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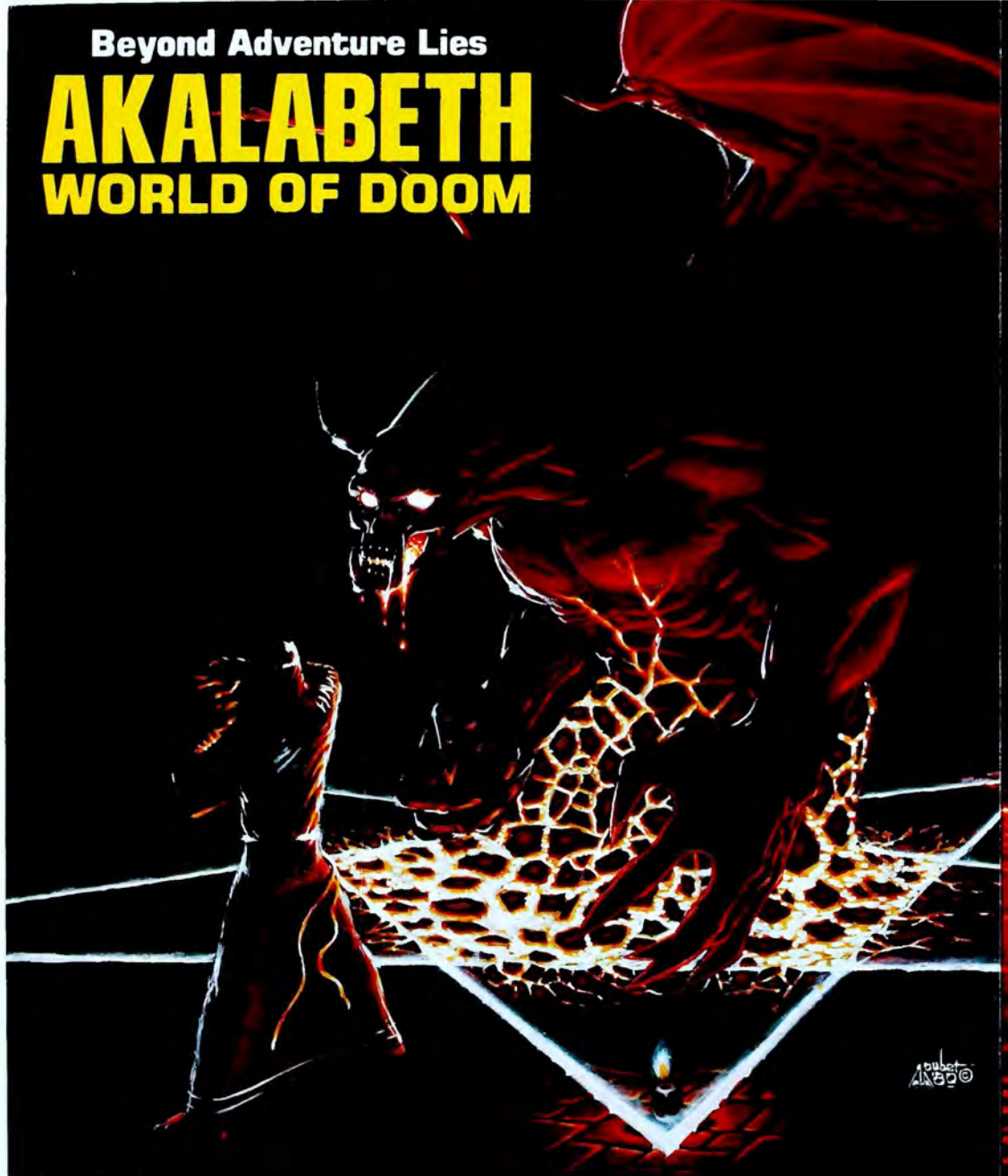
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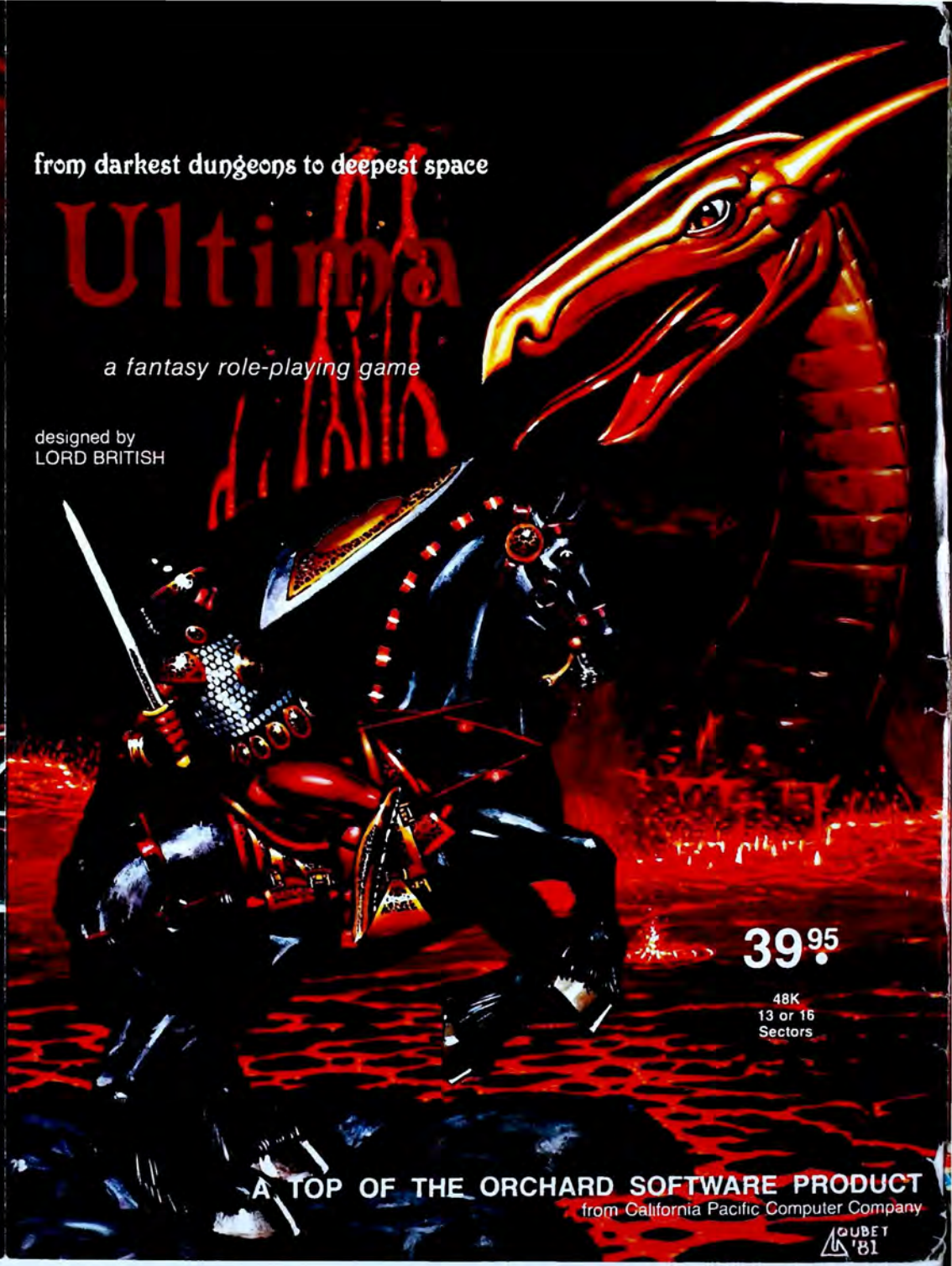
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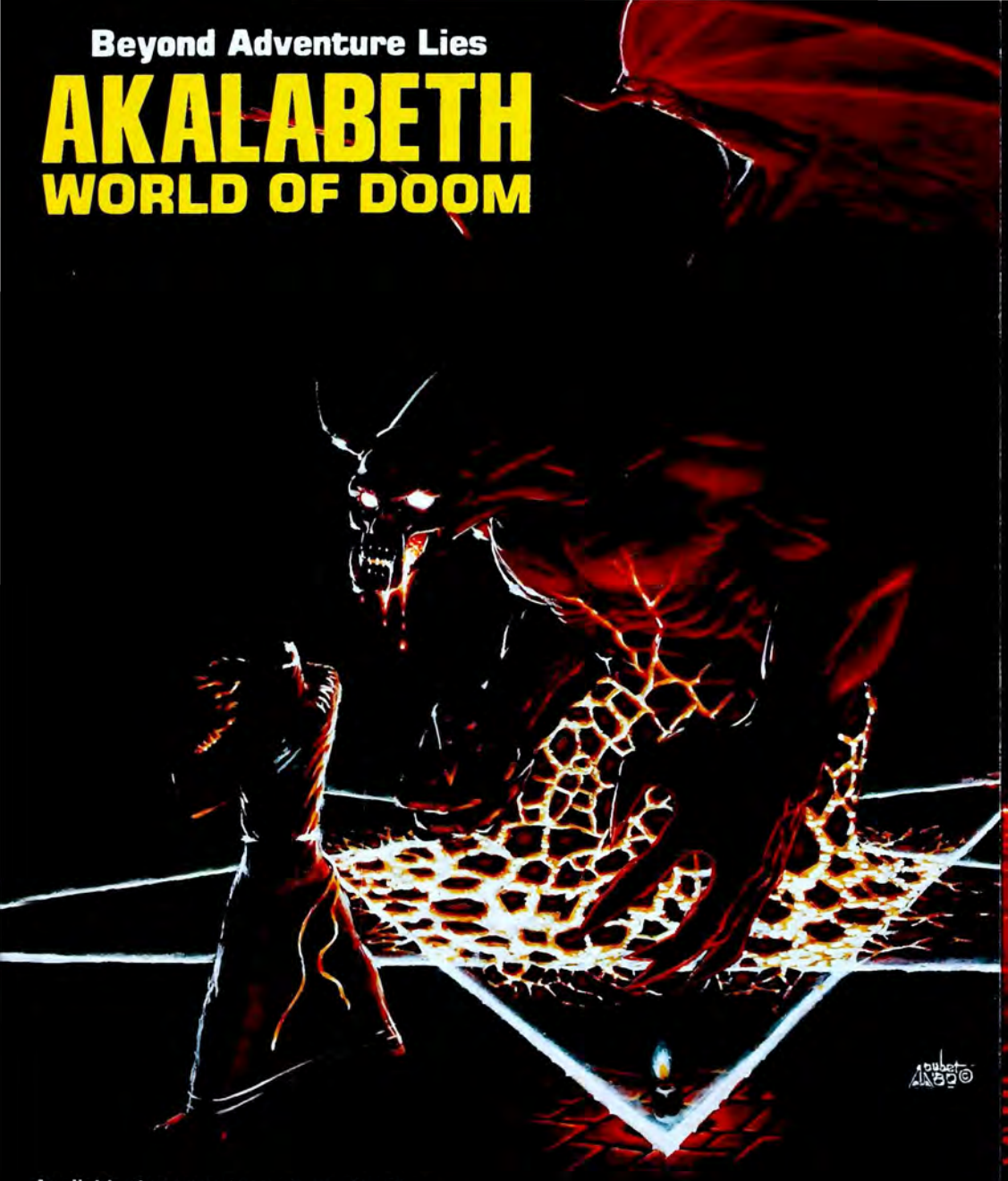
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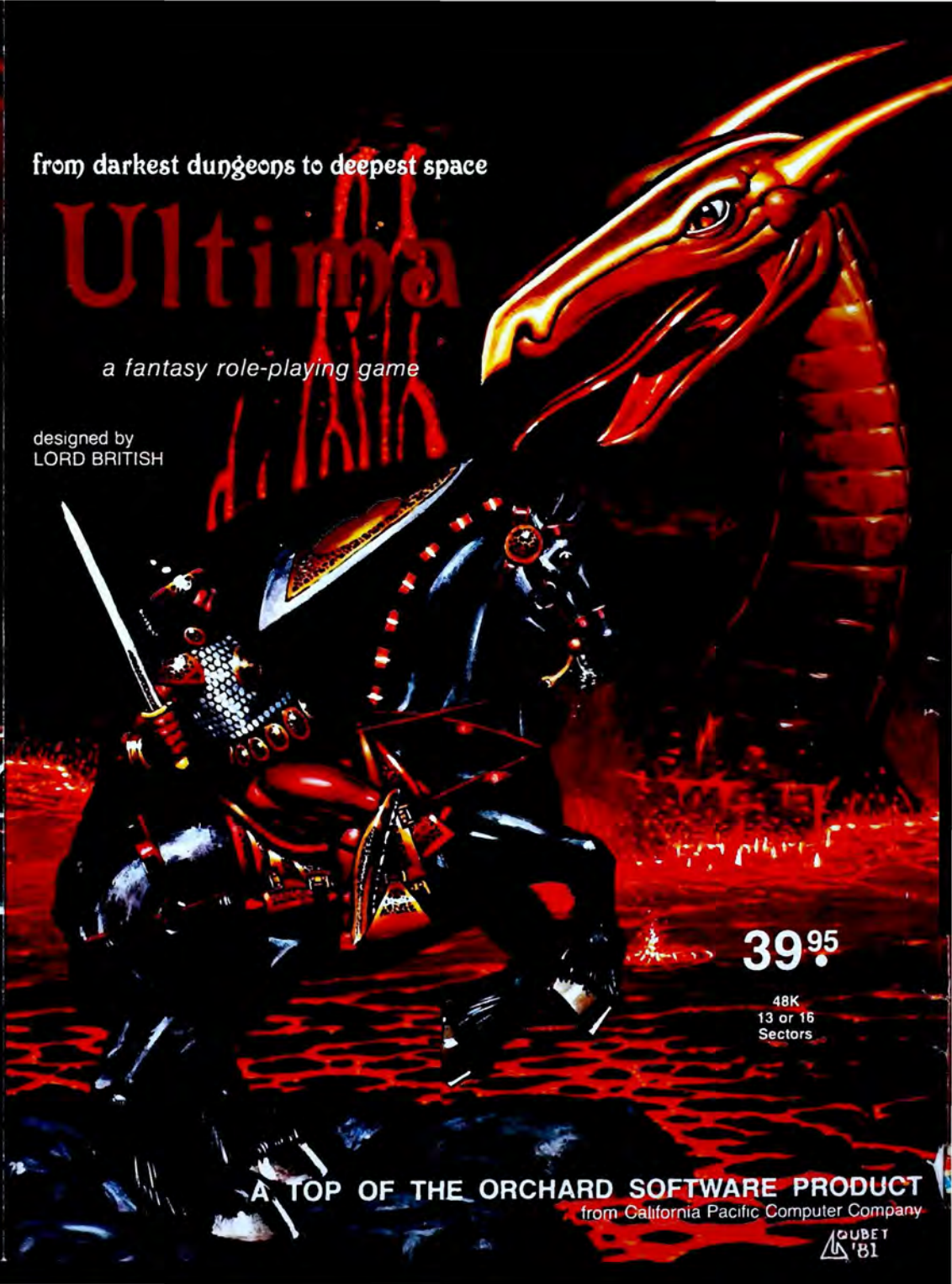
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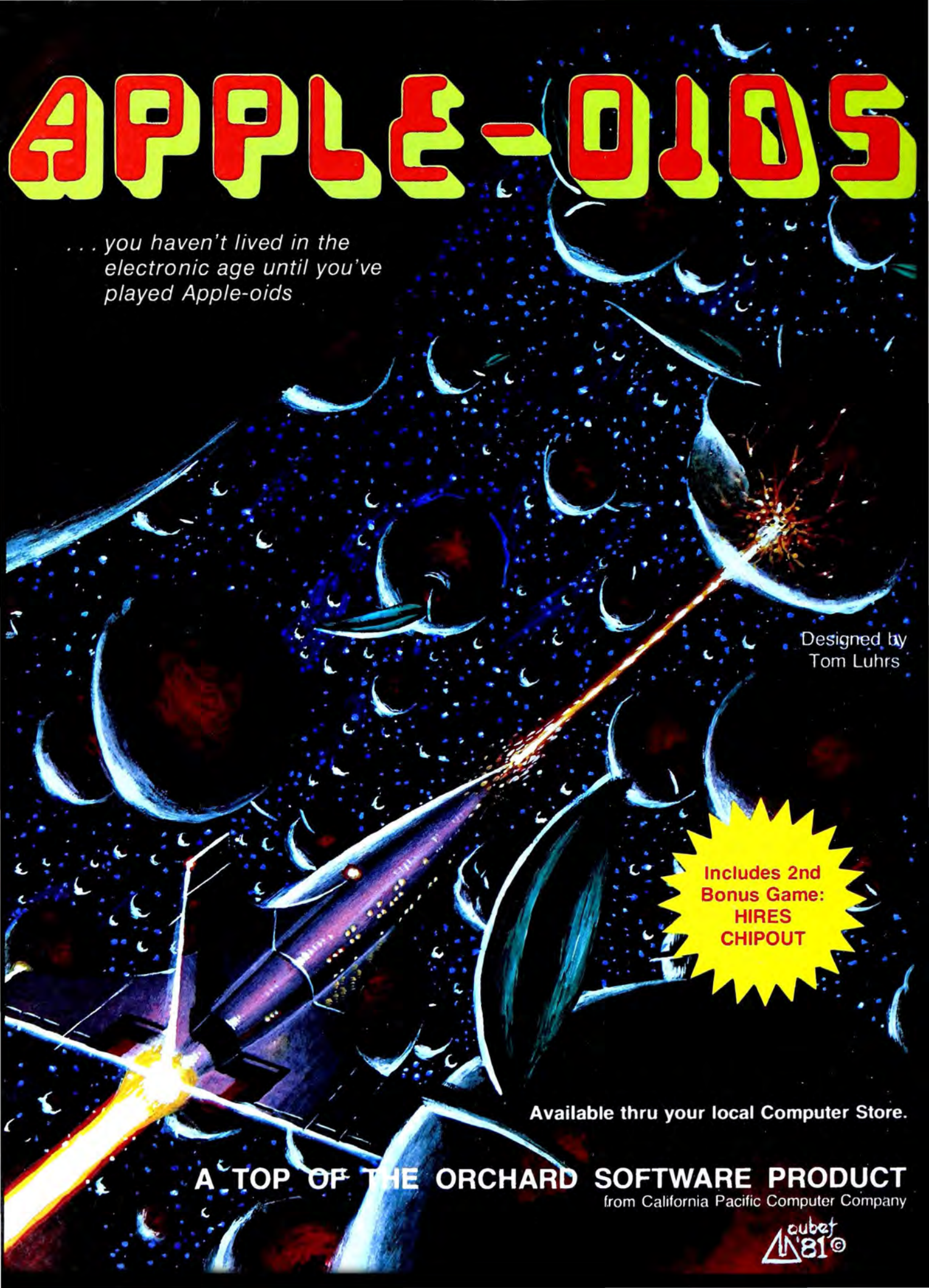
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Contest: Oracle '82

Oracle '81 won't draw to a close until 1981 is sealed and deposited in memory archives with the usual rounds of champagne, kisses, and hornblowing. When it does, one *Softalk* reader will be one Apple Disk II richer.

