characteristics, and answerback messages, as well as build an auto dial library complete with auto log-on command files and special dialing instructions for your modem if it is not compatible with the Apple modem commands. When in the terminal mode, the operator can send break commands, turn a receive buffer on or off, save a page of text to disk, send or receive any type of file with or without error checking, send a command file, and—one little feature that is really nice—display all data in hex.

ACCESS II will also emulate several different terminals, two of which are the DEC VT52 and DEC VT100. This makes possible operation with a system that expects one of these terminals to be communicating with it.

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Since ACCESS II uses ProDOS, there is a utility mode that allows one to format, catalog, lock, unlock, or delete certain files. We might mention also that, although one can operate this program without understanding ProDOS, it would be to the user's advantage to learn it, as ProDOS is quite different in operation from regular DOS 3.3.

Probably one of the nicest things about ACCESS II is its use of command files. These files provide an almost-assembly-language-like command structure that can be pre-built and run anytime. Some of the many options are jumps to specified labels, string matching routines, wait loops, and various print and display options. This arrangement enables the user to create intelligent log-on commands that actually look for the correct response (string matching) code from the remote computer, as well as the correct ID and password. The bad news is that, since this is all in ProDOS, you will need a text editor or word processor on ProDOS, or the ProDOS utility disk, to build the text files.

Also in the bad news department, when in the receive buffer mode, if you run out of room on the data disk and have forgotten to format a new one, the system will not allow you to escape without first providing a new disk upon which it can open a new file. It also would have been nice if an active status display had been provided in the terminal mode display. The way it is set up now, you must jump between the help screen and terminal screen to see where you stand.

Conclusion

If you are interested in telecommunications, yet want to avoid the trials and tribulations of possibly incompatible components, then the Apple modem package is for you. The two user's manuals will lead you through installation, set-up, and operation, no matter what level of expertise you may possess.

Status indicators, it turns out, are more of a user's preference and don't affect the sending or receiving of information (unless you try to send a file to a busy signal).

The user's manuals are up to Apple's usual quality, but, as always, contain no schematics or technical information. The Apple modem has much more potential and versatility than Apple lets you know about.

The Apple modem itself is a great little piece of equipment. The 300/1200-baud full-duplex combination will allow you to communicate with almost any dial-in information service or system in existence today. Due to its simple and easily-accessed command structure, you can interface this modem with almost any RS-232 full-duplex port.

Although there is a 300-baud-only version available, operation at 300 baud is a frustrating experience compared to 1200 baud. The four-fold increase in speed is a major benefit when communicating with an information service, such as CompuServe or The Source. Since these services tend to be menu intensive, to say the least, getting to the required information can be very tedious and expensive at 300 baud and 10 cents a minute, especially if you have to add on long distance charges.

Concerning Apple's enclosed Apple.Term program, I'll be nice and say it's a very elementary control program. I suspect they could have included no program at all and have come out about even.

ACCESS II is another story. It *is* a terminal program. Beyond the few minor complaints mentioned before, ACCESS II is a nicely laid out and thought out control program. I can't really see operating the modem on the Apple without it. Of course, this would depend on how the user planned on employing the modem. But being unable to at least save or transmit files would severely limit a modem's usefulness.

There are and will be other programs available to suit the Apple modem I'm sure, since, being intelligent, it is so easily accessed.

One little comment about ProDOS is in order. It seems Apple intends to release all their new software in ProDOS (sounds like the II Plus to //e switch), so you will meet it sooner or later. After using DOS 3.1/2/3 for all these years, ProDOS is a bit of a shock. But it is closer to the "real world," if there indeed is one, and its added operating features and functions do make quite an improvement.

For further information about the Apple modems or ACCESS II, contact Apple Computer at 20525 Mariani Avenue, Cupertino, CA 95014; phone (408) 996-1010.■

The authors would like to thank the people at Hi-Quality Office Machines and Equipment of Rock Springs, WY, for their assistance with ProDOS 1.0 and the Apple //e.

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NOVATION

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IIc vs. PCjr:

Which One Belongs

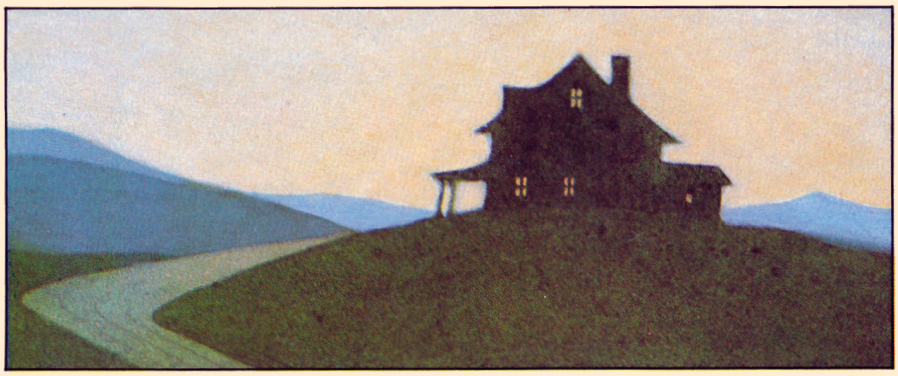
in Your Home?

by Amee Eisenberg, jr magazine staff and Bob Ryan, inCider staff

Apple and IBM are squaring off for battle. The weapons? Apple's //c and IBM's PCjr. The prize? Your home computer dollars.

Even in our little town of Peterborough the storm rises. In an unprecedented intermagazine competition, two swashbuckling technical editors recently sparred a few rounds for the amusement and edification of our readers. Carrying Apple's colors was Bob Ryan of *inCider* magazine; flying IBM's banner was Amee Eisenberg of *jr* magazine, CW/Peterborough's PCjr system-specific magazine.

With tape recorders set at 20 paces, the contenders spent three minutes each extolling the virtues of their respective machines. Then things got bloody. Here follow the opening statements and all the fit-to-print excerpts from the subsequent confrontation.



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Amee: Junior is a reasonably priced PC-compatible workhorse. Do you have a PC in the office? Then Junior lets you work at home without taking out a bank loan.

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And yes, Junior has great 16-color graphics, two levels of graphics resolution, joysticks, and cartridge slots that let you play any kind of computer game. Do you want to have fun? Junior plays with you at a price you can afford.

Junior's base model (priced at $495, down from $699) provides you with 64K of RAM, built-in BASIC, two cartridge slots, and mass storage in the form of your portable cassette recorder. The enhanced model comes with all that plus one disk drive and an additional 64K of memory—bringing Junior to 128K RAM—and lists at $999, down from $1299.

Junior can plug into your TV or a monitor. If your monitor can handle it, 80-column displays present no problem; and IBM sells a splendid color display for $429.

Junior is as portable as your electric typewriter. All it demands from its destination site is an outlet. It takes a lot of self-control to refrain from mentioning that it is as portable as the current Apple //c.

The key to Junior's potential is the 60-pin input/output (I/O) expansion channel. This extends the 8088's bus to allow the addition of up to five expansion adapters. What that means in English is that extra memory, parallel ports, voice synthesizer cards, and anything else you can think of can be added to Junior.

And the add-ons are in the stores, even as we write. Starting small and watching Junior grow up to meet your needs is an economical way to get a fine computer for your home and office.

The Apple //c—
A Computer for the Home

Bob: The design philosophy behind the Apple //c is similar to that behind the Macintosh. Apple designed the //c as an appliance. You don't have to know how the computer works, only how to use it. This "black box" approach is meant to appeal to people who are intimidated by the current generation of personal computers.

While designing the //c, Apple researched the experiences of new //e owners and discovered a lot of interesting things. First of all, they discovered that new owners don't like to open up their computers. They want to be able to set up the machine as easily as they set up a stereo system. Secondly, many new computer owners don't know what to do with their machine; many don't even know what software is. In general, newcomers to Apple computing are more interested in doing work with their machine than discovering how it works.

Apple designed the //c in response to these discoveries. You can't open the //c system unit (you can, but doing so voids the warranty), and setting up the computer is actually easier than setting up a stereo system. Apple has eliminated expansion slots, thus sacrificing internal expandability for ease of set-up and use. The fact that all //c's have the same internal specifications also makes it easy for you to buy software for it. You don't have to worry if the software you buy will support your particular 80-column card or serial interface. These components are identical in all //c's.

Apple also puts a lot of software in the //c box. This software is part of the interactive learning system Apple has designed to teach new owners about the machine. These tutorials also contain demonstrations of the most important applications of a //c. This is significant because it will let new owners know what kind of software they have to buy in order to do productive work with their computer.

The main point to remember about the //c is that Apple has ensured compatibility between the //c and the //e, thus making thousands of software packages available for the former. Apple did not cripple the //c to keep it from cutting into //e sales. Rather, Apple is now producing a family of compatible and complementary products. If you want an expandable machine that gives you direct access to the data and address buses, you can buy a //e. If you don't know (and don't care to know) what a bus is, then the //c is for you.

The Nitty Gritty

Amee: Okay, Bob, the pretty speeches are over. Let's get down to business and talk about CPU's. The Junior uses the Intel 8088 microprocessor. The 8088 is a 16-bit internal/8-bit external CPU, which is to say that it thinks with 16 bits and then talks to the world 8 bits at a time. Not only does it manipulate more bits than the //c's 65C02, but it runs at 4.77 MHz as compared to the 1.02 MHz of the 65C02. Apple has left the //c in the dark ages with its slow 8-bit microprocessor—a rehashed Model T, uh, 6502.

Bob: I concede that the 8088 has the potential of being a lot more powerful than the 65C02, but IBM doesn't come close to using the full power of the 8088 in the Junior. Besides, the 1 MHz clock driving the 65C02 is deceiving. The memory-to-memory architecture of the 65C02 permits it to work two to three times as fast as a comparably-clocked microprocessor that has a register-to-memory architecture. And the //c doesn't throw away every third machine cycle the way the Junior does. Maybe that explains why the //c ran ten percent faster than the Junior in all of the benchmarks we ran.

Amee: Granted the //c isn't a bad performer, but it is still limited in the

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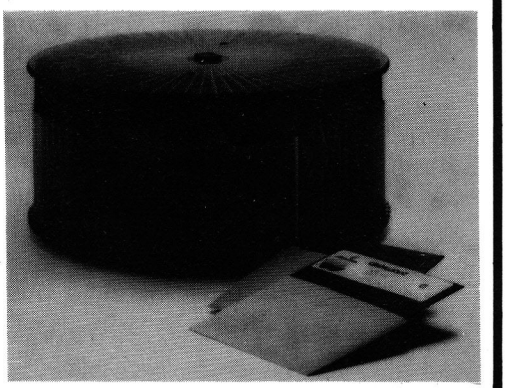

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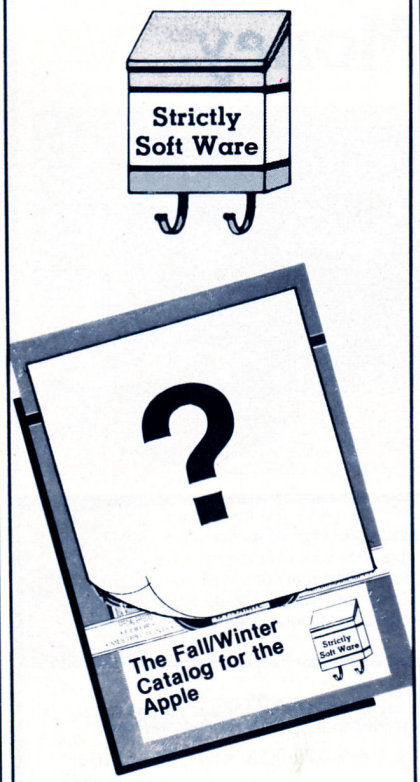

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amount of memory it can address. The 8088 can address up to a megabyte of memory. The 65C02 is still stuck with 64K.

Bob: Hold on, Amee. You can address a lot more memory with the 65C02 simply by using bank switching.

Amee: Be real, Bob. Bank switching will never be as fast, easy, or efficient as direct addressing. It's a kluge.

Bob: Well, what good is your megabyte addressing range? IBM has decided to limit the amount of memory inside the Junior to 128K, which is no more than the //c has.

Amee: That's all the //c will ever have, while a lot of third party companies are already producing memory expansion for Junior.

Bob: They aren't cheap.

Amee: At least they're available. And, speaking of memory, what is the capacity of the //c's disk drive? 14K?

Bob: That's 143K, as you well know.

Amee: Of course, how silly of me. Still, that pales quickly in comparison to the 360K available on Junior's disks.

Bob: Granted, but at least Apple has built in the capacity to add a second drive. I can be doing useful work on the //c while you're still swapping disks.

Amee: Once again, Junior's expansion capability makes it easy for third party companies to offer a second drive for the system. I've got a couple of them in my office right now, and they offer a lot more than 143K.

Bob: So will the third party drives that you will be able to buy for the //c. That's the beauty of Apple's new operating system, ProDOS. It means that Apples are no longer limited to 143K disk drives. And these drives will work with the //c's internal controller. You don't need an external one.

Amee: Big deal. Moving on, let's see how the //c stacks up against Junior in the quality of its output. Junior has the TI Complex Sound Generator chip that has three voices and a white noise generator. All four lines are programmable and can be mixed to create chords, and then you can send the output to an external amplifier. What do you say to that?

Bob: You've got me there. The //c is still saddled with the limited sound qualities of its older brothers. But as far as graphics goes, it beats the Junior hands down. The //c can generate 16 colors on a matrix of 560-by-192 dots. Too bad the poor little Junior can only muster four colors at that resolution.

Amee: Not quite that resolution, Bob. Junior has four colors at 640-by-200 dots. . .

Bob: A lot less color, Amee, and very little extra resolution.

Amee: . . .and 16 colors in 320-by-200 dots. That's certainly respectable.

Bob: The //c is still better to look at.

Amee: But a real drag to listen to.

Bob: Like some people I know.

Amee: Very funny.

Bob: Speaking of funny, Amee, let's talk about keyboards. Heh, heh.

Amee: Stop snickering, Ryan. We both read the report that said the center-to-center distance between Junior's keys is the same as the //c's and the IBM-PC's.

Bob: Yeah, but the //c doesn't have canyons between the keys that your fingers can get lost in. And there's no danger of getting cavities from the //c keyboard—no Chiclets, you know.

Amee: Hold on, Bob. What do you know about Junior's keyboard anyway—what you've read in the Apple press? I work with this keyboard every day, and it's really okay.

Bob: (uncontrollable laughter)

Amee: All right, all right, you've had your fun. Now I'll have mine. Let's talk about expandability. Of course, this is going to be a very one-sided conversation, since you can't expand a //c at all.

Bob: Whoa! Let's not get carried away. The //c is most certainly expandable, it just isn't expandable internally.

Amee: But that makes all the difference. With Junior's I/O Expansion Channel you can add a lot of different and interesting peripherals onto your system. Sound and speech synthesizers, extra memory, parallel ports, disk drives, co-processors—you name it and somebody is probably designing one for Junior.

Bob: So there are some things you can add to the Junior that you can't add to the //c. Big deal. The //c, with its two serial ports, external drive port, RCA video out, and video extension jack will meet the needs of 95 percent of the people who want to put a computer in their home. And it will do it more economically than the Junior.

Amee: I respectfully (cough, cough) disagree. The //c was designed to be sold from a vending machine—one standard computer in one standard package. You want it your way? Then don't go to Apple. They only sell it their way. And this from a company that accuses IBM of fascism.

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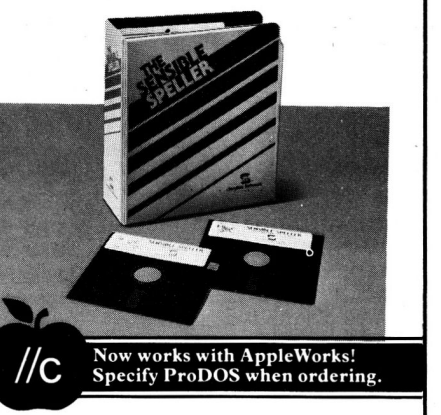

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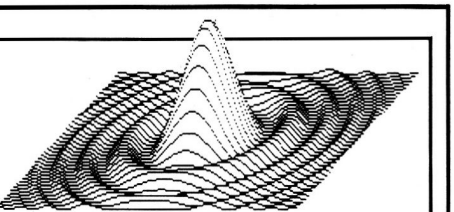

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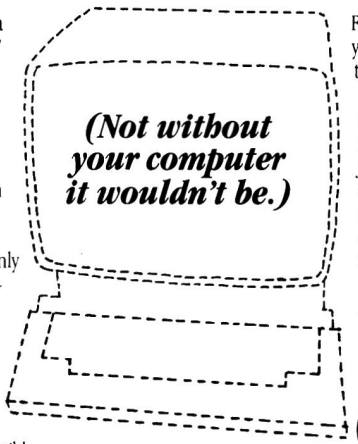

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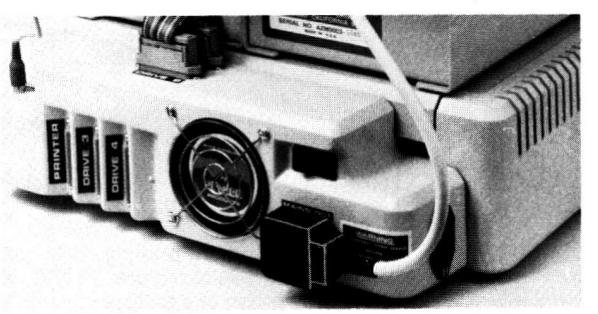

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IBM doesn't sell vending machine computers. IBM designed Junior so it can adapt to the unique needs of each owner. Do you want an RGB monitor? This one plugs right in. Do you want more memory, or a peripheral that has to access the internal buses directly? Junior has the expansion capability. And Junior is just as easy to set up as the //c. Plug D goes into the slot marked D. Can you figure that out? I knew you could.

Bob: The //c can also work with a variety of monitors, printers, modems, plotters, and so on. I don't see the lack of internal expandability as being so important. Like I said, the //c can satisfy almost everyone's computing needs. There are people who will need the internal expansion capability of the Junior, but they are a distinct minority (and they'd be better off buying a //e). In my opinion, the days of the computer pioneers are over. The days of computers as desktop appliances has just begun.

Amee: That's very pretty, Bob, but it still won't give you access to the //c's data bus.

Bob: You don't quit, do you?

Amee: Not when I know I'm right.

Bob: Well, instead of beating that horse to death, let's move on to one of my favorite subjects—software. Apple made the //c compatible with the //e. With minor exceptions, the //c can run all //e software. No one knows the exact count, but I'd say that, conservatively speaking, the //c has 10,000 software packages available for it. When you buy a //c, you can be assured there exists a software package for just about everything you might want to do with a personal computer.

Amee: Granted, the //c has more software available for it than Junior, but remember that Junior and the IBM-PC are compatible, and the PC has the fastest-growing library of software of any personal computer.

Bob: Wait a minute, Amee. A lot of the software written for the PC won't run on the Junior. When you talk about compatibility between the Junior and the PC you're talking a one-way street. Everything that runs on the Junior will run on the IBM-PC, but everything that runs on the IBM-PC will not necessarily run on the Junior. That's just one more example of IBM's old marketing ploy of ensuring "upward compatibility." You can always move from a less expensive machine to a more expensive one, but it's very hard to move from a more expensive machine to a less expensive one.

Amee: You make it sound as if no IBM-PC software will run on Junior, Bob. That just isn't so. At *jr* magazine, we've discovered that most IBM-PC software will run on Junior. The //c's software advantage is not as huge as you make it out to be.

Bob: But it's still significant, especially in those areas of greatest interest to home users: education, home productivity, and entertainment.

Amee: I won't argue that the //c has a larger software library, but most of it is redundant. How many word processors or home accounting packages do you need anyway? And as far as the rest goes, Bob, do you think that any software developer is going to ignore a computer made by IBM?

Bob: That remains to be seen, Amee. The Junior hasn't taken off yet, and it might be a while before some developers get on the bandwagon. And I don't think that the //c's software lead will ever be overtaken.

Amee: That, too, remains to be seen.

Bob: Well, Amee, I think we've hit all the major points (and disagreed on most of them). Any parting shots?

Amee: Just this. Both the Apple //c and the IBM PCjr are hawked as "home computers," yet their design philosophies reflect startlingly different concepts of who the home user is. IBM's home user is intelligent and farseeing enough to predict growing computer needs, and savvy enough to invest in a machine that can expand. The //c is built for the Pepsi generation—pop-top computing for people too dumb to open a box. Sure you can take the //c to the beach; you can even spill soda on it. But what if you think of something you need a *computer* to do?

Bob: Very clever, Amee, but I must disagree. The //c isn't for people who are too dumb to open it up, but for people who have better things to do with their time than delve into the arcane mysteries of computer science. //c owners want a computer they can do useful work with, not one that they have to work at to use.

Amee: You know, Bob, we're never going to agree about the relative merits of these machines.

Bob: I can agree with that, at least. I guess we can wrap it up here.

Amee: Okay. It's time for softball practice, anyway.

Bob: Right. Fish Heads forever!■

(Editor's note: The Fish Heads are a disreputable collection of softball players led by Dan Sullivan, editor of jr *magazine, that participates each summer in the Peterborough Co-ed Softball League.)*

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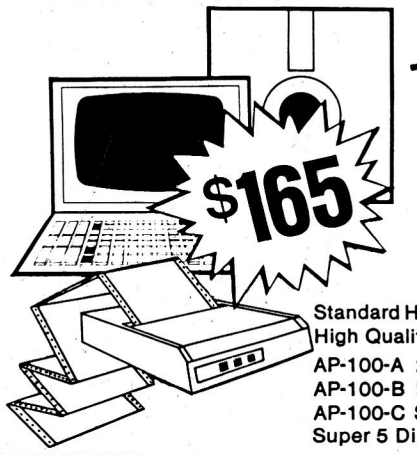

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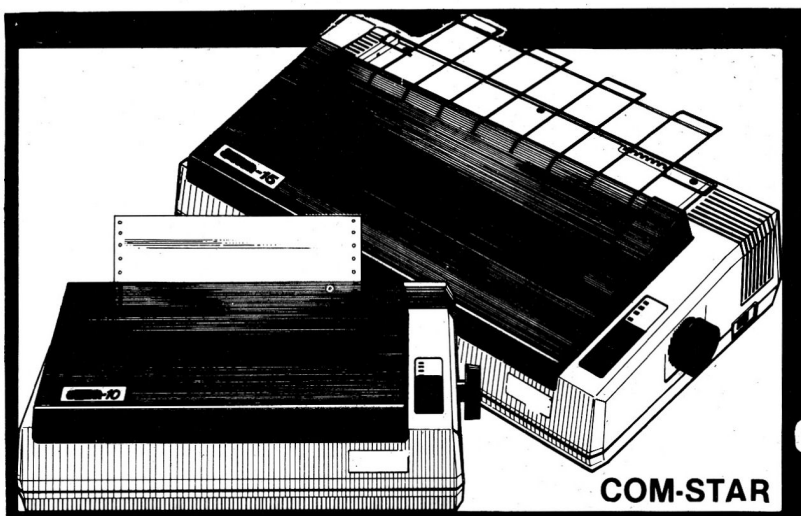

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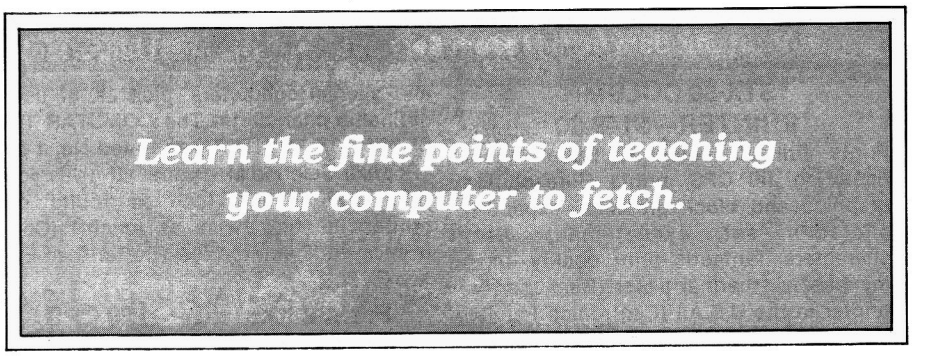
The Compleat Text File Primer

Part 6—Searching



by Lee Swoboda

Last month, we discussed ways and means of sorting. In addition to putting text in alphabetical or numerical order, it is also useful to search through lists of data to find specific items.

"That's easy," you say. "Just start at the top of the list and keep looking until you find what you want." Agreed, that is the simplest and most straightforward method, which, incidentally, is called a linear search. But, as with sort algorithms, the simplest is not always the best.

Before passing to bigger and better things, however, let's look at two searching techniques. **Listing 1** (divided into **Listings 6-1A** through **6-1C**) is a demonstration of these two methods. First enter **Listing 5-3** (p. 106), reprinted from the July *inCider*. Then enter and run **Listing 1**. Select item 1 from the menu; this will run **Listing 6-1B**, which is an algorithm for finding one five-letter "word" in the file of unordered text created in **Listing 5-3**. The pattern is simple. Line 1120 attempts to match the new word "LMNOP" to each word in the list, in sequence. If the computer finds the exact match, it prints the number of the matching word and resets the flag "FOUND" to indicate that it has not come up empty. If it does not find an exact match, the flag "FOUND" remains equal to zero (Boolean for "false") and prints a message telling you so (line 1160). Since "LMNOP" had no match, line 1180 selects an actual word from the list (for a sure match this time) and lines 1190–1230 repeat the process. The obvious application for this approach would be searching for a specific last name in a name/address program.

So much for finding strings that match exactly. But what if, in your name/address program, you want to find everyone who lives on a specific street? The address field (or record) would contain the street name, all right, but it would also contain a street address. The computer would never find an exact match between the street name only and a street name/address number combination. In this case, you need to take a more involved approach; you need to perform a sub-string search. That is, you need to look at parts of the address fields in this imaginary file to see if any *part* of the field matches the street name. Since you do not know where the street name appears in the address field, you must begin at the first character of the address field and move through the string one character at a time until you either find a match or reach the end of the address field.

Suppose that you want to find everyone in the file who lives on Bandley Drive in Cupertino, California. The search string is, of course, "Bandley". Since Apple Computer lives at 10260 Bandley Drive, the sub-string search would progress as follows:

```
SUB-STRING: "Bandley"
MAIN STRING: "10260  Bandley Drive"
POSITION 1:   "10260  B"
POSITION 2:    "0260  Ba"
POSITION 3:     "260  Ban"
POSITION 4:      "60  Band"
POSITION 5:       "0  Bandl"
POSITION 6:        "  Bandle"
POSITION 7:          "Bandley"
```

Write to Lee Swoboda at Padapple Computer Consulting, 1451 NE Paulson Road, Poulsbo, WA 98370.

After six unsuccessful matches, the computer found that portion of the main string that matched the sub-string. **Listing 6-1C** is an algorithm for making sub-string searches. The Applesoft command MID$ makes this procedure very simple. It merely takes a portion of the main string the same length as the sub-string and compares it to the sub-string (line 2060). Again, the flag "FOUND" is set to 1 if the sub-strings match. In both of these examples, the program began at the first record in the list and searched each record in sequence until it either found a matching item or reached the end of the list. This 1-2-3 search sequence is a linear or sequential search. Its pattern is exactly like reading the sequential text file, except that in this case, the records were in memory, not on disk.

In all of the search examples in **Listing 1**, the search ended as soon as it found the word or sub-string that matched. If you had wanted to find *all* words or sub-strings that matched, you would have deleted the GOTO in lines 1120, 1200, 2160, and 2290. The computer would then continue to search through the entire list, finding and printing all matches, rather than jumping out of the loop when it found the first match.

Binary Search

With a random list of data, the linear search is probably the only method available. Since the data has no pattern, the search can have only the simplest pattern. But remember I said in Part 5 that ordered (sorted) lists would save a lot of time and trouble. I showed how that maxim paid large dividends when I added a new item to an ordered list. Well, you get another dividend when you search ordered lists. You can use a binary search.

Binary, in this case, means dividing by two. The concept is simple. On the average, half of the items in an alphabetical list should lie on either side of the letter "M," which is the middle of the alphabet. So, the first comparison is to the middle item in the list. The chances are 50/50 that the matching string will lie above or below the center. Take whichever half of the list should contain the match and compare it with the middle item in that sublist (the 1/4 or 3/4 point in the total list). Keep dividing sublists into two equal parts until the comparison spi-

Listing 1. *Linear search demonstration.*

```
10    REM ------------
20    REM LISTING 6-1A
30    REM ------------

40    D$ = CHR$(4)
50    DIM A$(100)
60    HOME
70    PRINT "LINEAR SEARCH DEMONSTRATION"
80    PRINT "---------------------------------------"
90    PRINT
100   PRINT "1 -- EXACT MATCH"
110   PRINT "2 -- SUB-STRING SEARCH"
120   PRINT "3 -- QUIT"
130   VTAB 22
140   PRINT "WHICH SELECTION? - ";
150   GET A$
160   PRINT CHR$(1)
170   A = VAL(A$)
180   IF A = 3
        THEN HOME
    : END
190   IF A < 1 OR A > 2
        GOTO 130
200   ON A GOTO 1000, 2000

1000  REM ------------
1010  REM LISTING 6-1B
1020  REM ------------

1030  HOME
1040  PRINT "EXACT MATCH"
1050  PRINT "---------------------------------------"
1060  B$ = "LMNOP"
1070  FOUND = 0
1080  PRINT D$"OPEN UNSORTED TEXT"
1090  PRINT D$"READ UNSORTED TEXT"
1100        FOR I = 1 TO 100
1110        INPUT A$(I)
1120        IF A$(I) = B$
              THEN FOUND = 1
          : PRINT A$(I)" = "B$
          : GOTO 1150
1130        PRINT I"."A$(I)" <> "B$
1140        NEXT I
1150  PRINT D$"CLOSE"
1160  IF NOT FOUND
        THEN PRINT
    : PRINT
    : PRINT B$" NOT FOUND"
1170        FOR I = 1 TO 2000
          : NEXT I
1180  B$ = A$(50)
1190        FOR I = 1 TO 100
1200        IF A$(I) = B$
              THEN FOUND = 1
          : PRINT
          : PRINT
          : PRINT A$(I)" = "B$
          : GOTO 1230
1210        PRINT I"."A$(I)" <> "B$
1220        NEXT I
1230  IF NOT FOUND
        THEN PRINT
    : PRINT
    : PRINT B$" NOT FOUND"
1240        FOR I = 1 TO 2000
          : NEXT I
1999  GOTO 60
```

Listing continued.

Listing continued.

```
2000  REM ------------
2010  REM LISTING 6-1C
2020  REM ------------

2030  HOME
2040  PRINT "EXACT MATCH"
2050  PRINT "----------------------------------------"
2060  B$ = "ABC"
2070  L1 = LEN(B$)
2080  FOUND = 0
2090  PRINT D$"OPEN UNSORTED TEXT"
2100  PRINT D$"READ UNSORTED TEXT"
2110        FOR I = 1 TO 50
2120        INPUT A$(I)
2130        PRINT
          : PRINT "MAIN STRING = "A$(I)
          : PRINT
2140        L2 = LEN(A$(I))
2150             FOR J = 1 TO L2 - L1 + 1
2160             IF MID$(A$(I), J, L1) = B$
                   THEN FOUND = 1
                : PRINT
                : PRINT
                : PRINT MID$(A$(I), J, L1)" = "B$
                : GOTO 2200
2170             PRINT MID$(A$(I), J, L1)" <> "B$
2180             NEXT J
2190        NEXT I
2200  PRINT D$"CLOSE"
2210        FOR I = 1 TO 2000
          : NEXT I
2220  B$ = RIGHT$(A$(30), 4)
2230  L1 = LEN(B$)
2240  FOUND = 0
2250        FOR I = 1 TO 50
2260        PRINT
          : PRINT "MAIN STRING = "A$(I)
          : PRINT
2270        L2 = LEN(A$(I))
2280             FOR J = 1 TO L2 - L1 + 1
2290             IF MID$(A$(I), J, L1) = B$
                   THEN FOUND = 1
                : PRINT
                : PRINT
                : PRINT MID$(A$(I), J, L1)" = "B$
                : GOTO 2330
2300             PRINT MID$(A$(I), J, L1)" <> "B$
2310             NEXT J
2320        NEXT I
2330        FOR I = 1 TO 2000
          : NEXT I
2340  GOTO 60
```

Listing 2. *Binary search demonstration.*

```
10    REM ------------
20    REM LISTING 6-2A
30    REM ------------

40    D$ = CHR$(4)
50    DIM A$(100)
60    HOME
70    PRINT "BINARY SEARCH"
80    PRINT "------------------------- "
90    PRINT
```

Listing continued.

rals in on the matching item. This technique reduces the number of comparisons substantially, which also reduces the search time.

Listing 2 (divided into **Listings 6-2A** through **6-2G**) demonstrates the concept. Enter **Listing 2** and run the program. Select item 1. You have chosen **Listing 6-2B** (and its associated subroutine, **Listing 6-2E**), which tries to match the string "LMNOP" with the first 100 records in the file "SORTED TEXT" (lines 1100–1140). Since it doesn't match, the search will fail, as it did in **Listing 6-1B.** However, as the computer will tell you, it will make only seven comparisons in determining that it cannot find a match. The binary search doesn't have to make 100 comparisons as the linear search did. Obviously, the search time is reduced.

Figure 1 (p. 96) shows the search's pattern. Each time the computer fails to make a match, it divides the remaining records into two equal lists. The funnel shape results from the string sought ("LMNOP") being always greater than the other strings in the list (they all begin with "A," "B," or "C").

The program continues by selecting one of the elements of the list and searching for it (lines 1150–1200). This time, it only needs six comparisons to find a match, instead of the 38 that a sequential search would have required. With ordered lists, you can speed both sorting and searching dramatically.

Figure 2 (p. 96) shows a more typical binary search pattern. The computer determines from the first comparison that the matching string should lie in the lower half (50 items) of the list. It next determines that the match is in the upper half of that half. Since we chose the 38th element as our search string, the computer selects continually narrowing upper and lower limits until it zeros in on the matching string. The "funnel" in **Figure 2** converges at the matching string.

Save **Listing 2** for now. You will continue with the other menu selections after some more groundwork.