But, even before Oracle '81 is put away, Oracle '82 is born, with an opportunity for another *Softalk* reader to win another Apple disk drive—next year.

It's still no fun to wait a full year to see if you've won a contest, so, once again, the top score on each part of the Oracle will win the prize of the winner's choice from the products of any December 1981 *Softalk* advertiser, up to $100 in value, as soon as that part's answer becomes known. You're eligible for other prizes even after you win one.

To enter the Oracle, you must become an oracle and predict the outcomes of several events or the status on a specific date of some fluctuating state of being. Points will be awarded in each part of the contest according to how close you are to a correct prediction. Accumulated points will determine the winner of the disk drive.

Send your predictions on the form or a facsimile of it to Softalk Oracle '82, 11021 Magnolia Boulevard, North Hollywood, CA 91601. Entries must be postmarked on or before December 31, 1981. Because of the nature of the contest, this deadline is not flexible.

Now, here's the contest:

The Oracle '82

Predict:

1. Nielsen television rating achieved by the 1982 Super Bowl.
2. The number of days on which snow will fall on Manhattan Island after Groundhog Day and before the first day of spring, 1982. (Authority will be the New York City Bureau of Weather and Statistics.)
3. The date of the first no-hitter in the 1982 Major League baseball season. (A possible answer is that there won't be a no-hitter this season.) For a five point bonus, name the team that will be the *victim* of the no-hitting pitcher.
4. The closing price of gold on the New York market the day after Labor Day 1982.
5. The breakdown by party of the United States Congress after the 1982 election.
6. The three publishers, in order, who will have made the most appearances on the *Softalk* Top Thirty. (Appearances on specialized Top Ten or Top Five lists don't count. An appearance is that of one package on the list, so a company with three bestsellers might make three appearances in one month.)

My Oracle predictions are:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

The prize I'd like if I win one of the preliminary contests is:

Name: _____

Address: _____

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Your Autograph: _____

Mail your entry to Softalk Oracle '82, 11021 Magnolia Boulevard, North Hollywood, CA 91601, postmarked no later than December 31, 1981. ■

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Contest Winners
Oracle '81 Enters Home Stretch; City Hall Contest Winners Revealed

Bonus Contest. When we hatched our idea for the hidden contest in September, the egg it came out of was our discovery of a very hidden image of a city hall in a picture of something else entirely. None of us thought to examine a photo of New York's Wall Street, full of buildings, to

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see if that austere city's city hall might be one of those buildings.

Numerous readers looked at the Manhattan photo, however, and saw New York's city hall there. In fact, so many entries came bearing this discovery that we were convinced and began planning to award prizes to the first of these many souls.

But, ashamed as we were at our oversight in not thinking to check out all photos and not wanting a similar occurrence again, we took care to check on this one. According to New York's Finest, the police department that walks the beat in Wall Street and throughout Manhattan, the Bronx, and Staten Island, too, City Hall was last seen on Chamber Street, considerably north of the onetime northern wall of the city. None of these gentlemen surmised it had moved, and all agreed that the best rubbernecker couldn't catch a glimpse of the esteemed hall from the Stock Exchange or its environs.

Unfortunately, the ghost of Gotham's city hall probably kept many from looking further. Consequently, only one person found and identified the city hall we were looking for. We'll let him give you the real answer and some extra information as well.

Lou Meiss, of Granada Hills, California, wrote, "The hidden city hall is the Los Angeles City Hall. It appears on page 43 and it is reflected in the glass over the entry door above the Apple III. The glass, by the way, belongs to the Los Angeles Department of Water and Power building." Meiss's was also the first entry from the Pacific time zone to identify any city hall.

Meiss will receive the prizes he chooses from Rainbow Computing in Northridge, California.

Contest Contest. An ulterior motive revealed: after many months of making contests, the *Softalk* staff wanted the fun of solving some. Well, that wasn't really the motive, but it was a delightful side effect of the Contest Contest. Thanks to everyone who entered for many hours of enjoyable contesting.

In a very tight race, the winner of Contest Contest is Philip Suh, of San Francisco, California. Suh's contest, called Apple Jumble, will appear in the January issue of *Softalk*. Runners-up are Alan J. Nayer (San Francisco, CA), Elizabeth Riggle (Louisville, KY), and Jeff Lander (Yorba Linda, CA). Their contest will run in future issues of *Softalk*.

Suh appropriately chose games as his prizes: *Gorgon, Apple Panic,* and *Raster Blaster*. He'll collect them at AIDS San Francisco.

The Oracle 1981. One contest remains in the Oracle from last December; and when it's decided, so will be the race for the Apple Disk II. Meanwhile, we wondered for a time whether there would be an answer to the second to last part that dealt with the World Series.

Happily, if strangely, the baseball world came through, but they couldn't manage to be very original about it. After all, if you were to pick entrants in the World Series purely by odds based on past experience, you'd have been a winner. Once again, the old battle between Yankee and Dodger was bit. But this time, as only two other times in the eleven confrontations of the two, the Dodgers walked away with the spoils.

Although around ninety percent of the entries chose either the Yankees or the Dodgers to be in the series and nearly half of those chose both, only six entries selected the Dodgers to win in a Yankees-Dodgers showdown. Among these, our random number generator chose Paul Shanberg, of Moraga, California, as the winner. Shanberg will receive Strategic Simulation's *Computer Quarterback* from Computerland/Walnut Creek as his prize. Despite his win and a plus status he shares with only seven other entries, Shanberg is out of the running for the grand prize in the Oracle.

Jim Ganz, of West Hartford, Connecticut, holds a commanding lead in the race for the disk drive with +22 points. Because the final contest to be judged offers a set twenty points, only those entries presently scoring +2 or better have a chance to tie or win. Four entries stand in that position, and the disk drive will be won by either Ganz or one of these people, listed with their current scores:

Gary Kim, of Seattle, Washington, and Daniel Tobias, of Poughkeepsie, New York, are tied in second place with +9⅜ points; Tom O'Brien, Portland, Oregon, is close on their heels with +8⅝ points; Charles Lewis, of Richmond, Virginia, follows with +3⅝ points.

Besides Shanberg, two others deserve honorable mention for remaining in the black on the point scale. They are Michael Preston, of Culver City, California, and Gary Kim, who is currently tied for second with a different entry. ◻■

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Romance in the Future: A Form-Letter Affair

BY ANNE WAVMAN

Everyone from Alvin Toffler to the local news commentator has made wise pronouncements about what the computer age will bring us. Visions of interactive television bringing us a modern-day town forum that will let us truly speak with our government dance in the air.

We'll live in a cashless society that will let us avoid the hassle of balancing our checkbooks and give us believable records for the IRS. No longer will we have to spend hours and money driving to work. We will be able to do our jobs in the privacy and comfort of our own homes using our very own microprocessors.

No Hassles—Or Are There? The same keyboard, with the proper software, will allow our children to run up their homework quickly and provide stimulating tutoring guaranteed to take them away from the dangers of television. Our world will become like Marshall McLuhan's global village, and all our problems will be solved.

Well, maybe. But it seems to me there are some problems developing that we haven't even thought of. For example, I bought my Apple II Plus to process my golden syllables and better please editors with the look of my work. And this job it did delightfully from the word *go*.

But it wasn't long before my growing affinity for the contraption showed signs of becoming a problem. I used to get up at 6:30 in the morning to run—a good, healthy practice. Now I'm drawn irresistibly to my computer screen instead of to the streets and trails; I never make it out the door.

My evenings are no longer spent with the current Mr. Wonderful—or looking for Mr. Not-So-Wonderful's replacement. My computer is much more appealing. Concerned friends call to urge that I get out of the house, join them at a symphony or ball game; but, when I finally gave in once, I spent the time silently planning my next Basic session.

And it gets worse. I'm annoyed by my toaster because it doesn't have a command that allows me to delete the piece of bread I've just inserted. I'm frustrated in conversation because I can't, with a keystroke or two, move the sentence I just uttered to another part of the conversation.

There's a saving grace. With a computer, problems lead only to solutions, and the constant discovery of new capabilities in the miracle machine makes the problems bearable anyway. My Apple has many more talents than I knew of when I bought it—and that's a nice surprise after buying a car that's twice as expensive and getting only half the mileage to the gallon its makers "estimated."

Relationship Management Software. Just the other day, I purchased a new program that may just change my life completely. With this program, I can keep in touch with all my Mr. Wonderfuls in great style and little time and never leave my Apple! On top of that, I can keep my parents happy and deal with angry creditors to boot.

You see, the program I just bought allows me to print out in quantity letters I've written and edited. And, if I care to create a file full of names and addresses, this miracle program will address each copy of the letter to a different person. I can even custom write individual sentences within the letter so that certain parts of it change.

In short, I can do what those darned mailing houses do: cause your name to appear within the text of a form letter in hopes that you'll think I wrote it just for you.

Now, you're no dummy and neither am I; we recognize the distinctive dot matrix style of the computer printout that declares: "There's $5,000,000 put aside especially for you, VLADIMIR SCHMUCK, in the Bank of SHEBOYGAN, if only one of the 5,000 numbers enclosed and reserved in your name is the lucky winner. . . ."; or: "The future can be beautiful, no matter what it holds, and it's never too early to plan for it. Just imagine *your* name, WALTER WASTRELL, carved on one of our magnificent simulated marble headstones, guaranteed to last you the rest of your life!" But these are on the way out.

With coming price reductions, we'll all be able to purchase a printer whose output looks at least as good as any office typewriter. Since etiquette now allows typed correspondence, what's to stop us from using undetectable form letters ruthlessly?

And, when the time comes, we're all in for another cultural shock: the form-and-merge love letter. Convenient for sure, but what's going to happen to romance?

What will my—or your—biographers do in the future when they discover that fifty-eight of your lovers received almost identical letters just before you left for Paris? What happens if two of those paramours get together, brag about their everlovin', and each produces the wonderful letter he just got from what's-your-name? Trouble. That starts with T and that rhymes with G and that stands for Getoutoftowninahurry!

The Return of the Furtive Look. Pretty soon, the very arrival of the mail will be enough to raise the hackles of suspicion in all of us. A letter from your mother praising your most recent achievement—too generally perhaps? An adoring treatise from Lover #12—has he found someone else? How will we know what and who to believe?

I predict, first, the return of the typographical error. I see people examining letters closely for strikeovers and misspellings. In fact, in a warm, personal letter, I've already ordered several of my favorite programmers to start work on a program that will check my creative spelling and bring it into line with the norm.

For a while the status of correspondence will depend not on its perfection but on the number and sincerity of its errors. Thumb prints and grease spots will be prized.

Soon, however, everyone will catch on to the idea that all these things can be programmed. Every error can be duplicated by the computer; and the computer judges not. It simply does trustingly what it's told to do. With voice synthesizers and networks already on the market, you won't even be able to count on a phone call.

The next solution will be, of course, handwriting. Despite the discomfort of using unfamiliar muscles, for a short time the sale of pens will multiply exponentially and a smart few will make a fortune on special, noncomputer stationery.

Person-to-Person. It won't last. I have it from a reliable source that the Nepalese plan to release, sometime next week, additional memory, cameras, and such that will let our computers look at and duplicate anyone's handwriting.

Ye gods, we'll be forced back to communicating with each other in person!

And what about the love letters that started it all? What about the besmirched idea of romance?

Love letters will bite the dust altogether. When you kiss a lover good-bye at the spaceport, you can kiss the romance good-bye as well, because no romance will be expected to survive even the distance of a phone call. Lovers will stick close together, and, for those who can manage that, romance will be better than ever. ■

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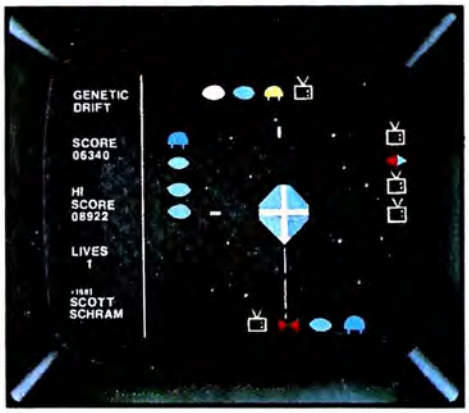
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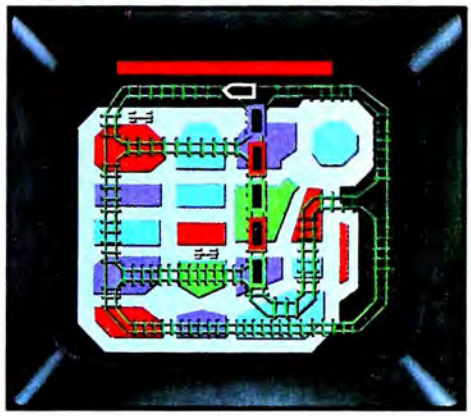
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OPEN DISCUSSION

You Could Be a Lord British . . .
Roger Wagner, help!

In your next installment of Assembly Lines, could you give us poor readers some hint on how to use hi-res graphics in assembly language?

I have not been able to find this information anywhere. What is Apple trying to hide from us? Is this a trade secret? Do we have to be a Nasir or Bill Budge to know the routines? Please reply soonest.
Ted Young, Riverdale, NY

Talk to the Animals
Thank you for your article on dolphins. My feelings of deep respect and admiration for Dr. John Lilly notwithstanding, I feel the approach used in dolphin research today to an understanding of the cetacean "language" may be inappropriate. I feel it is mistaken to search for words, syntax, or symbols in whale language, because I don't think they exist. Here's why:

A few years ago, in listening to "Songs of the Humpback Whale," a phonograph record which had attained some degree of popularity, I was disturbed by the discrepancy I heard between the record jacket's claim that the sounds were recorded in open ocean and the obvious reverberation that lent a pronounced tank-like, enclosed sensation to the sounds. It occurred to me that the whales produced the sound AND the echo. In other words, they may have been recreating, as a literal echo-picture, an environment to which they had been exposed, or more importantly, may have been inventing their own.

I think we should prepare ourselves for the possibility that the totality of cetacean communication is the creation of sonic reflective images of objects in real time and space, that is, sonic holography, which I choose to call holosonics.

We humans, with our linear, nonholographic communication medium, admit that one picture is worth a thousand words. (I suspect that's why we invented television.) So I don't think it is too difficult for us to accept the idea that a species can communicate through the use of holosonics.

We might ask ourselves what bandwidth a whale would use to adequately describe an object that may be kilometers long with details measured in centimeters. I suspect it would be the bandwidth the dolphins are known to use.

To digress momentarily, I should indicate here that my discussion of bandwidth is based in part on the assumption that living systems are more adept at performing phase-shift analysis on a reflected wave than they are at timing the duration between a short pulse and an echo. Thus a long "broooonk" would contain more information about a large object than a short "peep" to a whale. You may ask then why a bat doesn't produce long broooonks, but obviously the bat's small sound producing and receiving organs are incapable of resonating at low frequencies with enough energy to be useful. In addition, bats are primarily interested in moths, which are quite small.

We might also ask how easy it would be to teach a dolphin to communicate symbolically. About as easy, I submit, as it would to teach a human to talk and listen holosonically.

Computers are being used extensively today to crack the dolphin code, by seeking for correlations between behavior and speech patterns, and by trying to look for repetitive sequences that may be interpreted syntactically. But if, as I suspect, there is no syntax, it would be better to use the computers to find purely sonic relationships that can be mapped into spatial configurations as three-dimensional images. (Which may be difficult, as these images also undoubtedly contain motion as well.)

I think it will take a fast computer, and some very exceptional programming, to make the cetacean images perceptible to us. Your plea for programs of interest to dolphins is an interesting challenge. Why not a sonic *Breakout*, for starters? The dolphin would have to produce pulses which would have to satisfy certain parametric criteria to score a hit, and be rewarded with complex sound patterns.

Unfortunately, I suspect that even a knowledge on our part of the holosonic nature of cetacean language will do little to offset our wholesale slaughter of these beings, but it is a work I feel should be engaged with all reasonable dispatch.
Alex Funk, Durham, NC

On Homespun Hardware
Silas Warner, I have to inform you that your article (*Softalk*, October 1981), "The Controller Even You Can Make," is excellent! Even though I've only read one page at this time, I had to write this letter before finishing it. That type is what I like!

Keep up the fine articles!

P.S. Do you have an idea how to interface a ham radio to an Apple?
George E. Norkus, Utica, MI

I am building a demonstration board for our chess club. The pieces will have magnets that will operate reed switches in the board squares. The big question is, how are we going to read these squares? Along comes your article in the October issue of *Softalk*, "The Controller Even [McGraw] Can Make." The timing is fantastic.

I believe that I understand the workings of the APMOD card and will get one. The fact that it will monitor sixty-four switches is perfect.

I am a little concerned about the code changes necessary to read the sixty-four inputs and I wonder if it would be too much trouble to ask you to give me the code changes to read sixty-four inputs.

It is the lines 230 and 360 that would be the problem. I think there will be enough bugs to work out that if I can save some foolish code mistake, it will make things a lot faster.