Large Files

So far, we have done all the sorting and searching in memory. This is fine for small files, but what happens if the file is too large to fit in memory in one piece? I have already used one meth-

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Listing continued.

```
100   PRINT "1 -- MEMORY SEARCH"
110   PRINT "2 -- RANDOM FILE DISK
                  SEARCH"
120   PRINT "3 -- SEQUENTIAL FILE
                  DISK SEARCH"
130   VTAB 22
140   PRINT "WHICH CHOICE? ";
150   GET A$
160   PRINT CHR$(1)
170   A = VAL(A$)
180   IF A < 1 OR A > 3
        GOTO 130
190   ON A GOTO 1000, 2000, 3000

1000  REM ------------
1010  REM LISTING 6-2B
1020  REM ------------

1030  HOME
1040  PRINT D$"OPEN SORTED TEXT"
1050  PRINT D$"READ SORTED TEXT"
1060        FOR I = 1 TO 100
1070        INPUT A$(I)
1080        NEXT I
1090  PRINT D$"CLOSE"
1100  B$ = "LMNOP"
1110  NR = 100
1120  PRINT "STRING= "B$
    : PRINT
1130  GOSUB 4000
1140  PRINT N" COMPARISONS"
1150  B$ = A$(38)
1160  PRINT "------------------------"
1170  PRINT "STRING= "B$
    : PRINT
1180  GOSUB 4000
1190  PRINT B$" = "A$(I)
1200  PRINT N" COMPARISONS"
1210  VTAB 23
    : HTAB 20
    : INPUT "PRESS ANY KEY";A$
1999  GOTO 60

2000  REM ------------
2010  REM LISTING 6-2C
2020  REM ------------

2030  HOME
2040  B$ = "LMNOP"
2050  NR = 100
2060  PRINT B$
2070  GOSUB 5000
2080  PRINT
    : PRINT
2090  PRINT D$"OPEN SORTED TEXT, L6"
2100  PRINT D$"READ SORTED TEXT, R37"
2110  INPUT B$
2120  PRINT D$"CLOSE"
2130  GOSUB 5000
2140  PRINT B$" = "A$
2150        FOR I = 1 TO 3000
          : NEXT I
2999  GOTO 60

3000  REM ------------
3010  REM LISTING 6-2D
3020  REM ------------

3030  HOME
3040  B$ = "LMNOP"
3050  NR = 100
3060  PRINT B$
```

Listing continued.

od without mentioning it. Reexamine the examples in **Listing 1**. I used one way to search a large file: Load one record at a time from disk, make the comparison, and go on to the next record. The comparison (line 1120 in **Listing 1**) is inside the loop that loads the file records (lines 1100–1140). In this manner, only one record at a time is in memory, therefore the size of the file is immaterial. This helps if all you want to do is load text in a sequential file and look through the file for data. But this approach is neither a very sophisticated method nor a very efficient one. Again, data organization is the key to success.

Smaller Files

Sequential text files can manage only so much data efficiently. The DOS 3.3 disk will hold 105 different files. This means that you can divide one large file into several files that are small enough to fit into memory where each can be easily searched and sorted. Alphabetic information lends itself most easily to this technique. For example, use the first letter of the last name of all your friends as part of the file name and you will always know exactly where to look for them. Those whose names start with "A" will be in "FILE A," those whose names start with "B" will be in "FILE B," and so forth. All the names in "FILE A" should fit in memory where all the A's can be sorted into order. A master printout of all names will also be in order if you print all the names in "FILE A," then those in "FILE B," and so on. This method has a secondary benefit: The files are small enough that read and write times are reduced to tolerable levels. It is obviously faster to load a small file containing only A's than to load a large file containing all names. Although not the most sophisticated method of managing files, this is probably the simplest method for sequential text files. In such a scheme, of course, the last name (or whatever alphabetic data you are using as the file key) will predominate. In order to access any data quickly, your program will have to key its operation to the correct file. Otherwise, the computer will have to search each file in turn looking for a match and you will have gained little by dividing the files. Generally, in all "people oriented" data bases, the last name is the key to all data anyway, so this won't be a problem.

Listing 3 (p. 99) splits the "words" stored in "SORTED TEXT" into smaller files, one for each letter of the alphabet. The program reads through "SORTED TEXT" 26 times (lines 70 and 180). The first time through, it selects each "word" in "SORTED TEXT" starting with "A" and saves it in a new FILEA. The second time through it saves each "word" in "SORTED TEXT" starting with "B" in FILEB, and so forth through FILEZ. Any program wishing to access information need only pick the appropriate file—FILEA through FILEZ—and search through only those records in that file.

Disk Searching

The same concept examined for memory searches in **Listing 6-2B** can also be applied to disk searches. **Listing 6-2C** does just that for a random access text file. As in the illustra-

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Listing continued.

```
3070  GOSUB 6000
3080  PRINT
    : PRINT
3090  PRINT D$"OPEN SORTED TEXT"
3100  PRINT D$"POSITION SORTED TEXT,
      R37"
3110  PRINT D$"READ SORTED TEXT"
3120  INPUT B$
3130  PRINT D$"CLOSE"
3140  GOSUB 6000
3150  PRINT B$" = "A$
3160        FOR I = 1 TO 3000
          : NEXT I
3999  GOTO 60

4000  REM ------------
4010  REM LISTING 6-2E
4020  REM ------------

4030  LL = 1
    : UL = NR
    : N = 0
4040  IF UL < LL
        GOTO 4110
4050  I = INT((UL + LL) / 2)
4060  N = N + 1
    : REM COMPARISON COUNTER
4070  PRINT "N="N, "LL="LL, "UL="UL
4080  IF B$ = A$(I)
        THEN RETURN
4090  IF B$ < A$(I)
        THEN UL = I - 1
    : GOTO 4040
4100  LL = I + 1
    : GOTO 4040
4110  PRINT "NO MATCH FOUND"
4120  RETURN

5000  REM ------------
5010  REM LISTING 6-2F
5020  REM ------------
```

Listing continued.

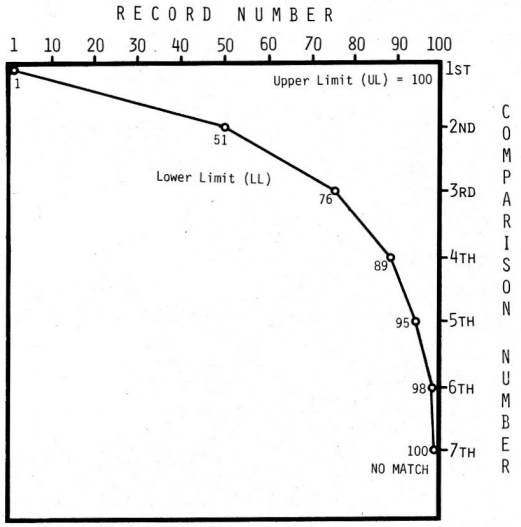

Figure 1. *Binary search (no match).*

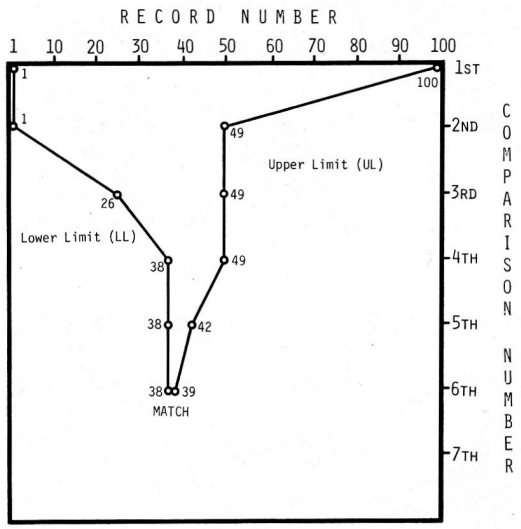

Figure 2. *Binary search (match at record 38).*

tion for **Listing 6-2B**, you try to find both the string "LMNOP" (lines 2040–2070) and a real word (lines 2090–2140). The subroutine, **Listing 6-2F**, like **Listing 6-2E**, uses a binary search algorithm. Instead of examining strings in memory, however, it reads each record from disk as it needs it. The technique is fast because it needs to read only seven or eight records for a "no-match" and two for a match, in this example.

Sequential text files can use the same approach with the POSITION command. **Listing 6-2D** (plus **Listing 6-2G**) show how. The logic is the same as for the random access text file, except that the file must be reopened every time (line 6060) and the file pointer must be positioned to the correct file (line 6070). Remember that the "R" parameter in the POSITION command refers to relative record numbers. The OPEN command relates the records from the beginning of the file, emulating the random access file.

Disk Sorting

In Part 5, I examined several means of sorting data in memory. Of course, you can sort records on disk just as in memory; disk operations are just so much slower than in-memory operations that the process would be too time consuming for volatile files (files in which you are constantly adding and deleting data). In these cases, you are better off keeping the data ordered and using the binary search technique discussed above. If you need only an occasional sort of disk-based files, you can use the algorithm in **Listing 4** (p. 99). Enter and run the program.

Listing 6-4A creates a temporary random access text file (cleverly named "TEMP") containing the first 100 records of the file "UNSORTED TEXT" (lines 120–200). The program then calls **Listing 6-4B** (line 220), which is a Shell sort, similar to the corresponding sort in Part 5. The difference between the two is that the Shell sort in Part 5 switched records in memory; **Listing 6-4B** switches records on disk. Lines 1130–1160 read two records from disk and line 1170 compares them. If the order is correct, the computer goes on to the next comparison. If the order is incorrect, lines 1180–1210 write the two records back to the disk, but in the reverse order.

The example in **Listing 4** is for a random access text file. The technique is most easily applied to ran-

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dom files, although it could be used with sequential files using the POSITION command, similarly to the way we used it in **Listing 6-2D/6-2G.**

Hash Address Processing

This particular hash has nothing to do with either corned beef or funny smelling weeds. It is a method for cross referencing records in a random access file (although we could adapt it to sequential files using the "R" parameter). The record number at which a string is stored in the file is calculated or "hashed" from the string itself. In a sense, the string becomes self-referencing. The trick is to come up with some means of always getting a unique record number, so that the computer will not try to store two different strings in one record. No one method works equally well with all types of data and no method works perfectly every time. Consequently, if you use hashing, you will have to protect your data by first comparing the contents of the file record to the new data to make certain both you and the computer are talking about the same

Listing continued.

```
5030  LL = 1
    : UL = NR
5040  PRINT D$"OPEN SORTED TEXT, L6"
5050  IF UL < LL
        GOTO 5120
5060  I = INT((UL + LL) / 2)
5070  PRINT D$"READ SORTED TEXT, R";I
5080  INPUT A$
5090  IF B$ = A$
        THEN PRINT D$"CLOSE"
    : RETURN
5100  IF B$ < A$
        THEN UL = I - 1
    : GOTO 5050
5110  LL = I + 1
    : GOTO 5050
5120  PRINT "NO MATCH FOUND"
5130  PRINT D$"CLOSE"
5140  RETURN

6000  REM ------------
6010  REM LISTING 6-2G
6020  REM ------------

6030  LL = 1
    : UL = NR
6040  IF UL < LL
        GOTO 6130
6050  I = INT((UL + LL) / 2)
6060  PRINT D$"OPEN SORTED TEXT"
```

Listing continued.

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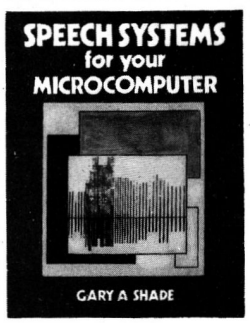

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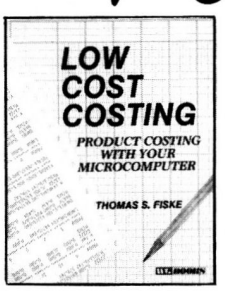

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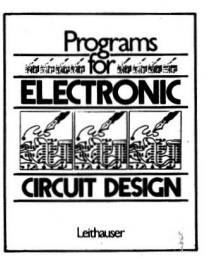

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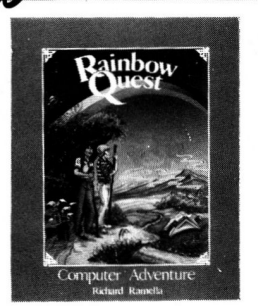

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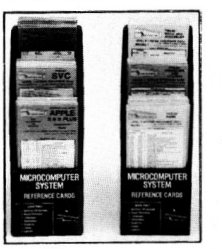

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record. If the computer has hashed two strings to the same record number, you will need to devise some way of resolving the collision. Keyed files eliminate this problem, but hashing requires virtually no overhead, contrary to the keyed file.

An infinite number of sort algorithms have been written. There are twice that many hashing algorithms (mathematicians note that I exaggerate for emphasis). Let's pick one. I have selected a method which we will call "Sum of the ASCII values." **Listing 5** (p. 100) will illustrate its use.

Listing 6-5E is the "hasher." It sums the ASCII values of the five letters in each word. Since all our words are alphabetic, each letter will have a value between 65 and 90. This produces hashed values between 325 (=65*5) and 450 (=90*5). **Figure 3** (p. 104) illustrates the process. The sum of the ASCII values for the word "ABCXY" is 65+66+67+88+89, which equals 375.

You could use this value "as is" for a record number in a random access file, but that would leave 324 blank files, which is certainly a waste of disk. So, the function in line 90 calculates a target record number "RNMBR" by scaling the hashed values back to a 100-record file. Those of you who are familiar with Integer BASIC will recognize the function as a variation of the MOD command, which Applesoft lacks.

Listing 6-5A demonstrates the three major list-processing operations as they are performed using hashing: adding a record (lines 180–220 and **Listing 6-5B**), finding a record (lines 260–300 and **Listing 6-5C**), and deleting a record (lines 340–390 and **Listing 6-5D**).

Note how collisions are handled. Line 1040 examines the target record selected by line 1030 to make certain that it has either never been used (B$(RN)="") or previous records have been deleted (B$(RN)="DELETED"). If the target record already contains data (a collision has occurred), line 1060 selects the next lowest record number and tries again. If the computer reaches the zero record, it loops to the top of the file and continues (line 1080). If it reaches the starting point again, it decides that there is no space available in the file and assigns the data to a newly created record (line 1070).

Listing continued.

```
6070  PRINT D$"POSITION SORTED TEXT, R"I
6080  PRINT D$"READ SORTED TEXT"
6090  INPUT A$
6100  IF B$ = A$
        THEN PRINT D$"CLOSE"
    : RETURN
6110  IF B$ < A$
        THEN UL = I - 1
    : GOTO 6040
6120  LL = I + 1
    : GOTO 6040
6130  PRINT "NO MATCH FOUND"
6140  PRINT D$"CLOSE"
6150  RETURN
```

Listing 3. *Separating a large file into smaller files to facilitate sorting.*

```
10    REM -----------
20    REM LISTING 6-3
30    REM -----------

40    D$ = CHR$(4)
50    ONERR GOTO 190
60    PRINT D$"OPEN SORTED TEXT"
70          FOR I = 65 TO 90
80          KEY$ = CHR$(I)
90          PRINT D$"OPEN FILE";KEY$
100         IF I > 65
              GOTO 140
110         PRINT D$"READ SORTED TEXT"
120         INPUT A$
130         IF LEFT$(A$, 1) = CHR$(I + 1)
              GOTO 170
140         PRINT D$"WRITE FILE";KEY$
150         PRINT A$
160         GOTO 110
170         PRINT D$"CLOSE FILE";KEY$
180         NEXT I
190   POKE 216, 0
200   PRINT D$"CLOSE SORTED TEXT"
```

Listing 4. *An algorithm for sorting disk-based files.*

```
10    REM -----------
20    REM LISTING 6-4A
30    REM ------------

40    D$ = CHR$(4)
50    NR = 100
60    HOME
70    PRINT "DISK SORT"
80    PRINT "----------------------------------------"

90    REM (RANDOM ACCESS)
100   REM

110   PRINT
    : PRINT "CREATING A TEMPORARY FILE"
120   PRINT D$"OPEN UNSORTED TEXT"
130   PRINT D$"OPEN TEMP, L6"
140         FOR I = 1 TO 100
150         PRINT D$"READ UNSORTED TEXT"
160         INPUT A$
```

Listing continued.

Listing continued.

```
170         PRINT D$"WRITE TEMP, R";I
180         PRINT A$
190         NEXT I
200    PRINT D$"CLOSE"
210    PRINT
220    GOSUB 1000
230    PRINT
     : PRINT "SORTED TEXT"
240    PRINT "-------------------------"
250    PRINT D$"OPEN TEMP, L6"
260         FOR I = 1 TO 100
270         PRINT D$"READ TEMP, R"I
280         INPUT A$
290         PRINT A$
300         NEXT I
310    PRINT D$"DELETE TEMP"
320    END

1000   REM -------------
1010   REM LISTING 6-4B
1020   REM -------------
1030   REM
1040   REM LISTING 5-4D (MODIFIED)
1050   REM

1060   I = 1
1070   PRINT D$"OPEN TEMP, L6"
1080   I = 2 * I
     : IF I < = NR
       GOTO 1080
1090   I = INT(I / 2)
     : IF I = 0
       THEN PRINT D$"CLOSE"
     : RETURN
1100        FOR L = 1 TO NR - I
1110        J = L
1120        K = I + J
1130        PRINT D$"READ TEMP, R";J
1140        INPUT A$
1150        PRINT D$"READ TEMP, R";K
1160        INPUT B$
1170        IF A$ < = B$
              GOTO 1240
1180        PRINT D$"WRITE TEMP, R";J
1190        PRINT B$
1200        PRINT D$"WRITE TEMP, R";K
1210        PRINT A$
1220        J = J - I
1230        IF J > 0
              GOTO 1120
1240        NEXT L
1250   GOTO 1090
```

Listing 5. *Hashing using the sum of the ASCII values.*

```
10     REM -------------
20     REM LISTING 6-5A
30     REM -------------

40     HOME
50     NR = 50
60     DIM A$(NR + 1), B$(NR + 1)
70     D$ = CHR$(4)
80     SCALAR = NR + 1
90     DEF FN RNMBR(X) = INT((X / SCALAR -
       INT(X / SCALAR)) * SCALAR) + 1
100    PRINT D$"READ UNSORTED TEXT"
110         FOR I = 1 TO NR
120         INPUT A$(I)
130         NEXT I
140    PRINT D$"CLOSE"

150    REM
160    REM ADD
170    REM

180         FOR I = 1 TO NR
190         B$ = A$(I)
200         GOSUB 1000
210         PRINT RN"."B$
220         NEXT I

230    REM
240    REM FIND
250    REM

260    PRINT
     : PRINT
270    I = 37
     : RN = 37
280    A$(I) = B$(RN)
290    GOSUB 2000
300    PRINT A$(I)" = "B$

310    REM
320    REM DELETE
330    REM

340    I = 37
     : RN = 37
350    A$(I) = B$(RN)
360    B$ = B$(RN)
370    GOSUB 3000
380    PRINT
     : PRINT
```

Listing continued.

The find and delete algorithms follow the same pattern. In this manner, some data will be in the record number calculated by the hashing algorithm, while others will require the computer to hunt around a little.

Other methods exist for hashing and for handling collisions, but **Listing 5** is fairly representative. See "Further Reading" if you are interested in pursuing this.

Keyed Files

Keyed file methods are also most readily applicable to random access files, although, once more, the fast-fingered among you can adapt the concept to sequential files by careful use of the "R" parameter. A keyed file is nothing more glorious than a secondary file (usually sequential) that serves as a cross-reference for another (usually random access) file. The cross-reference file contains an abbreviated "key" for each record in the main file, plus the corresponding record number. The object is to have each record be represented by a unique key in a cross-reference file that is small enough to fit into memory all at one time for quick reference. When the program wants the information in the main file, it determines the key from existing data, finds the key in the cross-reference file, takes the associated record number and retrieves the record by that key from the main file. If you select the method for calculating the keys carefully, you can even sort using nothing but the keys. Thus, you can have ordered data without having to put the main file in order.

I am still assuming that the majority of text file processing will have something to do with names. One of the better algorithms for calculating keys for

Listing continued.

```
390   PRINT "ITEM ";RN;" DELETED = "B$
999   END

1000  REM ------------
1010  REM LISTING 6-5B
1020  REM ------------

1030  GOSUB 4000
1040  IF B$(RN) = "" OR B$(RN) = "DELETED"
        THEN B$(RN) = B$
    : RETURN
1050  START = RN
1060  RN = RN - 1
1070  IF RN = START
        THEN NR = NR + 1
    : B$(NR) = B$
    : RETURN
1080  IF RN = 0
        THEN RN = NR
1090  GOTO 1040

2000  REM ------------
2010  REM LISTING 6-5C
2020  REM ------------

2030  GOSUB 4000
2040  START = RN
2050  IF B$(RN) < > "" OR B$(RN)
      < > "DELETED" THEN B$ = B$(RN)
    : RETURN
2060  RN = RN - 1
2070  IF RN = 0
        THEN RN = NR
2080  IF RN = START
        THEN PRINT "NO MATCH FOUND"
    : RETURN
2090  GOTO 2050

3000  REM ------------
3010  REM LISTING 6-5D
3020  REM ------------

3030  GOSUB 4000
3040  START = RN
3050  IF B$(RN) = B$
        THEN B$(RN) = "DELETED"
    : RETURN
3060  RN = RN - 1
3070  IF RN = 0
        THEN RN = NR
3080  IF RN = START
        THEN PRINT "NO MATCH FOUND"
    : RETURN

3090  GOTO 2050

4000  REM ------------
4010  REM LISTING 6-5E
4020  REM ------------

4030  HASH = 0
4040        FOR J = 1 TO 5
4050        HASH = HASH + ASC(MID$(A$(I),
4060        J, 1)) NEXT J
4070  RN = FN RNMBR(HASH)
4080  RETURN
```


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Listing 6. *Key filing using the Soundex algorithm.*

```
10    REM ------------
20    REM LISTING 6-6A
30    REM ------------

40    D$ = CHR$(4)
50    HOME
60    PRINT "KEYED FILES"
70    PRINT "----------------------------------------"
80    PRINT
    : PRINT
90    A$(1) = "APPLE"
100   A$(2) = "LEMON"
110   A$(3) = "ORANGE"
120   A$(4) = "ARTICHOKE"
130   KEY$(1) = "A1400001"
140   KEY$(2) = "L5500002"
150   KEY$(3) = "06520003"
160   NR = 3
170   ST$ = A$(4)
180   GOSUB 1000
190   B$ = KEY$(J)
200   GOSUB 2000
210   PRINT "STRING = "ST$
220   PRINT
230   PRINT "KEY = " LEFT$(KEY$(2), 4)
240   PRINT
250   PRINT "CROSS-REFERENCE = " RIGHT$(KEY$(2), 4)
260   PRINT
    : PRINT
270         FOR I = 1 TO NR
280         PRINT "KEY ";I;" = "KEY$(I)" "A$(VAL(RIGHT$
            (KEY$(I), 3)));
290         IF I = 2
              THEN PRINT " <--";
300         PRINT
310         NEXT I

320   REM
330   REM SAVE DATA
340   REM

350   PRINT D$"OPEN KEYS"
360   PRINT D$"WRITE KEYS"
370   PRINT NR
380         FOR I = 1 TO NR
390         PRINT KEY$(I)
400         NEXT I
410   PRINT D$"CLOSE KEYS"
420   PRINT D$"OPEN TEXT, L10"
430         FOR I = 1 TO NR
440         PRINT D$"WRITE TEXT, R";I
450         PRINT A$(VAL(RIGHT$(KEY$(I), 3)))
460         NEXT I
470   PRINT D$"CLOSE TEXT"

480   REM
490   REM READ DATA
500   REM

510   PRINT
    : PRINT
520   PRINT D$"OPEN KEYS"
530   PRINT D$"READ KEYS"
540   INPUT NR
550         FOR I = 1 TO NR
560         INPUT KEY$(I)
570         NEXT I
580   PRINT D$"CLOSE KEYS"
590   PRINT D$"OPEN TEXT, L10"
600         FOR I = 1 TO NR
```

Listing continued.

names is "Soundex." This method also gives us a means of sorting using the keys rather than the records themselves. The technique calculates its key as follows:

1. The first character of the key is the first letter of the name.
2. Eliminate all vowels and the consonants *h*, *w*, and *y*.
3. Assign the remaining consonants numbers as follows:
1 = b, f, p, v
2 = c, g, j, k, q, s, x, z
3 = d, t
4 = l
5 = m, n
6 = r
4. Eliminate all adjacent letters with the same code.
5. Concatenate a "key" from the first letter (item 1 above) and the codes for the next three consonants, padding with zeros if three digits are not available. The resulting key will be of the form "X000."

Figure 4 (p. 106) illustrates the algorithm. If we apply the Soundex principle to the word "AVOCADO," we first remove all vowels (except the first letter of the word), yielding "AVCD." Since there are only three consonants plus the first letter in the word, we do not have to truncate or pad the word. The values 1, 2, and 3 are assigned to the letters *V*, *C*, and *D*, respectively. This yields the key "A123."

Listing 6-6B is an algorithm for calculating a key using the "Soundex" algorithm. **Listing 6-6C** is an algorithm for building a cross reference table using the Soundex key to cross-reference random access text file record numbers. **Listing 6-6C** is an adaptation of the single-pass insertion sort that we used in **Listing 5-5B** last month for adding a new item to an ordered list. The difference here is that we are sorting the keys, not the actual records. The key, in this case, also includes a four-digit record number, so that everywhere the Soundex key goes, the corresponding record number goes with it.

Enter and run **Listing 6. Listing 6-6A** demonstrates the use of the keyed file concept in keeping track of records in a random file. In actual use, a sequential file ("KEYS" in **Listing 5**) contains the keys (Soundex value plus record number) for all records. The file would reside in memory at all times and serve as a cross-reference

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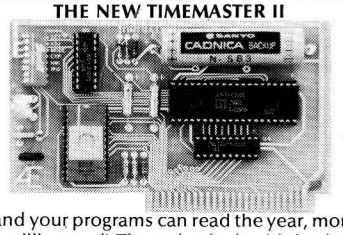

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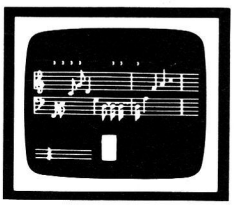

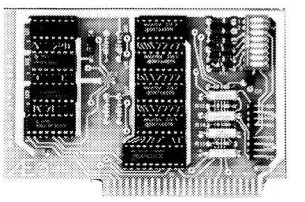

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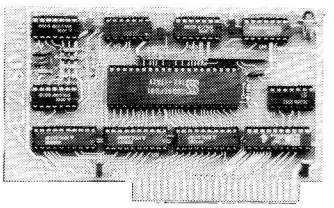

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Listing continued.

```
610         PRINT D$"READ TEXT, R";I
620         INPUT A$
630         PRINT A$
640         NEXT I
650    PRINT D$"DELETE KEYS"
660    PRINT D$"DELETE TEXT"
999    END

1000   REM ------------
1010   REM LISTING 6-6B
1020   REM ------------

1030   NR$ = "012301200224550126230102O2"
1040   X$ = " "
1050   KEY$(J) = LEFT$(ST$, 1)
1060   IF LEN(ST$) < 2
         GOTO 1170
1070        FOR I = 2 TO LEN(ST$)
1080        Z$ = MID$(ST$, I, 1)
1090        E = ASC(Z$) - 64
1100        IF E > 26 OR E < 1
              GOTO 1150
1110        Y$ = MID$(NR$, E, 1)
1120        IF Y$ = X$ OR Y$ = "0"
              GOTO 1150
1130        KEY$(J) = KEY$(J) + Y$
1140        IF LEN(KEY$(J)) > 3
              GOTO 1170
1150        X$ = Y$
1160        NEXT I
1170   KEY$(J) = LEFT$(KEY$(J) + "000", 4)
1999   RETURN

2000   REM ------------
2010   REM LISTING 6-6C
2020   REM ------------
2030   REM
2040   REM LISTING 5-5B (MODIFIED)
2050   REM

2060   NR = NR + 1
2070   B$ = B$ + RIGHT$("0000" + STR$(NR),
       4)
2080   IF B$ > = KEY$(NR - 1)
         THEN I = NR
     : GOTO 2190

2090   REM ** LOOP 1 **

2100        FOR J = NR - 1 TO 1 STEP - 1
2110        I = J
2120        IF B$ > = KEY$(I)
              GOTO 2220
2130        NEXT J

2140   REM ** LOOP 2 **

2150        FOR K = NR TO 2 STEP - 1
2160        KEY$(K) = KEY$(K - 1)
2170        NEXT K
2180   I = 1
2190   KEY$(I) = B$
2200   GOTO 2260

2210   REM ** LOOP 3 **

2220        FOR K = NR TO I + 1 STEP - 1
2230        KEY$(K) = KEY$(K - 1)
2240        NEXT K
2250   KEY$(I + 1) = B$
2999   RETURN
```

Listing 7. *Single-pass disk insertion sort.*

```
10     REM ------------
20     REM LISTING 6-7
30     REM ------------

40     D$ = CHR$(4)
50     NR = 100
60     HOME
70     PRINT "DISK INSERTION"
80     PRINT "-------------------------"

90     REM
100    REM

110    PRINT
     : PRINT "CREATING A TEMPORARY FILE"
120    PRINT D$"OPEN SORTED TEXT"
130    PRINT D$"OPEN TEXT"
140         FOR I = 1 TO 100
150         PRINT D$"READ SORTED TEXT"
160         INPUT A$
170         PRINT D$"WRITE TEXT"
180         PRINT A$
190         NEXT I
200    PRINT D$"CLOSE"
210    B$ = "APPLE"
220    PRINT
     : PRINT
230    PRINT "INSERTING"

240    REM
250    REM INSERTION ROUTINE
260    REM

270    FLAG = 0
280    PRINT D$"OPEN TEXT"
290    PRINT D$"OPEN TEMP"
300         FOR I = 1 TO NR
310         PRINT D$"READ TEXT"
320         INPUT A$
330         PRINT D$"WRITE TEMP"
340         IF FLAG = 0 AND B$ < = A$
              THEN PRINT B$
          : FLAG = 1
350         PRINT A$
360         NEXT I
370    PRINT D$"CLOSE"
380    PRINT D$"DELETE TEXT"
390    PRINT D$"RENAME TEMP, TEXT"
400         FOR I = 1 TO 2000
          : NEXT I
410    PRINT D$"DELETE TEXT"
```

Figure 3. *Sum of the ASCII values algorithm.*

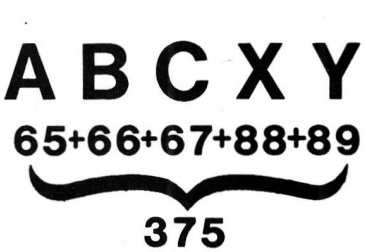

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Figure 4. *Soundex algorithm.*

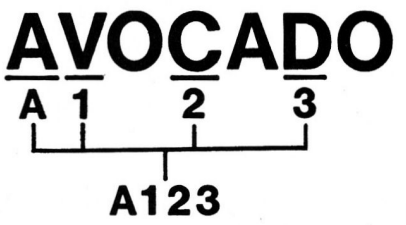

table for finding records in the main file, "TEXT." Lines 520–580 read in the cross-reference file, then lines 590–640 use the cross-reference table to locate records in "TEXT."

ISAM

No, ISAM is not the piano player in a Humphrey Bogart movie. It means Index Sequential Access Method. The concept is similar to the keyed file, but accesses the disk directly, without using DOS. There are also tree searching methods, so named because if you represent the logic graphically, it looks like an upside-down tree. Don't panic. These are very sophisticated methods of searching; it would be impossible to cover them to any great extent in this short article. Maybe later.

Insertion Sort Revisited Again

In case you think I have a fixation with the insertion sort, well, I guess I do. But doggone it, it's such a useful technique, if we have all our little data elements in order, that I just can't stay away. So, **Listing 7** uses the single-pass insertion sort algorithm just one more time, in this case to add a record to an existing sequential access file. Lines 120–200 create a temporary file "TEXT" consisting of the first 100 records in "SORTED TEXT." Lines 280–370 insert the new string "APPLE" into "TEXT." The algorithm used is a significant variation from the insertion sort algorithm in **Listing 5-5B**. The computer reads each record in "TEXT." It writes each record from "TEXT" to a new temporary file "TEMP." When it encounters the correct spot to insert the new record, it writes both the new record and the latest record from "TEXT" into "TEMP" (line 340). The computer then finishes transferring the records from "TEXT" to "TEMP." It deletes the old file "TEXT" and renames the new file, containing all the old records plus the new record, "TEXT."

Upper- and Lowercase

The Apple //e and many Apple IIs can use both upper- and lowercase in text. The mixture of upper- and lowercase certainly makes text much easier to read. Fortunately, DOS will easily process both cases in text files. When it comes to searching and sorting, we immediately run into a problem. The ASCII values for uppercase letters are entirely different from the values for lowercase letters. Since the Boolean comparisons that Applesoft uses for searching and sorting text are based on a character-by-character comparison of ASCII values, words containing lowercase letters will act differently from words containing only uppercase. If we are certain to be consistent in the way we represent words (for example, names all lowercase except the first letter), sorting will not be a problem.

Searching is another story. The word "XXXXX" is *not* the same as "Xxxxx". The usual means of solving this problem is to convert all words to uppercase for comparisons. This is the way virtually all the "spelling checkers" for word processors work. The process is somewhat imperfect, however, since "Xxxxx" and "xxxxx" would both be converted to "XXXXX." But then, I can't think of any case where that would be a problem, so the technique is good enough.

Some BASICs, which were initially designed to handle both upper- and lowercase, have a CAP$ command, or something similar, which converts everything to uppercase. Since the Apple was intended to handle only uppercase, Applesoft has no such command. However, the following statement will do the job:

```
10000 B$=A$ : A$="" : L=LEN(B$) : FOR I=1 TO L : A=ASC(MID$(B$,I,1)): IF A>90 THEN A=A-32
10010 A$=A$+CHR$(A) : NEXT I
```

Listing 5-3. *Random text generator.*

```
10    REM -------------
20    REM LISTING 5-3
30    REM GENERATE TEXT
40    REM -------------

50    HOME
60    DIM A$(100)
70    D$ = CHR$(4)
80    PRINT D$"OPEN UNSORTED TEXT"
90          FOR K = 1 TO 20
100               FOR J = 1 TO 100
110               A$(J) = ""
120                    FOR I = 1 TO 5
130                    A = RND(1)
140                    A$(J) = A$(J) + CHR$(65 +(26 * A))
150                    NEXT I
160               M = M + 1
170               PRINT TAB(10);M; TAB(15);A$(J)
180               NEXT J
190         PRINT D$"APPEND UNSORTED TEXT"
200         PRINT D$"WRITE UNSORTED TEXT"
210               FOR I = 1 TO 100
220               PRINT A$(I)
230               NEXT I
240         PRINT D$"CLOSE UNSORTED TEXT"
250         NEXT K
```

Further Reading

These references provide additional information on sorting and searching:

- Chapter 7 of *Programming the Apple* by J. L. Campbell and Lance Zimmerman (Prentice Hall).
- Chapter 6 of *Data Management Techniques* by John Grillo and J. D. Robertson (Wm. C. Brown Company).

More to Come

It's time for an application to demonstrate some of the principles I have covered in this series. So, search through the next issue of *inCider* for Part 7 and the finale, Visi-Data, a data base program which is a "look alike" to the electronic spreadsheet programs. ■

ASK inCIDER

If you have any general questions about Apples or Apple computing, write Ask inCider, 80 Pine Street, Peterborough, NH 03458.

Ultima Confusion

Dear *inCider*:

I'm having trouble getting your Ultima III Character Editor working (June '84). Can you help?

A befuddled reader

Dear *inCider*:

Your Ultima III Character Editor works great! Keep up the good work.

A satisfied reader

Dear *inCider*:

The damn thing won't work. What's the story?

An angry reader

This is a sample of the responses we've received about the Exodus: Ultima III Character Editor we published in June. It's not unusual when some people can't get a program to run, but the number of readers who complained about this one was unusual. And the fact that some readers got the program to run really muddied the waters: Is there something wrong with the character editor?

The answer is yes and no. Our review editor, Kerry Lanz, wrote the character editor and he was as puzzled as I was by the complaints we were receiving. He could find nothing wrong with the program. Finally, instead of using his own copy of the game, he tested the editor on a copy of Ultima III that was lying around the office. Lo and behold, the editor didn't work. Using a disk zap utility, Kerry discovered that there are two slightly different versions of Ultima III on the market. These two versions differ in the sector on track 3 that they begin writing character information to.

Without getting bogged down in details, I'll let you know that if you can't get the Ultima III Character Editor to work as it's printed in the magazine, change line 7040 as follows: POKE 47085,6 to POKE 47085,7.

What a Dump!

Dear *inCider*:

I have a C-Itoh Prowriter printer and I've been trying to get it to print the contents of my Apple's hi-res screens. Can you tell me how to do this? Also, a couple of other Apple magazines offer the programs they publish on disk. I haven't seen any mention of the fact that *inCider* will be offering this service. Do you plan to make your programs available on disk?

Greg Hanrahan
1510 Towne Drive
Ellisville, MO 63011

Dear Greg:

The easiest way to dump the hi-res screens to a printer is to buy one of the popular utilities that perform that task. Popular ones include Printographer by Roger Wagner Productions, 10761-E Woodside Drive, Santee, CA 92071; Zoom Graphix by Phoenix Software, 64 Lake Zurich Drive, Lake Zurich, IL 60047; and Paper Graphics by Penguin Software, 830 Fourth Avenue, Geneva, IL 60134.

We've decided not to make *inCider*'s programs available on disk, and for a very sensible reason. We are a magazine publisher, not a software publisher. Don't despair, however. We are working on a plan that will permit subscribers to get the programs published in the magazine. We are going to offer them on our own dedicated bulletin board. For the cost of a phone call, you will be able to download the programs we publish.

I can't give you the phone number now because we haven't run a dedicated line (bypassing the switchboard) into our offices, yet. That's the only thing holding us up right now. These things were a lot easier when we had only Ma Bell to deal with. Now, we have AT&T, NYNEX, and New England Telephone. What's wrong with a monopoly, anyway? Stay tuned for further developments.

I'd Rather POKE Than Switch

Dear *inCider*:

I am writing a program which is becoming quite lengthy and I've run across a few problems. The first problem is the fact that my program is so large that it will soon run into hi-res graphics page one, and I use page one for a picture. Is there any way I can make my program skip over page one and continue after it? Or, is there some way I can start the program after hi-res page one and store my shape table, subroutines, and variables below page one?

My second question concerns a space saving measure. I have an array which I dimension as having ten elements. I use only four elements of the array in the program. Will I save space by dimensioning the array with only four elements?

I have also come across a program that makes pictures appear on the hi-res screen two in an unusual way. The only thing is that it doesn't display the entire graphics screen. Instead, it leaves the bottom four lines as text. How can I get the screen to display graphics only, without any text?

Richard Morris
9032 Copenhaver Drive
Potomac, MD 20854

by Bob Ryan inCider staff

Dear Richard:

As far as relocating your program around the hi-res pages is concerned, you should check out Don Fudge's column in the June 1984 *inCider*. Don lets you know how to use HIMEM, LOMEM, and start-of-program pokes to manage the memory available to you. Based on the number of readers who write in with memory management problems, Don's June column could turn out to be the most useful piece we've ever published.

You will save memory by dimensioning your array with four elements instead of ten. Make sure, however, that a four element array will satisfy your future needs as well as your present ones.

Finally, in order to eliminate the four lines of text from the bottom of the hi-res screens, you must toggle some graphics switches. These "switches" are actually dedicated memory locations on page C000 of memory that control what part of memory is to be output to the monitor. Here is a table of the locations you are interested in.

mode switches	49232	graphics mode
	49233	text mode
mix	49234	full screen graphics
	49235	text/graphics mix
page	49236	page 1
	49237	page 2
resolution	49238	lo-res graphics
	49239	hi-res graphics

In your case, you want hi-res, full screen, page two graphics. You should POKE 49232,0: POKE 49234,0: POKE 49237,0: POKE 49238,0. By the way, these are non-destructive pokes. They will not clear the screens before displaying them.

The Two-Bit Game Contest

Have you noticed how things are getting more complicated these days. This is especially true with computer software. Programs are long and complex. Don't you yearn for a simpler time?

Well, yearn no more. Here is a programming contest just for you: the first *inCider* Two-Bit Game Contest. All you have to do is write a two-line Applesoft BASIC game and send it in to the magazine before September 20, 1984. If the editors think your game is the best, you'll get $100. Not a bad rate of pay—$50 per program line. Those lines, of course, can contain as much as you can squeeze into a line of code, so keep those colons handy. You can even poke a shape table into memory if you choose, but remember that the entire game must be contained in two lines of BASIC code.

Send your entries to Two-Bit Game Contest, *inCider* Magazine, 80 Pine Street, Peterborough, NH 03458. The editors' decision is final and anyone not connected with Computerworld Communications, Inc. or International Data Group can take part. The winning entry and honorable mentions will be published in the December *inCider*. Have fun and good luck!

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FEATURES

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Understanding Apple

When I used to repair computers, invariably a friend would raise the television issue. "The left side is folded in a little, do you think you could take a look at it?" I made the usual apologies about computers being just a wee bit different than televisions and quietly slipped away. It was the least I could do.

Now that I spend a lot of time at home writing and consulting on computer topics for a small, but select, group of clients, the computer issue arises. "You know, I was looking at the Apple and the <something>, and I'm having a hard time making up my mind. Do you have a few minutes to talk?"

You can fill in the <something> with almost any brand name you want. Sooner or later everything gets compared to the Apple (or vice versa). Usually what a person means is that the decision has already been made and you now have the onus of either changing their mind or confirming that they made a good choice.

Well, I promised my friends that I'd sit and talk as soon as I got a chance. Unfortunately, at 4:47 am none of them are awake, and, what with writing books and articles, this is the only free time I have. That leaves only one option. Things will be settled here.

Getting to First Base

Usually, when you draw up the specifications for any transition of operations to computers, one of the first things you zero in on is which computer you should buy. The answer is very simple—the Apple. But that's an unqualified answer appearing in a magazine that is rather biased in favor of the machine. As an intelligent consumer, you shouldn't accept that recommendation at it's face value. More investigation is needed. Let's look down the list of usual competitors in an abbreviated, but valid, comparison.

IBM PC/XT

There's nothing wrong with IBM's entry into the microcomputer market. It was needed. There are many people who would never have bought a computer were it not for the PC/XT. They found no solace in the longevity of companies such as Apple, Tandy, and Commodore and needed the old-line association. Also, in many companies slipping a microcomputer through the data processing department was out of the question unless it carried the same initials as the larger mainframe that occupied the room down the hall.

So, the corporate image helped—but what about the machine itself?

You can write to Bill O'Brien at P.O. Box 1010A, Fort Lee, NJ 07024. He can also be reached through CompuServe user ID 74216,1215.

by Bill O'Brien

It's nothing new. It has slots like the Apple (although only three of the five in the floppy-disk model, and five of the eight in the hard-disk model, can be used). The non-hard-disk models have a cassette port that uses the same cable as the TRS Models I and III, and the IBM keyboard, by unanimous acclaim, is arranged in the most terrible fashion. From the company that invented the Selectric typewriter, it was quite a surprise.

The base model comes with 64K, no disk drives, and no video output whatsoever. (That doesn't just mean it has no monitor; it doesn't even have a place to connect one.) You can buy the base machine, take it home, set it up, and do absolutely nothing with it. If you want black-and-white output, you buy a board that plugs into a slot. If you want color output, you buy *another* board.

In my PC, I have dual floppies, both monochrome and RGB (red-green-blue, a high-resolution type of color) video output, the normal composite color output, and a serial port. There's one slot left.

After you have the hardware and it breaks, what do you do? I have first-hand experience on that one. Through my own fault, I managed to disable the serial ports in both my PC and my Apple //e. I removed both boards and headed out to the respective repair centers.

At the IBM facility I was greeted with, "We don't repair boards. There must be someone who does, but we don't." They would "swap" a new board for the broken one at the full purchase price. That was definitely not my idea of a good time.

On another occasion, a friend with a disk drive problem took his machine in to a local IBM dealer in midtown Manhattan. After a few days of diagnosis he was told it would normally cost $500 to repair the drive, but, since he was a friend of the store's owner, they would do it for only $319. He took the drive back and bought a new one for $225. I bought the broken drive from him for $50.

Then there is the software developer who needs questions answered that are not covered in the IBM manuals. At last word, IBM had instituted a $350 yearly fee for providing this type of assistance.

So goes the corporate mentality of the company. There is also industry talk of IBM attempting to eliminate much of the cottage hardware industry that has arisen to support the machine's slot architecture. But this is, presently, only speculation.

Commodore

There is not much to be said either way about Commodore computers. People who use these machines are, perhaps, the bravest of the current computer enthusiasts. Unlike those who purchase other machines, Commodore users are still experiencing the delights of a hobbyist comraderie needed to fill the gaps the company has left in its support.

Whether or not the situation changes depends a lot on Commodore itself. In the past few years at least one computer magazine has recognized this fact and re-iterated the problems with the company. They even added a hopeful note, based on Commodore's own promises to amend its ways. Unfortunately, almost the exact same statement appeared about a year later in the same publication.

Tandy-Radio Shack

Ask any TRS-80 owner and you'll probably be told that the computer is great, but the company leaves much to be desired. Over the past few years there have been some interesting changes in the Radio Shack line, to the betterment of the equipment. But they have also created some interesting inconsistencies from model to model.

There is nothing really bad to be said about any of the line, except that their design does not allow much in the way of additional hardware to be incorporated. For all practical purposes, the Radio Shack computer is a closed system. It's dependent, and you can argue whether or not that dependency is a fault, on Radio Shack itself for hardware upgrades and modifications.

Apple //e

The discussion had to lead here, as it always does. The base machine comes equipped with 64K of RAM, both color and monochrome display capabilities, a cassette port, and no disk drives. The keyboard layout is standard Selectric, although it does have a slightly hollow feel to it.

It doesn't have a detachable keyboard, as the IBM does. But if you have furniture of the correct height—that is, about four inches lower than a standard desk—there's no reason for a detachable keyboard. Its function is to compensate for the height variance.

There are, in total, eight slots available for various pieces of hardware. Of these, five are usable, the other three being occupied by an optional disk controller, additional RAM, and 80-column video output cards.

This last addition can be very important, since the Apple //e does not come standard with 80-column. Its standard screen display is 40 columns wide to make this new version of the computer compatible with older versions.

For software developers, Apple has a Certified Developers program that keeps them informed and provides hardware at a reduced cost to facilitate their work. Without sufficient support from the manufacturer, software development can become a trial and error affair. It stands to reason, then, that the better the relationship between the computer manufacturer and the software developer, the better the programs will be and the sooner they will arrive.

On the repair end, having also destroyed the Apple's Super Serial Card, I took it in to my local authorized Apple repair center. They swapped a working card for the broken one at a cost substantially below the retail price of a new one. My car's engine hardly had time to cool before the exchange was completed. That counts for a lot when I recommend a computer.

All of which is not to say that the Apple doesn't have its faults. There's one glaring deficiency that comes to mind immediately. The storage capability of the typical Apple disk drive is very small compared to current standards. Typically, they hold only 143,000 characters, or the equivalent of about 58 double-spaced pages.

Whether or not this is a factor in your selection of a system will depend on your particular application.

But keep in mind that there are other manufacturers who support the Apple II line and can supply you with larger floppy disks at a minimal cost increment. If you should need an extremely large storage environment there are even hard disks, which have many times the capacity of a floppy disk, available from a selection of manufacturers.

Behind the Hardware

The other factor I consider when recommending a computer is corporate inertia. That's the company's ability (or lack of ability) to respond to customers' likes and dislikes about a product.

In 1981 IBM introduced the PC with the worst keyboard in history. Now, with 1984 almost gone and after universal, if not unanimous, critical review, they have corporately admitted that perhaps the keyboard is not all it could have been. They hope for a replacement before the year is out. That's three years to respond to a problem as simple as a keyboard. If it was built into the machine, the delay might be understandable, but it's not.

Apple, on the other hand, went through seven iterations of its motherboard and several modifications to its keyboard in an attempt to refine the system in response to user-supplied criticisms. That was by late 1981, also over a three-year time span.

Both companies follow the rules of inertia. In the case of IBM it's a company at rest staying at rest. With Apple it's a company in motion remaining in motion. As for the other companies in our overview, take a look at their history.

Commodore has steadily retreated down the list of potential sales outlets. Currently, Toys 'R' Us features Commodore equipment, which should be enough to demonstrate negative user support.

Tandy has always been violently opposed to any other company's product coming into contact with their computer. It's a realistic concept: They shouldn't be in the position of supporting non-Radio Shack products. But no one company can possibly provide everything a user will need.

Of course, if you combine manufacturers in your system, when something doesn't work you get caught in a debate over whose product is at fault. The example that comes immediately to mind involved my original Model I. I had purchased a non-Tandy cassette port interface that drove a serial printer—only mine didn't work. The company that sold it to me exchanged it; the new one didn't work either. I took the computer in for repair and was told there was nothing wrong.

Actually, there was a problem with the computer's cassette port that was not diagnosed for about five months. At that time I purchased a Radio Shack home appliance controller that also used the cassette port. It didn't work either. After several attempts I was finally told that the costs of diagnosing the problem would outweigh the value of the device.

The point is that while a product does change, and must change to reflect the evolution of technology, corporate attitude rarely does. It takes many years for a company to develop a corporate image and strategy. Then, like the proverbial leopard, the spots remain the same throughout its life.

The First Step

What you've just been through is the first step in the last phase of the decision process: identify the company you'll be most comfortable with. In this case, I think you'll admit that Apple does have an edge.

I got a PC for work I was doing at the time. The payment I received more than covered the cost of the machine, and the hardware became a tax deduction after that. Everything else I use is Apple. I'm happy with the company—and I have rather high standards.

The next step is to actually design the system itself, from the ground up. We'll do that next month. Some of you might even find out that as wonderful as your set-up is, you may be missing a few critical components.

In the News

There may be many of you considering an Apple //c portable computer as an adjunct to an existing Apple system. That's not a bad choice—with one exception. Some of the software that is Apple II, II Plus, or //e compatible may not work correctly on the //c.

"Both companies follow the rules of inertia."

All computers use some form of BIOS—the basic input/output system. It controls all of the things that leave the computer proper, including the video. Software people have a tendency to ignore the BIOS at times and write their own routines to handle the screen display. They do this based on certain hardware parameters they know exist in the machine.

Apple changed some of these parameters in the video section of the //c. So, if you already have a version of VisiCalc or pfs, to name just two of the more popular programs affected, that runs on the Apple //e, unless the version specifically states it is //c compatible, odds are it won't run quite the same.

The manufacturers are revamping the software and working versions should be out by the time you read this. My assumption is that updates will be available at a minimal charge, but check with the people involved for the exact details. If you're buying new software with both machines in mind, make sure the sticker says it works on both.

Coming Up

As mentioned, you've just established the foundation for your computer system—the company to buy from. Next month we'll build on that foundation and explore various hardware configurations that can be used in writing.

If all you've ever thought of doing are letters to Aunt Mae, don't be put off. I'll cover everything from the smallest possible arrangement to an all-out configuration for those 470-page manuscripts that just can't wait to get done.

Until then, keep in mind that the Apple II line is the second best computer in the world. Someday someone will invent the best one, but until then, make mine an Apple.■

Hi-Res Text Typing: Part 2

Last month I discussed hi-res text typing and labelling, but I used only vector shapes in my routines, and only 24 lines of 46 characters each. However, my characters were one dot apart, not two, as in normal Apple text, and the result was a 15 percent increase in the capacity of the hi-res screen.

This month I'll discuss block shape text typing, a variety of routine that has become known as a hi-res character generator. Keep in mind that in order to run the routines your HELLO (booting) program should have both POKE 104,64 and POKE 16384,0 in it. Also keep in mind that Apple //e's may use the shift key rather than the escape key for controlling upper/lowercase toggling.

Let's look now at the programs and files I've included this month:

BLOCK CHAR MAKER. If you've typed in the ALLCHAR file from last month and then decide you want hi-res character block shapes, all you need to do is type in this program (**Listing 1**), run it, and type in BSAVE BLOCKCHAR, A$800, L$300. You'll need the BLOCKCHAR file for use with MACH LANG TYPER DRIVER.

MACH LANG TYPER DRIVER—the speed demon of the bunch. With this utility (**Listing 2**) you'll be able to type as fast as you want on the hi-

Address correspondence to Don Fudge at Avant-Garde Creations, P.O. Box 30160, Eugene, OR 97403.

Listing 1. *BLOCK CHAR MAKER.*

```
0  HGR : HCOLOR= 3: REM BLOCK CHAR MAKER
1  PRINT  CHR$ (4)"BLOADALLCHAR": POKE 232,0: POKE 233
     ,16: ROT= 0: SCALE= 1: FOR Y = 0 TO 16 STEP 8: FOR
     X =  - 1 TO 216 STEP 7:CH = CH + 1:XX = X: IF X <
     0 THEN XX = 279
3  XDRAW CH AT XX,Y: NEXT
4  NEXT
5 AD = 2048:B = 8192:C = 15360
10  FOR A = B TO C STEP 1024:P =  PEEK (A): POKE AD,P:
     AD = AD + 1: POKE A,127: NEXT
20 B = B + 1:C = C + 1: IF B = 8224 OR B = 8352 OR B =
     8480 THEN 30
25  GOTO 10
30 Q = Q + 1: ON Q GOTO 40,40,60
40 B = B + 96:C = C + 96
50  GOTO 10
60  END
```

Listing 2. *MACH LANG TYPER DRIVER.*

```
0  HGR : POKE  - 16302,0: HCOLOR= 3: ROT= 0: TEXT : SCALE=
     1
1  REM  MACH LANG TYPER DRIVER
2  ONERR  GOTO 63990
3 D$ =  CHR$ (4): PRINT D$"BLOADBLOCKCHAR": PRINT D$"B
     LOADTYPE"
4  POKE 255,0
5  TEXT : HOME
6  GOTO 250
9  POKE 8,0: POKE 9,0: POKE 227,0: POKE 254,64: POKE 2
     53,0: POKE 6,255: POKE 7,255: POKE 15360,31: RETURN

250  CALL 62450: REM ERASE SCREEN
290  REM  SET POSITION POINTER & UPPER/LOWER TOGGLE FL
     AG IN 295
295 PSN =  - 1:UP = 0:X% = 0:Y% = 0:CH = 64: GOSUB 9
297  TEXT : HOME : PRINT : INVERSE : HTAB 9: PRINT "HI
     -RES TEXT TYPER": NORMAL : PRINT : PRINT : PRINT
     "CTRL A = THIS COMMANDS DISPLAY (A=AID)": PRINT
298  PRINT "CTRL Q = BACK TO MENU"
```

Listing continued.

by Don Fudge

Listing continued.

```
299  PRINT : PRINT "CTRL X = ERASE & RESTART": PRINT :
      PRINT "<--    = BACKSPACE": PRINT : PRINT "<RETU
     RN> = CARRIAGE RETURN TO START OF          NEX
     T LINE": PRINT : PRINT : PRINT : GOSUB 63000
300  REM  MAIN PROG LOOP START FOR TEXT ENTRY
305  HOME : PRINT : PRINT : PRINT : PRINT "NOW TYPE WI
     TH THE KEYBOARD, USING ESC ASYOUR UPPER CASE/LOWE
     R CASE TOGGLE, OR   ELSE TYPE ONE OF THE CTRL CHA
     RACTER     COMMANDS, SUCH AS CTRL Q TO QUIT TYPIN
     G & GO TO MENU.": PRINT
308  GOSUB 63000
309  POKE  - 16304,0: POKE  - 16297,0: REM DISPLAY HI-
     RES PAGE 1
310  CALL 2816
320 A =  PEEK (255): IF A = 1 THEN 297
330  IF A = 17 THEN 2999
340  IF A = 24 THEN 250
2999  TEXT : HOME : PRINT
3000  PRINT "(1) SAVE THE CURRENT SCREEN": PRINT : PRINT
     "(2) LOAD A SAVED SCREEN": PRINT : PRINT "(3) ERA
     SE SCREEN; RETURN TO TYPE MODE": PRINT : PRINT "(
     4) DON'T ERASE; RETURN TO TYPE MODE"
3001 : INVERSE : PRINT : PRINT "RETURN";: NORMAL : PRINT
     " CATALOG DISK   ": PRINT
3010  PRINT "(1-4): ";: GET A$
3015  PRINT  CHR$ (13): CALL 1002
3018  IF  ASC (A$) = 13 THEN  PRINT D$"CATALOG": GOSUB
     63000: GOTO 2999
3019  IF  ASC (A$) < 49 OR  ASC (A$) > 52 THEN 2999
3020  ON  VAL (A$) GOTO 4000,5000,250,3100
3100  POKE  - 16304,0: POKE  - 16297,0: GOTO 310
```

Listing continued.

res page with 7-by-8 characters, to a total of 40 characters per line and 24 lines, just like normal Apple text. Return is the carriage return, escape is the upper/lowercase toggle, backspacing is available, control-X erases and restarts, control-A summons the help menu, and control-Q lets you quit, after which you can save or load a hi-res picture, summon the disk catalog, or return to typing.

HI-RES BLOCK TEXT TYPER (**Listing 3**). I suggest that you *do not* type in this program! It is functional, but slow—for instructional purposes only. Compare it with MACH LANG TYPER DRIVER to see how machine language drivers are created from BASIC utilities. And compare HI-RES BLOCK TEXT TYPER to last month's HI-RES TEXT TYPER (which uses the vector shape characters of ALLCHAR) to see the differences between BASIC vector shape use and BASIC block shape use.

BLOCKCHAR, A$800, L$300. This block shape table (**Listing 4**) is a file of characters that take eight bytes apiece. There are 96 characters, so the file occupies 768 (8×96) bytes. You need to type BLOCKCHAR in unless you're using ALLCHAR from last month. Use BLOCK CHAR MAKER to create the BLOCKCHAR file.

TYPE,A$B00,L$250. This machine language routine (**Listing 5**) is needed in MACH LANG TYPER DRIVER. It's $250 bytes long and resides at $B00.

The routines in HI-RES TEXT TYPER let you see how to draw ALLCHAR's vector shape characters—which of course you can also do in programs you write yourself. Similarly, HI-RES BLOCK TEXT TYPER will show you how to use the block shape characters in BLOCKCHAR.

Block Shapes Versus Vector Shapes

A block shape is a block of hi-res bytes that is basically a data array. Character block shapes are one byte wide and eight lines tall. Block shapes are faster than vector shapes when used with machine language. However, in BASIC programs block shapes may be either faster or slower than vector shapes, depending on how they are used. In the case of HI-RES BLOCK TEXT TYPER, the

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Listing continued.

```
4000  TEXT : HOME : INPUT "SCREEN NAME: ";SC$: IF  LEN
     (SC$) = 0 THEN 2999
4005  GOSUB 20000
4010  PRINT D$"BSAVE"SC$",A$2000,L$1FF8": GOSUB 21000:
      GOTO 2
5000  TEXT : HOME : INPUT "SCREEN NAME: ";SC$: IF  LEN
     (SC$) = 0 THEN 2999
5005  GOSUB 20000
5010  PRINT D$"BLOAD"SC$",A$2000"
5015  GOSUB 21000
5035  POKE  - 16304,0: POKE  - 16297,0: GOSUB 63000
5040  GOTO 2999
20000  TEXT : HOME : FLASH : PRINT : PRINT "SWITCH TO
     YOUR DATA DISK.": NORMAL : GOSUB 63000: RETURN
21000  TEXT : HOME : FLASH : VTAB 4: PRINT "SWITCH TO
     YOUR PROGRAM DISK.": NORMAL : GOSUB 63000: RETURN

63000  PRINT : PRINT "(HIT SPACE BAR TO CONTINUE):": NORMAL

63010 PK =  PEEK ( - 16384): IF PK > 127 THEN  POKE  -
     16368,0: RETURN
63020  GOTO 63010
63990 ER =  PEEK (222): POKE 216,0
63991  ONERR  GOTO 63990
63995  IF ER = 254 THEN  RESUME
63999  GOTO 2999
```

block shapes are considerably slower than the vector shapes of HI-RES TEXT TYPER. Vector shapes can also be scaled, rotated, and are easier to use from BASIC than are block shapes. See your Apple manual or my past *inCider* columns for more on vector shapes.

Block Shapes and Hi-Res Screen Mapping

When block shape characters are used, they normally appear at the same screen locations as Apple text screen characters. This means that the upper left screen coordinate of a block shape character is (0,0) or (0,8) or (0,16) or (7,0) or (14,0) or (7,8) or (21,64), and so on. In other words, we use block shape X coordinates that are multiples of 7, and Y coordinates that are multiples of 8.

At the first hi-res character position (0,0) the actual hi-res screen addresses used are those in **Figure 1**. Each of these addresses contains an eight-bit byte, seven of which are displayed on the screen. (The eighth bit is used as a color flag.) **Figure 2** is a representation of the bit positions for one hi-res character.

The way an uppercase A fits into a block shape of eight bytes is diagrammed in **Figure 3**. Notice how bytes are normally displayed with the highest bit on the left, but the Apple hi-res screen displays all bytes backwards.

Also notice that bits 5 and 6 are kept blank (off) so there will be space between the displayed or printed characters. You should be aware that 6-by-8 character blocks using only one spacing bit between characters would suffice for good text reading, even though they wouldn't fit into the 7-bit-per-byte-display format of Apple block shape characters. Remember that the HI-RES TEXT TYPER program does just that, with the help of vector shapes.

Notice that the actual characters themselves are five wide and seven tall for vector or block shapes, and for either 6-by-8 character blocks (with one-bit spacing) or 7-by-8 character blocks (with two-bit spacing).

Variations

If you wanted to make inverse block shape characters possible, you could do it in any of three ways:

1) Before POKEing shape bytes into hi-res locations in the program, subtract them from 255. This inverses a byte. This could be done in BASIC in the GOSUB 9 of HI-RES BLOCK TEXT TYPER, or in machine language in the

Circle 310 on Reader Service card.

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Listing 3. *HI-RES BLOCK TEXT TYPER.*

```
0  HGR : POKE  - 16302,0: HCOLOR= 3: ROT= 0: TEXT : SCALE=
     1
1  REM  HI-RES BLOCK TEXT TYPER
2  ONERR  GOTO 63990
3 D$ =  CHR$ (4): PRINT D$"BLOADBLOCKCHAR"
4 AD = 2040
5  TEXT : HOME
6  GOTO 250
7  IF PSN > 959 THEN 2999
8  GOTO 310
9  HCOLOR= 0: HPLOT 7 * X%,Y%:B =  PEEK (38) +  PEEK (
     39) * 256 + X%:AA = 0: FOR E = B TO B + 7168 STEP
     1024: POKE E, PEEK (AD + CH * 8 + AA):AA = AA + 1
     : NEXT : RETURN
250  CALL 62450: REM ERASE SCREEN
290  REM  SET POSITION POINTER & UPPER/LOWER TOGGLE FL
     AG IN 295
295 PSN =  - 1:UP = 0:X% = 0:Y% = 0:CH = 64: GOSUB 9
297  TEXT : HOME : PRINT : INVERSE : HTAB 9: PRINT "HI
     -RES TEXT TYPER": NORMAL : PRINT : PRINT : PRINT
     "CTRL A = THIS COMMANDS DISPLAY (A=AID)": PRINT
298  PRINT "CTRL Q = BACK TO MENU"
299  PRINT : PRINT "CTRL X = ERASE & RESTART": PRINT :
      PRINT "<--    = BACKSPACE": PRINT : PRINT "<RETU
     RN> = CARRIAGE RETURN TO START OF             NEX
     T LINE": PRINT : PRINT : PRINT : GOSUB 63000
300  REM  MAIN PROG LOOP START FOR TEXT ENTRY
305  HOME : PRINT : PRINT : PRINT : PRINT "NOW TYPE WI
     TH THE KEYBOARD, USING ESC ASYOUR UPPER CASE/LOWE
     R CASE TOGGLE, OR   ELSE TYPE ONE OF THE CTRL CHA
     RACTER     COMMANDS, SUCH AS CTRL Q TO QUIT TYPIN
     G & GO TO MENU.": PRINT
308  GOSUB 63000
309  POKE  - 16304,0: POKE  - 16297,0: REM DISPLAY HI-
     RES PAGE 1
310  HCOLOR= 3: GOSUB 500: GET A$:A =  ASC (A$): IF A =
     27 THEN UP =  NOT UP: GOTO 310: REM GET CHAR & HA
     NDLE ESC AS UPPER/LOWER TOGGLE
311  IF A = 17 THEN 2999: REM CTRL Q TO QUIT
312  IF A = 24 THEN 250: REM  ERASE & RESTART
313  IF A = 1 THEN 297: REM CTRL A FOR AID MENU
320 PSN = PSN + 1: IF PSN = 960 THEN PSN =  - 1: REM
     UPDATE TEXT POSITION
325  IF A = 13 THEN CH = 1:Y% = 8 *  INT (PSN / 40):X%
      = PSN -  INT (PSN / 40) * 40: GOSUB 9:PSN =  INT
     ((PSN + 1) / 40) * 40 + 39: GOTO 7: REM  HANDLE C
     ARRIAGE RETURN
327  IF A = 8 THEN CH = 1:Y% = 8 *  INT (PSN / 40):X% =
     PSN -  INT (PSN / 40) * 40: GOSUB 9:PSN = PSN - 2
      * (PSN > 2): GOSUB 500: GOTO 310: REM  BACKSPACE
330 CH = A - 31: IF CH < 0 THEN CH = 1: REM    TABLE #
     S START AT ASC 32 (SPACE BAR); < 33 WILL BE SEEN
     AS SPACE
340  IF A >  = 65 AND A <  = 90 AND UP = 0 THEN CH = C
     H + 32: REM  LOWER CASE IF UPPER CASE FLAG=0
350 Y% = 8 *  INT (PSN / 40):X% = PSN -  INT (PSN / 40
     ) * 40: GOSUB 9: GOTO 310: REM   DRAW TYPED CHAR
500 Y% = 8 *  INT ((PSN + 1) / 40):X% = (PSN + 1) -  INT
     ((PSN + 1) / 40) * 40:CH = 64: GOSUB 9: RETURN : REM
      CURSOR ROUTINE
2999  TEXT : HOME : PRINT
3000  PRINT "(1) SAVE THE CURRENT SCREEN": PRINT : PRINT
     "(2) LOAD A SAVED SCREEN": PRINT : PRINT "(3) ERA
     SE SCREEN; RETURN TO TYPE MODE": PRINT : PRINT "(
     4) DON'T ERASE; RETURN TO TYPE MODE"
3001 : INVERSE : PRINT : PRINT "RETURN";: NORMAL : PRINT
     " CATALOG DISK   ": PRINT
3010  PRINT "(1-4): ";: GET A$
3015  PRINT  CHR$ (13): CALL 1002
3018  IF  ASC (A$) = 13 THEN  PRINT D$"CATALOG": GOSUB
     63000: GOTO 2999
3019  IF  ASC (A$) < 49 OR  ASC (A$) > 52 THEN 2999
```

Listing continued.

8192
9216
10240
11264
12288
13312
14336
15360

Figure 1. *Hi-res screen addresses associated with the first hi-res character position (0,0).*

0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Figure 2. *Representation of bit positions for one hi-res character.*

TYPE routine. Or you could write a quick routine that would create an inverse block shape table, using the BLOCKCHAR file for data. (The latter must be BLOADed first.) Type in FOR A=2048 TO 2815:P=PEEK(A):P = 255-P:POKE A,P:NEXT, followed by BSAVE BLOCKCHAR.INVERSE, A$800, L$300.

2) Another way to accomplish the inversing task is to change the BLOCK CHAR MAKER program so it XDRAWs black shapes on a white background. You'll need to change HCOLOR=3 in line 0 to HCOLOR=3:HPLOT 0,0:CALL 62454:HCOLOR=0. The HCOLOR=0 is merely a reminder command and is optional, just as the original HCOLOR=3 in line 0 was. It tells you what color you'll be drawing in—3 for white or 0 for black. Since XDRAW is the drawing command, color setting is irrelevant; XDRAW gives your shape bits the opposite color from the present screen color at that screen bit.

3) To make HI-RES TEXT TYPER do inverse typing screens you need to change lines 0, 250, 310, 325, and 327. In 0 you need to use HGR:POKE -

16302,0:HCOLOR=3:HPLOT 0,0: CALL 62454:HCOLOR=0:ROT=0: SCALE=1:TEXT. In line 250 try HCOLOR=3:HPLOT 0,0:CALL 62454 :HCOLOR=0.

In lines 310, 325, and 327 change every HCOLOR=3 to HCOLOR=0 and every HCOLOR=0 to HCOLOR=3.

In long lines don't forget that POKE 33,33 helps your subsequent edits. Use it in immediate mode.

Now it's your turn to get creative and figure out a way to type text in colored backgrounds. Hint: The word "bold" may help alleviate problems—so be bold!