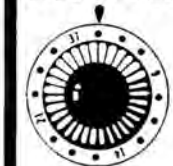
Softalk certainly has grown. The articles are pragmatic and such as yours are very useful. I hope you will be able to help me and I appreciate your comments.
Ralph McGraw, Arlington Heights, IL

Contained in the article, "The Controller Even You Can Make" (*Softalk*, October 1981) by Silas Warner, there are two paragraphs under the label TTL Logic Levels that contain some misinformation. Perhaps the following may help.

A TTL logic low level can be anywhere from 0 volts to 0.8 volts but usually is 0.4 volts or less. A TTL logic high level can be anywhere from 2.0 volts to

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5.0 volts but usually is 2.4 volts or higher. There is a big difference between an output that is grounded and an output that is in the low state. When TTL parts are tested by the manufacturers an output short circuit current test is usually performed but the output is grounded for only a few hundred microseconds to prevent damaging the device. It is not a good practice to literally ground an output.

Mr. Warner also discusses the differences between the output current that flows in the TTL device when high and low. It is true that TTL devices do most of their work when in the low state. This is because of the great difference between the current sinking capability (low) and current sourcing capability (high). Current flows into an output pin when it is low and out of an output when it is high. Three-state parts are different but not considered here. The 7400 (pronounced seventy-four hundred) series TTL logic family can sink 16 milliamps (mA) and source 800 microamps (uA) in many but not all cases.

Just as there are different "standard" configurations for the Apple computer, there are different "standard" TTL logic families. For instance, a 7410 TTL device and a 74LS10 (LS stands for low power Schottky) perform the same logical function but have different operating speeds, power consumption, and output drive capability. The LS part in this case can sink 8mA and source 400uA which is one half of the ratings for the 7410. There are differences between parts in the same family.

A person who is putting together a circuit that uses TTL devices should refer to one of the many available TTL data books for the specifics.
Kenny Lloyd, Falmouth, ME

Bit Copier and Risque Adventure Game: Strange Bedfellows
Can you tell me what the difference between the [*Softporn*] ad and any of my *Locksmith* ads is? Except the sweetheart relationship between a major software house and your publications. Censorship is one thing—hypocrisy is another.

P.S. Feel free to publish this letter if you want.
David M. Alpert, Omega Software, Chicago, IL

Hard Disk Headache
I have had an Apple II Plus and have accumulated a number of commercial programs. Recently I purchased a 10 meg Corvus disk drive with the understanding that it was completely compatible with my existing equipment. This is true, but you have to put the Corvus controller card in slot 6 and the floppy disk drive controller card in slot 4. Now everything works fine except a number of my commercial programs (*VisiCalc, Master Disk Catalog, Sands of Mars*) are slot 6 dependent. To run these programs, I have to take my computer apart and interchange my controller cards. Is there a patch or soft switch available to do this without physically doing it? Also, is there a way to use bit copy programs to copy locked disks to a Corvus?
Richard Smith, LaHabra, CA

A True Gentleman
I recently wrote to you concerning the fact that Maromaty and Scotto's Corp. would not produce an independently executable Applesoft program on my machine. The letter appeared in your October Open Discussion. Frankly, it appears that there is a problem with one of my disk drives and that indeed the program will produce an independently executable Applesoft program. Maromaty and Scotto were kind enough to refund my purchase price before I had located the error. My apologies to Maromaty and Scotto for maligning their software.
William Kirtz, Kyotoshi, Japan

Trust Is Best Protection
I'd like to say something as a new Apple owner on the subject of protected disks. I have no respect for a company that tries to sell me a program then charges me for a backup. I will do anything to break those disks, spend any amount of money to do it. On the other hand, to a guy like Scott Adams who sells me a program and tells me to first make a backup I will do everything I can to respect his program by not giving copies away and asking my fellow Apple owners to do the same. To him I send thanks from Apple owners of the world. Last but not least, what to do about companies that make programs that don't work and tell you it's your fault or the mail's fault that it doesn't work: so far I haven't found out what to do about this, nor can I get anyone else to say anything. A point in case is software from Crystal. Every program that has come into this area has had the same problems. I have returned one disk, *Laser Wars*, three times with the same problem; it has done the same thing on at least six other Apples yet the company says it's not the program.
P. J. Carroll, Fort Story, VA

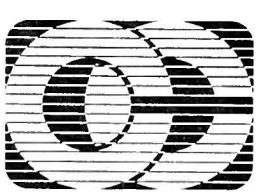
Addressing the Issue of Graphics
I'm fourteen and I'm making up a rocket ship defense type hi-res program for the Apple II Plus. I feel the program would be better in machine language, but I don't know the addresses of the hi-res drawing and plotting routines and none of my reference books gives them.

If you know the addresses for plot, line, draw, xdraw, color, scale, ROT, or any other graphics routines, please let me know through Open Discussion.
Ace Colter, Whittier, CA

FREE GAME

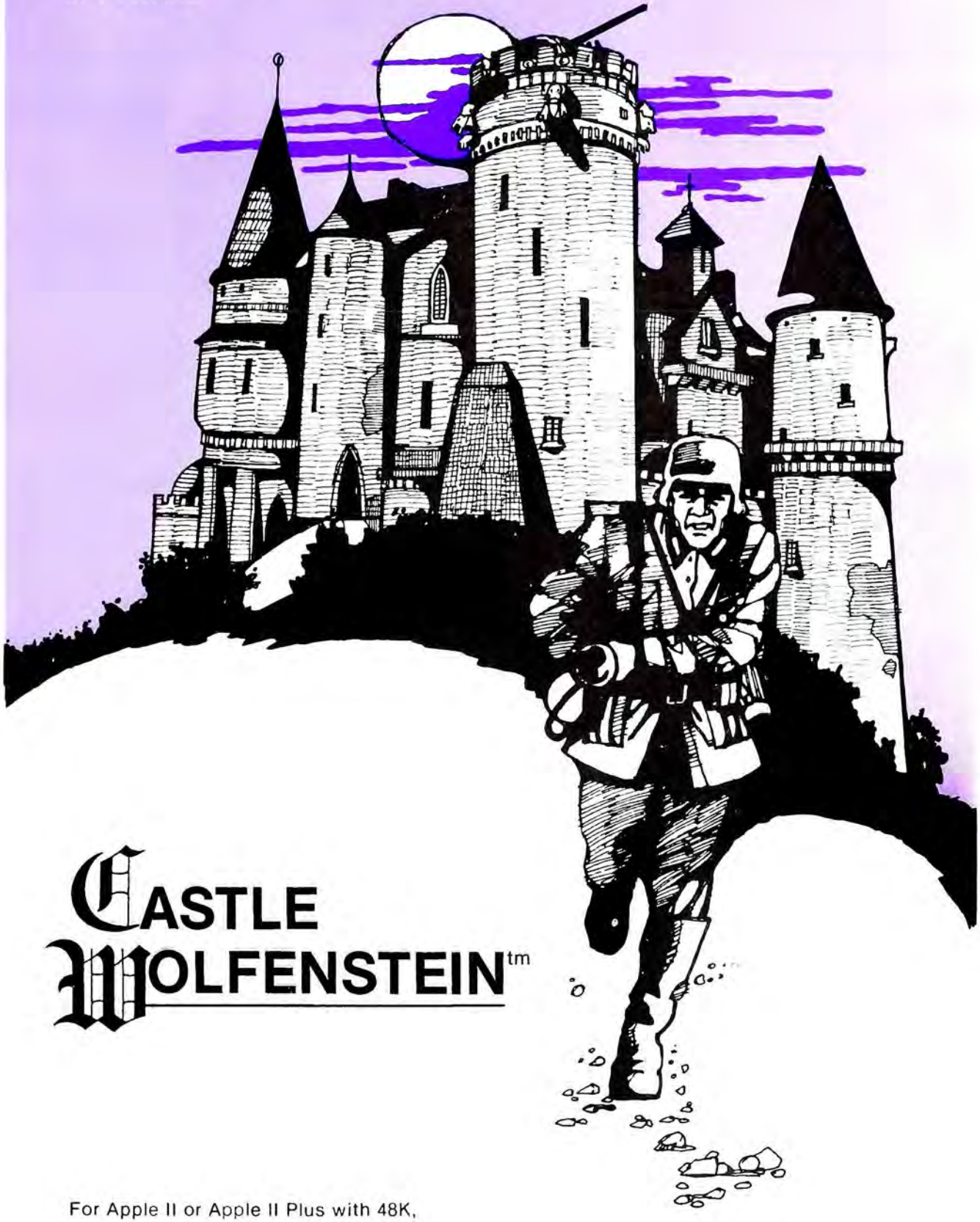
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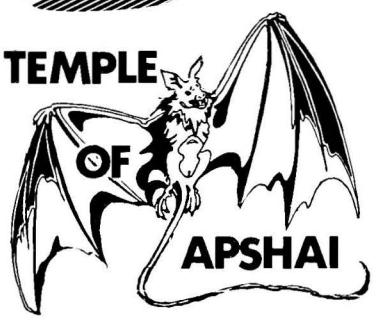
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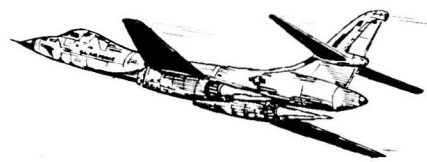
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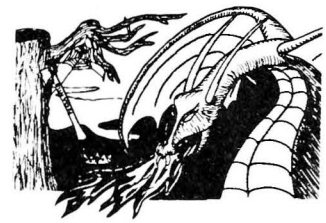
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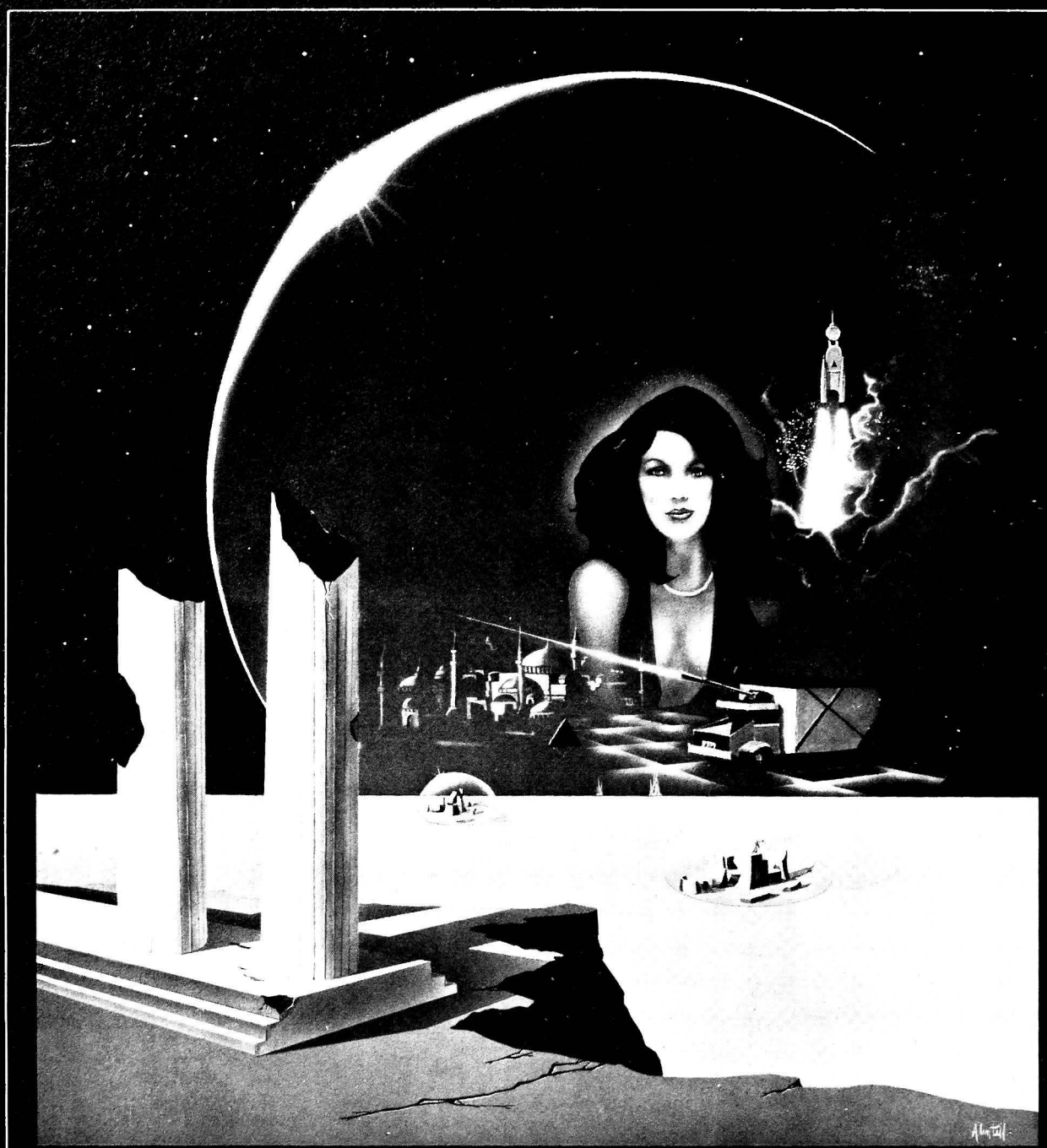
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More Data on Bases

I would like to thank Peter Olivieri for his recent review of *DB Master* (Mind Your Business, *Softalk*, October 1981). However, there were a couple of points in the article which may have been misleading, and I would like to clarify them.

First of all, Mr. Olivieri mentioned only three of *DB Master*'s eleven field types. Numeric fields include small integers (0-255), which require only one byte of storage, large integers (+/− 32767) which use two bytes each, real (floating point) numbers, stored in five bytes, and computed fields, also five bytes. (Storing numbers in binary form, rather than as ASCII characters, saves quite a bit of disk space.)

There are also special field types for dollar amounts, telephone and social security numbers, "yes/no" input, dates, and a special "auto date" field that contains the date of the most recent edit for each record.

Secondly, the review stated that the report generator allows up to twenty-four fields in a report. In fact, a report may contain as many as twenty-four *computed* fields. The total number of fields on a report may be up to one hundred, using up to nine lines per record.

Finally, although I am obviously biased in my viewpoint, I think it would be helpful for a review of data management systems to discuss the file capacities of each system (although I realize that testing those capacities can be a huge job). *DB Master* is, I believe, the only user-oriented file management system available for the Apple II that was designed from the start to handle efficiently large files with many diskettes of data. (Some of our users have files with fifteen to twenty diskettes of data—more than two megabytes in a minifloppy file!)

In addition, the combination of our data compaction, the lack of field delimiters (quotes and/or carriage returns stored in the file), and our operating system, which does not require track/sector lists on the disk, means that *DB Master* can store considerably more data on each diskette than most, if not all, of its competitors. For example, in a typical mailing list-plus-comments application, we can store 1500-1800 records per diskette! And of course, when the disk is full, the file can expand onto one or more additional diskettes.

Since each file does require at least two diskettes, and since you cannot have more than one file on a disk, *DB Master* is obviously not oriented toward the user with a lot of *very* small files. But, for those with large file requirements, *DB Master* can be the solution to many data management problems.

Thanks for the opportunity to be blatantly commercial. Keep up the good work.

Barney Stone, Co-author, *DB Master*,
San Rafael, CA

Peter Olivieri's article appearing in the October issue of *Softalk* about data bases contained a box score of the various data base management systems.

In describing *Data Factory*, it mentioned that one of the weaknesses of the data base was the field names are limited to five characters. This is not correct. The field name in the data base may be up to 239 characters in length. (The name of the field may not be any longer than the field itself.) None of the other data bases in this article have a capacity this large. With the *Data Factory*, in fact, you may have as many as 88 fields and each field may have up to 239 characters.

Also not discussed within the framework of the article was that the *Data Factory* is the only data base that includes the ability to add fields, take away fields, make fields larger or smaller, and move all or part of a data base to another data base. This has been a standard feature of the *Data Factory* for over two years. The data bases mentioned by Olivieri did not have any of these features at the time the article was printed.

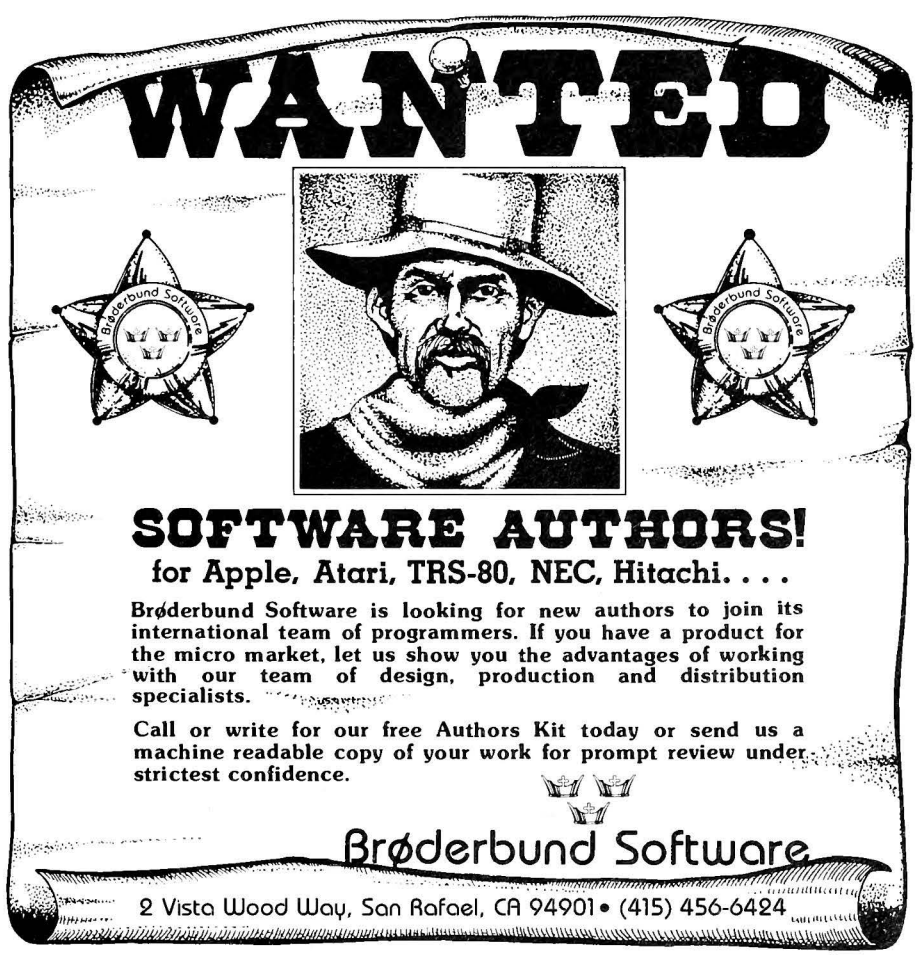
One of the prime considerations that a user should have when purchasing a data base management system is the obsolescence factor. What will happen to their data base when the company produces the next version of the product?

Micro Lab has solved this problem with its extended warranty. We have users who have purchased the 2.0 *Data Factory* and have updated to the 3.0 version, the 4.0 version, and soon will be updating to the 5.0 version. All this without buying the product over again. The data has always been compatible from one version to the next. As we work to include new features and capabilities to the product, we feel that the user should have a method of benefiting from the enhancements added.

Customer support is also a criterion by which you should judge the data base system that you purchase. We, at *Micro Lab*, have personnel assigned to aiding users when a problem arises. If a user has difficulties in using one of the five different methods available to generate reports, he can call *Micro Lab*. If a user has difficulty with the four different methods available to enter data, he may call *Micro Lab*. Although the ease of use of the product usually eliminates the need for someone to call us, it's a nice, secure feeling for a user to know that we are there in case they need us.

Peter Olivieri has done an excellent job in reviewing all the data base management systems. He is a fine addition to your magazine. We eagerly look forward to more columns by Peter.

Stan Goldberg, Director, Micro Lab,
Highland Park, IL

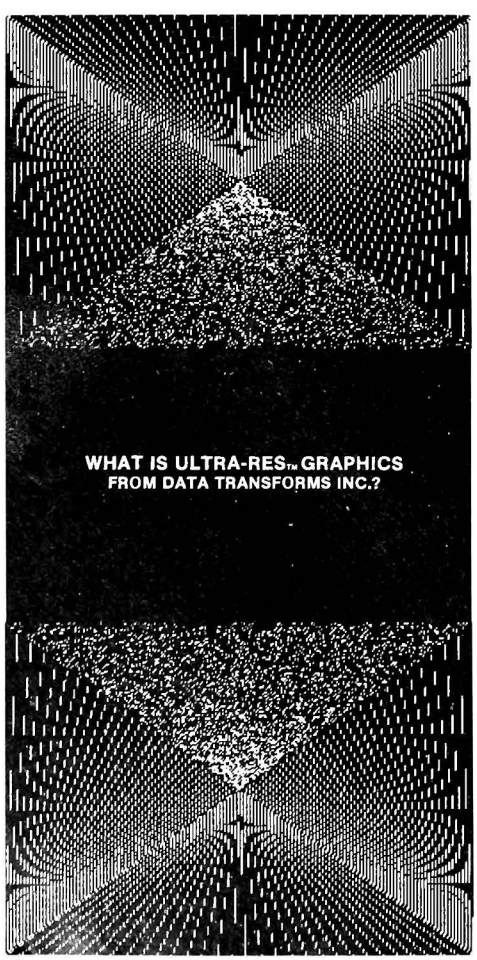


THE PASCAL PATH

By Jim Merritt

Tools of the Craft, Part 5

The CASE of the Several Alternatives. As shown in a recent installment, the IF-THEN-ELSE facility permits a program to make one- and two-way decisions. That is, it can choose to perform one action or not (IF-THEN), or to perform one action or another (IF-THEN-ELSE). Frequently, however, programs must choose to execute one from among many different mutually exclusive actions. Nested IF statements are often used to make the decisions in multiple-choice situations, as in the following example:




```
PROGRAM
  Entrees1;
(* Versian 1.0, 01-October-1981, by Jim Merritt *)
(* Uses a "ladder" af nested IF-THEN-ELSE stotements in
     displaying the daily dinner entree at my fovarite
     restauront.
*)
  TYPE
    Days=
      (Manday, Tuesday, Wednesday, Thursday,
       Friday, Saturday, Sunday);
  VAR
    D
      :Days;
BEGIN (* Entrees1 *)
  D := Tuesday;
  WriteLn;
  Write('Entree far taday, ');
  (* NOTE: Subsequent output occurs on same output line. *)
  IF (D = Manday)
    THEN
      WriteLn('Manday, is Southern Fried Chicken')
    ELSE
      IF (D = Tuesday)
        THEN
          WriteLn('Tuesdoy, is Hot Tamale Pie')
        ELSE
          IF (D = Wednesday)
            THEN
              WriteLn('Wednesdoy, is Hearty Beef Stew')
            ELSE
              IF (D = Thursdoy)
                THEN
                  WriteLn('Thursday, is Roost Tam Turkey')
                ELSE
                  IF (D = Friday)
                    THEN
                      WriteLn('Fridoy, is Grilled Red Snapper')
                    ELSE
                      IF (D = Saturdoy)
                        THEN
                          WriteLn('Saturdoy, is Ham Steak w/Pineapple')
                        ELSE
                          IF (D = Sunday)
                            THEN
                              WriteLn('Sunday, is Steak & Labster Tail');
END (* Entrees1 *)
```

This program chooses the correct string literal to display from among seven different ones, using the current value of D as its basis for decision. You can compile the program, execute it, then recompile it, assigning different initial values to the variable D, to convince yourself that the correct entree is displayed for any given value of D. Note that the original seven-way decision must be restructured into a succession of two-way decisions in order to be compatible with the IF-THEN-ELSE mechanism.

Another, often superior, way to express many multiple-choice decisions is to use Pascal's CASE statement. The syntax for CASE is given in figure 1. Here is a program that performs the same

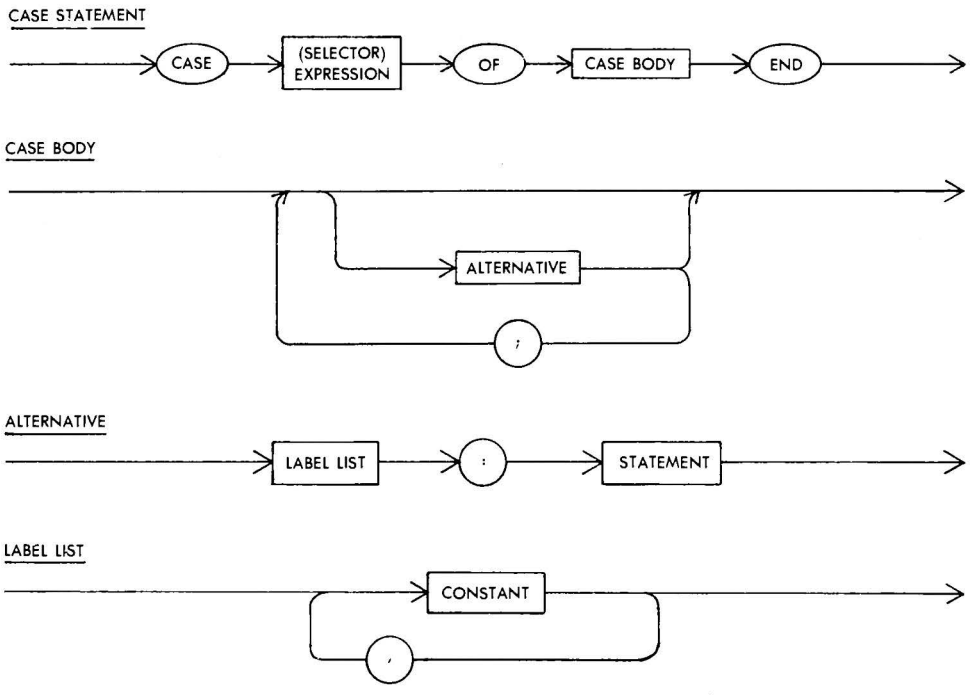


Figure 1.

function as Entrees1, but uses a CASE statement, instead of a ladder of nested IFs:

```
PROGRAM
  Entrees2;
(* Versian 1.0, 01-October-1981, by Jim Merritt *)
(* Uses a CASE statement in displaying the daily dinner
     entree at my favarite restaurant. Cantrast with
     pragram Entrees1.
*)
  TYPE
    Days=
      (Manday, Tuesday, Wednesday, Thursday,
       Friday, Saturday, Sunday);
  VAR
    D
      :Days;
BEGIN (* Entrees2 *)
  D := Tuesday;
  WriteLn;
  Write('Entree far taday, ');
  (* NOTE: Subsequent autput accurs an same autput
line. *)
  CASE D OF
    Manday:
      WriteLn('Manday, is Sauthern Fried Chicken');
    Tuesday:
      WriteLn('Tuesday, is Hat Tamale Pie');
    Wednesday:
      WriteLn('Wednesday, is Hearty Beef Stew');
    Thursday:
      WriteLn('Thursday, is Raast Tam Turkey');
    Friday:
      WriteLn('Friday, is Grilled Red Snapper');
    Saturday:
      WriteLn('Saturday, is Ham Steak w/Pineapple');
    Sunday:
      WriteLn('Sunday, is Steak & Labster Tail');
  END (* CASE D *);
END (* Entrees2 *).
```

The expression that lies between the keywords CASE and OF is called the *CASE Selector*. Every time a CASE statement is executed, its Selector expression is evaluated just once, before anything else happens. The CASE Body, which lies between the keywords OF and END, consists of one or more *CASE Alternatives*. Each Alternative has two parts, a list of Selector values for which that Alternative is valid (its CASE Label List), followed by a single statement that is executed whenever the particular Alternative is selected. (Remember that a single statement may also be a *compound*, which itself contains many individual statements.) When a CASE statement is executed, its Selector value is determined, and that value is then compared with the Labels given in the CASE Body until a match occurs or the END of the CASE statement is reached. If a match is found, the corresponding Alternative is selected and its active statement is executed.

The Selector expression must represent a value from one of the fundamental types, Integer, Boolean, or Char, or from a programmer-defined enumerated type (such as Days, in the examples above), or from a subrange of any of these. In particular, the Selector may *not* evaluate to a Real number or a String. (We haven't yet discussed any expressions of type String, but we'll be getting around to them within the next few installments. Be forwarned that they may not be used as CASE Selectors. Of course, if you happen to forget, the compiler will always remind you. . . .)

For each Alternative, the values given in the CASE Label List must be *constants* and *not* variables (or other forms of expressions). On the other hand, a Label List may include not only literal values, but also identifiers that have been declared and equated to constant values in a CONST section.

When a CASE statement is executed, the Selector value may not match any of the given CASE Labels. If this happens, none of the alternatives is selected and

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program execution continues with the statement (if any) that follows the CASE construct. For example, suppose you have declared a Char variable, named C, in your program. The following CASE statement causes a message to be printed on your screen only when the value contained by C is a vowel (A, E, I, O, or U), or a digit (0 through 9). All other characters are ignored because no Alternatives exist to handle them.

```
CASE C OF
  'A', 'E', 'I', 'O', 'U':
    WriteLn('Vawel');
  '1', '2', '3', '4', '5', '6', '7', '8', '9':
    WriteLn('Digit');
END (* CASE C *);
```

Common Mistakes with CASE. Here are several erroneous CASE statements. Each one illustrates a common error made by beginning Pascal programmers. They are presented within a single program so that you may find it easier to compile them.

```
PROGRAM
  BadCases;
(* Version 1.0, 05-October-1981, by Jim Merritt *)
(* ALL the CASE statements used here are illegal. *)
  TYPE
    Hue=
      (Red, Oronge, Yellaw, Green, Blue, Violet);
  VAR
    Character
      :Char;
    Calar,
    Tint
      :Hue;
    Number
      :Real;
BEGIN (* BodCases *)
  (* Initialize all variables *)
  Charocter := 'A';
  Calar := Green;
  Tint := Vialet
  Number := 3.14159;
  (* CASE Stotement #1 *)
  CASE Calar OF
    Red, Yellaw, Blue:
      WriteLn('Primory Calor');
    Orange, Green, Violet:
      WriteLn('Secandary Calar');

    (* The fallowing two Alternatives are illegal,
       since their CASE Label Lists include values
       that appear in previaus Lists within this
       CASE Statement.
    *)

    Red, Orange, Yellaw:
      WriteLn('Warm Calar');
    Green, Blue, Vialet:
      WriteLn('Caal Calar');
  END (* CASE Calar *);

  (* CASE Statement #2 *)
  CASE Tint OF
    Red, Orange, Yellow:
      WriteLn('Warm Calar');
    Green, Blue, Vialet:
      WriteLn('Cool Calar');

    (* The following Alternative uses a voriable name
       in its Label List. The campiler rejects it.
    *)
    Calar:
      WriteLn('Tint and Color are identical!);
  END (* CASE Tint *);

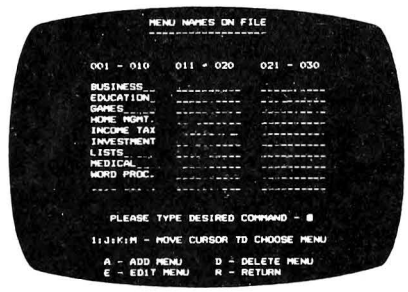
  (* CASE Statement #3 *)
  CASE Character OF
    'A', 'E', 'I', 'O', 'U':
      WriteLn('Vawel');
    '1', '2', '3', '4', '5', '6', '7', '8', '9':
      WriteLn('Digit');
    Green:
      WriteLn('Oaps! Green is af type Hue, nat
      Char!');
  END (* CASE Character *);

  (* CASE Statement #4 *)
  CASE (Number * 2) OF
    1.0, 2.0, 3.0:
      WriteLn('Real expressians may not be CASE
      Selectors');
    3.14159:
      WriteLn('Pi in the sky.');
  END (* CASE (Number * 2) *);
END (* BadCases *).
```

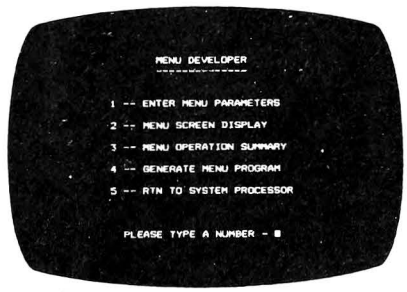
Naturally, the BadCases program causes the compiler to generate error messages. Remember that, whenever you receive an error message from the compiler, you may press the space bar, thus instructing the compiler to continue scanning the program for subsequent errors. Do this for all error messages you receive while trying to compile BadCases.

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You'll get six identical Error 156 messages in a row for the first CASE statement. This message translates to "Multidefined case Label," and indicates that you have used a certain CASE label more than once in the same CASE statement. If a particular constant appears in the Label Lists of more than one separate Alternative, this implies that every one of those Alternatives should be executed whenever the Selector evaluates to that constant. However, this cannot be done, and the compiler gives you an error message to tell you so.

The second CASE statement causes two error messages. The first one is Error 103, which means, "Identifier is not of the appropriate class." If you look closely, you can see that I've inserted a variable name into the CASE Label List and it is on this identifier that the compiler chokes. Since the only identifiers that may occur in a CASE Label List are those that are associated with constant values, the variable name is out of place—it is clearly of the wrong class. It's interesting to note that this particular error condition serves to confuse the compiler momentarily, and so thoroughly that it *mistakenly* detects a *second* error—another Error 156—immediately after the Error 103.

The compiler reorients itself in time to encounter the Selector of the third CASE statement, which is of type Char. However, one of the Labels in the subsequent CASE Body is of type Hue, and this leads to Error 147. In other words, Label type [is] incompatible with selecting expression.

The final CASE statement includes a Selector that evaluates to a Real number. The compiler recognizes this as an illegal situation and issues the message Error 144, indicating an illegal type of expression.

CASE Apes IF. You've seen how a series of nested IF-THEN-ELSE statements can be used to simulate the behavior of CASE. Just so, IF-THEN-ELSE behavior can be simulated in Apple Pascal using a CASE Statement:

```
CASE BaaleanExpressian OF
  True:
    ActianA;                    (* 1 *)
END;

CASE BaaleanExpressian OF
  False:
    ActianB;                    (* 2 *)
  True:
    ActianA;
END;
```

Example (* 1 *) simulates IF-THEN logic. Should the CASE Selector evaluate to False, no action will be taken. Example (* 2 *) behaves likes an IF-THEN-ELSE statement. Whether the CASE Selector value is True or False, some action will occur.

Given that either statement can perform the other's function, what guidelines can you use in deciding whether to use IF or CASE at a certain point in your program (besides the general rule that one-way or two-way decisions are best handled by IF-THEN and IF-THEN-ELSE, while CASE is tailormade for multiple-choice situations)? That's a *very* good question, and one that is best handled on a (pardon the expression) CASE by CASE basis. Were I to wax poetic on the distinctions between IF and CASE now, you could easily forget them by the time we get around to designing some "real" programs (in a month or two—be patient and you will be rewarded). Right now, it's enough that you recognize a CASE statement and understand a little bit about its function. When the time comes to make design decisions, I'll do my best to explain and justify mine so that you can acquire a realistic feel for the distinction between IF, CASE, and other tools of the trade.