See you next time.■

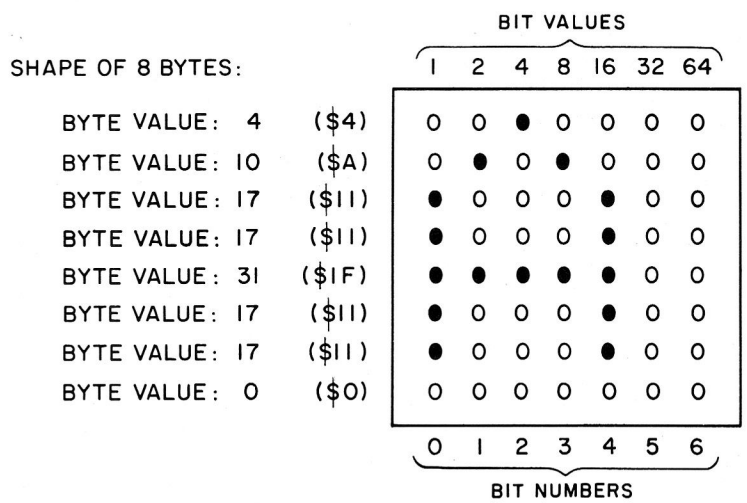
Listing continued.

```
3020  ON  VAL (A$) GOTO 4000,5000,250,3100
3100  POKE  - 16304,0: POKE  - 16297,0: GOTO 310
4000  TEXT : HOME : INPUT "SCREEN NAME: ";SC$: IF  LEN
     (SC$) = 0 THEN 2999
4002  HCOLOR= 0: GOSUB 500
4005  GOSUB 20000
4010  PRINT D$"BSAVE"SC$",A$2000,L$1FF8": GOSUB 21000:
      GOTO 2
5000  TEXT : HOME : INPUT "SCREEN NAME: ";SC$: IF  LEN
     (SC$) = 0 THEN 2999
5005  GOSUB 20000
5010  PRINT D$"BLOAD"SC$",A$2000"
5015  GOSUB 21000
5035  POKE  - 16304,0: POKE  - 16297,0: GOSUB 63000
5040  GOTO 2999
20000  TEXT : HOME : FLASH : PRINT : PRINT "SWITCH TO
     YOUR DATA DISK.": NORMAL : GOSUB 63000: RETURN
21000  TEXT : HOME : FLASH : VTAB 4: PRINT "SWITCH TO
     YOUR PROGRAM DISK.": NORMAL : GOSUB 63000: RETURN

63000  PRINT : PRINT "(HIT SPACE BAR TO CONTINUE):": NORMAL

63010 PK =  PEEK ( - 16384): IF PK > 127 THEN  POKE  -
     16368,0: RETURN
63020  GOTO 63010
63990 ER =  PEEK (222): POKE 216,0
63991  ONERR  GOTO 63990
63995  IF ER = 254 THEN  RESUME
63999  GOTO 2999
```

Figure 3. *Configuration of bits for a hi-res uppercase A.*



Listing 4. *BLOCKCHAR, A$800, L$300.*

```
0800- 00 00 00 00 00 00 00 00
0808- 04 04 04 04 04 00 04 00
0810- 0A 0A 0A 00 00 00 00 00
0818- 0A 0A 1F 0A 1F 0A 0A 00
0820- 04 1E 05 0E 14 0F 04 00
0828- 03 13 08 04 02 19 18 00
0830- 02 05 05 02 15 09 16 00
0838- 04 04 04 00 00 00 00 00
0840- 04 02 01 01 01 02 04 00
0848- 04 08 10 10 10 08 04 00
0850- 04 15 0E 04 0E 15 04 00
0858- 00 04 04 1F 04 04 00 00
0860- 00 00 00 00 00 04 04 02
0868- 00 00 00 1F 00 00 00 00
0870- 00 00 00 00 00 00 04 00
0878- 00 10 08 04 02 01 00 00
0880- 0E 11 19 15 13 11 0E 00
0888- 04 06 04 04 04 04 0E 00
0890- 0E 11 10 0C 02 01 1F 00
0898- 1F 10 08 0C 10 11 0E 00
08A0- 08 0C 0A 09 1F 08 08 00
08A8- 1F 01 0F 10 10 11 0E 00
08B0- 1C 02 01 0F 11 11 0E 00
08B8- 1F 10 08 04 02 02 02 00
08C0- 0E 11 11 0E 11 11 0E 00
08C8- 0E 11 11 1E 10 08 07 00
08D0- 00 00 04 00 04 00 00 00
08D8- 00 00 00 04 00 04 04 02
08E0- 08 04 02 01 02 04 08 00
08E8- 00 00 1F 00 1F 00 00 00
08F0- 02 04 08 10 08 04 02 00
08F8- 0E 11 08 04 04 00 04 00
0900- 0E 11 15 1D 0D 01 1E 00
0908- 04 0A 11 11 1F 11 11 00
0910- 0F 11 11 0F 11 11 0F 00
0918- 0E 11 01 01 01 11 0E 00
0920- 0F 11 11 11 11 11 0F 00
0928- 1F 01 01 0F 01 01 1F 00
0930- 1F 01 01 0F 01 01 01 00
0938- 1E 01 01 01 19 11 1E 00
0940- 11 11 11 1F 11 11 11 00
0948- 0E 04 04 04 04 04 0E 00
0950- 10 10 10 10 10 11 0E 00
0958- 11 09 05 03 05 09 11 00
0960- 01 01 01 01 01 01 1F 00
0968- 11 1B 15 11 11 11 11 00
0970- 11 11 13 15 19 11 11 00
0978- 0E 11 11 11 11 11 0E 00
0980- 0F 11 11 0F 01 01 01 00
0988- 0E 11 11 11 15 09 16 00
0990- 0F 11 11 0F 05 09 11 00
0998- 0E 11 01 0E 10 11 0E 00
09A0- 1F 04 04 04 04 04 04 00
09A8- 11 11 11 11 11 11 0E 00
09B0- 11 11 11 11 11 0A 04 00
09B8- 11 11 11 15 15 1B 11 00
09C0- 11 11 0A 04 0A 11 11 00
09C8- 11 11 0A 04 04 04 04 00
09D0- 1F 10 08 04 02 01 1F 00
09D8- 1F 03 03 03 03 03 1F 00
09E0- 00 01 02 04 08 10 00 00
09E8- 1F 18 18 18 18 18 1F 00
09F0- 00 00 04 0A 11 00 00 00
09F8- 00 00 00 00 00 00 00 1F
0A00- 02 04 08 00 00 00 00 00
0A08- 00 00 0E 08 0E 09 1E 00
0A10- 01 01 0D 13 11 13 0D 00
0A18- 00 00 1E 01 01 01 1E 00
0A20- 10 10 16 19 11 19 16 00
0A28- 00 00 0E 11 1F 01 0E 00
0A30- 0C 12 02 07 02 02 02 00
0A38- 00 00 16 19 19 16 10 0E
```

Listing continued.

Listing continued.

```
ØA4Ø- Ø1 Ø1 ØD 13 11 11 11 ØØ | ØAAØ- Ø4 Ø4 ØE Ø4 Ø4 Ø4 Ø4 ØØ
ØA48- Ø4 ØØ Ø6 Ø4 Ø4 Ø4 ØE ØØ | ØAA8- ØØ ØØ 11 11 11 11 ØE ØØ
ØA5Ø- Ø4 ØØ Ø6 Ø4 Ø4 Ø4 Ø5 Ø2 | ØABØ- ØØ ØØ 11 11 11 ØA Ø4 ØØ
ØA58- Ø1 Ø1 Ø9 Ø5 Ø3 Ø5 Ø9 ØØ | ØAB8- ØØ ØØ 11 15 15 15 ØA ØØ
ØA6Ø- Ø6 Ø4 Ø4 Ø4 Ø4 Ø4 ØE ØØ | ØACØ- ØØ ØØ 11 ØA Ø4 ØA 11 ØØ
ØA68- ØØ ØØ ØB 15 15 15 15 ØØ | ØAC8- ØØ ØØ 11 11 11 1E 1Ø ØE
ØA7Ø- ØØ ØØ ØD 13 11 11 11 ØØ | ØADØ- ØØ ØØ 1F Ø8 Ø4 Ø2 1F ØØ
ØA78- ØØ ØØ ØE 11 11 11 ØE ØØ | ØAD8- 1C Ø2 Ø4 Ø3 Ø4 Ø2 1C ØØ
ØA8Ø- ØØ ØØ ØF 11 11 ØF Ø1 Ø1 | ØAEØ- Ø2 Ø4 Ø8 1Ø Ø8 Ø4 Ø2 ØØ
ØA88- ØØ ØØ ØE Ø9 Ø9 ØE Ø8 18 | ØAE8- Ø7 Ø8 Ø4 18 Ø4 Ø8 Ø7 ØØ
ØA9Ø- ØØ ØØ ØD 13 Ø1 Ø1 Ø1 ØØ | ØAFØ- Ø2 15 Ø8 ØØ ØØ ØØ ØØ ØØ
ØA98- ØØ ØØ 1E Ø1 ØE 1Ø ØF ØØ | ØAF8- 7F 7F 7F 7F 7F 7F 7F 7F
```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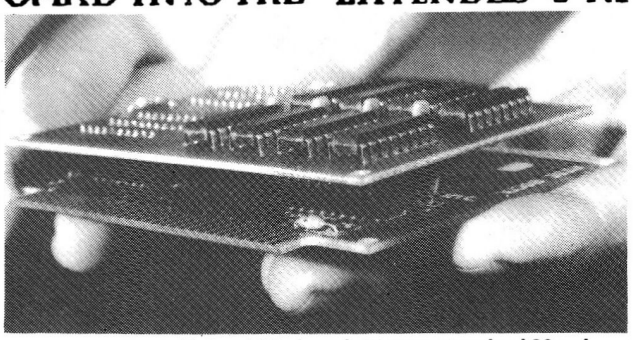

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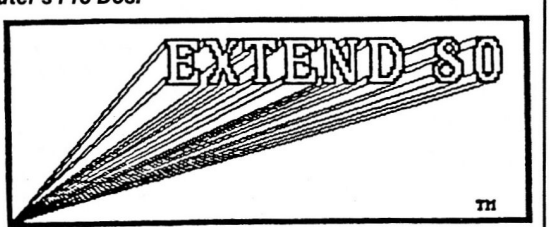

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Listing 5. *TYPE, A$B00,L$250.*

```
ØB00- 20 68 0C AD 00 C0 C9 80
ØB08- 90 F9 8D 10 C0 AD 00 C0
ØB10- 85 FF 20 68 0C A5 FF C9
ØB18- 1B D0 11 A5 FD F0 06 A9
ØB20- 00 85 FD F0 04 A9 01 85
ØB28- FD 4C 00 0B A5 FF C9 11
ØB30- D0 01 60 C9 18 D0 01 60
ØB38- C9 01 D0 01 60 E6 06 D0
ØB40- 02 E6 07 A5 06 C9 C0 D0
ØB48- 0B A5 07 C9 03 D0 05 A9
ØB50- 18 85 FF 60 A5 FF C9 0D
ØB58- F0 07 C9 08 F0 03 4C 0B
ØB60- 0C A9 01 85 FE A5 06 85
ØB68- EB A9 28 85 ED A5 07 20
ØB70- 2A 0D A5 EE 85 E3 06 E3
ØB78- 06 E3 06 E3 A5 E3 85 EC
ØB80- A9 05 85 ED 20 16 0D 85
ØB88- 1F A5 EB 85 1E 38 A5 06
ØB90- E5 1E 85 08 A5 07 E5 1F
ØB98- 85 09 20 BD 0C A5 FF C9
ØBA0- 08 F0 48 A5 07 85 1F A5
ØBA8- 06 85 EB E6 EB D0 02 E6
ØBB0- 1F A9 28 85 ED A5 1F 20
ØBB8- 2A 0D A5 EE 85 ED A9 28
ØBC0- 85 EC 20 16 0D 85 07 A5
ØBC8- EB 85 06 18 69 27 85 06
ØBD0- A5 07 69 00 85 07 C9 03
ØBD8- B0 03 4C 00 0B A5 06 C9
ØBE0- C0 90 05 A9 11 85 FF 60
ØBE8- 4C 00 0B A5 07 D0 09 A5
ØBF0- 06 C9 03 B0 03 4C 05 0C
ØBF8- 38 A5 06 E9 02 85 06 A5
ØC00- 07 E9 00 85 07 20 68 0C
ØC08- 4C 00 0B A5 FF 38 E9 1F
ØC10- 85 FE 10 04 A9 01 85 FE
ØC18- A5 FF C9 41 90 0F C9 5B
ØC20- B0 0B A5 FD D0 07 A5 FE
ØC28- 18 69 20 85 FE A5 06 85
ØC30- EB A9 28 85 ED A5 07 20
ØC38- 2A 0D A5 EE 85 E3 06 E3
ØC40- 06 E3 06 E3 A5 E3 85 EC
ØC48- A9 05 85 ED 20 16 0D 85
ØC50- 1F A5 EB 85 1E 38 A5 06
ØC58- E5 1E 85 08 A5 07 E5 1F
ØC60- 85 09 20 BD 0C 4C 00 0B
ØC68- A5 07 85 1F A5 06 85 EB
ØC70- E6 EB D0 02 E6 1F A9 28
ØC78- 85 ED A5 1F 20 2A 0D A5
ØC80- EE 85 E3 06 E3 06 E3 06
ØC88- E3 A5 E3 85 EC A9 05 85
ØC90- ED 20 16 0D 85 1F A5 EB
ØC98- 85 1E A5 06 85 08 A5 07
ØCA0- 85 09 E6 08 D0 02 E6 09
ØCA8- A5 08 38 E5 1E 85 08 A5
ØCB0- 09 E5 1F 85 09 A9 40 85
ØCB8- FE 20 BD 0C 60 A5 E3 A0
ØCC0- 00 A2 00 20 11 F4 A5 27
ØCC8- 85 FB A5 26 85 FA 18 65
ØCD0- 08 85 FA A5 FB 65 09 85
ØCD8- FB A9 08 85 19 A5 FE 85
ØCE0- 1E A9 00 18 85 1F 06 1E
ØCE8- 26 1F 06 1E 26 1F 06 1E
ØCF0- 26 1F 18 A9 F8 65 1E 85
ØCF8- 1E A9 07 65 1F 85 1F A0
ØD00- 00 B1 1E 91 FA E6 1E 18
ØD08- A5 FB 69 04 85 FB C6 19
ØD10- F0 03 4C 01 0D 60 A9 00
ØD18- 85 EB A2 08 46 EC 90 03
ØD20- 18 65 ED 6A 66 EB CA D0
ØD28- F3 60 A2 00 86 EE A0 08
ØD30- 38 E5 ED 08 26 EE 06 EB
ØD38- 2A 28 90 05 E5 ED 4C 43
ØD40- 0D 65 ED 88 D0 ED B0 03
ØD48- 65 ED 18 26 EE 60 00 00
```

inCider's inSidious inSolubles

Chip Uhn of Los Angeles wrote to inquire whether the inSolubles are puzzles that just happen to be on a computer or puzzles having to do with programming. But, Chip, that's the point of the inSolubles. As you type in those BASIC programs, strange developments mystically emerge from the depths of the silicon and one can never be sure just where the problem lies. Remember, as I said before, some of the inSolubles are hard, some are easy, some tricky, some just cute. All have answers, but, like all programs, you will probably be able to induce improvements. Now that we are providing two inSolubles each month, you should find more diversity among the problems.

If you haven't submitted an entry, why not? The rules are simple and the reward is fruitful. If your entry is printed you will receive a free 12-month subscription to *inCider*, or your present subscription will be extended, and your name will appear with your inSoluble. If you would like a response to your submission before it appears on *inCider*'s pages, please enclose a self-addressed stamped envelope.

Rules for inSidious inSolubles

1. An inSoluble must be a BASIC program in Applesoft. Any POKEd machine language subroutines and CALLs to that subroutine must be correct.
2. The program must accomplish something. In other words, when it's run, you should get some kind of result.
3. The program should not produce an error message of any kind, unless there is a typing mistake. It shouldn't crash.
4. There must be a short explanation of what the program is supposed to do. It may contain clues to the problem.
5. The program may make use of common peripherals such as disk, printer, or modem.
6. The program may have more than one error.

The shorter the inSoluble, the better—but we like programs that do something useful. Remember to provide the solution!

Send inSolubles to Art Ude, c/o inCider, *80 Pine Street, Peterborough, NH 03458.*

Equal or Not Equal

Tom Lorenzin of Mooresville, NC, and John Lomartire of Westport, CT, entered similar problems for this month's first inSoluble: Equal or Not Equal, That Is the Question. As you write your own checkbook program and try to reconcile the balance with that of the bank's statement, keep in mind that, when it concerns Applesoft floating point numbers, all things are not created equal.

Listing 1. *Equal or Not Equal, That Is the Question.*

```
10  REM EQUAL OR NOT EQUAL
20 X =  INT ( RND (1) * 150):Y =
     X / 100
30  PRINT "ENTER "Y" ON THE KEYBO
     ARD ";
40  INPUT Z
50  IF Z = 0 THEN  END
60  IF Z = Y THEN  PRINT "EQUAL"
70  IF Z <  > Y THEN  PRINT "NOT
     EQUAL  X/100= "X / 100" Y= "
     Y"  Z= "Z
80  PRINT
90  GOTO 20
```

The Imperfect Menu

Mike Wood of Hofstra University in Hempstead, NY, provides our second inSoluble: The Imperfect Menu.

> A simple choice
> the menu whose
> ASCII number
> lets you choose.
>
> Procrastinate,
> you must excuse
> our poor intent
> to just bemuse.

Tom, John, and Mike will each receive a free subscription to *inCider* for their efforts. ■

Listing 2. *The Imperfect Menu.*

```
10  REM THE IMPERFECT MENU
20  TEXT : HOME : PRINT "--------
    ----------------------------
    ---": INVERSE : PRINT "
    INCIDER'S INSIDIOUS MAIN MEN
    U      ": NORMAL : PRINT "---
    ----------------------------
    --------"
30  VTAB 6: HTAB 1: PRINT " CHOOS
    E ONE OF THE FOLLOWING:"
40  VTAB 10: PRINT "     <A> IF YO
    U WISH TO CONTINUE."
50  PRINT "     <B> IF YOU WISH TO
     EXIT PROGRAM."
60  PRINT "     <C> IF YOU WISH TO
     RE-BOOT."
70  VTAB 19: HTAB 12: PRINT "WHIC
    H: ";: FLASH : PRINT " ": NORMAL

80 T = 0
90 T = T + 1: IF T > 200 THEN 380

100 A =  PEEK (49152)
110  IF A < 128 THEN 90
120  POKE 49168,255
130 A$ =  CHR$ (A)
140  IF A$ = "A" THEN  GOTO 300: REM
    CONTINUE
150  IF A$ = "B" THEN  END
160  IF A$ = "C" THEN  PR# 6
170  GOTO 90
300  PRINT "REST OF PROGRAM GOES
    HERE"
310  END
380  CALL  - 198: PRINT "WHAT HAP
    PENED?"
```

Solutions on page 124.

by Art Ude

Remarks and Subroutines

A lot of emphasis has been given in recent years to using "structured programming techniques" in writing computer programs. The reason for this is easy to understand in light of the problems associated with so many of the programs written prior to 1970. The important thing in those "early" years of computing was to get a program to work. Little thought was given to the time and effort that would be needed to maintain the program once it was in use. Because of this, programs were often written in a helter-skelter fashion and could be understood only by the original programmer (if then).

Yet few programs are ever really finished. Sometimes bugs turn up only after several months or even years of operation, when some unusual combination of data crops up to cause a system crash. Other times a program needs to be modified to handle changing business requirements or to enhance its usefulness. In each of these situations a well-written and documented structured program proves to be worth its weight in gold. Any experienced programmer should be able to understand the operation of such a program in minimal time and to make necessary changes with minimal effort, thus saving time, money, and frustration.

In this article I will present some of the BASIC programming instructions you can use in your own programs to make them follow structured techniques. Even if you don't intend to write complicated programs for others to use, you will find that altering an old program after being away from it for several months is much easier if you have used structured concepts in its original design and coding. But first . . .

The Remark Statement

One of the easiest ways to make your programs more understandable, both to yourself and to others who may read them later, is to add comments throughout that explain what you are doing and how you are doing it. BASIC uses the REM command to do this. Whenever you think a note of explanation might be useful, add a line to your program that begins with REM, followed by your comment.

The computer recognizes the REM command as a signal that anything that follows is meant for human consumption only. It thus ignores the rest of that program line and goes on to the next one. What better opportunity for you to describe what you are doing?

Most newer, so-called "structured languages" such as Pascal require the programmer to "declare" the variables that are used within the program. This declaration is nothing more than a list of the variables and their type. BASIC will work without declaring the variables, but you can still use REM statements to make a list for reference purposes. However, it does require discipline on your part to take the time to add these lines. The only compensation for the effort is the consolation that it will pay off someday either for you or for someone else who is using your program.

For example, suppose your program contains the following two lines:

```
280 PRINT"WHAT IS YOUR NAME?"
290 INPUT NM$
```

At the beginning of the program you should include a REM line telling what the variable NM$ will represent. The following could be used:

```
11 REM NM$-THE USER'S NAME
```

As another example, suppose your program is designed to calculate your automobile's gas consumption. See **Listing 1** for such a program that includes a complete section at the beginning to list the variables to be used. Note also the REM statement in the first line that lists the title. An author line could also be added.

Again, none of these REM statements are necessary for proper operation of the program, and for such simple examples as these you may feel their use is a waste of time. But let me re-emphasize that good programming practice is a discipline as well as a skill. If you make yourself use good programming practice now, while you are writing fairly simple programs, you will develop habits essential to successfully writing more complex programs later on.

There is one other helpful feature demonstrated in **Listing 1**. Note that all of the program statements have line numbers that are multiples of ten, while the REM statement line numbers fall within these intervals. This is not a requirement of BASIC, but a programming practice that I have found very useful. There may come a time (believe it or not) when a program you are writing requires

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

by Dan Bishop

more memory than your computer has. When this happens, the first thing you will do is make a printed listing of the program with all of the REM statements (to be kept for future reference). You then will go back and begin removing REM statements to make more room in memory for your computer to work with.

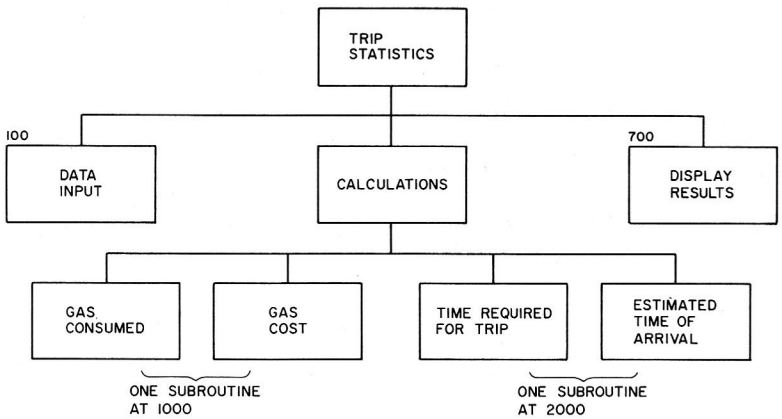
There is an inherent danger when you remove a program line, however. If you have a GOTO 380 instruction, for instance, and you remove line 380, the program will crash with an "undefined line number" error. Because of this danger, be sure that any line number references in GOTO and GOSUB instructions use line numbers of actual program instructions—never line numbers of REM statements that might someday be removed from the program. Always using multiples of 10 for program line numbers and placing REM statements within those intervals makes this easier.

The Subroutine—A Mini Program

The basic concept of structured programming is modular program design. Any program beyond the simplest consists of a number of functions that work together to carry out a given task. In the past no effort was made to isolate these functions. They were merely strung together or intertwined in the most convenient manner. This often meant the program was a hodge-podge of individual instructions that would, by some miracle or other, do the job. But whenever a modification had to be made, finding the exact instructions to be changed was difficult at best. Also, you could never be sure that the newly added or altered code wouldn't affect something else in another part of the program.

With structured programming, the major programming task is analyzed and broken down into several individually identifiable subtasks. If necessary each of these subtasks is further broken down into sub-subtasks. In developing a program it is useful to create a hierarchy diagram to represent the various functions involved, and how they relate to each other, much as a large corporation might use a hierarchy diagram to show the functional relationships that exist within the organization. The **Figure** is a hierarchy diagram for the road trip statistics program (**Listing 2**) presented later in this article.

Figure. *A hierarchy diagram for the program in Listing 2. Note that the program task, trip statistics, has been broken down into three subroutines and that the second of these has been further broken down into four individual functions. Diagrams such as this are very helpful in the design stages of programming.*



The lower levels of the hierarchy diagram represent functions that should be possible to carry out with only a few lines of program code. Each of these short functions is written into the program as a separate identifiable module. The main program, then, becomes no more than a list of commands that call up these modules as they are needed.

In BASIC such a module is referred to as a subroutine. A subroutine is distinguished from the main program only by the choice of line numbers assigned to it. For example, you may decide to use line numbers 10 to 5000 for the main program and line numbers 6000 and up for subrou-

Listing 1. *A short program illustrating the use of remark statements to document variables used by the program and to add comments describing the functions taking place within the program.*

```
1 REM PROGRAM TO CALCULATE FUEL CONSUMPTION
3 REM
5 REM LIST OF VARIABLES
7 REM     BM - INPUT - BEGINNING ODOMETER READING
9 REM     EM - INPUT - ENDING ODOMETER READING
11 REM    G  - INPUT - GALLONS OF FUEL CONSUMED
13 REM    TM -       - TOTAL MILEAGE FOR PERIOD
15 REM    GC - OUTPUT- GAS CONSUMPTION IN MILES/GALLON
97 REM
98 REM ****************************************
99 REM         mAIN    PROGRAM
100 HOME
110 PRINT"ENTER BEGINNING ODOMETER READING:"
120 INPUT"          ";BM
130 PRINT"ENTER ENDING ODOMETER READING:"
140 INPUT"          ";EM
150 PRINT"HOW MANY GALLONS OF FUEL DID"
160 INPUT"YOU USE? ";G
170 TM = EM - BM
180 GC = TM / G
190 PRINT:PRINT
200 PRINT"YOUR VEHICLE AVERAGE "GC
210 PRINT"MILES PER GALLON."
220 END
```

Listing 2. *A fully documented listing for a program that calculates the gas consumed, fuel cost, time duration, and estimated time of arrival for a road trip. This sample program illustrates the use of remark statements and "structured" program design using subroutines.*

```
1 REM  PROGRAM TO CALCULATE TRIP STATISTICS:
3 REM         GAS CONSUMPTION AND COST ;
5 REM         TRIP TIME AND TIME OF ARRIVAL.
7 REM VARIABLES USED:
9 REM         NM - INPUT - NUMBER OF MILES OF TRIP
11 REM        MG - INPUT - MILES/GAL RATING OF YOUR CAR
13 REM        SP - INPUT - AVERAGE SPEED DURING TRIP
15 REM        NS - INPUT - NUMBER OF STOPS
17 REM        TS - INPUT - AVERAGE TIME PER STOP
19 REM        PG - INPUT - AVERAGE PRICE/GAL OF GAS
21 REM        HR - INPUT - TIME OF DEPARTURE, HOURS
23 REM        MN - INPUT - TIME OF DEPARTURE, MINUTES
25 REM        TT -         - TRIP TIME (IN HOURS)
27 REM        ST -         - STOP TIME (IN HOURS)
29 REM        GG - OUTPUT - GAS USED (IN GALLONS)
31 REM        CG - OUTPUT - COST OF GAS USED
33 REM        HT - OUTPUT - FULL HOURS FOR TRIP
35 REM        MT - OUTPUT -   & ADD'L MINUTES
37 REM        HF - OUTPUT - ARRIVAL TIME - HOURS
39 REM        MF - OUTPUT - ARRIVAL TIME - MINUTES
98 REM
99 REM  ***  MAIN  PROGRAM  ***
100 HOME
110 GOSUB 400: REM OBTAIN DATA INPUT
120 GOSUB 1000: REM CALCULATE GAS CONSUMPTION AND COST
130 GOSUB 2000: REM CALCULATE TRIP TIME AND ETA
140 GOSUB 700: REM DISPLAY RESULTS
150 END
397 REM
398 REM ****************************************
399 REM DATA INPUT SUBROUTINE
400 INPUT"HOW MANY MILES FOR THIS TRIP? ";NM
410 PRINT:PRINT"WHAT IS YOUR CAR'S GAS CONSUMPTION"
420 INPUT"IN MILES-PER-GALLON?  ";MG
430 PRINT:PRINT"WHAT AVERAGE SPEED DO YOU EXPECT TO"
440 INPUT"USE FOR THIS TRIP (MILES/HR)?  ";SP
450 PRINT:PRINT"HOW MANY STOPS DO YOU PLAN "
460 INPUT"TO MAKE?  ";NS
470 PRINT:PRINT"WHAT IS THE AVERAGE TIME YOU PLAN TO"
480 INPUT"SPEND AT EACH STOP (IN MINUTES)? ";TS
490 PRINT:INPUT"ENTER THE COST OF GAS PER GAL. ";PG
500 PRINT:PRINT"ENTER YOUR TIME OF DEPARTURE AS TWO"
510 PRINT"NUMBERS (HRS,MIN); USE 12 HOUR CLOCK:"
520 INPUT HR,MN
530 RETURN
697 REM
698 REM ************************************
699 REM  DISPLAY RESULTS
700 HOME
710 PRINT"YOUR GAS CONSUMPTION WILL BE"
720 PRINT GG" GALLONS FOR A "NM" MILE"
730 PRINT "TRIP AT "MG" MILES/GAL."
740 PRINT
750 PRINT"AT $ "PG"/GAL, THIS IS $ "CG" ."
760 PRINT
770 PRINT"AT "SP" MILES/HOUR, THE TRIP"
780 PRINT"WILL TAKE "HT" HOURS, "MT" MINUTES"
790 PRINT"IF YOU MAKE "NS" STOPS TAKING"
800 PRINT TS" MINUTES EACH."
810 PRINT
820 PRINT"IF YOU LEAVE AT "HR":"MN" YOUR"
830 PRINT"ETA WILL BE "HF":"MF"  ."
840 RETURN
997 REM
998 REM ************************************
999 REM GAS CONSUMPTION AND COST CALCS.
1000 GG = NM / MG
```

Listing continued.

tines. One subroutine might extend from 6000 to 6180, another from 6300 to 6680, and a third from 8000 to 8110.

When looking at a section of BASIC code, the only way you can tell it is a subroutine and not the main program is that the last command is RETURN. With the three subroutines suggested in the above paragraph, RETURN would appear in lines 6180, 6680, and 8110.

The instruction within the main program that tells the computer to jump to a subroutine is the word GOSUB followed by the line number of the first instruction in that particular subroutine. (Don't forget to make the line number a multiple of 10.) Once again using the examples from the previous paragraph, the three subroutines begin at lines 6000, 6300, and 8000, so the main program would contain the command GOSUB 6000, GOSUB 6300, or GOSUB 8000, whenever one of the subroutines was needed.

Now the function of the RETURN command can be appreciated. Suppose your main program looked something like this:

```
100 A=255
110 GOSUB 6000
120 GOSUB 8000
130 INPUT X
140 GOSUB 6300
150 GOSUB 6000
160 END
```

The computer first sets the variable A to 255. Then, at line 110, it sees the GOSUB 6000 command and jumps immediately to line 6000. (It doesn't matter how many intervening lines there might be between 110 and 6000.) The instructions in the subroutine are then executed in sequence from line 6000 until a RETURN command is encountered, at which point the computer jumps back to the very next instruction in the main program following the GOSUB 6000. In this example that would be the instruction in line 120, which initiates another jump to line 8000.

The computer stores the memory location of the instruction that follows the GOSUB command so that when it encounters the RETURN it knows exactly where to go. Because the

RETURN is based on a memory location, not a line number, several instructions can be placed on a single line and the computer will still return to the proper one. The above example could have been written like this:

```
100 A=255:GOSUB 6000:GOSUB 8000:
    INPUT X
110 GOSUB 6300:GOSUB 6000: END
```

and the program would have functioned exactly the same. After the computer had finished with the first subroutine call to line 6000, the RETURN command in line 6180 would have sent it back to line 100 and the GOSUB 8000 command.

Although BASIC doesn't require you to identify the beginning of a subroutine in any way, or to tell just what function the subroutine performs, it is good practice to do so, and you can use a remark statement to fulfill both purposes. As mentioned earlier, avoid making this statement the one referred to in the GOSUB command. I prefer to back off one or two line numbers to accommodate my subroutine titles. For example, if the functional lines in a subroutine that calculates the perimeter and area of a rectangle having sides A and B begin at line 2000, the entire subroutine, with remarks, might look like this:

```
1997 REM PERIMETER (P) AND AREA
     (R) OF
1998 REM RECTANGLE GIVEN SIDES
     A & B
2000 P=2*A+2*B
2010 R=A*B
2020 RETURN
```

The basic subroutine begins at line 2000, but the title and explanation begin at line 1997. Note too that the remark statements indicate what variables are needed for input by the subroutine (A and B) and what variables are used to hold the output of the subroutine (P and R).

Spending the time to identify the functions within a program and organize them in a hierarchy diagram helps you to identify those functions that should be handled as subroutines and organize your program accordingly. The program in **Listing 2** uses the hierarchy diagram in the **Figure** as its basis for organization.

Sample Program

If you studied through last month's column, you should be familiar with the use of the PRINT, INPUT, and HOME commands, and assignment statements. The road trip statistics program in **Listing 2** uses these commands along with REM and GOSUB commands. Although this program is relatively simple, it does contain several identifiable functions and therefore makes use of modular design and subroutines.

The hierarchy diagram in the **Figure** indicates that six separate functions are associated with this program. This is determined by totaling the number of functions at the lowest level on each branch. However, the calculations for gas consumed and gas cost are so closely related that both functions have been combined into a single subroutine. Similarly, the time required for the trip and the estimated time of arrival are calculations that logically fit into the same subroutine. So the program actually has only four subroutines.

You will note that all of the variables used in the program are identified at the start with remark statements. Whether the variable is defined by an input process or is used as output is also indicated. The main program and subroutines are clearly marked with additional remark statements, and remark statements are used in the time calculation subroutine to explain the function of each calculation. In addition, each GOSUB command in the main program contains its own remark statement, so you can follow the progress of the program by reading these comments as they appear.

The trip program contains one decision statement at line 2090 that you should just ignore for the time being. Its only purpose is to convert the number for hours from 0 to 12 for the estimated time of arrival display.

One other function, INT, appears several times and is useful in a variety of common situations. Any value, when zapped with INT, becomes an integer. The integer function produces the largest complete integer contained within the number it operates on. For positive values the decimal portion is simply stripped away. 12.1928 becomes 12, for instance. For negative values the result is the integer just below the number operated upon. Thus −48.6211 becomes −49.

To use the integer function, place the item you want it to operate on in parentheses. INT(−17.295) or INT(X) or INT(X+Y−2.2) are all valid examples. The first acts on a specific number, the second on a variable, and the third on the results of an arithmetic expression. In that case, the expression is evaluated first and INT operates on the result.