Holiday Greetings. Because of the nature of the magazine publishing cycle, this installment is scheduled to appear in *Softalk*'s December issue, yet it is being written several weeks before Halloween! Even though the holiday spirit hasn't yet seized me, I'd like to take this time to thank you for being my traveling companions along the Pascal Path. As a token of my appreciation, here's an "intelligent Christmas card," which, appropriately, uses a CASE statement to express my sentiments.

```
PROGRAM
  Card;
(* Versian 1.0, 10-October-1981, by Jim Merritt *)

(* Displays a variable haliday message *)

TYPE
  FaithType=
    (Christian, Jewish, Druid, Other);

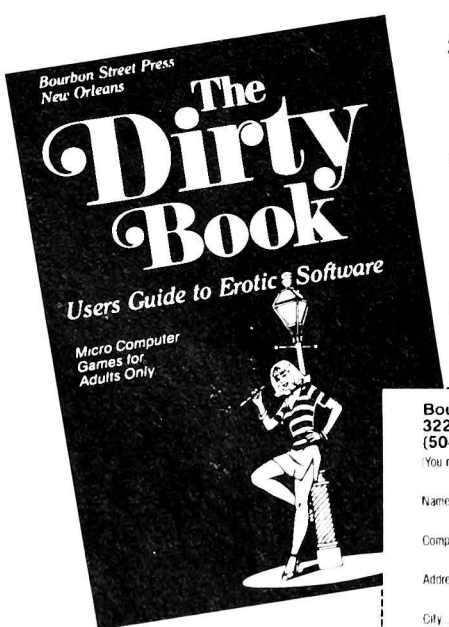
VAR
  Faith
    :FaithType;

BEGIN (* Card *)
  Faith := Druid;          (* Madify ta suit yourself *)

  CASE Faith OF
    Christian:
      Write('Merry Christmas');
    Jewish:
      Write('Happy Chanukah');
    Druid:
      Write('Enjay the Salstice');
    Other:
      Write('Happy Holidays');
  END (* CASE Faith *)
    WriteLn(', and have a great 1982!');
    WriteLn(' — Jim Merritt, the Pascal Pathfinder');
  END (* Card *).
```

Enjoy yourself over the holidays, but please don't eat too much. I'll need you in running trim for January's jaunt along the Path; we'll have a lot of ground to cover! ◨

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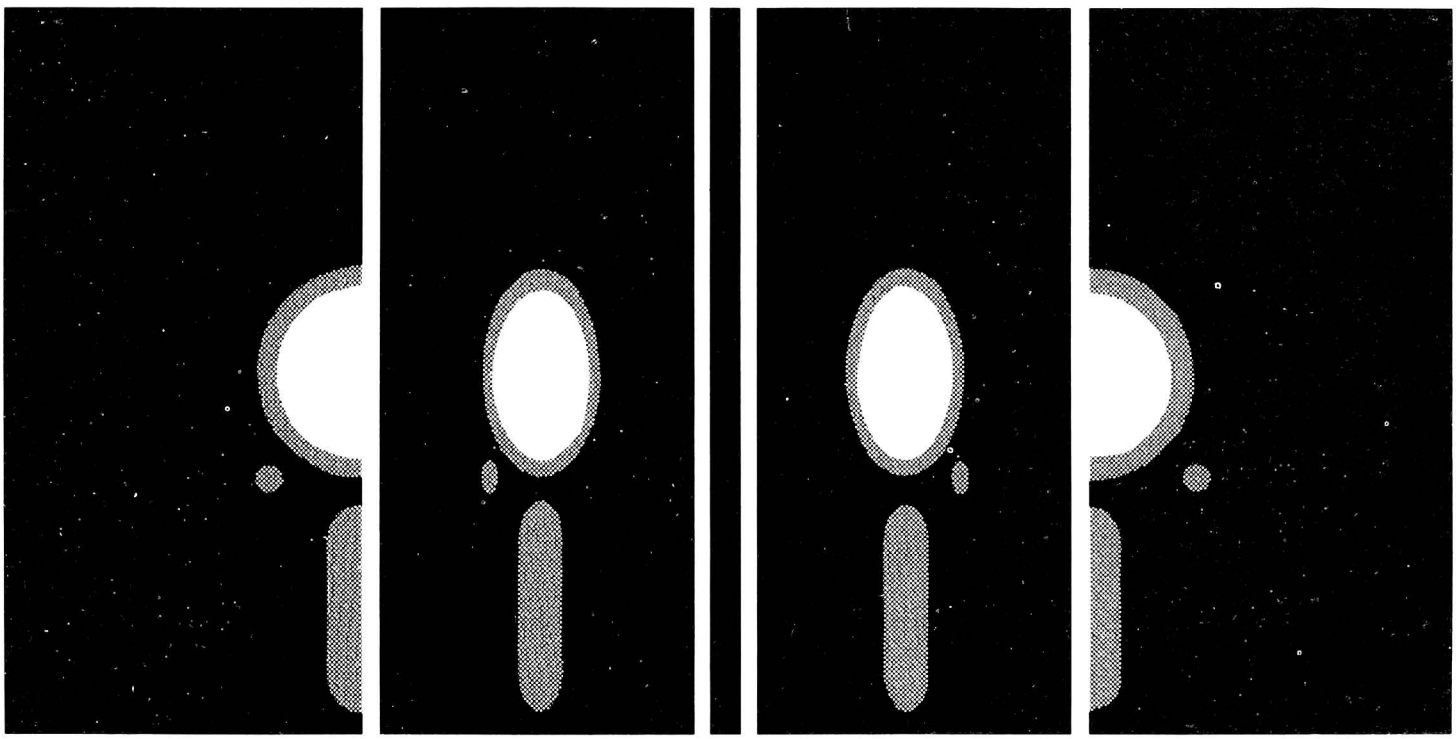
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Exec micro lab:

The year now ending has marked such growth on the part of software producers that the industry is barely recognizable. Compilers for both Applesoft and Integer Basic hit the market. Personal Software came out with *VisiCalc* in 3.3 and added several packages complementary to *VisiCalc*.

Sirius Software and Broderbund blossomed into major entertainment suppliers. On-Line Systems, which had been heavy in entertainment, branched into business and utility software. Bill Budge started his own company and immediately reached the top of the bestseller charts with his first offering.

The number of other companies, offering both software and peripherals, that have been successfully launched in the last year augurs well for the Apple industry and the community of Apple users.

Beginning with Bestsellers. Arguably, no company has been more active this year in a broader spectrum of software publishing to the benefit of Apple owners than Micro Lab, the Chicago-based publisher. Micro Lab opened the new year with two products, *Data Factory* by Bill Passauer and *Dogfight* by Bill Basham. It understates the fact to say that these were perfectly respectable products. Both were ensconced in the top fifteen of *Softalk*'s bestseller list as last year ended.

With that kind of success as a foundation for a new company, it's no wonder that Rosalie Dixler and Stan Goldberg, the codirectors of Micro Lab, have churned out a new spate of products this year. The Micro Lab catalog has expanded to twenty items, most coming in the last quarter of the year. The litany of products includes entries in the business, educational, entertainment, utility, and tax and finance areas, making Micro Lab perhaps the broadest based software company extant.

This is a most improbable occurrence, based on the genesis of the company and the original desires of the directors. In fact, there're no more unlikely pretenders to the claim of software magnates than Dixler and Goldberg. These are two folks who were looking to form a tidy little part-time enterprise to occupy their spare moments. That's not necessarily an unusual goal, but the end result is—because neither had any particular expertise in the microcomputer field that could foretell even the remotest probability of success.

An Unexpected Love Affair and a Reluctant Purchase. That's not to say that the pair had not achieved significant successes in prior businesses. Dixler was coming off a success as a travel agent and Goldberg was an executive in the garment industry. However, neither was primed for entry into the microcomputer software publishing industry. Goldberg had to explain away his purchase of an Apple to his wife, Susan, by assuring her that he would be able to make the expenditure into an investment. Dixler resisted the purchase of an Apple because she feared, as has become the case, that her interest in the machine would become all-encompassing.

It was Goldberg's purchase of an Apple that started the ball rolling inexorably toward the formation of a company. He was functioning as the vice-president of marketing for a Chicago clothing concern and traveling on a weekly basis to New York. He became so enamored of the computer that he would haul it with him on his trips, using the flight time to devour the manuals and read all the computer magazines.

Goldberg's fascination with the computer carried over to his home, where his son caught the interest and started showing the Apple to his friends, one of whom was Dixler's son: He urged his mother to buy an Apple, but she was reluctant.

Abandoned Tour. At the time, Dixler was functioning as a truly successful travel agent. Her success had almost pushed the owner of the travel agency out of his own office as she required more and more space to cater to her clientele. In fact, her clientele had grown to the point where she faced a major decision: should she strike out on her own as a full-fledged agency, or should she leave the business? The alternative of staying in business working under her curent set of conditions was not tenable.

This was not an easy decision for her to make. Dixler is a woman who enjoys the excitement of the unknown and loves to travel. This lure of the unexplored place manifested itself as early as her college days, when she attended college in Mexico City and Hawaii as well as at three mainland schools before graduating. In addition, she spent one summer, between her junior and senior years in college, touring Europe.

Clearly, Dixler had the early makings of the travel agent extraordinaire she became. But given the option of replicating her success under her own travel banner or pursuing some other line of endeavor, she opted to turn her clients over to her former boss and look for other opportunities.

She was bound to be selective in what form that other opportunity would take. Dixler had noted that most jobs open to women had the same failing: the remuneration was not sufficient for the effort expended. So when she considered new career options, she was looking for something that would provide the constant challenge of the unknown and fair compensation. She investigated parapsychology but found that, while the stimulus of changing circumstances was certainly present, the compensation was lacking. Then she turned to computers, which is where Goldberg and his Apple came in.

Commitment to Profit Presaged Part-Time Partnership. Goldberg was feeling frustrated over the lack of quality applications software available for the Apple (this was in the pre-*VisiCalc* days) and, spurred on by his wife's periodic query as to when this mystical machine was going to transfigure itself from an expense into an asset, was giving some thought as to how to enter the personal computer industry.

He and Dixler started comparing notes and found that they were both interested in building a business that could be conducted on a part-time, twenty-hour-a-week or so, basis. The two found that they were complementary in their skills—Goldberg's creativity being conceptual and supported by great energy and enthusiasm, while Dixler's creativity found some outlets in marketing and in ensuring timely implementation of the projects under development.

So it was that they struck a partnership to build a part-time software publishing company with its base of operations in the Dixler household basement.

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TRYING TO MAKE CONTACT ?



It should be noted here that a start in a basement in Highland Park, Illinois, is not exactly comparable to starting a computer company in a garage in Cupertino. Highland Park is definitely one of the high rent districts around Chicago. In fact, in Highland Park, rent is what you collect from others, not what you pay. In Highland Park, food stamps are U.S. Postal Service commemoratives that elevate vegetables to a place of honor. In Highland Park, you start with an expectation of success, even, as in this case, when that expectation is unwarranted by a past track record in the endeavor you set out for yourself.

How Best-Laid Plans Went Awry—for the Better. But expectations of success do not a success make, as many a would-be entrepreneur has discovered to his sorrow. So, even though a basement in Highland Park is clearly more luxurious a beginning than many companies in the personal computer industry had, it was the more common ingredients of hard work and long hours that carried the day, although it should be remembered that who we have here are two folks who had not intended to become too closely acquainted with hard work during the course of their twenty-hour-a-week part-time enterprise.

Goldberg had seen a program sold in Chicago stores called *Data Factory.* It seemed to be the best of the applications programs then out, but author Bill Passauer had no distribution outside the stores in the local area. Goldberg convinced Passauer to let the infant Micro Lab distribute the program. Passauer incorporated several enhancements suggested by the embryonic publishers and the company was on its way, releasing the revised *Data Factory* in June 1980.

Dixler believes that the success of *Data Factory* in the face of the entrenched competition from Personal Software's *CCA Data Management System* stemmed from Micro Lab's emphasis on making all their programs user friendly. Their perception that most personal computer owners are novices has led Micro Lab to stress simplicity in use.

Even in this first publishing venture, Micro Lab confronted decisions of far-ranging magnitude. The original *Data Factory* had been sold unprotected, but the question of how to handle copy protection was a burning issue among publishers by this time.

At the suggestion of a friend, Micro Lab adopted the policy they've stuck with—providing a backup disk in the original package to ensure continuity of program use in case the master disk should crash. That policy increased the cost of publishing considerably, but freed the partners to make the decision to lock the program.

Expansion Underway. Their success with *Data Factory* attracted the attention of a young Illinois physician who had just finished what was to become the first arcade game for the Apple not copied from a coin-operated machine. Bill Basham submitted *Dogfight* to Micro Lab for publishing and that program immediately joined *Data Factory* as a bestseller.

Two hits in two trips to bat is an unusually high batting average even for companies with the most cause for success. For two neophyte publishers who were also computer novices, it defied the odds.

In the first nine months of this year, several other products joined the line. In the entertainment field were *Crown of Arthain, Mad Venture,* and *Palace in Thunderland. Mini-Factory* and *Invoice Factory* joined the business product line. And *Learning System* opened up the educational area.

But the fruits of a year's labor have been showing up particularly in this last quarter of the year. *English SAT* and *U.S. Constitution* were added to the educational line. *Data Manager III,* a hard disk data base for the Apple III, was scheduled for December. *Merger,* a utility to work with *Data Factory* files, *VisiFactory,* a program that makes *Data Factory* files compatible with *VisiCalc,* and *VisiBlend,* a program that allows the merging of *VisiCalc* files, joined the business product line.

The tax and finance markets were addressed with *Tax Manager* and *Asset Manager. Tax Manager* offers the ability to use the Apple to figure your income taxes. *Asset Manager* provides a means of keeping track of net worth of an individual or business and is particularly timely because of recent changes in the law concerning how certain assets should be treated for depreciation. With *Asset Manager,* adjustments from the old methods to the new method of depreciation can be done quickly and relatively inexpensively.

Painter Power and three volumes of *Language Plus* also hit the market in the last quarter, marking Micro Lab's entry into the utility field. *Painter Power* is a graphics program. *Language Plus* is a series of amper routines that can be integrated into Basic programs to enhance their power. Written by in-house programmers Curt Rostenbach and Michael Hatlak, the programs reflect Goldberg's conviction that the compilers have not provided sufficient power for the Basic programmer and that amper routines offer a cost efficient and powerful alternative.

Spare-Time Dabbling Can Take All Day. If there is any one salient implication of this spate of activity, it's that such a catalog cannot be built by two folks working in a part-time business. Dixler observes, with at least a trace of regret, that she can't remember any week when either of the directors put in as few as twenty hours. Rather than being a venture that served to while away a few otherwise unproductive hours, it's been from the start a consuming task.

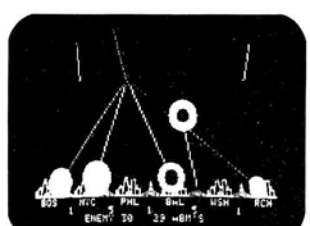
In Dixler's view, that's the nature of the beast. She observes that the marketplace is now so competitive that when a publisher presents a new and dramatically more powerful program, the lead they gain is only temporary. Soon other publishers will be matching and exceeding the capabilities of the original program with their competing products.

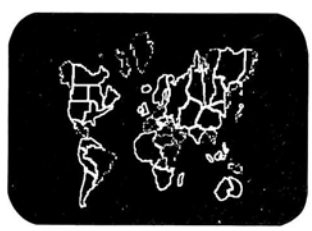
Keeping even or ahead of the market has entailed seven-day workweeks and long hours, including many overnights, for both directors. The sheer volume of the catalog gives an indication of the work that's gone into building the company. But that ignores what Dixler and Goldberg believe is one of their major strengths—they listen to their users.

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a Christmas present for you

Due to the generosity of an Irish professor, Micro Lab has a true Christmas gift for all members of the Apple community.

Diarmuid McCarthy teaches computer science at the College of Marketing and Design, a third level school in Dublin. In the course of using the Apple II in his classes, McCarthy developed an Applesoft tutorial on disk for use by his students.

Typical of a spirit that seems to have almost disappeared from the Apple community, McCarthy has offered his tutorial to all Apple owners with the specific proviso that no publisher or disseminator of the disk do so for a profit and that the software be considered in the public domain.

Stan Goldberg and Rosalie Dixler, codirectors of Micro Lab, accepted the burden of handling the logistics for getting the program into the hands of American Apple owners.

According to Goldberg, the program consists of two beginner lessons on the Apple and its keyboard, zooming in on the use of the edit keys. Two introductory chapters and two chapters introducing Basic follow. The major body of the work consists of two instruction blocks of twelve lessons each.

An Applesoft reference section contains sixty-six commands with explanations as to their use.

Goldberg was high in his praise for the programming techniques used in developing the tutorial. According to him, the software is strongly error-trapped.

Apparently the program is a suitable gift for beginner or intermediate programmers, and Micro Lab is providing the disk for a $7 charge that includes the cost of the disk, the cost of duplication, and the cost of postage. Inquiries and orders may be directed to them at 2310 Skokie Valley Road, Highland Park, IL 60035. The program requires 48K and DOS 3.3. ◨



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Users Come First—and First Again. Listening to the users results in updates to products already on the market to make them more responsive to the uses to which the program is being put. The final result of that policy has been two updates to *Data Factory* and one update to *Invoice Factory*. An improved version of *Dogfight* also was published during this same period.

The policy of updating the programs, as well as the policy of locking the programs, has caused Goldberg and Dixler to construct a user-support program that they believe has contributed significantly to their success. In addition to providing the backup disk with the original package in applications programs, they offer an extended warranty that permits users to upgrade to improved versions of the product at little expense. Micro Lab has always designed their updates in such a fashion that files of data developed under previous versions of a program will be compatible with the new version.

Although Goldberg, a former industrial engineer before he turned to marketing, has not been able to fit in the hours of tennis and recreation that he foresaw resulting from his part-time business, he's found sufficient other rewards in Micro Lab.

For him, the fun has been in the creative process of conceiving of an idea, getting other persons excited and involved with a new concept, and nurturing that concept through to completion. "Where else," Goldberg asks rhetorically, "other than when you parent a child, do you have the freedom for that degree of molding and shaping?"

Goldberg has definitive ideas about the shape a product should take, but that doesn't foreclose accepting input from the rest of the Micro Lab staff. Generally, the development process encourages contributions from everyone involved in a project and the end product is the result of the suggestions of many contributors.

But uppermost in Goldberg's considerations is that each offering has to be credible in its own right. "Our best public relations is the catalog of programs that we've published. We can't afford to release a turkey." Goldberg believes that Micro Lab's success has been a happy combination of fortuitous timing and high quality product.