There's an important note regarding the use of the integer function with expressions that involve division. Sometimes, due to rounding problems, the computer will com-

Listing continued.

```
1010 CG = GG * PG
1020 RETURN
1997 REM
1998 REM ************************************
1999 REM TRIP TIME AND ETA CALCS.
2000 TT = NM / SP : REM TRAVEL TIME IN HOURS
2010 ST = (NS * TS) / 60 : REM STOP TIME IN HOURS
2020 TT = TT + ST : REM TOTAL TIME IN HOURS
2030 HT = INT(TT) : REM TOTAL HOURS
2040 MT = INT((TT - INT(TT))*60) : REM ADD'L MINUTES
2045 REM
2046 REM    ***  ETA CALCULATION  **
2047 REM
2049 REM REDUCE HRS TO 12 HOUR CLOCK
2050 HF = (HR + HT) - 12*INT((HR + HT)/12+.001)
2060 MF = MN + MT
2067 REM CARRY HRS FROM MINUTES COLUMN IF OVER
2068 REM     60 AND REDUCE MINUTES BY 60 TIMES
2069 REM     # OF HOURS CARRIED.
2070 HF = HF + INT(MF/60+.001)
2080 MF = MF - 60 * INT(MF/60+.001)
2090 IF HF=0 THEN HF=12
2100 RETURN
```

plete a division with a result of, say, 3.999999 instead of 4.000. For this reason it is always a good idea to add some very small value (such as .001) to the result of a division before the integer function does its job. Check lines 2050, 2070, and 2080 in the listing.

Conclusion

Most texts that teach programming in BASIC do not introduce subroutines until the end of the course. This is unfortunate, because it results in a tendency toward nonstructured programming practices and contributes ultimately to poorly designed programs. My feeling is that subroutines should be encountered early and that their use should be encouraged from the very beginning. That is why, in this second article of my BASIC programming tutorial, you have been introduced to the hierarchy diagram concept of program design and to subroutines. I hope you will make use of these techniques in every program you write. ■

Solutions to inCider's inSidious inSolubles, from page 119

Solution to Equal or Not Equal, That Is the Question:

The problem here is due to the internal conversion of binary numbers to decimal within Applesoft. The fix will alleviate the bug, but not necessarily exterminate it. Replace line 40 with:

```
40 INPUT Z$: Z = INT ( VAL (Z$) *
   100 + .05 ) / 100
```

To get a better idea of what's happening in Applesoft, try this:

```
10 FOR X = 1 TO 10 STEP .1
20 PRINT X,
30 NEXT X
```

Solution to The Imperfect Menu:

The PEEK in line 100 returns an ASCII value, but the value is 128 too high. Change line 130 to:

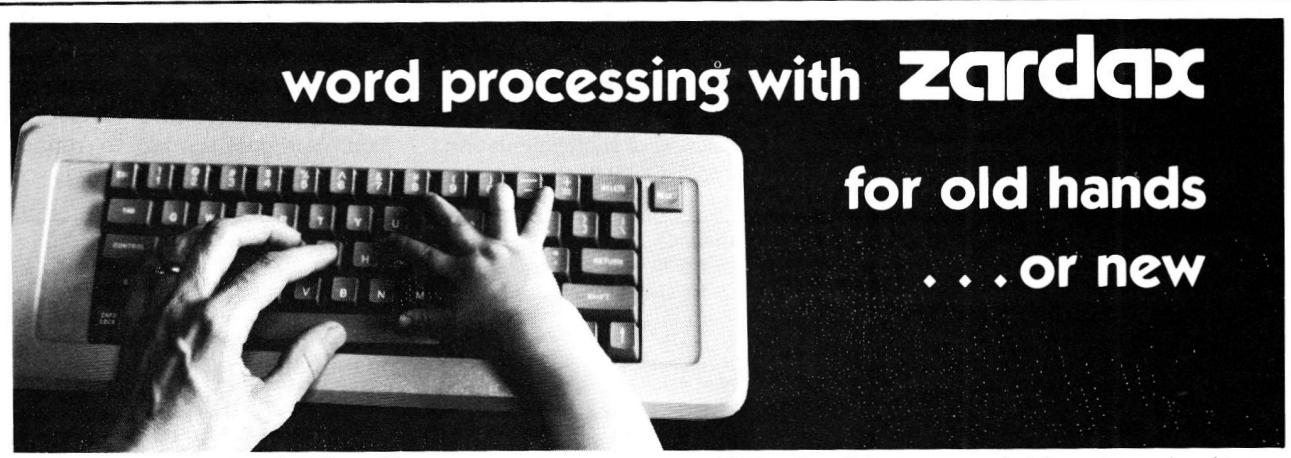
```
130 A$ = CHR$ (A – 128)
```

This will then match the IF statements of lines 140–160.

A better solution would be to change line 130 to accommodate either a lower- or uppercase input, since some people have a //e. Mike and I will leave this problem up to you.

If your screen asks WHAT HAPPENED?, then you are not responding as quickly as your Apple would like. Waiting for a key press, the loop increments the variable T until it exceeds 200 and then branches to line 380. This is a nice way to control the user's input time. Notice also line 160 that reboots without the control-D disk command. I hope you saved your program before making this inSidious choice.

Circle 26 on Reader Service card.



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Apple][+, //c, //e. Your choice of DOS or ProDOS. Apple /// SOS version, too. All: $210. Zip-Comm modem communications option: $80.

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Goodbye 80-Column Blues

by Jon Sutten

I have Apple's Quick File program for the //e that I use for maintaining club lists, address files, price lists, and the like. I also have an Epson MX-80 printer which I use with Quick File.

While doing table-format reports, there were times when I thought I should have purchased an MX-100 with the wider carriage. Then, when a report includes name, address, city/state/zip, phone number and various code categories, it wouldn't look so crowded.

One evening while writing a report, I realized I *could* have 132 columns and it would work fine with Quick File as well as other data base programs. Here's what to do:

1) Boot up with the System Master.
2) Turn the printer on.
3) Type PR#1 <return>.
4) Then type PRINT CHR$(15) <return> (compressed "on").
5) *Do not* turn the printer off.
6) Restart with Quick File and a data disk.

You can now adjust your table report layout to 132 columns. When you set printer options, change 80 columns to 132 and you're all set. You've instructed the printer to use compressed mode (132 columns), and told the computer that you have a 132-column printer. The computer doesn't care what kind of printer you have. It's still going to send 132 columns of information. The printer doesn't care what the computer thinks, because in compressed mode it can print 132 columns! The whole key is in *not* turning the printer off after sending it your control codes.

This method also works with Bank Street Writer, allowing me to print in italics. I assume it would work with other word processors.

Although not earth shattering, this tip can help you control printer output in some of your programs. ■

Jon Sutten writes his reports at 14709 W. Burnsville Parkway #133, Burnsville, MN 55337.

Poignant Statements

by Viktor Rubenfeld

Did you ever try to print something simple on the screen, just to see it come out looking like this?

```
FOURSCORE AND SEVEN YEARS AGO, OUR FOREF
ATHERS BROUGHT FORTH UPON THIS CONTINENT
 A NEW NATION . . .
```

That's the result you normally get if you use a single print statement such as the following:

```
100 PRINT "FOURSCORE AND SEVEN YEARS AGO
, OUR FOREFATHERS BROUGHT FORTH UPON THI
S CONTINENT A NEW NATION . . ."
```

People often deal with this problem by using multiple print statements, as follows:

```
100 PRINT "FOURSCORE AND SEVEN YEARS AGO, OUR"
110 PRINT "FOREFATHERS BROUGHT FORTH UPON THIS"
120 PRINT "CONTINENT A NEW NATION . . ."
```

This isn't much of an answer, however, as it involves counting the letters in your message and allocating a new print statement for every 40 letters. It's tedious and repetitive.

What's the solution? Paste a ruler to your monitor? No, there is a better way. Here's an example:

```
100 PRINT "FOURSCORE AND SEVEN YEARS AGO
, OUR      FOREFATHERS BROUGHT FORTH UPO
N THIS     CONTINENT A NEW NATION . . ."
```

This will print out on the Apple 40-column screen the way you intended it:

```
FOURSCORE AND SEVEN YEARS AGO, OUR
FOREFATHERS BROUGHT FORTH UPON THIS
CONTINENT A NEW NATION . . .
```

Try it for yourself. The trick is to line up the beginning of a new word under the beginning of the first word in the print statement. I find it a simple answer to an otherwise troublesome question. ■

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

APPLE EXTRACT

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

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

AccountingPlus Super/e
★★★★
Ask Micro, P.O. Box 1100, 100 Blue Ravine Road, Folsom, CA 95630
Business, March '84.
An outstanding accounting package for the //e. All it needs is a shorter name. GL-$450. AP, AR, Inv-$350. Payroll-$450.

Accounts Payable
★★★
Peachtree Software, Inc, 3445 Peachtree Road N.E., Atlanta, GA 30326
Business, February '84.
No one likes paying out money, but this program at least does it well. CP/M only. $400.

Accounts Receivable
★★★
BPI Systems, 3423 Guadalupe, Austin, TX 78705
Business, June '84.
Get a handle on your business. This package does what an AR package should. $395.

Accounts Receivable
★★
Peachtree Software, Inc., 3445 Peachtree Road N.E., Atlanta, GA 30326
Business, February '84.
Keep track of who owes you what. Requires a Microsoft Softcard. $400.

Alphabet Beasts and Company
★★
Readers Digest Software, Microcomputer Software Division, Pleasantville, NY 10570
Education, July '84.
Beautiful graphics help youngsters learn how to draw numbers, letters, and strange creatures. $34.95.

AppleWorks
★★★★
Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Business, July '84.
A superb integrated package featuring a word processor, a spreadsheet, and a data base manager. An excellent value. $249.

Arcademic Skill Builders in Language Arts
★★
Developmental Learning Materials, One DLM Park, Allen, TX 75002
Education, February '84.
Arcade style word games that are simple to use and educational, too. $44.

Beagle Basic
★★★★
Beagle Bros, Inc., 4315 Sierra Vista, San Diego, CA 92103
Language, March '84.
The world's favorite software company has liberated Applesoft from ROM and programmers from Applesoft. $34.95.

Break the Bank Blackjack
★★
Gentry Software, 9411 Winnetka Avenue, Chatsworth, CA 91311
Entertainment, July '84.
This program teaches you how to count cards when playing blackjack. $24.95.

Caverns of Callisto
★★
Origin Systems, Inc., P.O. Box 58009, Houston, TX 77258
Arcade game, June '84.
It's a long walk (400 million miles) back to Earth if you don't find the parts stolen from your spaceship. $34.95.

Chivalry
★★★
Weekly Reader Software, 245 Long Hill Road, Middletown, CT 06457
Arcade game, June '84.
Beautiful graphics enhance this game set in days of yore. A great game for kids. $49.95.

Circascript
★★★
Circadian Software, Inc., Box 1208, Melbourne, FL 32902
Word processor, May '84.
A low cost WP with a lot of professional features. Ideal for students and small businesses. $39.95.

College Board SAT Preparation
★★
Krell Software, 1320 Stony Brook Road, Stony Brook, NY 11790
Education, February '84.
Krell guarantees a 70 point increase in SAT scores. Care to take them up on it? $299.

Crypto Cube
★★
Designware, 185 Berry Street, Building 3, Suite 158, San Francisco, CA 94107
Education, February '84.
A game for ages 8–adult that puts the fun back into spelling. $39.95.

Cubit
★★
Micromax, 6868 Nancy Ridge Drive, San Diego, CA 92121
Arcade game, May '84.
An Apple clone of Q-Bert. Explore the mysteries of pyramid power. $39.95.

Cut & Paste
★★
Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403
Word processor, May '84.
A lot of features for a little money. A good value for computer novices. $49.95.

Death in the Caribbean
★★
Micro Fun, 2699 Skokie Valley Road, Highland Park, IL 60053
Adventure game, April '84.
Danger lurks everywhere in this hi-res adventure. After playing this, snow won't seem so awful after all. $35.

Disk Quick
★★★
Beagle Bros, Inc., 4315 Sierra Vista, San Diego, CA 92103
Utility, June '84.
Turn the extended 80 column card in your //e into a RAM disk. $29.50.

Early Music Games
★★★
Counterpoint Software, Inc., Suite 218, 4005 W. 65th Street, Minneapolis, MN 55426
Education, February '84.
Music education for ages 4–10. Music Theory 101 was never this much fun. $29.99.

The Eating Machine
★★★
Muse Software, 347 North Charles Street, Baltimore, MD 21201
Home, July '84.
A cut above the average self-improvement program. The Eating Machine helps you plan a healthy diet. $49.95.

The Factory
★★
Sunburst Communications, Inc., 39 Washington Avenue, Pleasantville, NY 10570
Education, July '84.
Designed for fourth through ninth graders, The Factory teaches real problem solving skills in a challenging way. $24.95.

Financial Planning for VisiCalc
★★
Howard W. Sams and Company, 4300 W. 62nd Street, Indianapolis, IN 46268
Business, February '84.
A set of 18 VisiCalc templates which perform financial calculations. A good value. $79.95.

The Graphics Magician
★ ★ ★
Penguin Software, 830 4th Avenue, Geneva, IL 60134
Graphics, June '84.
A great graphics utility for the Apple. No wonder so many professional game designers use it. $59.95.

Graph 'n' Calc
★ ★
Desktop Computer Software, Inc., 303 Potrero Street, Santa Cruz, CA 95060
Business graphics, March '84.
Chart your way to the top with this graphics package for the Apple ///. $199.

Gruds in Space
★ ★
Sirius Software, Inc., 10364 Rockingham Drive, Sacramento, CA 95827
Adventure game, June '84.
Saving the universe can be a chore. A game where all is not what it seems. $39.95.

Gutenburg Jr.
★ ★
Micromation Limited. 1 Yorkdale Road, STE 406, Toronto, Ontario, M6A 3A1
Word processor, June '84.
A powerful and inexpensive program for combining text and graphics. Limited in the hardware it supports. $85.

Homeword
★ ★
Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614
Word Processor, July '84.
The use of icons makes this inexpensive package easy for beginners to understand. $69.95.

In Search of the Most Amazing Thing
★ ★ ★
Spinnaker Software, 215 First Street, Cambridge, MA 02142
Education, June '84.
An adventure game for children that helps develop reasoning skills and which de-emphasizes violence. $39.95.

In-The-Mail
★ ★
el Dorado Software, 350 7th Avenue, Suite 324, San Francisco, CA 94118
Business, July '84.
In-The-Mail gives you 99 different letters for all those times when you can't think of what to write. From sympathy notes to letters of resignation, this package has them all. $60.

IQ Baseball
★ ★
Davka Corporation, 845 North Michigan Avenue, Chicago, IL 60611
Strategy game, May '84.
Baseball trivia fans will eat this one up. So who was the only pitcher to appear in 1000 games? $24.95.

Jeepers Creatures
★ ★
Kangaroo, Inc., 332 S. Michigan Avenue, Suite 700, Chicago, IL 60604
Education, July '84.
A program for preschoolers that lets kids be creative while practicing word recognition and association. $34.95.

Kidwriter
★ ★ ★
Spinnaker Software, 215 First Street, Cambridge, MA 02142
Education, July '84.
A good reason why Spinnaker has a reputation for excellence. This program lets young kids create pictures and then write short stories to accompany them. $34.95.

Lancaster
★ ★
Silicon Valley Systems, 1625 El Camino Real, Belmont, CA 94002
Arcade game, April '84.
Bubble blowing space bugs threaten the Earth!!! You are humanity's only hope!!! Oh well, better luck next time. $29.95.

Legionnaire
★ ★
Microcomputer Games, Inc., 4517 Hartford Road, Baltimore, MD 21214
Strategy game, March '84.
I came, I booted, I played. Luckily, Brutus doesn't make an appearance when you become Caesar and take on the barbarian hordes. $40.

Letters and Words
★ ★
Learning Well/Methods and Solutions, Inc., 200 S. Service Road, Roslyn Heights, NY 11577
Education, July '84.
Games for pre-schoolers that teach alphabet sequencing, upper/lowercase association, and word/object association. $49.95.

Lode Runner
★ ★ ★
Broderbund Software, 17 Paul Drive, San Rafael, CA 94903
Arcade game, April '84.
You hated them in Star Blazer, you loathed them in Choplifter. Well, the Bunglings are back! Apple Panic was never this much fun. $34.95.

Magic Memory
★ ★
Artsci, Inc., 5547 Satsuma Avenue, North Hollywood, CA 91601
Data base, June '84.
Put your address book on your computer with this easy to use package. Although not very powerful, it does its job well. $99.95.

Masquerade
★ ★ ★
Phoenix Software, Inc., 64 Lake Zurich Drive, Lake Zurich, IL 60047
Adventure game, July '84.
This hi-res game features a wonderful collection of characters and a bewildering array of puzzles that you must solve before you can unmask that arch-criminal, Mr. Topp. $34.95.

Micro-Math
★ ★
Hayden Software, 600 Suffolk Street, Lowell, MA 01853
Education, April '84.
Four basic math packages for ages 4–10. Good graphics and color. $29.95.

Microscopic Journey
★ ★
Hayden Software, 600 Suffolk Street, Lowell, MA 01853
Arcade game, February '84.
Not a small rock group, but a computer game that lets you play doctor. $34.95.

Microzine
★ ★
Scholastic Wizware, 730 Broadway, New York, NY 10003
Education, June '84.
A disk magazine from the publishers of Scholastic. More fun than flipping pages. $39.95.

Neuromuscular Concepts
★ ★
Biosource Software, 2105 S. Franklin, Suite B, Kirksville, MO 63501
Education, February '84.
Everything you ever wanted to know about muscle contraction. Helpful for students. $49.95.

North Atlantic '86
★ ★ ★
Strategic Simulations, Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043
Strategy game, March '84.
An excellent simulation of a hypothetical Soviet-NATO naval confrontation. For serious war-gamers only. $59.95.

One-on-One
★ ★ ★
Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403
Game, July '84.
The best sports game available for the Apple. When Larry Bird and Julius Erving go one-on-one, it's almost as much fun as a Celtics-Sixers playoff game at the Garden. If only they had included a parquet floor. $40.

OPVAL
★ ★
Calcshop, Inc., Box 1231, West Caldwell, NJ 07007
Personal finance, May '84.
Make a killing in the market with this option analysis program. $250.

Paper Graphics
★ ★ ★
Penguin Software, P.O. Box 311, Geneva, IL 60134
Graphics, July '84.
This package lets you print the contents of the Apple hi-res screens. As an added bonus, you can edit the pictures before you print them. $49.95.

PeachCalc
★ ★ ★
Peachtree Software, Inc., 3445 Peachtree Road N.E., Atlanta, GA 30326
Spreadsheet, February '84.
A powerful spreadsheet with features not found in VisiCalc. For CP/M equipped Apples only. $150.

Pen-Pal
★ ★
Howard W. Sams and Company, 4300 W. 62nd Street, Indianapolis, IN 46202
Word processor, April '84.
Inexpensive, and designed for basic letter writing. Easy to learn but not too powerful. $59.95.

Pentapus
★ ★
Turning Point Software, 11A Main Street, Watertown, MA 02172
Arcade game, April '84.
If you're sick and tired of being kicked around by multi-appendaged aliens, then this game is for you. $29.95.

Personal Health
★ ★
RAM Resources, Inc., 100 Lynn Street, Peabody, MA 01960
Home health, February '84.
You can have information on health problems and medical emergencies at your fingertips. $49.

PFS:Write
★ ★ ★
Software Publishing Corporation, 2021 Landings Drive, Mountain View, CA 94043
Word processor, April '84.
(Fermentations)
Easy to use, and with most of the functions you need in a word processor. A great value. $125.

Piracy Proof
★ ★ ★
Kane Computing, 184 Pine Brook Boulevard, New Rochelle, NY 10804
Utility, March '84.
No one will ever come up with a foolproof software protection scheme, but Kane Computing comes close. $250.

Plasmania
★ ★
Sirius Software, 10364 Rockingham Drive, Sacramento, CA 95827
Arcade game, March '84.
Ready for a Fantastic Voyage? Here is a real inside look into vascular surgery. $34.95.

Portfolio
★ ★
Flexible Software, 134-10 Ivy Drive, Charlottesville, VA 22901
Strategy game, May '84.
So you don't have the money to invest in the market? The thrill of investing without the risk. $64.95.

Sammy Lightfoot
★ ★
Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614
Arcade game, March '84.
A fun game featuring the ups and downs of the circus life. Oh, those daring young men . . . $29.95.

Speed Reader II
★ ★
Davidson & Associates, 6069 Groveoak Place, #12, Rancho Palos Verdes, CA 90274
Education, June '84.
Increased productivity is the goal of this software. A good alternative to expensive speed reading courses. $69.95.

Stellar 7
★ ★ ★
Software Entertainment Co., 537 Willamette, Eugene, OR 97401
Arcade game, April '84.
Beautiful 3-D graphics and plenty of action make this hunt for the evil emperor Gir Draxon an instant classic. $34.95.

Teleminder
★ ★ ★
Teleware, Box 729, 28 Bloomfield Avenue, Pine Brook, NJ 07058
Communications, March '84.
A specialized package that automatically pulls quotes from the Dow Jones News/Retrieval Service. $195.

Term Exec 1.2
★ ★ ★
Exec Software, 201 Waltham Street, Lexington, MA 02173
Communications, June '84.
A sophisticated yet low cost communications package for the Apple. Sometimes hard to use, but worth the bother. $79.95.

Think Tank
★ ★ ★
Living Videotext, Palo Alto, CA 94306
Idea processor, April '84.
Not just a word processor, this program will help keep your thoughts straight. $150.

Troll's Tale
★ ★
Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614
Adventure game, March '84.
A game for children 9 and over. What kid doesn't want the chance to become an Honorary Dwarf? $29.95.

Tycoon
★ ★
Blue Chip Software, 6744 Eton Avenue, Canoga Park, CA 91303
Strategy game, April '84.
A realistic commodity market simulation game. Money doesn't grow on trees, but in soybean fields. $59.95.

VODAC-The Alpine Encounter
★ ★
Ibidinc, 179 Allyn Street, Suite 607, Hartford, CT 06103
Adventure game, July '84.
A hi-res game of intrigue set in the Swiss Alps. Robert Ludlum would love this game. $39.95.

The Witness
★ ★ ★
Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138
Text adventure, March '84.
This game is good, sweetheart. It's very, very good. Be sure to play it again, Sam. $49.95.

Word Blaster
★ ★
Random House, 201 East 50th Street, New York, NY 10022
Education, July '84.
Students in grades two through six will enjoy this reading and comprehension program. You don't have to tell them they can learn from it. $150.

Work Force II
★ ★
Core Concepts, P.O. Box 24157, Tempe, AZ 85282
Home, June 84.
Six programs that help you manage your budget. Includes a checkbook program, a loan analyzer, and a savings analyzer. $29.95.

Write Away
★ ★ ★
Midwest Software Associates, 1160 Appleseed Lane, St. Louis, MO 63132
Word processor, March '84.
A powerful and complete word processor. And it's fast. $175.

The Writer
★ ★
Hayden Software, 600 Suffolk Street, Lowell, MA 01853
Word processor, July '84.
A solid, low-cost word processor, The Writer is a scaled down version of Hayden's popular Pie Writer. $49.95.

Hardware

Amdisk-I Microfloppy
★★★
Amdek Corporation, 2201 Lively Boulevard, Elk Grove Village, IL 60007
Disk drive, May '84.
An excellent second drive for the Apple. And it won't take up a lot of room on your desk. $299.

Color Plotter
★★
Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Plotter, May '84.
A four-pen plotter for making charts and graphs. Hampered by a lack of software support. $799.

EXP 500
★★
Silver-Reed America, Inc., 19600 S. Vermont Avenue, Torrance, CA 90502
Printer, June '84.
A daisy-wheel printer with 12 cps and a low price tag. Free yourself from dot-matrix. $599.

Juki 6100
★★★
Juki Industries of America, Inc., 299 Market Street, Saddle Brook, NJ 07662
Printer, June '84.
A low-cost daisy-wheel printer that features 18 cps operation. $699.

Keywiz VIP
★★
Creative Computer Peripherals, Inc., Aztec Environmental Center, 1044 Lacey Road, Forked River, NJ 08731
Keyboard, February '84.
A keyboard enhancer with up to 248 user-programmable keys. A touch typist won't need it but it could be a lifesaver for people who have to hunt 'n' peck. $439.

Koala Pad
★★
Koala Technologies, 4962 El Camino Real, Suite 125, Los Altos, CA 94022
Graphics, May '84.
A low cost alternative to expensive graphics tablets. Comes with software to help you create your own graphic wonders. $125.

L-1000
★★
Smith-Corona Consumer Products, 65 Locust Street, New Canaan, CT 06840
Printer, June '84.
Letter quality can be within your budget. This inexpensive daisy-wheel printer features 12 cps operation. $595.

Microline 93
★★★
Okidata, 532 Fellowship Road, Mount Laurel, NJ 08054
Printer, February '84.
Dot-matrix printer rated at 160 cps. Also features an excellent correspondence mode at 40 cps. A quality printer. $999.

Riteman Printer
★★
Inforunner, 1621 Stanford Street, Santa Monica, CA 90404
Printer, May '84.
A low-cost dot-matrix printer. It doesn't have all of the features of a more expensive printer, but it doesn't have a huge price tag, either. $399.

UDS 212A/D Modem
★★
Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805
Modem, March '84.
A 300/1200 baud modem that should satisfy all of your communications needs. Works with most Apple communications software. $645.

V1200
★★
Vista Computer, 1317 Edinger, Santa Ana, CA 92705
Disk drive, April '84.
Up to 6 megabytes of on-line storage for DOS, CP/M, and Pascal. No great speed improvement over standard floppies but back-up is easier than with hard disks. $1500.

Voice-Based Learning System
★★
Scott Instruments Corporation, 1111 Willow Springs Drive, Denton, TX 76205
Education, June '84.
A hardware-software that lets you create interactive tutorials that recognize speech input. A system with a lot of potential. $895.

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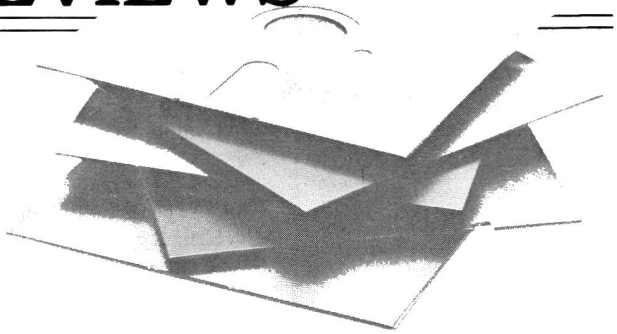
SOFTWARE REVIEWS



Tournament Golf

Two golfers reminisced about a club member who had gone wrong. The critical moment, they decided, was in a game when the member's ball wound up in a tree limb, lodged in a live hornet's nest. The member refused to play the ball, opting instead to take penalty strokes. "Not the Golfing Spirit," the disgusted golfers scoffed.

There's plenty of the "Golfing Spirit" in a new Avalon Hill game, Tournament Golf. You do not have to shoot your ball out of a hornet's nest and you don't have to worry about thunderstorms or lost balls. Instead, you'll find two challenging 18-hole courses, a fascinating simulation of swinging the golf club, and a realistic and highly engaging golf game.

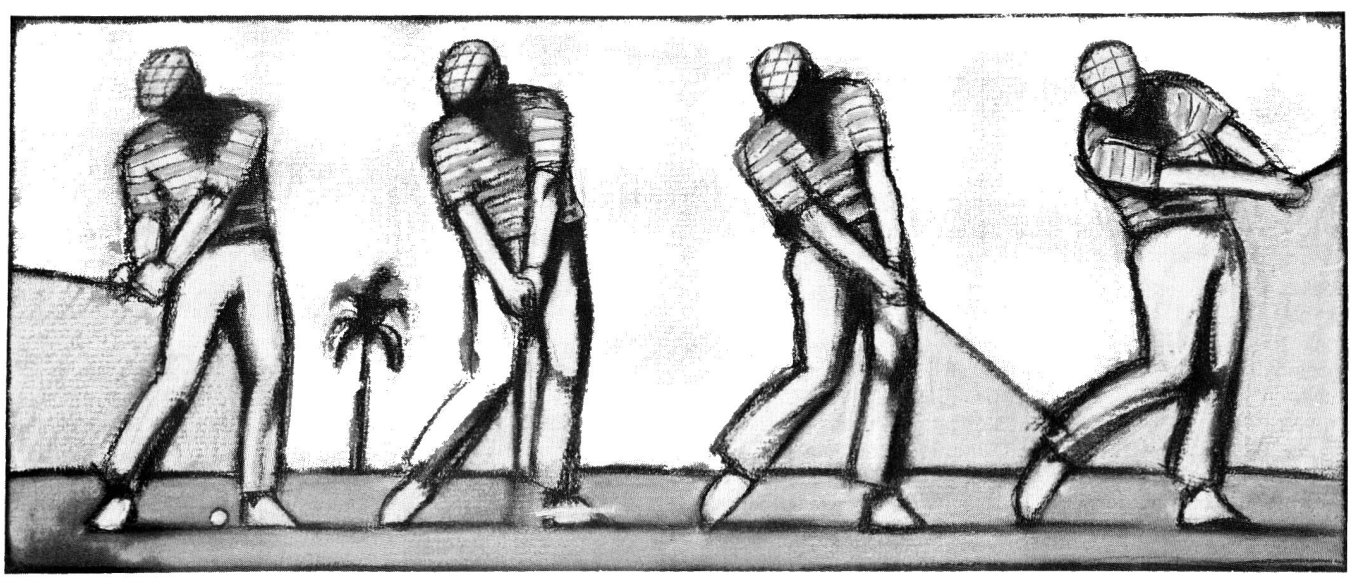
The most important realistic game element is the golf swing simulation. The best place to see the simulation is in the "Driving Range" option, where you can practice the skills needed to build a successful swing.

As the simulation begins, a stick figure, club in hand, addresses the ball. To make the figure swing the club, press buttons 0 and 1 on your game paddles or joystick. Paddle 0 moves the arms and paddle 1 cocks the wrists. The idea is to press both buttons so that the club is brought back far enough and the wrists are cocked at the precise angle for a good swing.

The next stop for the aspiring golfer is the practice green, a detailed simulation with a fringe of grass around the actual carpet, rising and falling ground, and what golfers call "break"—the tendency for the putting surface to slope toward or away from the cup. The same swing simulation is used for putting. The major difference is that you can use either arm power (button 0) or wrist power (button 1) alone to move the putter. If you're more than 25 feet from the pin, use arm power to get the ball close to the cup and then flick the wrists to sink the putt.

Aim is another important factor of the simulation. Before you putt, you must decide where you want the ball to travel. A cross on the screen marks your ball's location. A line, projected from the cross, indicates the direction the ball will travel. The player uses the 0 button to move the line counterclockwise and 1 to move clockwise. After reading the break indicator on the screen and allowing for the slope of the green, you can position the line to indicate the ball's path and begin your swing.

On the golf course, you have a simi-



lar aiming device. As you prepare to tee off, a cross marks the location of your ball on the tee. Again, using paddle buttons, you can move the line to indicate where you want the ball to fly. Use strategy before you settle on a path. Note the location of traps, water hazards, light and heavy rough, and trees. Check wind direction since the breeze can lengthen or shorten your shot or move it to the right or left.

You are equipped with four woods (D,2,3,4), ten irons (2–9 and a pitching wedge), and a pair of recovery clubs for shooting out of the trees. Take the time to try out the clubs on the driving range. The clubs propel the ball to minimum and maximum distances, but your swing determines within a range of 60 yards where the ball will land.

Select a club by moving the joystick or paddle 0, which displays the different club names on screen. (This action also lengthens or shortens your aiming line, giving you a feel for the average distance the club will send the ball.) When you reach the club you want, hit any key and the process of the swing begins.

It all sounds complex, but Tournament Golf is simple to play. After no more than 15 minutes of driving and putting practice, you should be able to play a very realistic and enjoyable 18 holes of golf enhanced by the lovely graphics mapping the course and the speed at which the game moves along.

Tournament Golf is produced by the Avalon Hill Game Company, 4517 Harford Road, Baltimore, MD 21214. You'll need a 48K Apple II or a //e with a disk drive, DOS 3.3, and paddles or a joystick to play. The list price is $30.■

Brian J. Murphy
Fairfield, CT

Murder By The Dozen

You insert a disk into your Apple II disk drive and flip on the power. Suddenly, you're sitting in the detective squad room with a half-finished cup of coffee at your elbow. You're typing a report for the lieutenant when the phone rings. It's a call from dispatch. A woman was found strangled in her bedroom at the swank Sinclair Towers Apartments. You fill in the lieutenant and leg it for the Sinclair.

When you enter the apartment you find the victim, Adrienne Bishop, on the bed, fully clothed . . . and fully dead.

Snooping around, you come across Adrienne's diary. In it are the sordid details of a blackmail plot. But was it the catalyst for murder?

Could be, but you'll never find out unless you invest in a copy of Murder By The Dozen, a detective game for dedicated sleuths.

The package contains 12 murders (including the Adrienne Bishop slaying described above) for you to solve. You can unravel the cases by yourself or with three other players. You'll select one of 12 murders as the game begins with a rundown of the facts known by the police, witness accounts, and physical evidence.

As you follow those leads, you'll discover that your investigation turns up clues from two sources. One source is your interrogation of witnesses and acquaintances of the victims. They will give stories that sometimes support one another, but sometimes conflict. Your job is to distinguish between the witnesses who are telling the truth and the liars who have something to hide.

The second source involves a lot of footwork. Inspections will take you to search the premises where witnesses are located, examine their papers, and snoop around. Follow your detective's instincts. Usually, these hunts will turn up nothing, but sometimes you'll run across the one important piece of physical evidence that locks up a case once and for all.

In Murder By The Dozen, a solution is considered the correct identification of the murderer plus a full explanation of his motives. A solutions book provided with the game tells you if you fingered the correct culprit. The computer does not reveal the solution, so make sure you're ready to refer to the solution before you consult the book.

Bear in mind that you're working against the clock. To use time efficiently, learn to recognize the witnesses and locations where you stand a reasonable chance of uncovering important evidence. Also, avoid the temptation to search insignificant places or to interview people simply because they were mentioned in the opening crime scenario.

Carefully study the information given at the beginning of the scenario. Start forming theories right away and use your map of the city to investigate sites.

Remember that every murderer has a "MOM"—Means, Opportunity, and Motive. Motive is the most important key to the solution. If you can establish a plausible motive for the crime, you are close to solving the murder.

Murder By The Dozen is as intriguing to play at a party as it is for solitary enjoyment. The hi-res graphics are slick and classy, adding to the sense of mystery. This is a well-designed game for those who fancy themselves Sherlock Holmes or Hercule Poirot.