Dixler concurs in that opinion, but adds that the breadth of the product line has been a strongly contributive factor as well. In her view, dependence on one product or one line of products in an industry changing as rapidly as the microcomputer industry would be foolhardy.

The Elements of Partnership. It's true that an unbiased observer would not have chosen the combined experiences of Dixler and Goldberg as most favorable portents for success as software publishers. That same observer would have been hard pressed to select them as likely partners in the first place.

Goldberg was born and raised in Brooklyn. His family was what is most often described as one of modest circumstances. Dixler's father was the owner of two businesses and she was raised in the more affluent areas around Chicago. But the two have meshed their skills well despite the diversity of their backgrounds. Goldberg handles product research and development, making publishing agreements with authors and closing other contracts. Dixler pulls the loose ends together, handling packaging, developing marketing compaigns, and getting documentation completed.

The pair share joint responsibilities for the company's advertising campaigns.

It wasn't until *Dogfight* was safely into the marketplace and had been accepted that the partners added their first employee. Like other elements about Micro Lab, conventional wisdom was not operative in the search for employees.

One of the unmistakable features of most software publishing companies is the youth of the staff. Dixler believes that's because young persons more readily accept change and new things than do older persons. In her view, change—particularly change that comes as rapidly as it does in the microcomputer industry—is threatening to most older persons. They have more difficulty adjusting to a pace where the technology of three months ago may already be out of date. So there's a nat-



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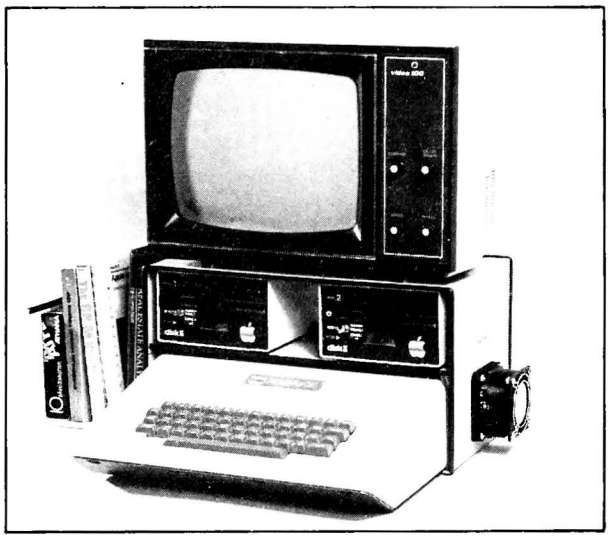
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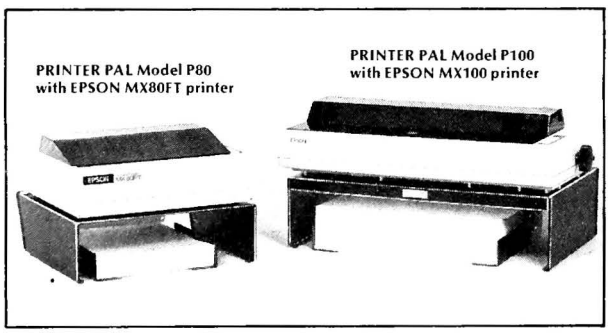


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ural trend to hire younger persons for whom such rapid rates of change are not threatening.

The Value of Living. But directors Dixler and Goldberg refused to accept as necessary settling for key employees who might lack experience because of their youth. Even in their hiring of programmers—a microcomputer skill where twenty-five is practically ancient—Micro Lab has sought out and hired older, more experienced persons. While there's no danger of anyone mistaking the Micro Lab offices for a home for doddering retirees, there's clearly an emphasis on experience and efficiency reflected in the employees on board.

Martha Erickson is a case in point. Last spring, she was hired to handle many of the customer support functions—answering queries from customers about the use of the various company products and solving specific problems that might arise. Erickson is not your typical recent college graduate, looking for work and receptive to the new world of the microcomputer.

She's a schoolteacher of twenty years' experience who was reentering the job market. Toward that end, she'd taken a class in accounting but found the work not to her liking. She then took a business computer course. While taking the course, she applied for work at Micro Lab and was told to come back when she had finished. She did and was hired.

Erickson's teaching experience has been invaluable in handling customer queries. Most of the questions derive from the inability of the customer to understand the proper use of the program—a situation which calls for them to be taught the correct method.

Erickson allows that teaching over the telephone is difficult, but her background has made it easier to apply appropriate teaching techniques for each caller. The almost infinite patience that a seasoned teacher must learn to survive has stood her in good stead when callers open conversations with hostile attitudes. She most often manages to kid the person into a more receptive frame of mind while solving their problem.

Knowledge Never Hurt Sales. The major areas of her responsibility are *Data Factory* and *Invoice Factory*. Because of the reliability and ease of use of the products, her time is not consumed in customer service. Because of her familiarity with the advantages of the products, she uses her additional time to dial up retailers and push the product.

Micro Lab has provided an Apple for every employee, but Erickson confesses that she hasn't yet had time to learn one program other than those for which she's providing support. So while Dixler has converted from finding the computer an imposition when writing to an indispensable tool for composing, Erickson has yet to get the time to test that theory for herself.

Hired about the same time as Erickson was Deborah Mihm, likewise a computer novice. Mihm, like Dixler, has a fascination with new experiences that has found some fulfillment in the microcomputer industry. As one of the persons responsible for documentation, she's had to work closely with the programmers and found this stimulating. She describes the programmers' environment as one of humor and intense concentration. If that's not how you've seen it or pictured it, perhaps her comment represents a true tribute to the atmosphere created at Micro Lab by Goldberg and Dixler.

Mihm wasn't exactly looking for work in the microcomputer field, but when a friend mentioned that Micro Lab might have need of a person with her journalistic talents, it struck her right. Her vicarious knowledge of computers, gleaned from friends who were closely associated with data processing, prepared her to be quite comfortable with micros.

No stranger to hard work—she earned her way through college—that concept was tested early by her assignment to do the documentation for *Painter Power*. She sat with two computers, one displaying the program and one to do word processing, for several weeks.

Like Erickson, she represents those programs she's most familiar with to the retailers. She's found that contact enjoyable in that the retailers seem to like what they're doing. She's

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THE THIRD BASIC



by Taylor Pohlman

Exploring Business Basic — Part Four

Those of you who have Apple IIIs have probably received some very good news in the last few weeks. Yes, Virginia, there is a new version of Business Basic with some fantastic new features! But first, a word from our sponsor. . . . Seriously, let's conclude presenting the information promised last time before getting into the new goodies.

As you may remember (and are otherwise encouraged to discover), the last article concluded with some points about the use of data files in Business Basic and modified our simple database program to use the data file format. For at least one more time, we'll list the program as it currently stands and then plunge into this month's enhancements, which cover the breathlessly exciting topics of list management, indexing, and sorting. That will about finish us in the data management area, leaving future issues to explore formatting, business arithmetic, and matrix arithmetic.

Once more, dear friends, into the breach. . . .

The Program as It Currently Stands. Remember that this program was designed to allow the entry and retrieval of information about parts such as might be maintained by a distributor or retail store. So far the program allows creation of parts files, and adding, deleting, and finding records of specific parts by part number. The program:

```
5     HOME
7     PRINT
10    PRINT"Parts File Create and Modify
        Program"
20    PRINT:PRINT"Type:"
30    PRINT" 1 to Create a parts file":PRINT
40    PRINT" 2 to Use an existing parts
        file":PRINT
49    PRINT" 9 to Quit":PRINT
50    PRINT:INPUT"Your selection: ";a$
60    IF a$="" THEN 1000
70    a=ABS(VAL(a$))
80    ON a GOSUB 100,400
90    IF a=9 THEN 1000:ELSE 5
100   PRINT:INPUT"Name of new parts file: ";a$
110   IF a$="" THEN RETURN
120   CREATE a$, DATA,64
130   PRINT"Parts file ";a$;" created."
140   RETURN
400   HOME
405   PRINT:INPUT"Name of existing parts file:
        ";a$
410   IF a$="" THEN RETURN
420   OPEN#1,a$
425   file$=a$
430   HOME
435   PRINT:PRINT"Madify Parts File
        ";CHR$(34);file$;CHR$(34):PRINT
437   PRINT"Type:"
440   PRINT" 1 to add to your parts file":PRINT
445   PRINT" 2 to delete a part from your parts
        file":PRINT
450   PRINT" 3 to find a part in your parts
        file":PRINT
460   PRINT" 9 to quit the madify made":PRINT
465   PRINT:INPUT"Your selection: ";a$
467   a=ABS(VAL(a$))
470   IF a=9 OR a$="" THEN RETURN
475   ON a GOSUB 500,700,800
480   GOTO 430
500   HOME
505   PRINT:INPUT"Part number to add: ";a$
510   IF a$="" THEN RETURN
520   a=VAL(a$)
530   IF a<1 OR a>32767 OR INT(a)<>a THEN
        500
535   rec=a
540   partnum$=a$
545   PRINT:INPUT"Description: ";a$
550   IF LEN(a$)>35 THEN a$=MID$(a$,1,35)
560   desc$=a$
570   PRINT:INPUT"Location: ";a$
580   IF LEN(a$)>15 THEN a$=MID$(a$,1,15)
590   location$=a$
600   PRINT:INPUT"Quantity on hand: ";a$
610   a=0:a=VAL(a$):IF INT(a)<>a OR
        a>99999 THEN 600
620   quantity$=a$
630   PRINT:PRINT"Record is:
        ";partnum$;"/";desc$;
        "/";location$;"/";quantity$;
640   INPUT" OK? ";a$
650   a$=MID$(a$,1,1):IF a$<>"y" AND
        a$<>"Y" THEN 505
660   GOSUB 2000
665   If errarcade=0 THEN PRINT:PRINT"Record
        added.":GOSUB 995:GOTO 500
670   PRINT:INVERSE:PRINT"Record not added,
        ERROR= ";:NORMAL:PRINT errarcade:
        GOSUB 995:GOTO 505
700   HOME
705   PRINT:INPUT"Part number to Delete: ";a$
710   IF a$="" THEN RETURN
715   a=VAL(a$)
720   IF a<1 OR a>32767 THEN 700
725   rec=a
730   GOSUB 1800
735   IF errarcade=1 THEN PRINT:PRINT
        CHR$(7);"No such part number":GOSUB
        995:GOTO 700
740   PRINT"Delete ";partnum$;"/";desc$;
        "/";location$;"/";quantity$;"? ";
745   INPUT"";a$:a$=MID$(a$,1,1)
750   IF a$<>"y" AND a$<>"Y" THEN
        PRINT"Not deleted":GOSUB 995:GOTO
        700
755   GOSUB 1900
760   PRINT:PRINT CHR$(7);CHR$(7);"Record
        deleted":GOSUB 995:GOTO 700
800   HOME:PRINT
805   INPUT"Part number to find: ";a$
810   IF a$="" THEN RETURN
815   a=VAL(a$)
820   IF a<1 OR a>32767 OR INT(a)<>a THEN
        800
825   rec=a
830   GOSUB 1800
840   IF errarcade=1 THEN PRINT:PRINT"No such
        part number":GOSUB 995:GOTO 800
850   PRINT:PRINT"Part number: ";partnum$
855   PRINT:PRINT"Description: ";desc$
860   PRINT:PRINT"Location: ";location$
865   PRINT:PRINT"Quantity on hand: ";quantity$
870   PRINT
890   PRINT:INPUT"Press RETURN to continue:
        ";a$:GOTO 800
899   REM
900   REM delay subroutine
901   REM
995 FOR i=1 TO 1000:NEXT i:RETURN
996   REM
1000  PRINT:PRINT"End of parts file program."
1010  CLOSE
1020  END
1799  REM
1800  REM retrieve a record with record number =
        "rec"
1801  REM
1805  errarcade=1
1810  ON EOF#1 RETURN
1815  READ#1,rec:IF TYP(1)=5 THEN RETURN
1820  READ#1,rec;partnum%,desc$,
        location$,quantity
1825  IF partnum%<0 THEN RETURN
1830  partnum$=STR$(partnum%):quantity$=
        STR$(quantity)
1890  errarcade=0:RETURN
1899  REM
1900  REM delete a record with record number =
        "rec"
1901  REM
```

```
1905 partnum%=-partnum%
1907 WRITE#1,rec;partnum%,desc$,
       lacatian$,quantity
1910 RETURN
1999 REM
2000 REM add a recard with recard number =
       "rec"
2001 REM
2005 errarcade=0
2010 partnum%=VAL(partnum$):quantity=
       VAL(quantity$)
2015 ON ERR GOTO 2040
2020 WRITE#1,rec;partnum%,desc$,
       lacatian$,quantity
2030 OFF ERR:RETURN
2040 errarcade= ERR:OFF ERR:RETURN
```

Impressive, right? In playing around with this program, you may have discovered something very interesting. Retrieving individual records on parts is simple and quick, as long as you remember the part number you want. Try coming back to the program after a few days or weeks and attempt to remember the part numbers that were previously entered. It'll immediately be obvious that a list of all the active (not deleted) part numbers is needed. The program below will accomplish this task.

```
10   PRINT"Name af Parts file: ";
20   INPUT a$
30   OPEN#1,a$
40   PRINT"Name af list file: ";
50   INPUT a$
60   OPEN#2,a$
70   ON EOF#1 GOTO 1000
75   PRINT"Part number","Description",
       "Lacatian","Quantity":PRINT
80   FOR rec=1 TO 9999
90    READ#1,rec:IF TYP(1)=5 THEN 200
100  READ#1;partnum%,desc$,lacatian$,
       quantity
110  IF partnum%<0 THEN 200
120  PRINT#2;partnum%,desc$,lacatian$,
       quantity
200  NEXT rec
1000 PRINT#2:PRINT#2"End af file"
1010 CLOSE
1020 END
```

Notice that this program has been set up to read from any parts file and to output to any file as well. This is similar to some programs from previous articles and allows output to go to the screen (by replying *.console*) or to a printer, and so on. Additionally, since we have no idea which part number records are actually in the file, a for-next loop is used to scan all the valid record numbers. Line 90 reads the particular record into memory and checks to see if it contains valid data. Recall that TYP(1)=5 means that there is no data in the record. If data is present, it is read into the variables and the part number is checked. A negative value means that the part number has been deleted. If the data passes all tests, it is printed out.

Running the program reveals several interesting things. Notice the sample print-out in figure 1.

Part number	Description	Locotion	Quontity
35	shovel	bin 3	2
200	hammer	bin 1	10
300	wrench	bin 5	6
2000	onvil	top shelf	1

End of file

Figure 1.

Try entering these part numbers yourself and run the sample program. You'll notice that the first records print out fairly quickly, but the last one appears only after much whirring of the poor, overworked disk. This is easy to understand, since 1,700 records must be searched before the final one is found. Just imagine if we had used 9000 as the last record instead! Clearly there must be a better way to find out what's in the file than searching every record. However, we still want the fast lookup of an individual record that the random record access technique provides.

Here's where all those comments earlier in the series about how neat it is to have lots of user memory in Business Basic become important. With the extra memory, we can keep extra data structures around to simplify the task of finding out what data is on the disk and where it is. The term *data structure* is a much revered one in computer science circles, and simply refers to organized ways to maintain data and the information about the data. In this case, we need a structure called a list. Sounds obvious, right? Lots of things in computer science are needlessly obfuscated. (Lots of things in English can be, too!)

In this case, the list will consist of the part numbers stored in the file. Since the part number is also the record number, our task of retrieving the part number information is simply one of looking up all the record numbers stored in the list. One other note. The file can contain up to 9,999 parts, so it will be convenient to keep track of how many records there are in our list. To do that, the following kind of list will be used:

```
element 1: number af items in the list
element 2: first item recard number
element 3: secand item recard number
   .
   .
   .
   .
element    (number af items+ 1):last item recard
             number
```

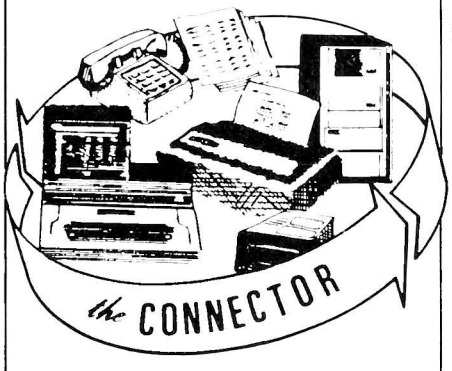
Since all the record numbers are less than 10000, we can easily use an integer array to store them and the count. Also convenient is the fact that all arrays in Business Basic begin with element 0, a handy place to store the number of items. The next thing required is a place to store the information permanently so that it can be used by the main program and others (such as the little list program above). This could be done with a separate file on the disk, but it is much safer and more convenient to store the information in the main data file itself.

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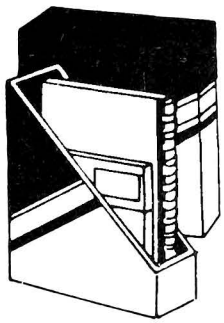
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Among other things, it is much easier to keep track of where the information is if it is all physically together. With that in mind, let's pick record 20000 to park the list. This is clearly out of the way of our regular data, and, because very little extra space is taken up, it doesn't hurt anything.

So much for the philosophy. The following additional program lines will accomplish the task. First set up the array for the list:

```
4    DIM flist%(1000):maxrecord%=1000
```

The variable *maxrecord%* will serve as a check not to exceed 1,000 part numbers. Since Business Basic permits very large arrays, this could just as easily be 9,999 as long as the *dim* statement and the *maxrecord%* variable agree.

Next, we need to retrieve the list when the file is initially referenced by the program. To allow us to change this easily, a subroutine will be used:

```
427  GOSUB 2500
2500 ON EOF#1 GOTO 2570
2505 READ#1,20000
2510 IF TYP(1)<>2 THEN flist%(0)=
       0:WRITE#1;flist%(0):RETURN
2515 READ#1;flist%(0)
2520 IF flist%(0)=0 THEN RETURN
2530 FOR i=1 TO flist%(0)
2540  READ#1;flist (i)
2550  NEXT i
2560 RETURN
2570 flist (0)=0:WRITE#1,20000;flist%(0):RETURN
```

First an *on eof* statement is used in connection with the *read* statement in line 2505 to take care of the case where the file is newly created. In that circumstance record 20000 will be past the end of file and statement 2570 will set up the list count in *flist%*(0) and write that into the file. If record 20000 exists, a check is made to be sure the data is of the correct type (and initialized if not). If everything is okay, the list count is read in and then a for-next loop loads the remaining data. Note that this is much more efficient than reading or writing all 1,000 values each time.