Murder By The Dozen is perpetrated by CBS Software, One Fawcett Place, Greenwich, CT 06836. The list price is $34.95. You can commit Murder By The Dozen on any 48K Apple II Plus or on the //e.■

Brian J. Murphy
Fairfield, CT

BASIC Tutor

BASIC Tutor is a computer-aided instructional package that teaches the fundamentals of programming in the BASIC language. Produced by SuperSoft, Inc., 1713 S. Neil Street, Champaign, IL 61820, BASIC Tutor retails for $99.95. It consists of an instructional manual and six disks organized in a nine lesson format.

Eight of the lessons are designed for typical, computer-based programmed instruction. Introductory text material, sample program instructions, short example problems, and review quizzes are included in the lessons. After completing each lesson, additional materials in the manual reinforce key points. The remaining lesson, number four, consists of elementary text material concerning Apple DOS system commands, immediate and deferred operational modes, and the "how to" of entering and editing BASIC programs on the Apple. It is different from the other eight lessons because it is not preceded by an introductory segment.

BASIC Tutor uses few graphics and no music routines. The graphics utilized, however, are very well done. When the program describes a looping procedure, a small hand with a pointing finger "walks" through the program line by line to illustrate the order that the lines will be executed. This animation is helpful for the beginner. The information contained in each of the nine lessons is well-organized and appropriate to introduce beginners to BASIC programming. There are a couple of minor flaws in the package, though.

First, although the computer language used to program the lessons produces a fine product, that language is not BASIC. I am not certain which language it is, either, because the documentation does not say. This oversight could frustrate novices who are still uncertain about what computer languages really are, and why the lesson disks don't "behave" the same as "normal" disks.

To overcome the language problem, the package simulates BASIC during the nine lessons. In doing so, the user can't test many of the commands and instructions until the lesson is terminated and a "normal" disk is booted. This is a minor problem, but the lack of any explanation is confusing.

A tutorial concerning a computer language should be written in the language it purports to teach. That way, when users observe a technique occurring in a given program, they can stop the program and review the steps that produced the effect. Had this tutorial been written in BASIC, the user would have benefited from an almost unlimited set of learning experiences. Since this package was written in another language, the user is restricted to those few examples of

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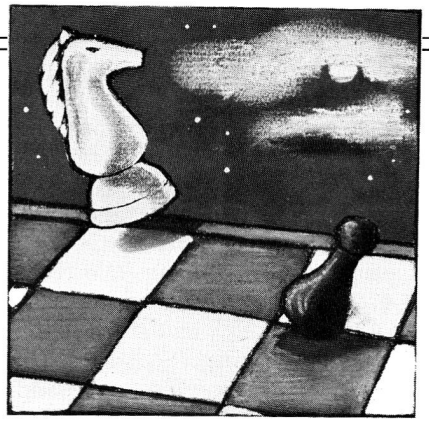
BASIC programming offered in the lessons.

Second, the authors wrote the package as though it were intended for a single user. Each completed lesson is marked by an asterisk. This nice feature works for only one person. There is no provision for resetting these "flag" markers when a new user begins to work with the package. The package is not copyable and the documentation does not mention the company's multiple copy policy for educational institutions.

The BASIC Tutor package is filled with good, well-organized information. The lessons are presented in the classic, programmed instructional format, allowing the user to work at his or her own pace. BASIC Tutor's drawback is that it was not programmed in BASIC, thus denying the beginner many examples of exemplary programming technique. ■

Michael Waugh
Statesboro, GA



Sargon III

Sargon III was written by Dan and Kathe Spracklen, the same people who brought you the predecessor chess programs, Sargon and Sargon II. Their first program, Sargon, was prepared for the Z-80 microprocessor, while Sargon II was written for the 6502. The program was interfaced with the Apple, using excellent graphics to display the board and pieces. It was also put into a stand-alone, chess-playing machine using a 6502B chip running at two MHz, twice the speed of Apple's 6502. This latest version is the most sophisticated of their efforts.

Special features enhance Sargon III. It can suggest moves if you need help getting out of a tight situation. You can adjourn a game at any point and save it to disk for later play. You can even watch Sargon III plan strategy. The display changes so rapidly, though, that you can only see the first few moves it is considering. The visual display will show you either the most recent moves of the game in a text format, or you can view the board in high resolution by hitting the escape key. Another option prints the current board position and game moves listing.

As with Sargon II, you indicate your moves by using computer algebraic chess notation. The rows of the board are numbered from one to

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Ten New DOS Commands

1. **TLOAD speed loads all Text Files, random or sequential, to ram.**
2. **TSAVE speed saves all Text Files, random or sequential, from ram.**
3. **TLIST Lists all Text Files, random or sequential to screen/printer.**
4. **DUMP Memory to screen/printer in Hex with Ascii on right side.**
5. **DISA disassembles Binary to screen or printer.**
6. **AL prints last loaded program Address & Length in decimal & hex.**
7. **HIDOS moves DOS to Language Card & continues operation of program.**
8. **/ is a one keystroke Catalog in addition to the original command.**
9. **DATE prints with any clock. Also File Dating with clock or manual.**
10. **FIND prints address's of hex found in 64k memory. Hidos cmd only.**

Compatible

All DOS entry addresses have been preserved. DOS is original length and compatible with most software. David-Dos II is copyable and creates fully copyable updated disks. DAVID-DOS II is licensed by programmers for inclusion in the software they sell. Init areas were used for David-Dos II. Works with all Apple IIs including IIe 80 Col, Franklin & Hard Disks, such as Corvus & Xebec. Requires 48K. Complete documentation for screen or printing and many utilities are on the disk.

All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DIVERSI DOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO	NO
	TLOAD	6.2	NO	NO	NO
(791 Strings,	WRITE	29.3	28.0	29.4	88.4
32 chars ea)	READ	24.3	16.3	24.3	83.8
	PRINT/READ	44.2	45.9	45.1	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	151.1	1231.2
APPLESOFT (100 Sectors)	*SAVE	6.4	16.4	6.4	33.1
	LOAD	5.0	4.0	5.0	23.5
INTEGER (100 Sectors)	*SAVE	6.6	NO	6.6	33.4
	LOAD	4.9	NO	4.9	23.4
BINARY (100 Sectors)	*BSAVE	7.3	18.4	7.3	28.7
	BLOAD	5.8	4.8	5.8	24.5
48K PROGRAM SPACE	APPLESOFT	36,352	NO	36,352	36,352
(With 3 Bufs avail)	INTEGER	36,352	NO	36,352	36,352
	BINARY	36,352	34,816	36,352	36,352
64K PROGRAM SPACE	APPLESOFT	46,592	31,232	45,658	35,162
(With 5 Bufs avail)	INTEGER	46,592	NO	35,162	35,162
	BINARY	46,592	40,704	45,658	35,162
NUMBER OF DOS COMMANDS		37	29	31	28
CLOCK FILE DATING		YES	YES	NO	NO
MANUAL FILE DATING		YES	NO	NO	NO
ONE KEYSTROKE CATALOG		YES	NO	YES	NO
AUTO USE INTEGER CARD ANY SLOT		YES	NO	NO	NO

Each Program was tested twice W/Apple Clock Card on a newly formatted disk containing DOS.
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eight, starting at the bottom of the screen. The columns are lettered from left to right as A to H. Thus, an opening move advancing the king's pawn two squares is entered as E2–E4.

You can select any of nine difficulty levels. Moves are timed from five seconds (level 1) to ten minutes (level 8). There is an infinite time limit (level 9) if you want Sargon III to keep looking for the best move. This feature might be useful for those who play chess by mail.

The newest chess programs, including Chess 7.0 and Sargon III, think while you think. This dramatically improves your playing skill, because whenever you select a move the evaluation algorithm expected, the program is one step ahead of you. If you want, you can stop Sargon from thinking by pressing control-E. This will increase your advantage against Sargon.

Since computers have memories, you would imagine that a chess program could "remember" a few good opening sequences. Sargon III has an extraordinary "opening book" of 68,000 positions. If you remain "in the book," Sargon III will move automatically without re-evaluating.

I have few criticisms of the package or its documentation. The extensive, 79-page manual reviews chess rules and strategy, and summarizes the special features of Sargon III. The last sections contain short descriptions of the classic games and chess problems included on the disk.

Additional chess instruction would complement Sargon III. One competing package allows the novice to see all of a piece's possible moves. It also displays the pieces attacking or defending a square. These options would facilitate learning the game, but their absence does not impair Sargon III's performance. Sargon III is manufactured by Hayden Software, 600 Suffolk Street, Lowell, MA 01853. It sells for $49.95.■

David Morganstein
Germantown, MD

Electronic Playground

Wouldn't it be nice to have a playground where you could send your kids when it's raining and not run the risk of catching a cold? The Electronic Playground is the perfect place to keep your three to eight year olds busy. Electronic Playground is a collection of three programs designed with the intention of "learning for the fun of it."

When booted, a rather unique menu displays an illustration representing each of the three program choices. At the bottom of the screen, a little matchman selects the desired program. Once the matchman is in proper position, pressing button 0 on the joystick runs the chosen program.

Heidi's Program is the simplest of

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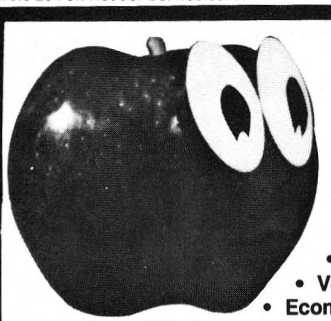

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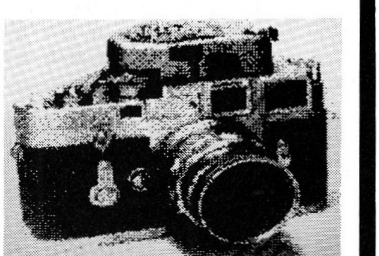

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— Superscan: Enables you to enhance the DS-65's Hi-Res pictures with colors! Choose from 21 different colors and assign them to grey scale values, modify pictures, zoom, enhance contrast, etc. Includes print routines for Anadex 9500 or 9501; Epson MX-80GFT and MX-100; and IDS 460 Paper Tiger*. Written for The Micro Works by Magna Soft. Price: $79.95

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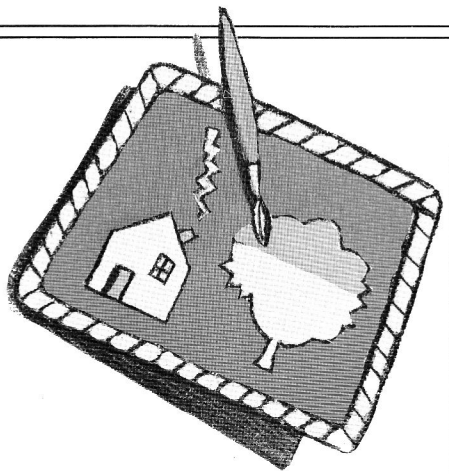
the three selections. Pressing any of the keys produces a kaleidoscope of color bars and noises. This colorful, interesting program requires little in the way of computer expertise. Certainly, a three year old would enjoy it.

Matchbox provides three matching tasks—shapes, upper- to lowercase letters, or numbers to objects. The screen displays four boxes and choices in this game. The object to be matched is presented on the upper left side of the screen. The joystick controls an animated matchman to pick the match. If the objects match, the program plays a song and flashes happy faces on the screen. An incorrect choice removes the wrong answer or rearranges the choices depending on the parameters specified in the Adult Management Interface. (The AMI can also be used to specify sound on/off, starting difficulty level, and number of plays per level.)



Magic Blackboard, the third program in this set, is a hi-res drawing and coloring program that may interest older children. This program allows the child to create and save pictures. Draw, erase, paint, and disk access are the four operation modes used for drawing. A hi-res pencil moves around the screen in response to joystick control. The pencil may be lifted or replaced on the screen by pressing button 1, while drawing speed is selected from the keyboard (1–9).

The user erases by designating lines or clearing the entire screen. Painting takes a lot of practice to do well. This filling process paints any enclosed areas or shapes with a choice of six colors. Printing follows three steps. First, the pencil must be moved inside the area to be colored. Then, the paint brush is selected from the drawing tools menu. Finally, the color is chosen and filling is initiated by pressing joystick button 0.

An interesting feature of Magic Blackboard is the Picture Menu. A miniature version of each created picture serves as the catalog entry for that picture. The Picture Menu is used for saving, loading, and deleting pictures on the Picture Disks. The Picture Menu illustrates disk operations along with the catalog entries. One caveat—colored backgrounds show up on the Picture Menu as plain white with no shapes visible.

The documentation is brief, yet entirely adequate. All necessary op-

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erations are described. The programs, according to the manual, have been designed to minimize use of verbal instructions, computer keyboard, and adult supervision.

All three programs in Electronic Playground are very interesting and well done. Children of all ages will find something of interest on this program and even discover a challenge here and there.

Electronic Playground, written by Jeff Tunnell, is published by Software Entertainment Company, 537 Williamette Street, Eugene, OR 97401. The programs run on the Apple II, II Plus, and //e. A color monitor, while not necessary, helps to capture the full capabilities of this $24.95 disk.■

Leslie R. Schmeltz
Bettendorf, IA

Carrier Force

Given the chance to command the U.S. carriers at Midway, would you be able to duplicate the surprise victory of the American commander, Admiral Spruance, by sinking four Japanese carriers at the price of only one U.S. flattop? Could you better the records of Japanese Admirals Yamamoto and Nagumo and capture Midway, save your carriers, and destroy the American force?

Gary Grigsby's Carrier Force gives you the chance to answer those questions in the most realistic carrier warfare simulation that he or anyone else has produced. Until now, Grigsby's games focused on grand strategy and logistics on a theater-sized battlefield. Carrier Force focuses more narrowly on tactics rather than strategy. The challenge is not to manage a theater, but a limited carrier force operating in a relatively small area of sea.

The player may choose to fight any of the four most important sea battles of the Pacific Theater in World War II: Coral Sea, Midway, Eastern Solomons, or Santa Cruz. In these scenarios, the players (except for the Japanese side in Midway) command both naval and land-based air forces, as well as surface and undersea warships.

The warship lineup is accurate for each side from the aircraft carriers and battleships right down to the last seaplane, destroyer, and sub. In all cases, the American player is outnumbered and outgunned.

Both players must learn the limits of their ships and planes. You may have 40 bombers and fighters aboard a carrier, for example, but if the ship is headed away from the wind, you may be able to launch only 12. When your divebombers are in the air, you'll discover just how limited their range can be with a full load of bombs. You'll have to bring your carriers dangerously close to the target in order to bomb it and recover your planes.

When you play the American side you'll learn, to your chagrin, that the Japanese Zeke (Zero) fighter planes eat up the F2A Buffaloes and more than hold their own against the F4F Wildcats and the P-36 Lightnings. Another realistic frustration of battle is actual cloud cover.

In the solitaire mode for the four scenarios, the computer commands the Japanese forces skillfully. Possessing the air advantage, the Japanese raids are heavy, well-protected by fighters, and disconcertingly frequent. When darkness falls, if the computer detects your carriers, the Japanese battleships move up for a deadly night battle.

Nice features make this game easier to enjoy. The most important is the "save game" option. Play can sometimes last for six to eight hours in the two-player mode, which means that you'll want to save any game you're playing at least once. If your opponent is being soundly thrashed and decides he wants to bow out after you've saved the game, no problem. You can finish a two-player game alone and vice versa. In the solitaire mode, you can select from four difficulty levels. And by the way, you can cheat.

Cheating is part of the art of warfare. I won't tell you how to cheat, but if you figure it out and break into the first Japanese command menu, be sure you check the locations and courses of the Japanese task forces and planes. Let me rationalize

cheating for you. In World War II, friendly coast watchers and naval code breakers gave the American admirals just about the same edge, and they never worried about cheating. Believe me, you'll need it as much as they did.

Carrier Force is a tough game to win, which makes it all the more satisfying when you do. It may be a long hard struggle before you win, because Carrier Force is for advanced war game players. You may find that, far from changing the course of history, you'll be hard pressed to repeat it.

Carrier Force was launched by Strategic Simulations, Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043-1983. Carrier Force sails on any 48K Apple II with Applesoft, the II Plus and on the //e. The game lists for $59.95.■

Brian J. Murphy
Fairfield, CT

Number Commander

Researchers and engineers take heart. Now there's a way to record experimental data without using stubby pencils and coffee-stained notebooks; a way to create formatted tables and graphs without drawing a single line; a way to perform complex, statistical analyses and mathematical operations without reaching for the slide rule and scientific calculator. Number Commander, a general purpose data storage, analysis, and reporting system has come to the rescue.

The package consists of a starter disk (which includes Apple's own COPY A utility), a program disk, and a 70-page manual. Written almost entirely in Applesoft BASIC, Number Commander comes with a tutorial and a built-in RPN scientific calculator, code-named KALQLATOR. You need an Apple II Plus or //e with an 80-column board, two disk drives, and a hi-res monitor. Number Commander works with printers having the capacity to print at least 132 characters per line with half-reverse or half-forward line feeds and line feed suspension. Number Commander contains the appropriate codes for the Apple Dot Matrix, IDS-460, Centronics 737, Epson MX-80 and FX-80, and NEC Dot Matrix, model PC 8023A-C.

I returned to the main menu and selected option C (Change Printer Codes) to see if Number Commander could correct the problem. I specified the printer and interface being used, and that I wanted the necessary code changes made for me. Number Commander also promised a test print to confirm that the codes were sent correctly. The test print never materialized. Instead, Number Commander brought me back to my starting point. I tried responding differently to the question about eliminating extra line feeds, but nothing worked.

I sent the codes to disk, but subsequent attempts to print any graph were halted by a syntax error in part of the printer code loading routine. I listed the line and found it identical to what appears in the manual. It's a good thing I worked with copies of the starter and program disks, since there was no way around this glitch other than to create new working copies from the originals.

Another annoyance concerned the tutorial. It is located on the starter disk, but there is nothing on the main menu to let you know it exists.

You must select a file to display information indicating that a tutorial is available. If you press T with the starter disk in drive 2, the tutorial begins. The trouble is, it discusses how to convert formulae in Applesoft BASIC—useful when it comes to correlating data, but disappointing if you were expecting a guided tour of the program.

Aside from these easily corrected flaws, Number Commander is true to its name. It gives you virtual mastery over data. You can create files with up to 30 named variables and retrieve them whenever you want.

Despite its sophistication, Number Commander is easy to use. You are prompted to confirm data entries and intended operations including deletions. The frequency with which I encountered these queries stemmed from the fact that Number Commander won't let you mess things up without a fight.

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Automatic Scaling is another nice feature. Once you decide whether to plot selected variables as raw data, products, or ratios, you merely choose the value ranges and Number Commander does the scaling automatically. Up to 120-by-122 plot positions are available on an 8½-by-11 sheet of paper, so you can obtain a fairly high resolution picture of your results.

Whatever you save on disk—diagrams, correlations, conversion formulae, comments, variables, files—can be retrieved, modified, and incorporated into any word processing program or telex system. Number Commander can trap and eliminate errors before they cause the system to crash.

While Number Commander can do plenty, it cannot do everything. It cannot print bar graphs, pie charts, cross tabulations, ranking test analyses and other specialized statistical routines. But for professionals who need to record and store data, or for those who must perform mathematical operations and correlations with speed and precision, Number Commander will do nicely.

Number Commander is produced by ComputerEase, Inc., 1312 W. Cedar Street, Appleton, WI 54914. Price is $125.■

Wayne J. Sassano
Hartford, CT

Jenny of the Prairie

Jenny of the Prairie is a "plucky pioneer girl." Separated from her covered wagon, she must survive through the winter and make it to spring. Jenny has nine adventure game format screens to find food and shelter.

The game is set up on a point system. Jenny needs 100 points to prepare for the winter. She can earn credits by picking apples for two points or berries for one point each. She can spear a fish for seven points or aim a slingshot at a rabbit for five points. A handful of wheat yields two points.

It isn't as easy as picking berries, though. Jenny may get thirsty in the process, and must quench her thirst as soon as possible by getting a drink from a river. And there is the problem of finding tools, presumably discarded by previous trailblazers. In her travels, she may trip over a spear for fishing, a slingshot for hunting rabbits, or a hatchet for chopping wood. Jenny luckily has a little mirror in her pocket to start fires.

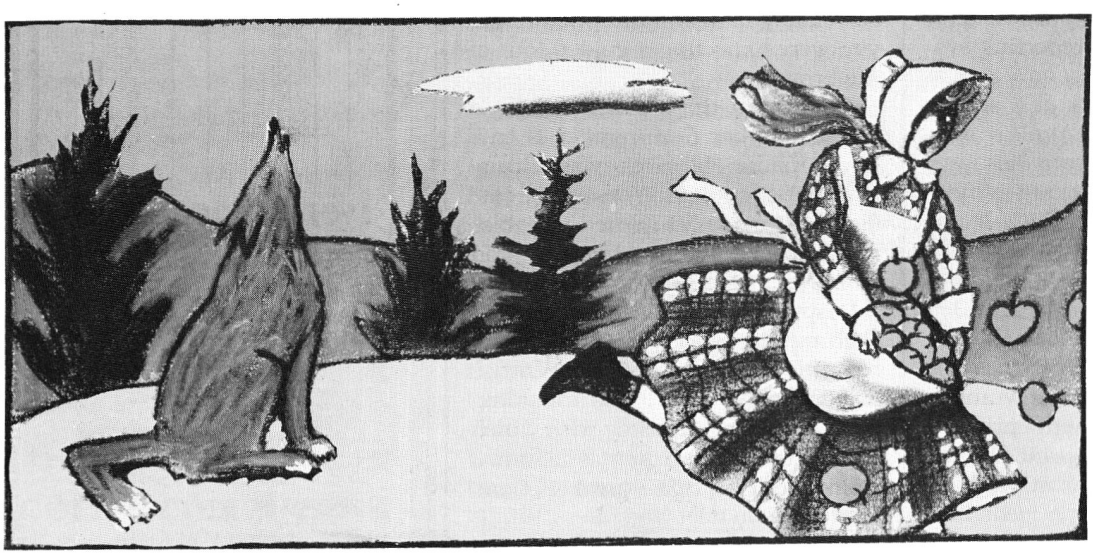
Food, tools, and fires are not enough for survival. She needs a roof over her head. She can build a lean-to out of logs, or she can tame a fox. What's the connection? If she wins the fox's loyalty with an apple, the fox will share its cave with her.

"Food, tools, and fires are not enough."

If this isn't enough activity for you, help Jenny collect enough rabbit fur to make a cape, or decorate her living quarters with flowers for an extra graphics display. I found that simply getting her to carry her food supply while outrunning rattlesnakes, mountain lions, and coyotes took all my wit.

Three levels of difficulty keep you and Jenny busy. In level one, Jenny has no time limit for tasks and the dangers are always in the same place. It's convenient, but boring. In level two, the map is the same, but the dangers move around and the blizzard arrives to end the game after three predictable light snows. In level three, the map changes, the dangers change position, everything is difficult to catch, and the blizzard is unpredictable.

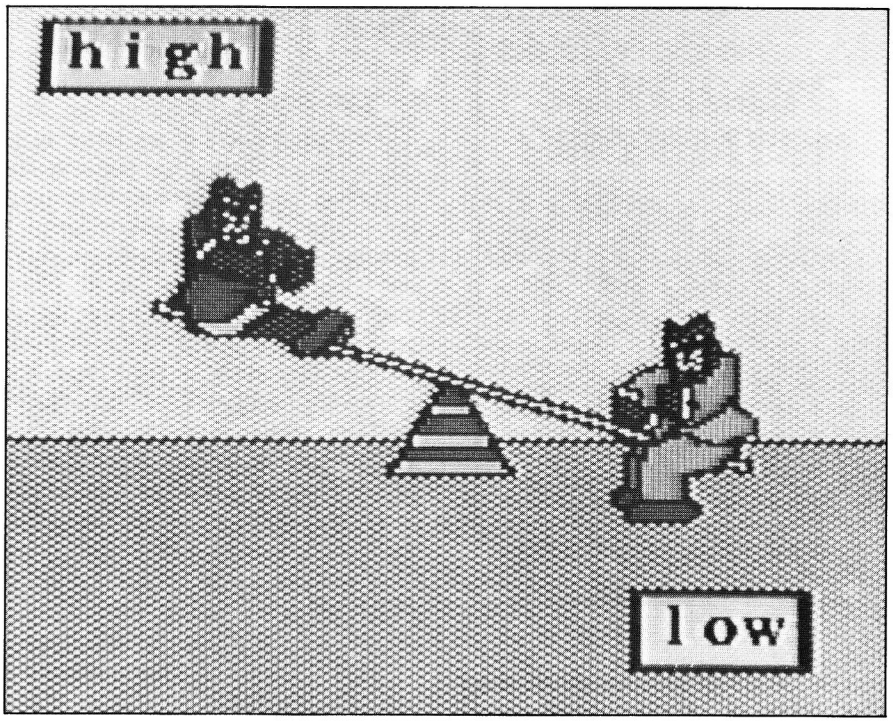
The graphics in this program are delightful color maps with a slightly animated Jenny, animals, vegetation, and flowing water. The game is entertaining, whether played by one person or a group. While aimed at elementary school girls interested in adventure, gathering food, building shelters, keeping house, and taming animals, it is fun for anyone from about third grade up. The program dovetails nicely with the standard elementary school curriculum of colonial pioneers. It allows students to participate in a simulation.



The Jenny software is interactive and teaches how a computer works while being fun. Jenny of the Prairie is available from Addison-Wesley Publishing Company, Jacob Way, Reading, MA 08167, for $39.95.■

Molly Watt
Antrim, NH

Stickybear Opposites



If you want to know about mice, ask a cat. If you want to know about children's software, ask a child. So I gave Stickybear Opposites to my four-year-old daughter, Katie, for review, and her reactions were positive on all but one point. She likes the program's brilliant color graphics and lively sound.

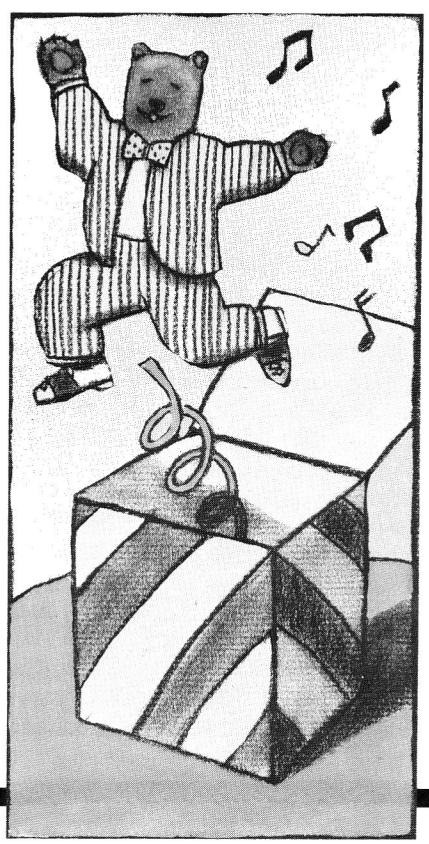
Stickybear Opposites teaches children word opposites such as UP and DOWN, IN and OUT. It gives the child two colorful pictures illustrating one of the word pairs, and allows the child to flip back and forth between the two illustrations by pressing the right and left arrow keys (or by twisting the paddle control). For example, for OUT Stickybear stands outside a box and the word OUT appears in large type above the bear. When the child presses the right arrow key, the bear leaps into the box and the word changes to IN.

When the child tires of flipping between these two pictures, a press of the spacebar (or paddle button) loads a new pair of pictures. The program contains 21 word pairs illustrated by appropriate graphics. Some word pairs have more than one graphics display. That is, FAST and SLOW may accompany a motor, bird, plane, or car.

The graphics are bold and colorful, appealing to a child's interest. The shapes move quickly without flicker, and bears move behind walls, airplanes fly below bridges, and bears walk inside houses without the overlapping images we expect from Apple shape tables. The sound is bright and cheerful though Mom says the program needs a wider variety of musical phrases to protect the sanity of parents. The programming is fast and smooth, taking only three seconds to load a new pair of opposites from the disk.

Although the images are colorful, color is not critical to the program, so you can use a monochrome monitor. Only one image depends on color: In STOP and GO, a car drives under a stop light the child changes from red to green. On a monochrome display, the red and green lights are indistinguishable, but then they are not very easy to see on a color display either. If you have young children, you should use a color display for whatever software they have, because they enthusiastically respond to the bright colors.

According to the documentation, the program is intended for children three to six years old, but you must use your judgment. Depending on the age and abilities of the children, you may need to give them quite a bit of friendly reinforcement if they are to get much from the program, but this is true of any educational toy. The documentation contains good advice, and parents should read the three pages of suggestions before booting the disk.



My daughter's only complaint about Stickybear Opposites is that she can't backup. She must look at the word pairs in the program's sequence, and if she wants to go back to the preceding pair, she can't. Worse yet, Daddy can't make the bird appear on demand, and when a four-year-old expects Daddy to work wonders, Daddy appreciates wonders that are workable. Future versions of the program should provide a backup key to return to the previous word pair and control sequences that summon a particular word pair.

Almost every illustration involving a bear shows a male bear. A female appears in only a few, and in one of the scenes, she is washing the windows of a little house. I would rather see fewer stereotyped deeds.

If Stickybear Opposites did nothing but teach opposites, it would not be worth the price, but it has great potential if you work with your child. Besides the interaction of playing with the computer, you can help your child learn words and concepts. Once your child knows the opposites, you can stimulate imagination by asking questions: "What will the bear do when you press the arrow?" "Whose door is that?" "Why is the bear climbing up a ladder?" Use the book that comes with the disk to continue with other opposites.

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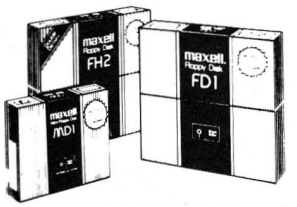

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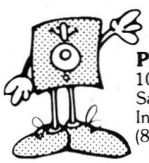

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Stickybear Opposites comes in a folder with a sheet of six large stickers, a poster illustrating some of the opposites, a small booklet of instructions and hints for parents, and a hardbound children's book of more opposites not included in the program. It will run on any Apple II Plus (48K) with DOS 3.3 or on the //e or Apple ///. The disk is protected and comes with a 90-day limited warranty, after which time-damaged disks will be replaced for $10. It is manufactured by Weekly Reader Family Software, a division of Xerox Education Publications, 245 Long Hill Road, Middletown, CT 06457, and lists for $39.95.■

Mike Seeds
Lancaster, PA

Planetfall

Welcome aboard the Stellar Patrol Ship Feinstein. You begin your mission as a lowly Ensign Seventh Class scrubbing the filthy metal deck of this monstrous ship. Watch out for dreaded Ensign First Class Blather, the bane of your shipboard existence, who appears at any time to make life miserable by giving you demerits for leaving your assigned job on deck nine. Worse than that is winding up in the brig for disobeying his orders.

An alien ambassador, Br'gun-Te 'Elkner-ipg'nun from the planet Blow'k-Bibben-Gordo is also on board. Much to your dismay, he leaves a trail of green slime everywhere he goes. Of course, he always promenades just where you finished cleaning.

Suddenly, there's an explosion! I hope you remember where the primary escape pods are, because they're the only way to get off the ship and continue Planetfall. Upon landing your escape pod, you'll find yourself in a wondrous land, somewhat reminiscent of Zork but with a touch of Starcross.

One of the first things you'll have to decipher is a plaque. The language is strange because it's written in a corrupt form of Galalingua. Learn this language quickly because it's used all over the countryside.

Now for the joy of this adventure. He stands four feet tall and his name is B-19-7, but his friends call him Floyd. Floyd is a robot who follows you around. Best of all he talks so you won't get lonely while exploring. Floyd can be a pest at times, though. He loves to play Hucka-Bucka and Hider-Seeker. Don't get mad, because Floyd would give his life for you.

Enjoy exploring this lost civilization while you learn about its past. There are shuttles and elevators to take you around on your journey. Food and drink are the only things to worry about for a while. What to eat is obvious, but what to drink may pose more of a problem. Sleeping is necessary, but you can't curl up just anywhere. You will awaken when fully rested and not a millichron sooner.

Time is measured in the millichrons of current Galactic Standard Time. Read the documentation to understand millichrons. You only need 80 points to win, but they're a tough 80.

Planetfall sells for $49.95, and can be played on either the Apple II, Apple II Plus (or Apple /// in Apple II emulation mode). Also needed are 32K of RAM and a 16-sector disk drive. A printer is optional, but with one you can make a transcript of the adventure as you play. Planetfall is from Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138.■

Linda Beaulieu
Ansonia, CT

The Coveted Mirror

Magic mirrors can tell you who's the fairest in the land, take you beyond the looking glass or, as in Penguin's The Coveted Mirror, see your misdeeds and immediately punish you. Such a mirror can be a powerful tool in benevolent hands, but in the grasp of an evil man, like the sinister King Voar, it could subjugate a kingdom.

King Voar, in seizing the mirror from a wizard, blundered and broke the glass into five pieces. He was able

to take only four of the pieces. With the shards, he is able to see anyone in his kingdom. If he discovers any subjects plotting against him, he uses the mirror to teleport the malefactor to the castle for punishment.

The kingdom has one hope. If you can locate the hiding place where Voar keeps his pieces of the magic mirror, and find the one remaining piece which was hidden by a wizard, then you'll break Voar's power and free the kingdom. But, can you survive long enough without Voar detecting you and find the clues to lead you to his piece of the mirror?

As the game begins, you are in the audience room of King Voar. Every time you meet the tyrant, he'll toss you into a dungeon cell. The first trick is to escape from the cell, equipped with only a pitcher, wash basin, and bed. When you escape, it will be a moving experience. Once out, scout the castle, the grounds, the countryside, and the town for clues.

At each location, try all of the possible command combinations. Every command in the game (except E, W, N, S for direction and TALK and INV for inventory) are a verb-noun combination: GET RING, OFFER GRAIN, GO DOOR, OPEN DOOR, MOVE TABLE, and so forth. Try everything, no matter how farfetched. GO into anything that will fit; OFFER anything as a gift; GET anything that isn't nailed down; TALK to everyone; READ any signs or books.

You'll learn how to move undetected through locations. Sometimes a time limit exists on how long you can search. A gift to the right character at an opportune moment can extend this period. In town, you'll discover that a favor is often repaid in kind, so be a good Samaritan. Be prepared to participate in a fishing tournament or a joust. Will the arcade-style games help you complete your quest? You'll have to try them and see.

The Coveted Mirror is manufactured by Penguin Software, 830 Fourth Avenue, P.O. Box 311, Geneva, IL 60134. The list price is $34.95. The game runs on any 48K Apple II Plus and on the //e.■

Brian J. Murphy
Fairfield, CT

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September 5–7
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contact:
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Raging Bear Productions
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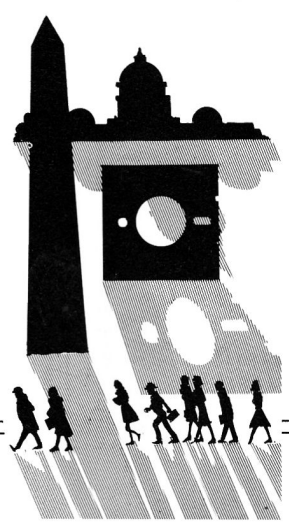
Suite 175
Corte Madera, CA 94925
(800) 732-2300
(415) 732-1194



September 6–8
Personal Computer Interfacing Workshop
Washington, DC
contact:
Dr. Linda Leffel, CEC
Virginia Tech
Blacksburg, VA 24061
(703) 961-4848

September 6–9
Byte Computer Show
San Francisco, CA
contact:
Peter B. Young
The Interface Group
300 First Avenue
Needham, MA 02194
(617) 449-6600

September 11–13
Mini/Micro Southwest—84
Dallas, TX
contact:
Nancy Hogan
Electronic Conventions
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Los Angeles, CA 90045
(213) 772-2965

September 13–16
Computer Showcase Expo
New York, NY
contact:
Linda Yogel
The Interface Group Inc.
300 First Avenue
Needham, MA 02194
(617) 449-6600

September 13–16
Computer Technology for the Handicapped
Minneapolis, MN
contact:
Paula Barnhart
P.O. Box 68
Henderson, MN 56044
(612) 665-6573

September 14–16
Heart of Texas Computer Show
Corpus Christi, TX
contact:
Heart of Texas
Computer Show
P.O. Box 12094
San Antonio, TX 78212
(512) 681-2248

September 16–20
COMPCON Fall '84
Arlington, VA
contact:
Small Computer
(R)evolution
P.O. Box 639
Silver Spring, MD 20901
(301) 589-8142

September 20–21
Educational Microcomputer Conference
Winston-Salem, NC
contact:
Jeanette Gann
NC Regional
Educational Center
P.O. Box 21889
Greensboro, NC 27420
(919) 379-5764

September 20–23
Userfest/New York
New York, NY
contact:
Northeast Expositions
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Chestnut Hill, MA 02167
(617) 739-2000

September 27–30
5th Annual Mid-Atlantic Computer Show & Office Equipment Exposition
Charlotte, NC
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CompuShows Inc.
P.O. Box 3315
Annapolis, MD 21403
(800) 368-2066

October 6
Computer Conference for Educators
Indianapolis, IN
contact:
Carol Vodde
ICE Conference '84
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Fort Wayne, IN 46802
(219) 425-7602

October 9–11
Southwest Computer Conference
Tulsa, OK
contact:
E. Z. Million
Southwest Computer
Conference
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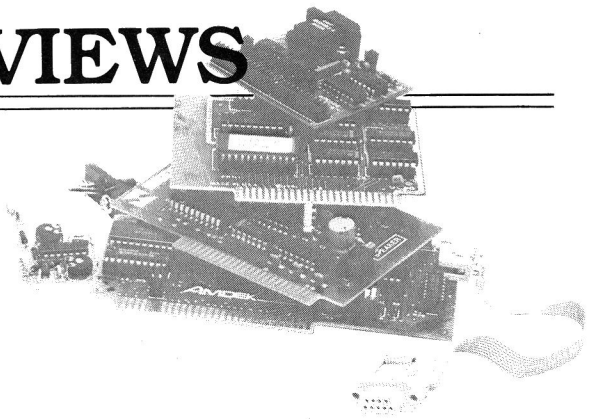
(918) 587-9550

HARDWARE REVIEWS



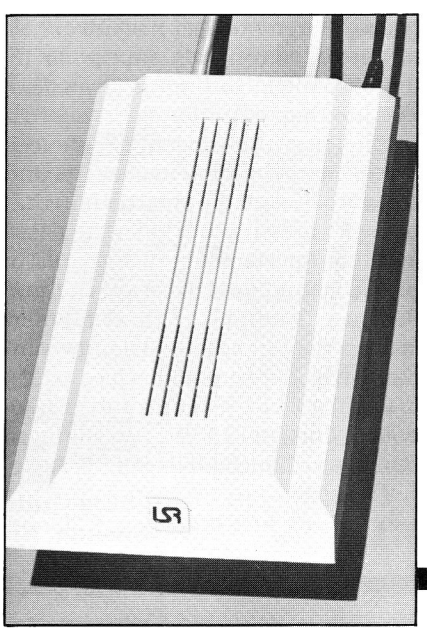
U.S. Robotics Password Modem

The U.S. Robotics system contains two of the three things you need to get your modem up and running. The missing third part is the physical interface to your Apple II computer.

Right now, this "missing link" contributes to one of the major differences between modems. The U.S. Robotics system represents those modems that are separate from the computer interface but adaptable to a variety of computer systems. The other modems have the phone interface built into the card installed inside the Apple.

Each system has its advantages and disadvantages. Built-in modems take up less room because everything except the phone cable is inside the Apple. They usually are "smart" cards with built-in modem programs in ROM to handle simple tasks of establishing a two-way computer link and acting like a dumb terminal. Usually, additional software is provided to extend the capabilities of the system to include full screen terminal emulation and file transfer capability.

The U.S. Robotics Password modem.



The major disadvantage of these modems is that they will only work with the system you buy them for. If you exchange your Apple for another computer, even another Apple product such as the Macintosh, you will not be able to use your modem on this new system.

The U.S. Robotics Password modem is a self-contained 300/1200 baud modem separate from the Apple. It interfaces to your system with three cords. One cord is the power cord to an AC/DC wall-mounted transformer, such as the ones used with calculators or game computers. The second cord is a line terminating in a telephone modular jack.

You may have problems with the third cord. This line connects the Password to your Apple. The interface used is called RS-232C, which represents a popular standard for connecting devices that communicate a bit at a time (i.e., serially). The problem is that the standard Apple II does not provide a built-in RS-232C serial interface.

Serial Interface Needed

You will have to supply this interface card. Dozens of serial interface cards appear on the market, but each implements the RS-232C standard differently. The Password documentation provides technical definitions of the required interface which you can match with your interface card. This procedure, however, is usually beyond the technical ability of the typical home computer user.

U.S. Robotics tested its modem with Apple interface cards and indicated that the following three can be used with the Password:

1) Apple Super Serial Card
2) SSM Apple Serial I/O Interface
3) CCS Model 7710 Asynch Serial Interface

Unfortunately, you don't find this out until you read up to page 56 of one of the three manuals. I strongly suggest you try the system in the store with your interface card, or call U.S. Robotics, before you buy the system if you have an interface card other than those listed here.

The Password has its own microcomputer and can be used in a stand alone mode without any Apple software support other than that for the Apple interface card. After activating the interface card for input/output (usually with a command such as IN#2 if the card is in slot 2), commands can be sent to the Password as simple character strings.

Firmware Commands

The commands supported in firmware within the modem include dialing (touch-tone or pulse), automatic answering, full and half duplex communications (echoing or not echoing typed characters back to the local computer), terse (numbers) or verbose (text) for modem responses to your commands, and setting the modem escape character.

The modem escape is useful for getting the modem's attention while communicating to another system.

Circle 56 on Reader Service card.

AMPERGRAPH

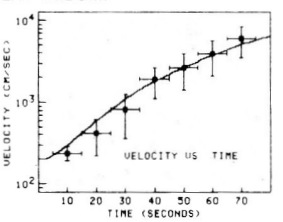
AMPERGRAPH is a powerful, easy-to-use relocatable graphics utility for the Apple II +/e/c. AMPERGRAPH adds twenty-two Applesoft commands that allow effortless generation of professional-looking plots of scientific or financial data. All of the necessary scaling and screen formatting is accomplished with 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 + T!2:NEXT T
35 FOR T = 10 TO 70 STEP 10
40 &CLOSED SQUARE, T,
   (150 + T!2)*(.8 + .4*RND(3))
45 &ERROR BARS, 5, T!2/2
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
* Fast
* Adjustable horizontal tab
* Easy to use
* Compatible with AMPERGRAPH
* 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.

madWest SOFTWARE
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Madison, WI 53705
MasterCard 608-238-4875 VISA

If the escape character is + (the default setting), then three pluses typed in a row will cause the modem to respond rather than send the data to the remote system.

A particularly useful feature of the Password is a built-in speaker for listening to the call without using a separate telephone. You can listen for a busy signal or wrong number and immediately dial again rather than wait for the modem to time out and automatically hang up. The speaker cuts out when the Password detects a modem tone and establishes communication. The modem time out interval is also adjustable.

Software Enhancements

Using the modem firmware is convenient but does not fully utilize the computer's capability. Transferring files and full-screen terminal emulation, for example, require computer software. U.S. Robotics provides such software, except for full screen emulation, for a number of CP/M computer systems including the Apple equipped with a Z-80 card. Provided with the system is an Apple CP/M formatted disk with several files which comprise the TELPAC software.

System default options you can modify with the TELPAC software include baud rate (300 baud using Bell 103 standard/1200 baud using Bell 212 standard), full or half duplex, parity (even, odd, mark, or space), and dialing method (touch or pulse). A help function at each menu step walks you through the available options, which is a useful feature when you aren't using the manual or trying to implement an infrequent option.

The TELPAC software ($99) supports several file transfer protocols. The simplest is straight transfer with no error checking or handshaking with the remote computer. A second method defines the simple handshake to be used. For example, send a line of text every time the character "?" is received. This is useful for remote computers that use line editors to enter text and prompt with a "?" for each line of text.

The most powerful file transfer available is the Ward Christensen XMODEM protocol, popular with CP/M systems. This protocol sends and receives files 128 bytes at a time with full error checking and automatic block re-transmission on error detection. Even binary files containing control or graphics characters can be sent using the protocol. (Look for this protocol if you're interested in bulletin boards.)

Automatic command files are supported in order to build a file of commands which can be executed one after another without demanding your constant attention. One such sequence of commands illustrated in the manual would allow your system to wait several hours, call a preselected number, open a local disk file, automatically log into a remote computer (using stored passwords), download a file from the remote system, and automatically log off the remote system without any further attention on your part.

Directory and Auto-Answer

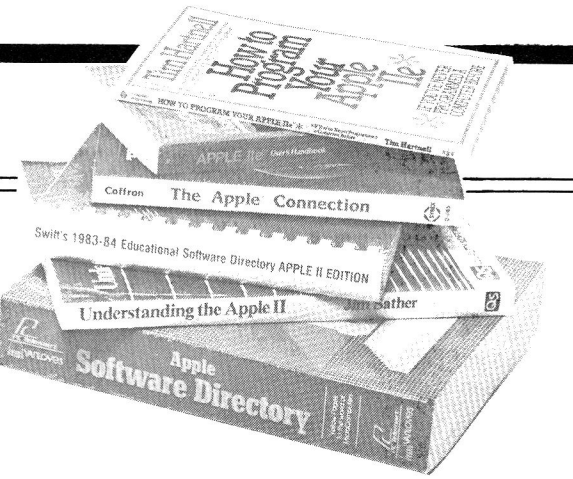
The system supports an on-line phone directory where you can store names of systems or people, communication parameters (baud rate, parity), and the names of automatic log-on files for each system. The directory is easily maintained with a built-in editor.

A simple host mode places the modem in an automatic answer mode. Anyone phoning in is greeted by a high-pitched modem tone, which is great if you're a modem. Anyone calling in with a modem-equipped terminal or computer is greeted by a log-on message to enter a password. If the password matches the one you enter, the remote user has full access to all the commands supported by the system, including file transfers. You are then a mini-bulletin board.

The Password modem is an excellent system both in hardware and software. Keep in mind, though, that the software only works in the CP/M operating system (requiring an Apple CP/M add-on card), and the modem needs an RS-232C serial interface to the Apple (requiring a compatible Apple serial interface card). It's available for $449 from U.S. Robotics, Inc., 1123 W. Washington Boulevard, Chicago, IL 60607. ■

G. Skip Guild
Nashua, NH

BOOK REVIEWS



Getting On-Line: A Guide to Accessing Computer Information Services

by M. David Stone

Prentice-Hall, Inc.
Englewood Cliffs, NJ
Softcover, $14.95
Hardcover, $21.95

Any computer's optimum use is as an information resource. Unfortunately, this is often thought of only in terms of what the user enters into the machine him- or herself. The information services that already have data on-line and accessible are frequently forgotten.

However, the considerable time required to hunt down these services can easily offset the time saved, since there are numerous systems with different features. It's at this point that you'd purchase M. David Stone's *Getting On-Line*.

Actually, if the book contained only a directory of services, I wouldn't have bothered purchasing it; there are other such listings in both magazines and books. Stone's guidance, however, takes a total system approach.

The book is not dedicated to the Apple computer. No book of its scope could possibly be. What it does include, though, are comprehensive sections on software (17 pages, half of which are Apple-compatible), hardware (30 pages of modem information, more than half of which are Apple-compatible), and a lot of theory.

Stone covers the problems inherent in using your computer as a terminal; a breakdown of the various ways your computer can be so used; the benefits and limitations of the Apple Communications, High Speed Serial, and Super Serial Cards; and even the possibilities of so seemingly simple an object as an RS-232 port.

The last 140 pages of the book deal with the available information services, and Stone departs from the typical treatment. While listing the various companies that provide services (The Source, CompuServe, NewsNet, and the like), he goes further by revealing a basic understanding of how the services work. For example, often these services will be moved from one network (like The Source) to another (such as CompuServe) by the people who produce them, generally for reasons of coverage and compensation. As a result, what may be on one network one week may not be there the next.

Stone has compiled an index of the services available (financial, personal, and so on) and listed the various companies that offer them. For instance, you may be using an employment/resume service on The Source and want to find out if anything better exists. Looking under that topic in *Getting On-Line*, you'll see that CompuServe and DIALOG also provide this service. The listings (including specialized company services) literally run from A to Z with cross-referencing.

Since these services are available for a fee, Stone discusses search strategies intended to maximize their utility while minimizing their expense. And, for those more interested in using their Apple for personal communications than information gathering, there is a listing of places to look for these access numbers as well.

As mentioned, this is not an Apple-specific book, but the Apple-oriented material it contains is valuable for getting on-line. If you're interested in telecommunications, this guide will become a well-used part of your reference library. ■

Bill O'Brien
New York, NY

Pascal for the Apple

by Iain MacCallum

Prentice-Hall International, Inc.
London, England
Softcover book & disk, $33.00

Can one book answer all your questions on Pascal? This one seems to come close.

Pascal for the Apple comes with a disk containing programs written in Pascal, as well as explanations of how certain programs work. The book refers to these programs throughout. If the reader needs further explanation, he can execute the appropriate explanation code on the disk and a graphic diagram will take him through the problem, step by step.

In the first section of the book, on graphics, the reader must load one of the programs provided on the disk, find the errors in the program, correct those errors, compile, and execute the program. After the program is running successfully, the reader must modify the program in various ways to make it perform different functions. The reader can then save the program in various forms to a different disk. These tasks may not seem like much to someone who is familiar with Pascal, but to a novice they can be quite difficult.

Mr. MacCallum does an excellent job of explaining these important procedures that the programmer will use all the time. He goes on to analyze different ways to accomplish tasks by

using conditional statements such as CASE, REPEAT...UNTIL, WHILE... DO, and IF...THEN. Recursion, a fairly difficult concept, and other concepts are all explained in depth; they are easy to understand with the follow-along method of using various programs from the supplied disk.

The second part of the book deals with type restrictions, checking input, formatting output, and strings. The reader also learns about subrange types, enumerated types, and sets. The author does a superior job of teaching records, a powerful tool in Pascal, and a concept that can be difficult to break down.

The final section of the book explains the two remaining data types in Pascal, files and pointers. These are hard applications to comprehend, but Mr. MacCallum spells them out clearly. He uses examples and diagrams each step of the way, as the reader works with the programs supplied on the disk. At the end of each chapter, exercises test comprehension of the concept covered.

The reader can usually find further explanation in skeletal form in the appendices. The appendices themselves could comprise a book, covering everything from Turtlegraphics and reserved words to debugging a program and Pascal syntax diagrams.

The author considers the book a complete first year course on Pascal, and rightly so. This book covers the full scope of Pascal. The concepts are introduced in a logical and ordered manner and explained equally as well. It also explains in detail many basic procedures for maintenance of the Pascal system, such as transferring files, renaming files, copying disks, and the various command levels in general.

Can one book answer all your questions on Pascal? Maybe not all your questions, but the author does a superb job of anticipating the reader's questions and explaining concepts in a lucid manner. This is a fine book for anyone wishing to learn Pascal on the Apple.■

Marc Dodson
Mission Viejo, CA

Discovering Apple Logo: An Invitation to the Art and Pattern of Nature

by David D. Thornburg

Addison-Wesley
Reading, MA 01867
Softcover, $14.95

An unsuspecting buyer, seeing the title of this book, might believe it would teach everything needed to understand and use the Logo language. On the contrary, Thornburg's book covers only about 56 of the more than 150 primitives available in Apple Logo, and most of the primitives covered are not fully explained. This book would be better titled "An Invitation to the Art and Pattern of Nature through Apple Logo."

Throughout the book, the author has used the full spelling of the primitive names, making no mention of the abbreviated forms of many of the more commonly used words. One of the features I like most about Logo is that it is sympathetic to my abominable typing skills, allowing me to enter BG instead of BACKGROUND, or CS rather than CLEARSCREEN.

Early chapters of the book repeat information and some procedures already available in the reference manuals supplied with the Logo disks. Later chapters are based on, but do not fully exploit, powerful mathematical and artistic concepts. The book defines procedures that draw cute little pictorials—tessellations, moire patterns, trees, dynamic spirals, fractals, and mountains—but lacks adequate follow-up. The text provides a few explanations, historical references, and obvious inferences, but it poses few questions and provides no challenging exercises. A competent teacher of mathematics or art is necessary to fully apply this information.

Discovering Apple Logo would be

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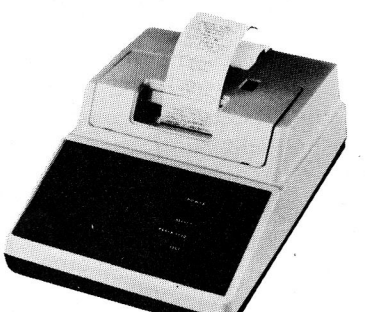

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useful for math and art teachers, or in training courses to use Logo in teaching art and mathematics. The average reader will quickly become bored with the cute pictorial procedures, lack of definitive information about the use of Logo, and inadequate explanations about the use of the Logo primitive.

If you are a mathematics or art teacher, *Discovering Apple Logo* is for you. If you are a student or a person keenly interested in learning Logo, this book gives several useful procedures that could be used in developing other Logo programs, but you will be left doing what the title of this book states—discovering Apple Logo!■

A.E. Doughty
Edmonton, Alberta

The Farm Computer

Fred E. Sistler

Reston Publishing Co., Inc.
Reston, VA 22090

Hardcover, $19.95

Even on the farm, computers have a place. In *The Farm Computer*, Fred Sistler guides the independent farmer through selecting, buying, and using a computer.

Chapter one gives a simple introduction to computers and their vocabulary. Mr. Sistler describes eight steps for writing a computer program—steps that could also be used as a guide for selecting a program.

Chapter two is a buyer's guide to computers, computer peripherals, and software. Mr. Sistler explains three steps to help you design a system to fit your needs: define your needs, select software to meet those needs, and select the hardware that can run the selected software.

Chapter three describes equipment required for accessing computer services, including professional services that you pay for and free services offered by your state, university, and local extension service. The equipment includes terminals and modems. Communication requirements are also covered.

Chapters four and five make up a tutorial in the BASIC language. These two chapters will not make the reader an instant programmer, but they give enough information to understand the concepts developed in chapters six through ten.

Chapter six deals with machinery management. The author presents four different programs that deal with sizing machinery, equipment depreciation, and equipment replacement costs. He also shows how to design and write a program.

Chapter seven contains two programs on livestock production. The first program, on sow farrowing, keeps accurate breeding records to obtain maximum profit. The second program charts market prices.

Chapter eight discusses crop production, with programs on grain production costs, plant population (selecting the best seed spacing to maximize yield), and field records.

Chapter nine contains many short programs dealing with chemical applications such as sprayer travel speed calculations, nozzle capacity, sprayer calibration, and mixing ratios.

The final chapter discusses greenhouses and nurseries. It contains a program for culture schedule records using disk operations in a BASIC program.

This is a good introductory book describing the various applications of computers on the farm. The programs demonstrate computer applications to the farm more than offering useful everyday applications. Mr. Sistler could have spent more time explaining how to define your special needs.

The only other fault I found with the book was the lack of information on Mr. Sistler's background. Having been raised on a large apple farm in New England, I know that farmers don't take advice from non-farmers without knowing something about their credibility.■

Oliver Holt
Amherst, NH

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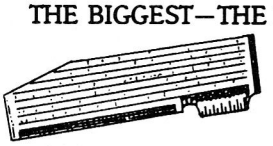

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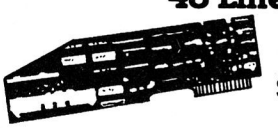

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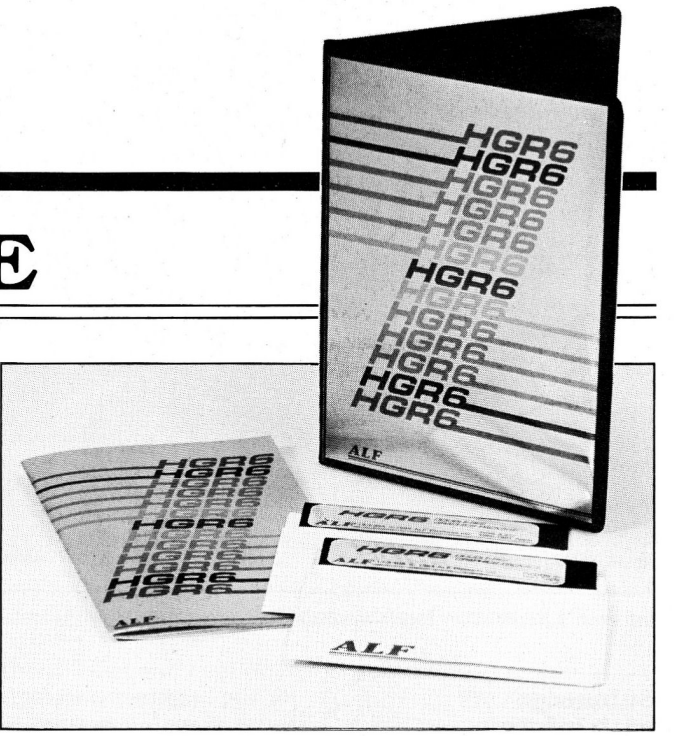

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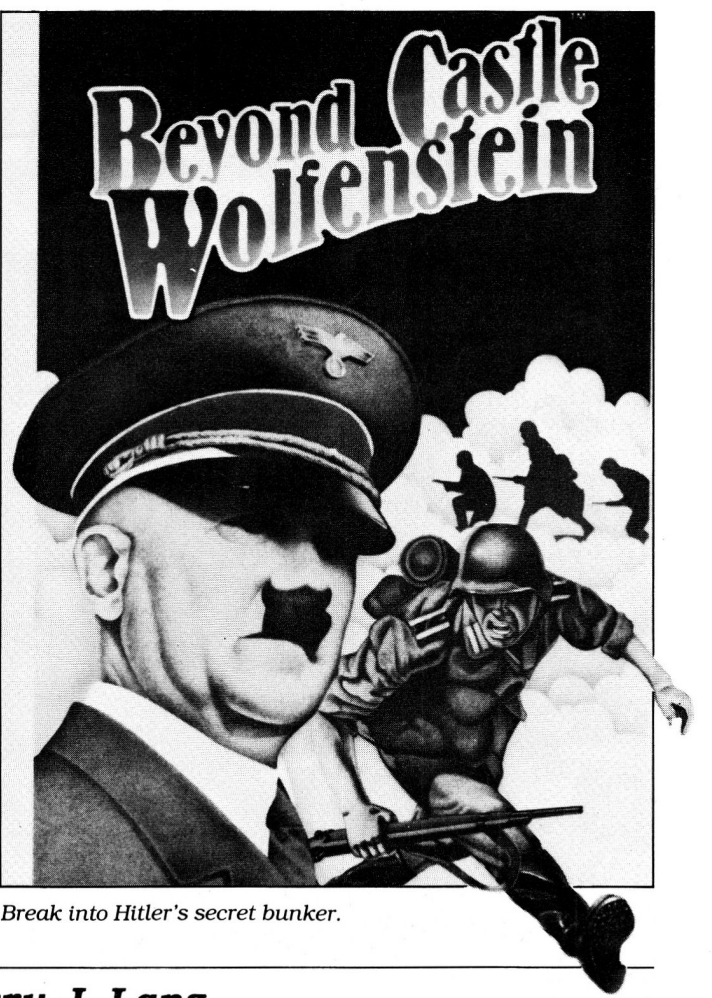
Grolier in the //c Race

Grolier, Inc., the world's largest publisher of quality encyclopedias, enters software publishing with two series for the home. These are designed for the new Apple //c, but are compatible with the //e and II Plus with 64K. The Home Power Series has a file manager for elementary school children and a full-feature graph program. The Knowledge Builder Series has two adventures that coordinate with a printed text. All the programs are designed for home use by young children. For price and ordering information write Grolier Electronic Publishing, Inc., 95 Madison Avenue, New York, NY 10016. Reader Service number is 463.

Son of Wolfenstein

The hero of Muse Software's best-selling Castle Wolfenstein takes on a new mission in Beyond Castle Wolfenstein. The sequel, a foray to Hitler's bunker for an attempt on the Fuehrer's life, can be played and understood without knowing the original. Beyond ($34.95) runs on the Apple II family, including the //c. Muse Software is located at 347 N. Charles Street, Baltimore, MD 21201. Reader Service number is 454.



Break into Hitler's secret bunker.

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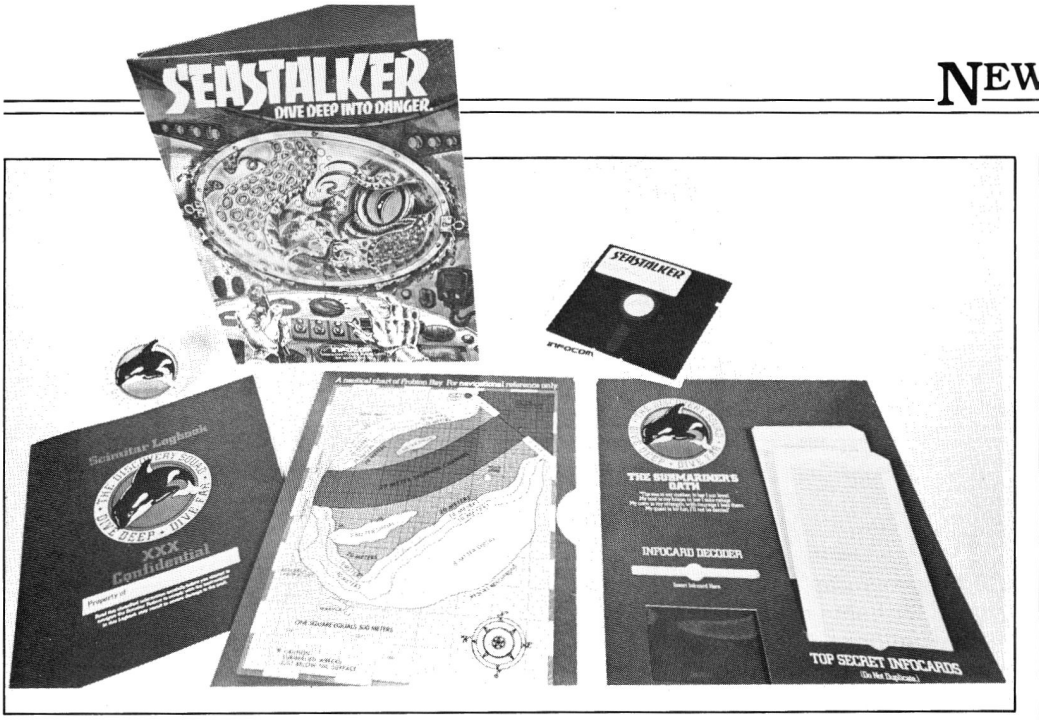
edited by Kerry J. Lanz



Infocom's Seastalker leads to undersea adventure.

Submerge with Infocom

Seastalker from Infocom is the first in a new series of text adventures for the beginner and for those as young as 9 years old. You captain a specially equipped submarine to save Aquadome, the world's first undersea research station. Once you type in your name, the game makes you the main character throughout the story. Seastalker, at $39.95, is the latest from Infocom, 55 Wheeler Street, Cambridge, MA 02138. Reader Service number is 450.

Making a Perfect Martini

Uncle Josh wanted a sombrero, and you thought it was a hat. Micro Barmate is a computer-age bar guide that includes recipes and more. It answers questions on mixing, sorts the recipes by ingredients, and even recommends drinks for a hot day. This computer bartender is available for $40 from Softsmith Corp., 1431 Doolittle Drive, San Leandro, CA 94577. Reader Service number is 464.

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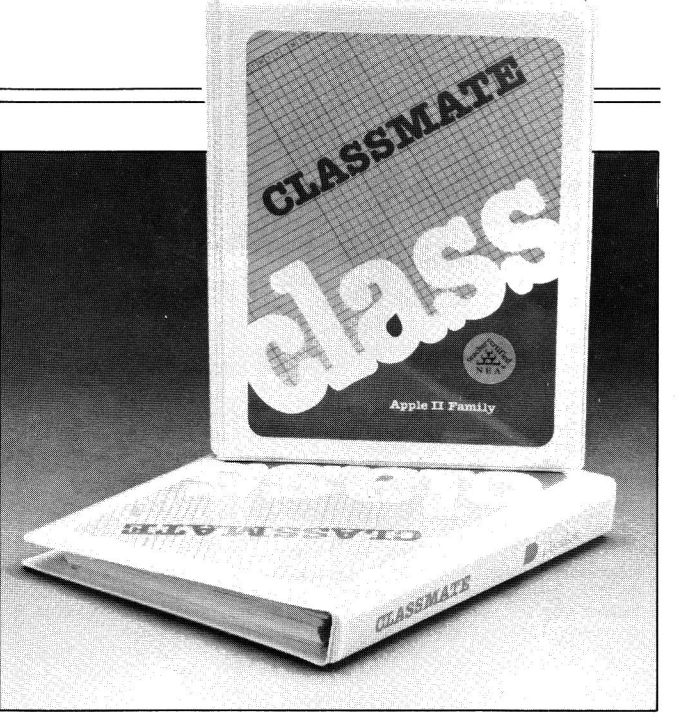
Make Math More Fun

Success with Math is a series of self-paced math tutorials for grades 1–12. New titles in this series, directed at grades 5–8, cover decimals and fractions. On-screen instructions illustrate the process of problem solving. New examples are generated at random each time the program is run. These new titles come from CBS Software, One Fawcett Place, Greenwich, CT 06836. Reader Service number is 456.

Proof Is in the Picture

A graphics utility and editor for the KoalaPad, The Graphics Exhibitor ($39.95) works with the entire Apple family, including the //c. It lets you edit pictures, combine them, label and caption them. With the menu-based Exhibitor you can create a "slide show" of your pictures or send them to your printer. All commands are made through the KoalaPad. The Graphics Exhibitor comes from Koala Technologies Corp., 3100 Patrick Henry Drive, San-



Classmate handles classroom records and reports.

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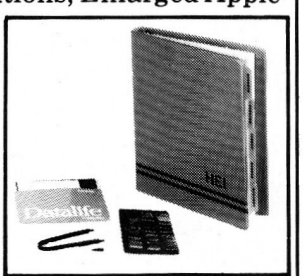

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Heaven Also Knows

The EZ Contribution System records up to 3,300 church pledges or contributions on an Apple II disk. The system also generates statements and reports at any time of the year. All reports can be graphed. Password protection and helpful data entry features are included. The Contribution System must be used with the comprehensive EZ Church Membership System. It is available by itself for $75 or with the comprehensive package for $359.95 from EZ Systems, Inc., P.O. Box 23190, Nashville, TN 37202. Reader Service number is 458.

Money in Your Futures

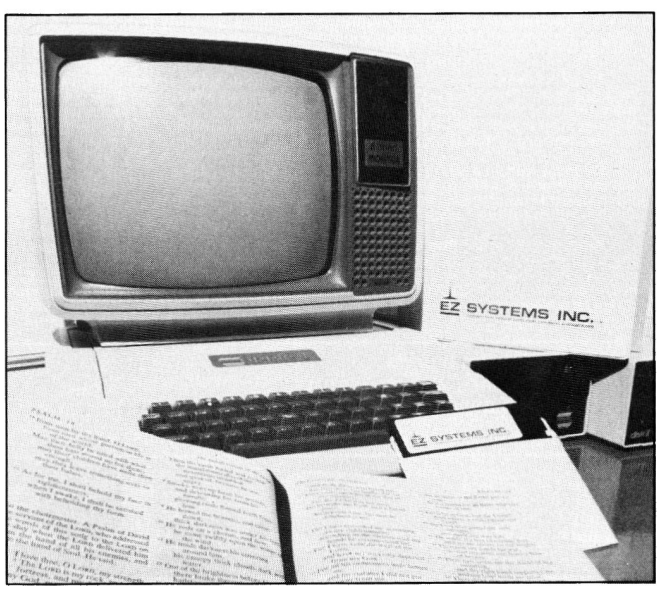
Trading in stock and commodity futures requires the best data and analysis. The ProfitTaker is a program for the serious futures trader. It calculates technical indicators and can be updated through a modem. For details write Investment Growth Corp., 3601 Swann Avenue, Tampa, FL 33609. Reader Service number is 462.

Watts, Amps, and Bucks

The Edge produces complete job estimates for residential electrical wiring contracts. The program covers material and labor costs, travel allowances, and even contractor's mark-up. It prints a custom proposal for each job. The cost for program and manual is $285 from The Edge, P.O. Box 149, San Luis Obispo, CA 93406. Reader Service number is 469.

Want to Play Around?

Odesta has a new series of classic games that



EZ Contribution System manages church records.

can use a mouse for input. They are compatible with all the Apple II family but make the most of the //c. With a general title of "How About a Nice Game of . . .," they cover chess, backgammon, checkers, and Othello. Each disk ($34.95) includes a tutorial to teach the game. Details are available from Odesta Corp., 3186 Doolittle Drive, Northbrook, IL 60062. Reader Service number is 460.

Protecting Your Turf

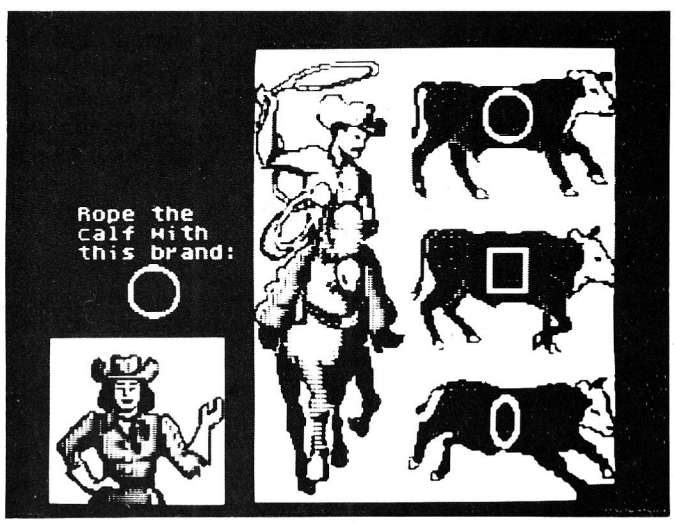
Designed for the professional and amateur gardener, Turf Management is a data base on eight common turf species. This program covers species characteristics, soil and fertilizer requirements, planting, and weed control. Disk and instructions cost $150 from Benton Laboratories, P.O. Box 5455, Athens, GA 30604. Reader Service number is 468.

Computers for Tiny Tots

Three new early childhood programs have been introduced for children up to 7 years old. Alphabet Circus combines circus tunes and graphics to explore the alphabet. Number Farm explores numbers with farm songs, animal sounds, and graphics. Shape and Color Rodeo sharpens visual perception and eye-hand coordination. A full catalog is available from DLM, Inc., One DLM Park, Allen, TX 75002. Reader Service number is 457.

Picking Pipes that Fit

If your business installs or fixes pipes, Line-Size can help. This is the first multi-function line-sizing program for the Apple II family. It solves pressure drop problems involving single-phase flow for water and other liquids, steam, and gas. All data can be stored on disk and printed out. The full system ($295) or a demonstration disk ($25) can be ordered from Specialty Micro Software, 79 Tallowood Drive, Medford, NJ 08055. Reader Service number is 467.



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Explore Cities of Gold

The latest game from the masters at Electronic Arts is Seven Cities of Gold, an adventure that re-creates the Spanish exploration of the New World. Play begins in a three-dimensional city where you manage your resources to equip a campaign. As play progresses you encounter friendly and hostile towns, and your choices affect the direction of the adventure. Seven Cities of Gold ($40) is from Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. Reader Service number is 455.

Read 'em and Learn

Learning to read and sharpening language skills become adventures in three new games. Fantasy Land, Magic Castle, and Galaxy Search are for primary and intermediate readers. Each game can handle 1–6 players and costs $49.95. They are published by Learning Well, 200 South Service Road, Roslyn Heights, NY 11577. Reader Service number is 461.

Clean Up Amway Records

To the Amway distributor who hates paperwork, Ambiz-Pak is a lifesaver. The Pak is tailored to Amway accounting and pricing, and includes Order Verify and Generate, Bonus Calculation, Gross Profit, 12-Column Ledger, Speed-Letter, Mailing Labels, and others. The Apple version costs $100 and comes from Blechman Enterprises, 7217 Bernadine Avenue, Canoga Park, CA 91307. Reader Service number is 466.

It Even Talks

This could be the state-of-the-art in computer courseware. Micro-LADS, a set of six disks on grammar fundamentals, can speak through an Echo II speech synthesizer. Graphics, animation, text, and speech combine to present the basics of syntax. Disks are available individually for $170 or as a set including the synthesizer for $650 from Laureate Learning Systems, Inc., 1 Mill Street, Burlington, VT 05401. Reader Service number is 459.

Adventure in the Seven Cities of Gold.

Kids on the //c

Scholastic is fast from the gate with Fact and Fiction Tool Kit, designed specifically for the //c and its broad capabilities. The Kit, for children ages 8 and up, contains two programs. "Story Maker" takes full advantage of double hi-res graphics in enabling children to draw and write their own stories. "Secret Filer" is an easy-to-use electronic filing system that lets children sort and save their own files. For more information, contact Scholastic Software, 730 Broadway, New York, NY 10003. Reader Service number is 453.

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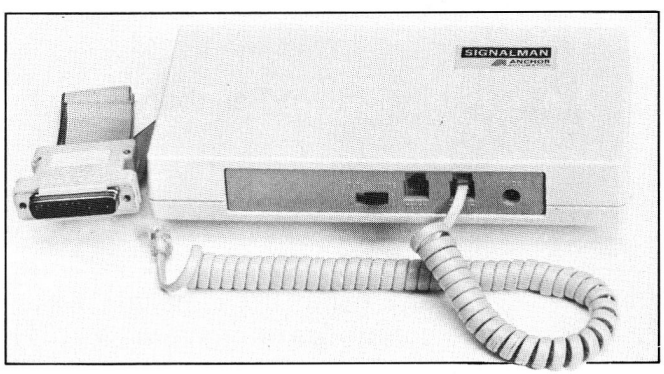

Mark X modem: high value, low cost.

Apple Talks to IBM

A new interface card from Apple lets your Apple II communicate with IBM mainframes and networks. The Apple Communications Protocol Card is programmable and can be reconfigured. The card costs $700 and needs emulator software ($300) to function. Details are available from Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. Reader Service number is 478.

Wire Cube Protection

A remarkably small protector, The Wire Cube guards your system against voltage spikes and interference. Barely an inch on a side, it plugs into any standard wall outlet, then your computer plugs into The Cube. Its retail price is $39.95 from Networx, 203 Harrison Place, Brooklyn, NY 11237. Reader Service number is 486.

Wolstens Makes Networking Easy

Schools and businesses can link 16 Apple computers with Network 816. The system operates with one or two disk drives, and loads all 16 computers with any program. No special software is needed. Network 816 costs $1995 and each interface card is $89.95. Write for details to Wolstens Computer Devices, Inc., 99 Washington Street, East Orange, NJ 07017. Reader Service number is 488.

More Modem for Less

The Mark X is a low-cost modem packed with features. It is a smart, 300-baud auto-dial/auto-answer unit that sells for $169. Compatible with tone and pulse dialing, it uses a standard RS-232 serial interface. The Mark X is part of the Signalman line from Anchor Automation, Inc., 6913 Valjean Avenue, Van Nuys, CA 91406. Reader Service number is 479.

Experimenter's Prototyping Board

The eZ Board is a solderless system for building experimental add-ons for your Apple. The printed circuit board comes with a set of solderless breadboarding units, four separate distribution buses with 50 tie-points, and DIP switch connections to different parts of the board. The Apple II model is priced at

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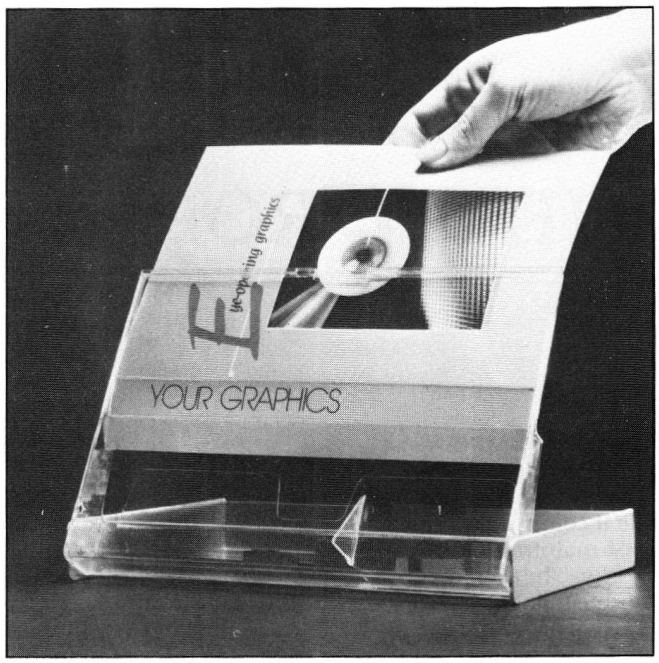


Uni-Pak packaging has a built-in easel.

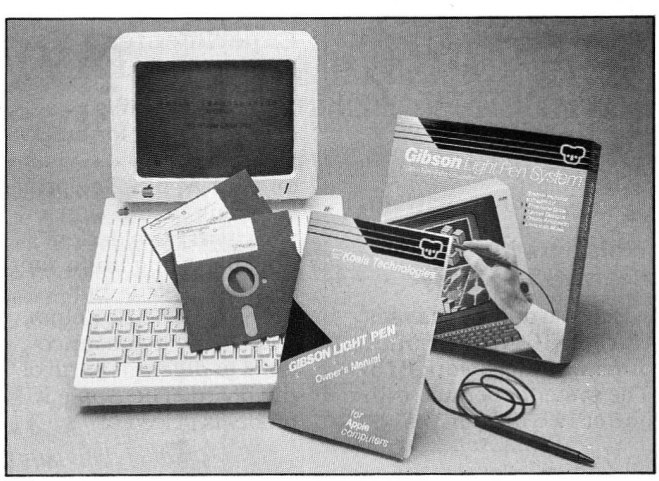
$174.95 by Sabadia Export Corp., P.O. Box 1132, Yorba Linda, CA 92686. Reader Service number is 484.

Pilfer-Resistant Software Case

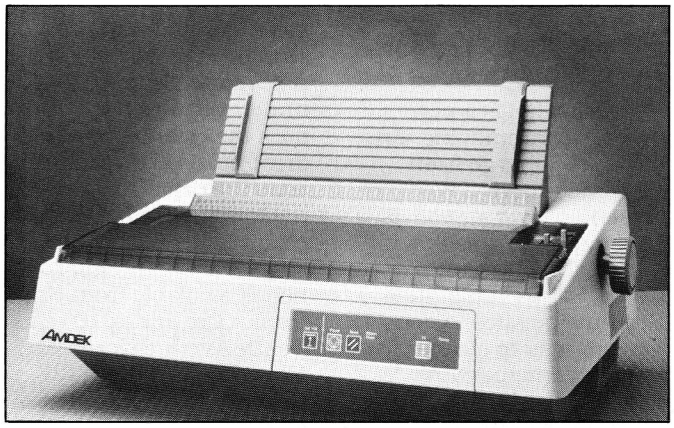
Uni-Pac is an innovative departure from conventional software packaging. The Pac is made of tough, shatter-resistant plastic with room for the disk, thick documentation, and a label. When opened the lid doubles as a table-top easel to hold the manual. The cover label is inserted in a non-permanent format, allowing for change when the program is updated. Contact Bankier Companies, Inc., 3420 Dundee Road, Northbrook, IL 60062. Reader Service number is 483.

Light Pen for the //c

The Gibson Light Pen, hardware and software, is



Gibson Light Pen for the //c.



Amdek 5000-series letter-quality printer.

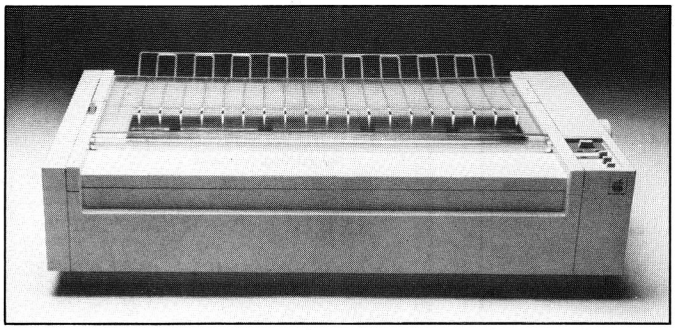
now available for the Apple //c. The pen is a handheld pointing device connected to the computer by cable. The system, at $249, also includes four icon-based programs: PenPainter, PenDesigner, PenAnimator, and PenMusician. The Gibson system is distributed by Koala Technologies Corp., 3100 Patrick Henry Drive, Santa Clara, CA 95052. Reader Service number is 470.

Amdek Series 5000 Printers

Amdek has introduced three new letter-quality printers—the 5000 series. All the machines in the series, including a lightweight, operate at a low 50 db noise level. They have a wide carriage and a variety of interchangeable daisy wheel typefaces. The main differences among them are speed, from 25 to 55 cps, and cost, from $799 to $1990. Contact Amdek Corp., 2201 Lively Boulevard, Elk Grove Village, IL 60007. Reader Service number is 481.

Wide-Carriage Imagewriter

Apple Computer now has a wide-carriage model of the popular Imagewriter dot matrix printer. The wide carriage is designed for spreadsheets, forecast models, budgets, and data processing reports. Imagewriter has eight character fonts, underscoring, sub- and superscripts, a speed of 120 cps, and both friction-feed and pin-feed. The price is $749, from Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. Reader Service number is 471.



Apple's Wide-Carriage Imagewriter handles big needs.

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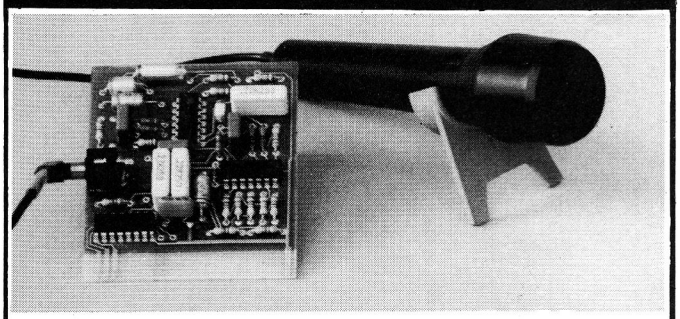
NEW! TALK TO YOUR APPLE



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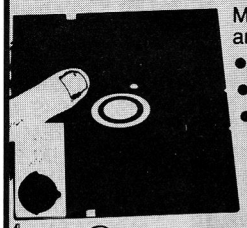

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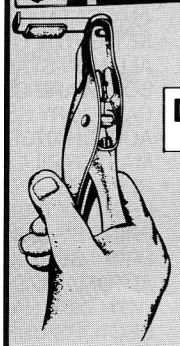

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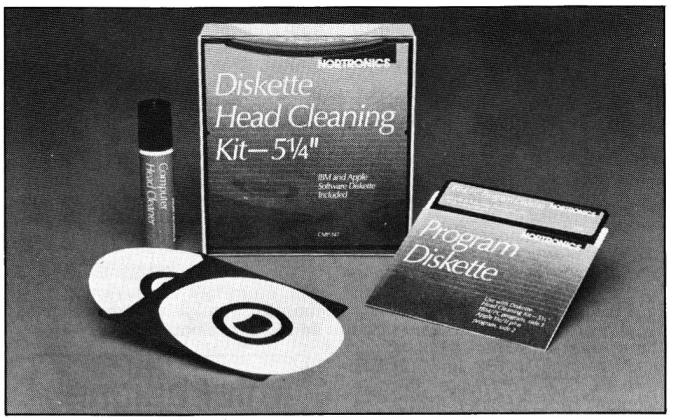

Disk drive head cleaner combines software and hardware.

Screenwipe Does Windows

Screenwipe is a new product for removing dirt and static charge from your monitor or TV screen. Each wipe comes in a convenient pack with a chemical cleaning agent. Safer than liquids, Screenwipe offers a convenient way to cleaner living. Screenwipes are $12.50 for a box of 50 from Aldine Paper Co., 315 Park Avenue South, New York, NY 10010. Reader Service number is 485.

Complete Head Cleaning

A unique combination product helps you prevent data loss from dirty disk drives. The software gives easy-to-follow instructions on the screen. A separate cleaning disk, under software control, does the cleaning of the drive heads. The program runs the drive and keeps track of the life of the cleaning disk. The kit costs $39.95 and information is available from Nortronics Co., Inc., 8101 Tenth Avenue North, Minneapolis, MN 55427. Reader Service number is 472.

Microdisk Storage

The new 3½-inch microdisks are great, but they surely pile up. Ring King Visibles has just introduced a complete line of storage trays and looseleaf panels for the new disks. For complete information contact Ring

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San Jose, CA 95154
$29.95
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VISA,MC call : (408) 978-1048
48 K Apple II, II+, IIe, 1 disk, printer
Apple is a trademark of Apple Computer, Inc.

King Visibles, Inc., 2210 Second Avenue, Muscatine, IA 52761. Reader Service number is 487.

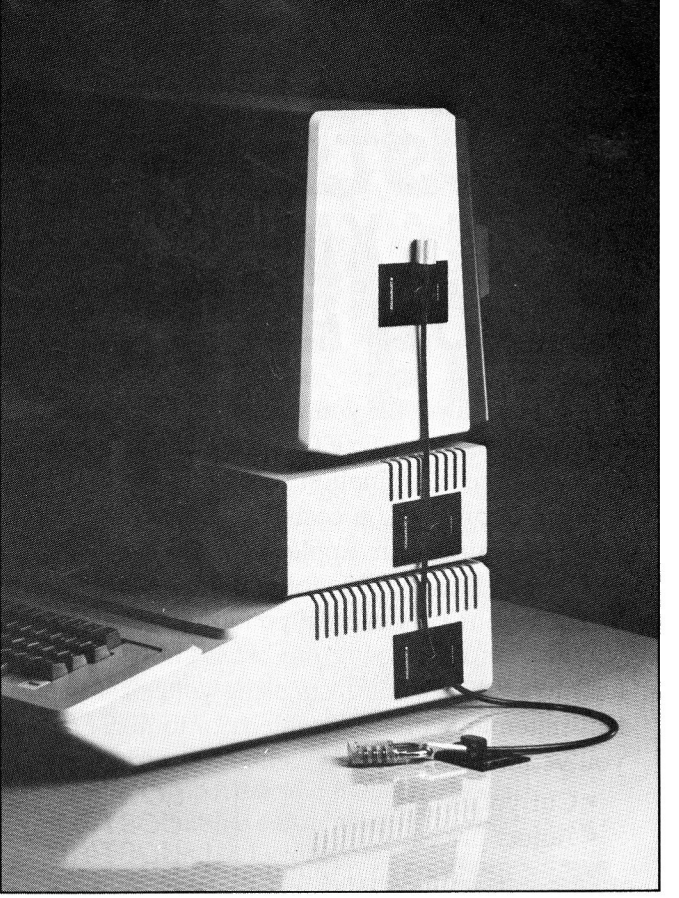
Computer Controlled Slide Shows

Photographers can use their Apple and a number of projectors to produce dazzling rapid-fire slide shows with a multi-imaging programming system. The system includes the Gemini 2002 controller for two projectors ($479), and an interface card and editing software for $349 combined. Special effects include superimpose, animate, flash, fade, and more. The system comes from Pacific Micro Systems, Inc., 160 Gate 5 Road, Sausalito, CA 94965. Reader Service number is 475.

Technalock for Security

To keep your Apple, drives, and monitor secure, try Technalock. This innovative product is inexpensive and easy to use. A system of adhesive plates, steel cable, and lock, it deters theft and can be expanded to meet your needs. The basics are priced at $24.95 by Business Security Systems, Inc., 512 South Hanley, St. Louis, MO 63105. Reader Service number is 474.

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 an endorsement by inCider *of any given product.*



Technalock protects your system.

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Disk Version: TRS-80 Model I (formated disk for Ver. 2-7, 2-8), III (formated disk), IV (formated disk for Ver. 6-0). Apple II, II+, IIe.

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10567 N.W. 8th Lane
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For More Information Call: (305) 672-2238
Please Specify Computer Model, Disk/Cassette

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CONTROL YOUR COSTS AND MAXIMIZE YOUR PROFIT

To make a profit, you have to know what your costs are. *Low Cost Costing* is a book-and-software combination that will help you determine production costs for your small business, using your Apple, IBM PC, or TRS-80.

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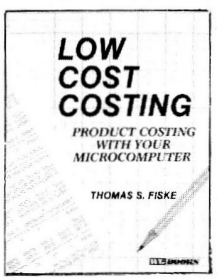

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Thomas S. Fiske
approx. 112 pp.
$24.97

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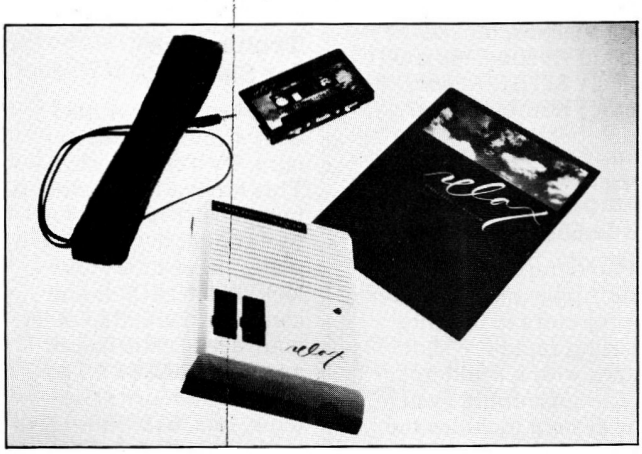


Relax with Apple hi-res feedback.

Relax with Biofeedback

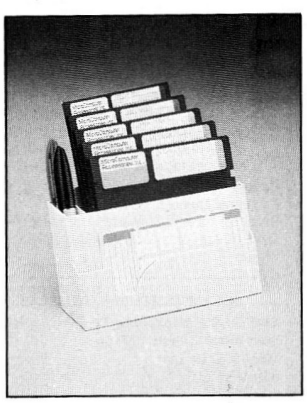
Your Apple can become a biofeedback monitor with Relax. Combining software and hardware, Relax allows you to measure and observe stress levels. Three sensors are included on the headband, and the software converts their readings to hi-res graphs or patterns. An audio tape and workbook describe methods for reducing stress. This product ($149.95) comes from Synapse, 5221 Central Avenue, Richmond, CA 94804. Reader Service number is 473.

Emergency Power Sources

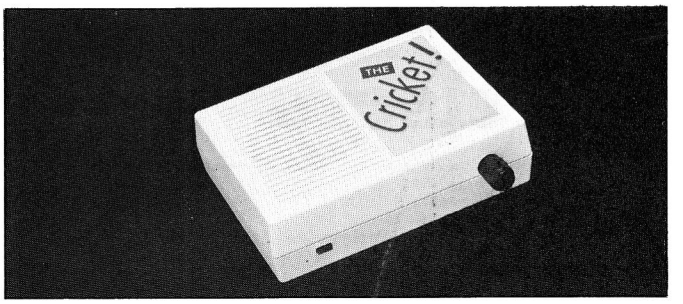
If your town is subject to brown-outs and black-outs, you know how easily an Apple forgets a full memory. Sola Electric has three new products to address the problem. Rated at 1 kVA and 750 VA, two uninterruptible power supplies provide emergency back-up power, plus continuous voltage regulation and line cleaning. Also available is a standby power source without additional features that switches from line power to battery when voltage drops below a set level. Contact Sola Electric, 1717 Busse Road, Elk Grove Village, IL 60007. Reader Service number is 482.

Disk Jockey for a Third Hand

When you're using many disks at the same time, Disk Jockey can lend a hand. This stylish temporary disk file helps organize and protect your in-use disks. It holds five at a time and has compartments for pens and labels. This accessory costs just $6 from Micro-Computer Accessories, Inc., 5721 Buckingham Parkway, Culver City, CA 90230. Reader Service number is 489.



Disk Jockey helps on busy days.



Cricket synthesizer specially for the //c.

Group Response System

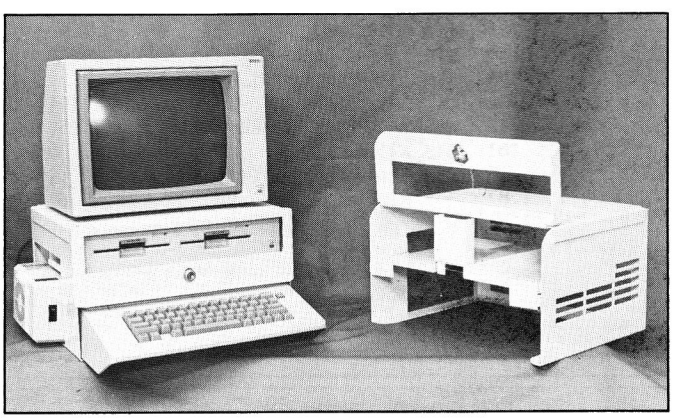
Trainers, educators, and market researchers have a computerized way to conduct group quizzes or polls. The Group Response System links up to 30 people to an Apple II. Each person answers multiple-choice questions through a 12-button response pad. The system tracks both individual and group response, tabulating it immediately to produce a chart on the screen or printer. The system costs $1400 for 15 pads, cables, interface, software, and manual. For more details contact Reactive Systems, Inc., 40 North Van Brunt Street, Englewood, NJ 07631. Reader Service number is 476.

Cricket on the //c

One of the first hardware products for the new //c is the Cricket speech and sound synthesizer, bundled with programs. Cricket has its own speaker, volume control, headphone jack, and cable. It features natural voices (male and female) and a robotic voice produced by the TI 5220 speech chip, six channels of music and sound effects, and an onboard clock. For information write Street Electronics, 1140 Mark Avenue, Carpinteria, CA 93013. Reader Service number is 477.

Armor for Your Apple

With Apple Armor II you can lock down your computer, two disk drives, fan, and monitor. Apple's new duo-disk fits in snugly. This is an effective, easy-to-install method of securing your system. The unit costs $175 from Omni Tech Corp., 1455 N. Barker Road, Brookfield, WI 53005. Reader Service number is 480.



Apple Armor II for peace of mind.

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Use your microcomputer and *Programs for Electronic Circuit Design* to help you select the correct value for each component in an electronic circuit. The programs are adaptable to most microcomputer systems and are also available on disk for the Apple, IBM PC and TRS-80. The thirteen programs can be used individually, or they can be combined, using a master menu, as explained in the book.

Topics covered include:

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- circuits that have combinations of resistors, capacitors and inductors
- series and parallel circuits
- voltage dividers
- impedance and frequency
- phase angles
- operational amplifiers
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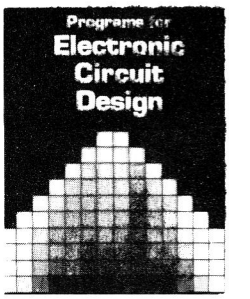

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David Leithauser
$14.95 ISBN 0-88006-068-9
softcover 7 by 9 approx. 100 pp. 1984 BK7400

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Send me _____ copies of *Programs for Electronic Circuit Design* (BK7400) at $14.95 each. Send me _____ packages for the Apple II, II Plus, IIe (CC740011); _____ packages for the IBM PC (CC740012); _____ packages for the TRS-80 Model I/Model III (CC740013) at $24.97 each. Shipping and handling is $1.50 for the first item; $1.00 for each additional item.

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Paul Boule, Sales Manager; Barbara Alvarez, Craig Everett

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A. Are you the owner, manager or principal of a small company?
- ☐ 1. Yes
- ☐ 2. No

B. Are you an educator?
- ☐ 1. Yes
- ☐ 2. No

C. Do you earn extra cash with your micro?
- ☐ 1. Yes, full-time
- ☐ 2. Yes, part-time
- ☐ 3. No

D. Which of the following microcomputers do you own or use?
- ☐ 1. Apple II/II+
- ☐ 2. Apple IIe
- ☐ 3. Apple III
- ☐ 4. Lisa
- ☐ 5. Macintosh
- ☐ 6. Apple compatible
- ☐ 7. Other
- ☐ 8. Don't own or use one

E. What are the chances that you'll buy a (an additional) Macintosh this year?
- ☐ 1. Good
- ☐ 2. Fair
- ☐ 3. Remote

F. Are you interested in reading more about the Mac in *inCider*?
- ☐ 1. Yes
- ☐ 2. No

G. Regarding games, do you prefer:
- ☐ 1. Arcade games
- ☐ 2. Adventure/Strategy games
- ☐ 3. Like both about the same
- ☐ 4. Sorry, I don't play games

H. Do you belong to a user's group?
- ☐ 1. Yes
- ☐ 2. No

I. Which of the following magazines do you read regularly?
- ☐ 1. inCider
- ☐ 2. A+
- ☐ 3. Softalk
- ☐ 4. Nibble
- ☐ 5. Call-A.P.P.L.E.
- ☐ 6. Peelings II

J. How many people read your issue of *inCider*?
- ☐ 1. 1
- ☐ 2. 2
- ☐ 3. 3
- ☐ 4. 4
- ☐ 5. 5 or more

K. On a scale of 1 (no interest) to 5 (great interest), please rate your interest in the following types of articles:
- ____1. Programming techniques
- ____2. Reviews
- ____3. New products
- ____4. Hardware construction
- ____5. Application programs
- ____6. Speech/Sound
- ____7. News
- ____8. Editorial
- ____9. Telecommunications

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- ☐ 1. Yes
- ☐ 2. No

B. Are you an educator?
- ☐ 1. Yes
- ☐ 2. No

C. Do you earn extra cash with your micro?
- ☐ 1. Yes, full-time
- ☐ 2. Yes, part-time
- ☐ 3. No

D. Which of the following microcomputers do you own or use?
- ☐ 1. Apple II/II+
- ☐ 2. Apple IIe
- ☐ 3. Apple III
- ☐ 4. Lisa
- ☐ 5. Macintosh
- ☐ 6. Apple compatible
- ☐ 7. Other
- ☐ 8. Don't own or use one

E. What are the chances that you'll buy a (an additional) Macintosh this year?
- ☐ 1. Good
- ☐ 2. Fair
- ☐ 3. Remote

F. Are you interested in reading more about the Mac in *inCider*?
- ☐ 1. Yes
- ☐ 2. No

G. Regarding games, do you prefer:
- ☐ 1. Arcade games
- ☐ 2. Adventure/Strategy games
- ☐ 3. Like both about the same
- ☐ 4. Sorry, I don't play games

H. Do you belong to a user's group?
- ☐ 1. Yes
- ☐ 2. No

I. Which of the following magazines do you read regularly?
- ☐ 1. inCider
- ☐ 2. A+
- ☐ 3. Softalk
- ☐ 4. Nibble
- ☐ 5. Call-A.P.P.L.E.
- ☐ 6. Peelings II

J. How many people read your issue of *inCider*?
- ☐ 1. 1
- ☐ 2. 2
- ☐ 3. 3
- ☐ 4. 4
- ☐ 5. 5 or more

K. On a scale of 1 (no interest) to 5 (great interest), please rate your interest in the following types of articles:
- ____1. Programming techniques
- ____2. Reviews
- ____3. New products
- ____4. Hardware construction
- ____5. Application programs
- ____6. Speech/Sound
- ____7. News
- ____8. Editorial
- ____9. Telecommunications

L. If you are not a subscriber please circle 500.

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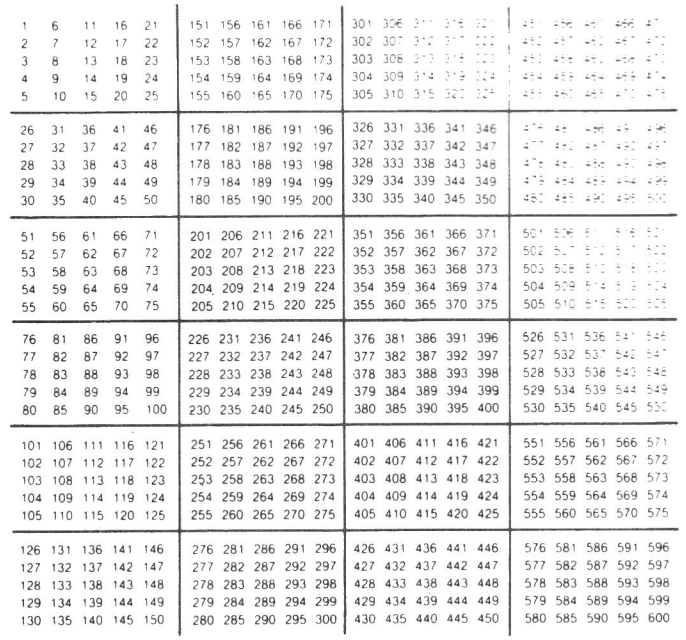

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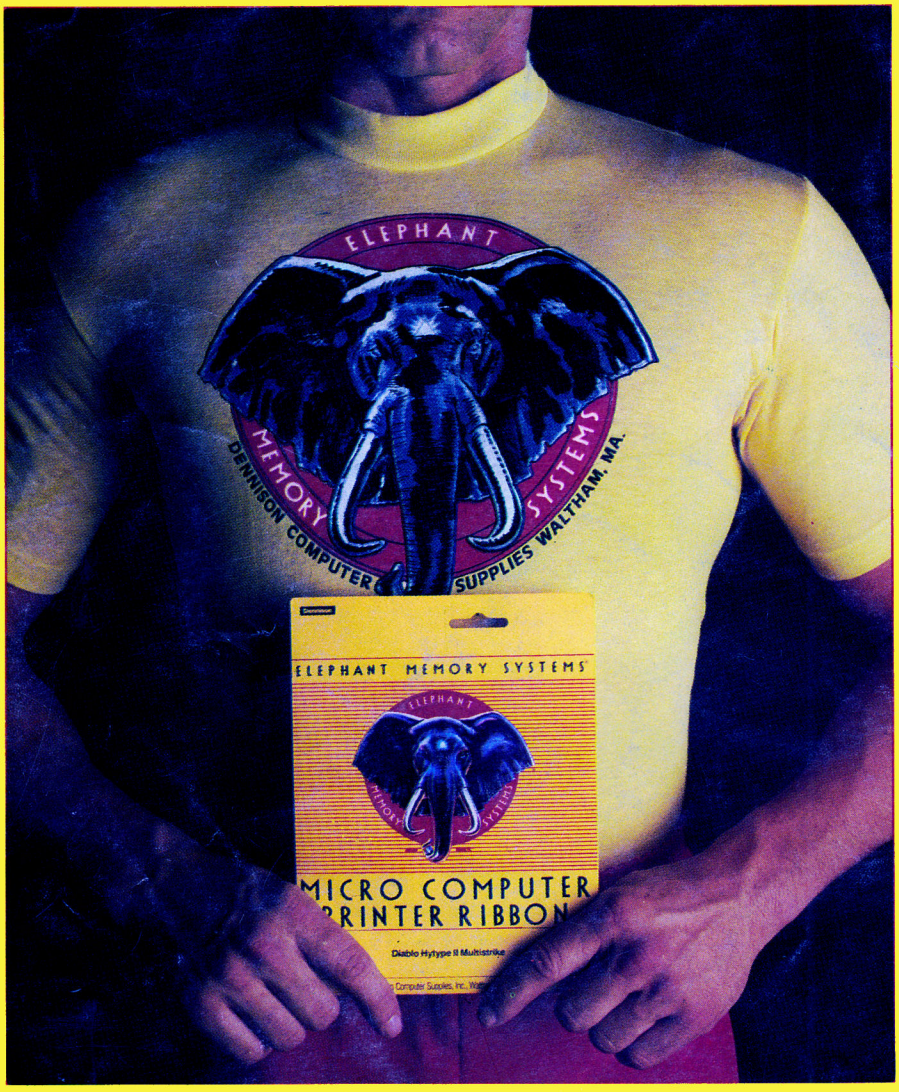

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