Next we need to add the list option to our menu of things we can do with existing files. Fortunately, the way the program is set up makes that simple to accomplish. The following changes add the new option:

```
452  PRINT" 4 ta list the parts in yaur ports
       file":PRINT
475  ON a GOSUB 500,700,800,1100
```

The list option requires a new subroutine to read the list array and print the list to the screen:

```
1100 HOME
1110 PRINT:PRINT"List of current ports for ports
       file: ";file$
1120 PRINT
1130 IF flist%(0)=0 THEN PRINT"Na parts on
       file":GOSUB 995:RETURN
1135 PRINT"Partnumber","Descriptian","Lacatian",
       "Quantity":PRINT
1140 FOR i=1 TO flist%(0)
1150  rec=flist%(i)
1160  GOSUB 1800
1170  If errorcade = 0 THEN PRINT
       partnum$,desc$,lacatian$,quantity$
1180  NEXT i
1190 PRINT:INPUT"End of list, press RETURN ta
       cantinue: ";a$
1200 RETURN
```

After checking to see if the list was empty, the program prints the heading and scans the list array. We can use the subroutine at 1800 to retrieve the record and set up the variables. That subroutine also checks for deleted records and line 1170 uses the errorcode variable to check for that. Note that we could have opened a secondary file here to redirect the list to another device if desired.

The next changes just clean up some sloppy programming from before. See that? There is no such thing as a perfect program (or a perfect programmer). These changes just recognize the fact that our part numbers were supposed to be four-digit numbers, yet we allowed any part number up to 32767. That was fine before we decided to put the part number list at record 20000. The changes are as follows:

```
530  IF a<1 OR a>9999 OR INT(a)<>a THEN
       500
720  IF a<1 OR a>9999 THEN 700
820  IF a<1 OR a>9999 OR INT(a)<>a THEN
       800
```

The next change is to add to the list each time a record is added to the file. This involves updating the list count and storing the new part number in the next available list position. Since adds are done in the subroutine at line 2000, the changes are simple:

```
2006 If flist%(0)=maxrecard% THEN
       errarcade=-1:PRINT"Ports file
       full":RETURN
2025 flist%(0)=flist%(0)+1:flist%
       (flist%(0))=rec
```

First, line 2006 checks to be sure that the list count will not be exceeded by adding this record. If everything is okay, line 2025 updates the list count and uses it as the index to store the new part number (record number).

The last task is to write out the updated list as a part of ending the program. This must also be done when switching to a new file. The changes are as follows:

```
470  IF a=9 ar a$="" THEN GOSUB 2600:
       RETURN
1005 GOSUB 2600
```

The subroutine at 2600 does just the reverse of the one at 2500; that is, it writes the list back into the file starting at record 20000:

```
2600 IF file$="" THEN
       RETURN:ELSE:WRITE#1,20000;flist%(0)
2610 IF flist%(0)=0 THEN RETURN
2615 FOR i=1 TO flist%(0)
2620  WRITE#1;flist%(i)
2625  NEXT i
2630 RETURN
```

Notice that we use the fact that *file$* is assigned the name of the file after opening to determine if the modify section of the program was used. If the string is empty (null), then there is no open file to which to write.

All that seems like a tremendous number of program changes, but the results are well worth it. You can now find out what's in the file at any time, and the listing speed is essentially independent of the way the data is arranged in the file. Furthermore, this permits us to do some really interesting things later.

The type of data structure used here is commonly referred to as a "variable length list." Here *variable* is used in the sense of *changeable*. This is an extremely useful and widely used structure. One example in front of you at the moment is the Business Basic string variable. See your Basic manual for details of how the length of a string is stored.

Indexing and Sorting. Now that we've made all these fun changes, try running the program on a new file. Try adding the following part numbers in this order: 5, 35, 200, 100, 50. Now when you use the list option, you'll notice that the part numbers appear in the order in which they were entered. The previous example of a separate list program always listed the parts in part number order, since it scanned the file sequentially from the beginning. Ordering of lists according to the sequence in which they were entered into the file is called *chronological* order. Ordering the list in any other way is generally referred to as *sorted* order.

Clearly, if the array *flist%* was arranged in numeric order, we could use the subroutine at 1100 to list the contents of the file out in that order. That's because the values in *flist%* are used as indexes into the larger file itself. It is the value assigned to the variable *rec* in line 1150 that determines which record is read and listed. Unfortunately, sorting the information in *flist%* would destroy the chronological order, and that might be a useful way to list the data as well. This implies that we should create some additional arrays to hold sorted versions of the *flist%* array. These arrays are sometimes called sorted indexes. In fact, it may occur to you that several of these sorted indexes could be stored simultaneously in the file. Similar kinds of multikey indexing are used in sophisticated database management systems.

Wow! That's a lot of definitions of esoteric computer topics. In fact, there is enough implied in the preceding paragraph to be the meat for several articles. We'll look at a simple example and then I suggest you slide over to your local library for a book on database techniques for the real details.

First, let's change the list routine to provide some sort options:

```
1102 PRINT"Type:"
1103 PRINT" 1 far chranological arder"
1104 PRINT" 2 far port number arder":PRINT
1105 INPUT"Yaur selection: ";a$
```

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```
1106 sortorder=VAL(o$):IF sortorder <>1 AND
       sortorder<>2 THEN GOTO 1100
1107 GOSUB 1300
1140 FOR i=1 TO slist%(0)
1150  rec=slist%(i)
```

The changes from 1102 to 1107 set up the choice and gosub to 1300 to perform the actual sort. Lines 1140 and 1150 change the list index to a new array, *slist%*, which has the same structure as *flist%*. This allows changing the order without changing the actual contents of *flist%*. This also means a change to line 4:

```
4    DIM flist%(1000),slist%
       (1000):moxrecord%=1000
```

Isn't having all that memory nice?

Next, let's cook up a subroutine which will sort the *flist%* array and create an *slist%* array with the contents in ascending order:

```
1300 IF flist%(0)=0 THEN RETURN
1305 slist%(0)=flist%(0)
1310 FOR i=1 TO flist%(0)
1315  slist%(i)=flist%(i)
1320  NEXT i
1325 IF sortorder=1 THEN RETURN
1330 length%=slist%(0)
1332 IF length%=1 THEN RETURN
1335 FOR poss=1 TO length%:modeoswop%=0
1340  FOR position=1 TO length%-poss
1345   IF slist%(position)>slist%
         (position+1) THEN SWAP
         slist%(position),
         slist%(position+1):madeoswop%=1
1350   NEXT position
1355  IF madeoswop%=0 THEN RETURN
1360  NEXT poss
1365 RETURN
```

Several things are of note here. First, if there is anything in the *flist%* array, it is copied to *slist%*. If chronological order is desired, we're finished. If not, the contents of *slist%*, but not the list count, *slist%(0)*, must be sorted in order. For simplicity, we use a version of the classic bubble sort, with a new wrinkle. Business Basic has a new statement named *swap* that comes in very handy in sorting situations, among others. It will exchange the values of any two variables of the same type. This includes, as this example points out, elements of arrays. Normally this exchange is handled by assigning one variable to a temporary variable, as in the following example:

```
1345 IF slist%(position)>slist%(position+1) THEN
       temp%=slist%(position):
       slist%(position)=slist%(position+):
       slist%(position+1)=temp%:
       modeaswop%=1
```

In addition to being ugly, this version performs significantly slower than the version using *swap*, since *swap* is done internally by Basic in assembly language.

Try putting this routine into your program. For small lists it will perform very well. For larger lists, there are far better sort techniques. Later in this series I will try to do an article on different sort techniques. Most microcomputer references on sorting tend to try to minimize memory utilization, which usually hurts performance. Since you lucky Apple III owners have fewer problems in that area, the classic techniques have to be looked at differently.

It might also occur to you that it is possible to sort on items other than the part number. A good experiment for you might be to change the sort subroutine so that the *slist%* array was used to read in records to build a string array from the values of *description$*. When you sort the string array, you could swap the *slist%* elements in correspondence to the way you swap the string array elements. Then listing from *slist%* would produce a list in description order. This is referred to as a *pointer* sort.

Another interesting change would be to use record 0 of the data file as a place to store the record number where *flist%* begins. Right now, that is hardcoded at record 20,000, but for a lot of reasons, it might need to be changed later. Writing it into the file and reading it back at open time would make the program much more flexible. Also, if you decided later to keep multiple indexes for different elements, you could store all their addresses there (or maybe just the address to the addresses!). Another thing hardcoded into this program is the record format, including not only the number of elements, but their names, types, and ranges of values allowed. Real database

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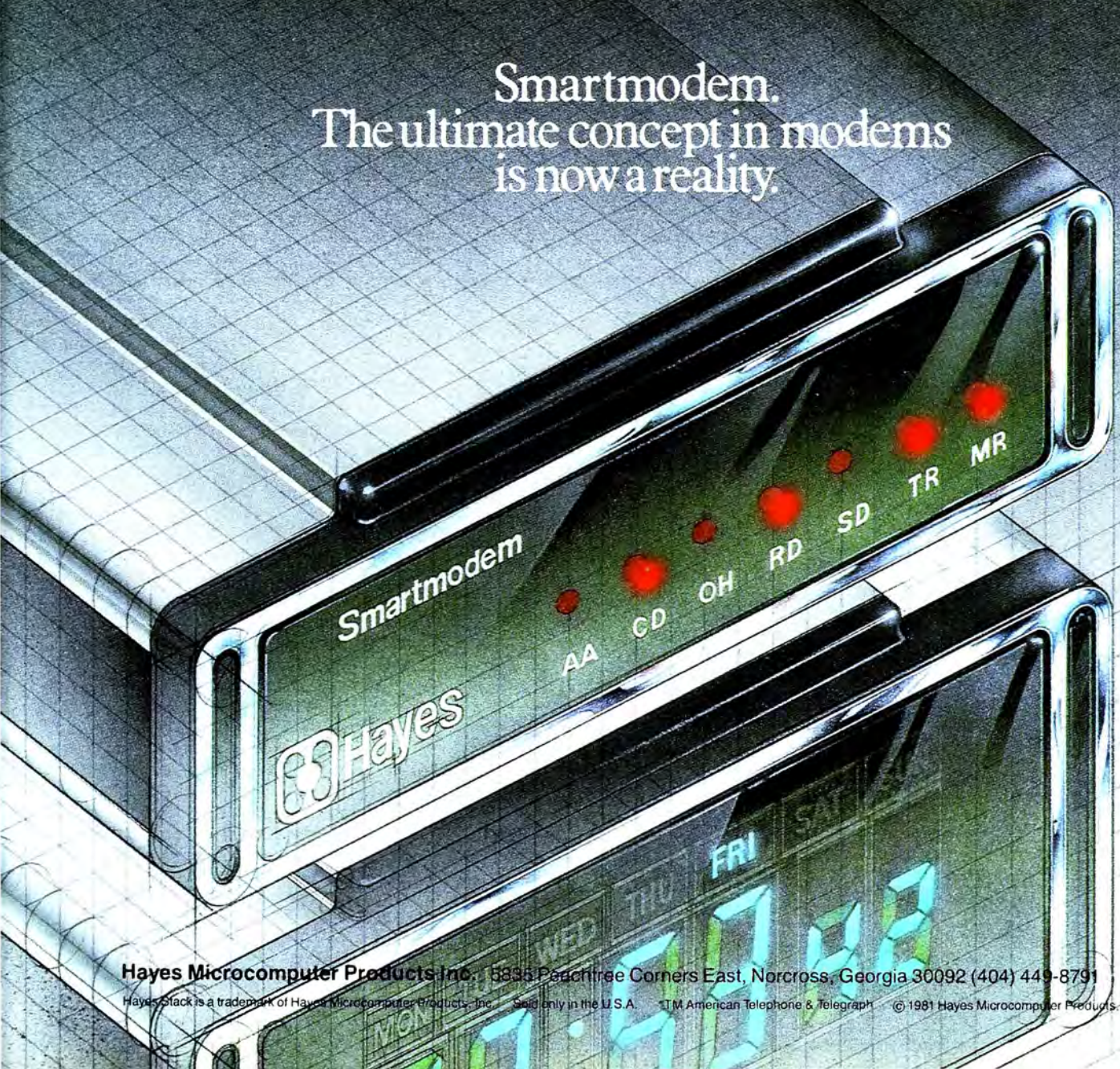
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programs maintain this information in the file as well, permitting the user to define many different data bases with the same program. You might think about how our program would be modified to do that as well.

The preceding paragraph contains enough challenges to last you as long as you want. Just remember that Business Basic has the power and capability to allow you to be as sophisticated as you wish in managing file data. Good luck!

The New Goodies. Version 1.1 of Business Basic is now available and it's neat! Obviously, it clears up some nasty little problems from the first version, and the manual is now a completely revised (and two-volume) reference guide that you'll really enjoy. But that's only the beginning. Several new capabilities have been added in response to user requests and some pretty good thinking on the part of the Apple engineering staff. They are summarized below, but drop in on your local dealer to get the real scoop. The postscript is pretty good, too. It's free to all current purchasers of Basic, no matter how long ago you bought your old version!

New language additions. There are two new reserved words, *indent* and *outrec*. *Indent* sets the level of indentation for the for-next loops (default is three) and *outrec* sets the record length Basic uses to format listings. Ever have a long line in a Basic program that got overprinted on your eighty-column printer? *Outrec* is initially set to 80 but can have any value to 255. Zero causes listings to work as in the old version. The neat feature is that when the printed output reaches the *outrec* value, Basic automatically inserts a carriage return and spaces over to line the next part up with the indentation level of the previous line. No more screwing up those pretty indented listings with long lines! This works with any output file you specify.

An enhancement has been made to the *get* statement as well. You are now allowed to use *get#* to get a single character from any file. This includes disk data files, text files, and character devices. I can't begin to tell you all the possibilities this presents, but it should keep you busy for a while.

New Invokable Modules. The design of the Basic invoke mechanism allows the language to be extended almost infinitely. Since the invokable routines are accessed by name and are available from immediate execution mode as well as deferred, its really like adding commands to the language. With all the memory available in the Apple III, you can keep lots of these routines around, or, if you need the space for data, you can invoke just the ones you need at a particular time. The new release of Business Basic contains some really powerful invokables. Hang on to *.console*, here they come!

For the development programmer, the most significant module is probably *Renumber/merge*. There's too much available in this one to go into detail but for those of you who have been frustrated by wanting to add that one extra line into a program and having no place to put it, take heart. *Renumber* will renumber your program in memory and save it on disk automatically or renumber a program stored on the disk and place it in memory for you. In addition, it enables the merging of programs on disk with programs in memory. This means you can save important subroutines and have them automatically added to the program you are currently working on. Because it is an invokable module, it won't take up any memory unless you want it (obviously there is little need, and less desire, to renumber a program while it is running).

The next biggie is the *request* module. Remember all those wonderful things we keep saying about SOS? *Request* allows a Basic program to make calls to the operating system directly. You can read or write up to 64K bytes in one statement to any file on the system (including text and data files, *.console*, and so on). Numeric arrays can be stored about twenty times faster than with regular for-next loops! In addition, *request* allows the Basic programmer to get device status directly and to use the SOS *setcontrol* mechanism. More details on this superpowerful module are in the documentation.

The last goodie is an invokable which allows you to *download* character sets directly to the RAM-based character generator. After setting up the character definition in an array, one *perform* statement passes it to the operating system as the new character set. The Business Basic disk contains several sample character sets, and you can have fun inventing your own. This also allows you to create animation, by properly defining special characters, ala the *DOS Tool Kit Animatrix* program. I'm sure some clever programmers will design a really nice program to use this invokable for character set design.

Closing Thoughts. Whew! Glancing up at the prompt line of my *Applewriter III* display, I see that I'm up to 26,590 characters in this article! Your tired eyes and my tired fingers both need a rest. Next time, we'll have a mixed bag of things to enjoy, including some comments on the powerful formatting capabilities of Business Basic; and I'll reveal a secret that I hope you all get in on. That secret is the answer to the question, "How many bytes of memory are available for programs in a 256K Apple III?" Until then, have a happy holiday season!

P.S. As you probably noticed in the paragraph above, there's more than Basic that's changed about the new Apple III!

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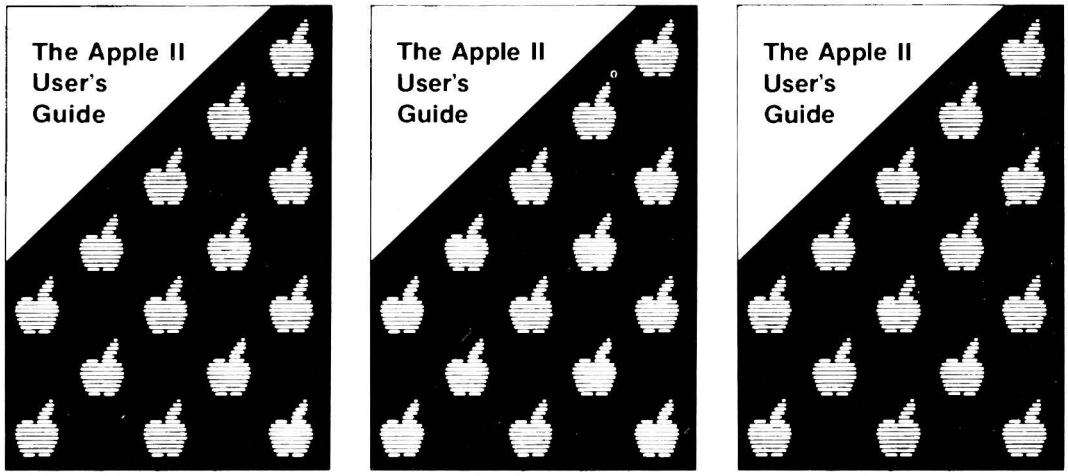
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The Apple II User's Guide by Lon Poole, Martin McNiff, and Steven Cook #46-2, $15 ☐

This Guide is the key to unlocking the full power of your Apple II or Apple II plus computer. The Apple II User's Guide brings together in one place a wealth of information for Apple computer users. It will tell you more about your Apple than any other single source.

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NEWSPEAK



☐ **To Brighten the Fame.** Next fall, one hundred randomly chosen households in Ridgewood, New Jersey, will participate in a field experiment involving Videotex, a home information system. Working together, CBS and AT&T will install terminals in homes of this affluent Jersey neighborhood to ascertain the market potential for home information systems.

Participants in the experiment will have access to large computers via phone lines. In addition to having news and featurelike programs, the system will allow two-way communication between people who have Videotex. Communication with local institutions will be a handy feature, allowing participants to handle banking transactions without leaving the comfort of their home.

According to Jim Bauer, director of business development at CBS, the terminals, equipped with an alphanumeric keyboard, will be from Western Electric and "fairly dumb." Participants will not be able to store the information they get out of the system.

Harry E. Smith, vice-president of technology at CBS, wants to find out what the consumer demand for such a system might be. "The technology involved is proven; now we need to test the human factor. The public at large may not like the technology. Is there a market in the general public or will only a certain percentage of people go for this?" Smith believes that the same people who would buy an Apple computer are potential customers for Videotex, but whether the nonscientific computer illiterate will is what the study is trying to determine.

The joint Videotex experiment will start in one hundred homes around October of next year and last for three months. After the end of the year, the units will be placed in a different one hundred homes in the area for another three months, resulting in two hundred participants altogether. The nature of the agreement between CBS and AT&T is pretty clear cut. The former has control over the content of Videotex and the latter handles the software and installation of the terminals, along with providing the necessary phone lines.

Both CBS and AT&T are optimistic about the potential of the Videotex system, predicting spectacular developments if the concept catches on. Smith can't enumerate all the system will eventually be able to offer, but he made clear that permission will be obtained for the use of all copyrighted material.

Why Ridgewood, New Jersey? Officials of both companies wanted the experiment close to home base—AT&T's technical facilities—as well as to a large metropolitan area. Smith further notes that Ridgewood is a good community for testing Videotex because the population is representative of people who might want (and can afford) a home information system. The lucky participants will be culled from this unsuspecting town with the idea of providing a cross section of the potential market for Videotex.

☐ It's hard to imagine anything easier to use than a simple light switch. Our ancestors had to light fires, put oil in lamps, make candles, and even do without light in their dwellings, depending on the epoch and place. Now we can eschew the knuckle-bending task of flipping the light switch on and off every time we enter and leave a room.

Kesser Electronics of Totowa, New Jersey, offers an energy-saving device that utilizes ultrasonic soundwaves to determine when someone is in a room. Filling a room with high-frequency inaudible sound waves, the KESS (kilowatt energy saving system) waits for the sound field to be broken by a moving person and then automatically turns on anything connected to it. According to Marilyn Misheli, director of sales at Kesser, the system is mainly designed for lighting but can effectively control anything that is switchable.

Although not available to home owners for a few months, the KESS will allow you to hook up your television set, stereo, microcomputer, or just about anything else that plugs into a wall socket. When you entered the front door, the lights would go on, the stereo would launch into the evening pops concert, and the Apple would boot *Beer Run*.

Some of the obvious disadvantages of this system have been thought of in advance. A sensitivity adjustment will keep the cat from turning on the lights every time it moves from the easy chair to the comfortable spot underneath the coffee table. You can also work in a room next to one that has a KESS and not have to shut the door to keep the lights from turning on.

Misheli believes that the KESS will become a part of many homes, but it will be treated as a luxury item, rather than as an essential money-saving device. Where it performs the most good is in businesses, particularly large ones. "Recent studies indicate that employees in large companies may be absent from their work stations fifty percent of the workday," explains Misheli. Typewriters and computers would be hooked up into the system, making absentmindedness a thing of the past.

Misheli goes on to cite the successful case of Mid Atlantic Bank. The initial investment for a KESS was not cheap, but in six months the system had paid for itself. Looking now at 55 percent savings every year on their electric bill, Mid Atlantic seems to have made a pretty good deal.

The KESS can also be a nifty deterrent against burglary and other home-related crimes. Only a thief with steel nerves would stick around if the lights suddenly went on and there was nobody else in the room.

In two or three months, when the KESS reaches the home market, it will cost somewhere between fifty and seventy-five dollars. It should help out the energy minded consumer and help make for a lot of nervous criminals. ❑■

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1-THE HOUSE OF USHER- Haunted house type adventure game with scrolling in the Atari version. Wander the creepy hallways of the three story castle based on Edgar Allen Poe's short story of the same name. Written in graphics, of course, with animation and sound. We have introduced a new mystery for another $100 prize. $29.95/1 disk

2-FANTASYLAND 2041 A.D.- The largest disk based adventure game in the world (that we know of). Enter the Hall of Heroes and prepare yourself for the greatest fantasy-role-playing game you will see for years to come. To win you must survive Congoland, Arabia, King Arthur, Captain Nemo, Olympus (a sea voyage), and Dante's Inferno (Hell itself). In both the Atari and Apple versions it takes up more than 400,000 bytes of memory and uses more than 400 hires screens. The winner of the contest described in the manual with this game will receive $1000.00 and a bronze trophy. We have pushed the award date forward to February 1982 to allow more people to participate in the contest. $59.95/6 disks

3-GLAMIS CASTLE- Yes, Pat and I are on our way to Britain to stay in the dreaded Glamis Castle. If we survive our real life adventure, we'll be measuring it and will be able to provide you with a 3-D game based on this ancient haunted site where King Duncan met his end at the hands of Macbeth. Our good friend, Mark Benioff, after much research, said there's a mystery room that has never been found in this castle and a half beast, half-man creature that guards a treasure therein. Our stay will be covered by the British media and we hope to share our experience with you through the writing of this game. $49.95/2 disks

4-BENEATH THE PYRAMIDS- You are an archaeologist in 1932 and must find your way through the perilous chambers beneath the pyramids to discover a golden statue of the cat goddess Bast. This game is in hires graphics, includes sound, your little man actually moves through the corridors which you can see on the screen. The monsters are animated and very agressive. There is a new $100 prize for the first to solve the mystery; which is a toughie! $29.95/1 disk

★★★ SPACE GAMES ★★★

5-GALACTIC QUEST- An excellent combination of Star Trek and Space Trader. Battle the animated Vegan fighters as you warp from galaxy to galaxy. At the same time, you may land on and trade with hundreds of planets. Super hires graphics and lots of sound. This has been one of our most popular games. $29.95/1 disk

6-SANDS OF MARS- Take an exciting voyage to the planet Mars via the Starship Herman. This game compared to the rest, is second only to Fantasyland 2041 A.D. It includes scrolling on the Atari and hundreds of full screen graphics. You can move your little man through the terrain of Mars; if, of course, you survive the exciting journey to Mars, which occupies the whole first disk. There is a new mystery and another $100 prize just waiting for some clever adventurer out there. Good luck! $39.95/2 disks

★★★ WAR GAMES ★★★

7-WORLD WAR III- You Atari gamers will have to see this in the Atari version to believe it! If your tired of war games which take 15 minutes a move and have a manual the size of a telephone book; but still want a complex, real-time action war game-this is it! It is designed for two arm-chair generals which may manuever up to 128 seperate type of units at a time. The game displays a map of Iran & Iraq in the first scenario and later on you will find yourself moving nuclear submarines and battleships through two world wars. This is not a boring copy of a board based game but an original war game which takes a lot of skill and may take weeks to play. $29.95/1 disk

8-WATERLOO II- If you had been Napolean would you have done a few things differently? Well as you approach this final battle you are equipped with the same forces, face the same opposition, and survey the same terrain which he did. We have done a great deal of research to make this historically accurate as well as extremely complex. Even the angle of sight, fatigue of the individual soldier, and his psychological profile are included in the calculations. Oh by the way, your opposition is no slouch. You may find it more difficult to change the course of history than you think! $49.95/2 disks

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10-LITTLE CRYSTAL- The first of our line of education software, which will be completed by December. It includes a very fine version of Hangman, Mr. Music; which transforms the computer into a piano, Gunk-a hilarious shoot-em up game, and Storytime- an anthology of bedtime stories featuring Herman, the cat, Oscar, the Hamster, and of course, Little Crystal. $39.95

11-IMPERIAL WALKER- A fine game pack written by our Atari programmer, Michael (graphics) Potter. Includes the Walker animation which is superb, Gunfight, and Lasar Nim, a game of 'how many robots'. $29.95

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Since *Softalk*'s first Holiday Gift Guide last December, the Apple product market seems to have exploded. We saw that as even more reason to offer you a guide this year; your fingers may have farther to walk this year, but the rest of you can stay as comfortable as ever. And the end results, the packages that stuff those stockings, will come from a pool of goodies more various and unique than ever before.

Once again, we asked software publishers and hardware manufacturers of products for the Apple to send us short descriptions of products they think Apple owners might like for Christmas. *Softalk* has not tried all these products, and we leave it to our readers to determine their applicability and worth for gift-giving needs.

A few generalizations: where memory required is not specified, assume you need 48K; where language is not specified, assume you need Applesoft; where no operating system is specified, assume DOS 3.3 and one disk drive. A requirement for ROM Applesoft can be filled by RAM Applesoft laoded into a language card.

Finally, if you cannot obtain a product from your dealer, or the place you live is not conveniently served by a dealership, check to see if the manufacturer or publisher is a *Softalk* advertiser, in which case you can probably learn how to reach them from the ad, or consider trying one of the mail-order services who advertise in *Softalk*. If all else fails, call *Softalk*, and we'll try to find the lost company for you.

Good shopping and have a very happy holiday!

The Currier and Ives print "Eorly Winter" first published in 1869. Dithertized by Computer Stations Dithertizer II system by Gary Hatfield and hand-colored by Martin Cannon

Games

Accent Software, Palo Alto, CA

☐ *Loophole.* Evade enemy. Hi-res and color with sound effects and bullets. Fast action game for two. Each game is different. Interrupted only by screams and laughter. Paddles or keyboard. Either DOS. $29.95.

Apple Computer, Cupertino, CA

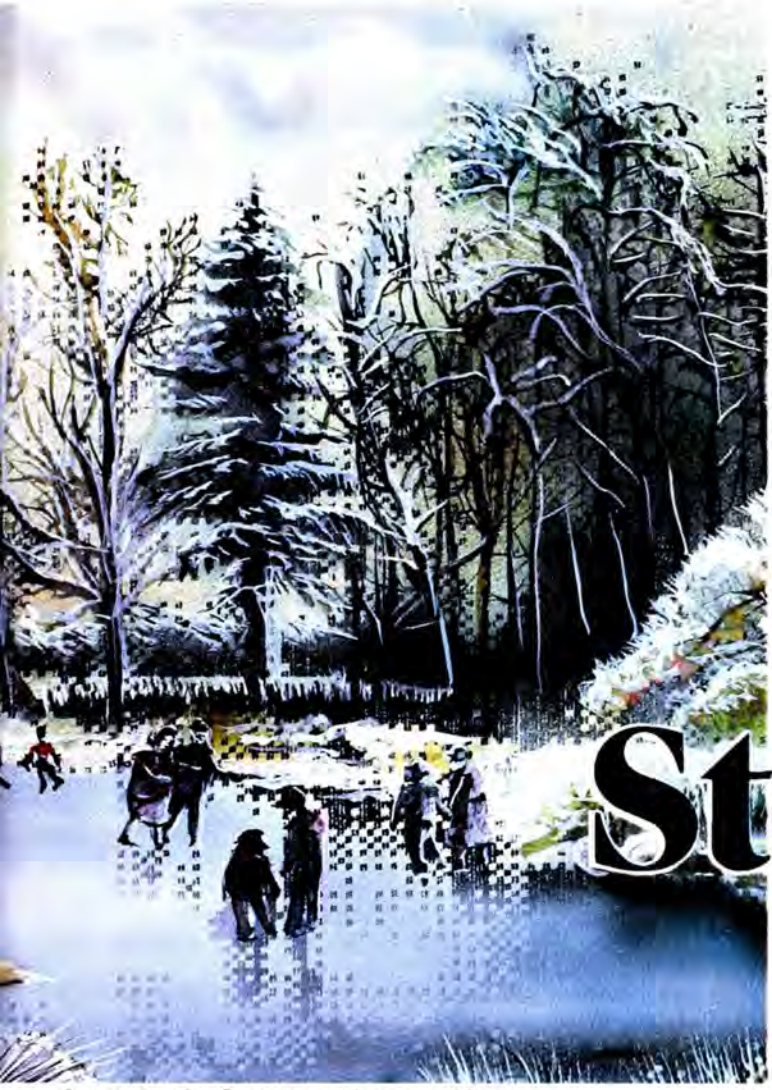
☐ *Apple Stellar Invaders.* You're being bombarded! Evasive maneuvers and laser-sharp shooting are your only self-defense. Either DOS. $25.

☐ *Apple Adventure.* You're lost in a huge cavern, with an open chasm on one side and a fire-breathing dragon on the other. An exciting puzzler to challenge your perseverance and intuitive abilities. DOS 3.2. $35.

Applied Information Dynamics, San Francisco, CA

☐ *Colorblind* by B. Johnston and A. Iapicca. A two-player, sea battle game. Uses color filter goggles to hide opponent until in line-of-sight. A great action/strategy game. Game paddles. $34.95.

☐ *Santa's Sleighride* by B. Johnston and A. Iapicca. Ride with Santa and Rudolf and drop packages into chimneys for points while avoiding the Grinch, satellites, and birds. $29.95.



Stocking Stuffers

A Holiday Gift Guide

Avant-Garde Creations, Eugene, OR

☐ *Chambers of Xenobia* by Steven Sacks. Hi-res adventure with action sounds. Find the treasures and take them back to the right place. Either DOS. $15.95.

☐ *5 Great Games. Animal Bingo, Jungle Safari, Space Defense, Sky Watch, Air Traffic Controller.* All hi-res with sounds. A super value for hours of fun. Either DOS. $29.95.

☐ *5 More Great Games. Deep Sea Treasure, Mystery Code, Depth Charge, The Mine Fields of Normalcy, Turn 'Em Loose.* Hi-res with sounds. Bring up treasures, avoid torpedoes, find the code, and arrange the symbols while avoiding tornadoes. Either DOS. $29.95.

☐ *The Sex Disk.* See to believe. Includes several hi-res games designed to open up your thinking about issues related to sexuality. Either DOS. $15.95.

☐ *Air Traffic Controller.* Control all of the airport's traffic. Guide landings, stop hijackings, avoid UFOs. Variations include: Landing Centered, Collision-Prevention, Multiple Controllers, Regular ATC, and Genocidal Maniac. Either DOS. $12.95.

☐ *Race for Midnight* by Steven Sacks. Hi-res adventure with action sounds and the fastest color-fill routines in existence. You suspect you're a werewolf and your only hope is to find the antidote before the full moon rises. Either DOS. $29.95.

☐ *Hi-Res Computer Golf* by Stuart Aronoff. Amazing dynamic club-swing control, five 18-hole courses, multi-screen fairways, obstacles, contoured greens, no green fees, no waiting, hi-res color, machine language sounds. Better than the real thing. Either DOS. $29.95.

Beagle Bros., San Diego, CA

☐ *Game Packs #1, 2, 3 & 4* by Bert Kersey. Three excellent games per disk. Listable, so you can see how they work. With free Apple Tip Book and Command Chart. Superb Apple learning tools. 32K. $24.

Broderbund, San Rafael, CA

☐ *The Broderbund Arcade Machine* by Chris Jochumson and Doug Carlston. Each time you use the *Broderbund Arcade Machine,* you will generate a new, copy-protected disk containing an arcade of your own design. No knowledge of programming necessary. $44.95.

☐ *David's Midnight Magic* by David Snider. Hi-res pinball at its best. Dual flipper controls, upper and lower playing levels, tilt mechanism, rollovers, multiple ball play, electronic deflectors, and many special effects. $34.95.

☐ *Track Attack* by Chris Jochumson. Fast cars and fast trains make this gold heist arcade game hard to beat. To steal gold on the train while avoiding other cars you need great timing and good peripheral vision. $29.95.

☐ *Red Alert* by Olaf Lubeck. Hiding behind a thin red shield, you must protect your base and supplies from deadly alien menace by using your radar, ack-ack, and remote fire. Joystick controlled. $29.95.

☐ *Genetic Drift* by Scott Schram. This finger-pounding arcade game requires you to mutate hostile aliens into a benign life form even as they attack from all sides. But watch it. One slip and the friendly ones become deadly once again. $29.95.

☐ *Apple Panic* by Ben Serki. Ladders take you from level to level in this hi-res, fast action Japanese import. Dig holes in the bricks to catch a medley of monsters chasing you about. For all ages. $29.95.

☐ *Space Warrior* by Marc Goodman. You are the space warrior, attacked on all sides by multicolored waves of drone ram ships. You must destroy them all before they pierce your shields and smash you to bits. 32K. $24.95.

☐ *Alien Rain* by Tony Suzuki. In brilliantly colored array, the alien swoops down from all sides in dazzlingly swift attacks to do battle upon the lone defender. Keyboard or joystick controlled. $24.95.

☐ *Alien Typhoon* by Tony Suzuki. For fanatics only. Twice as many, twice as fast, and twice as tricky as *Alien Rain.* Keyboard or paddle controlled. $24.95.

☐ *Tawala's Last Redoubt* by Doug Carlston. The fourth episode of the *Galactic Saga.* Join the local rebel leader, Benthi, in the final assault on the cruel Emperor Tawala. $29.95.

☐ *Galactic Empire* by Doug Carlston. The first episode in the

Galactic Saga. A classic strategy game of military planning and logistics, played out in real-time hi-res with optional sound effects. $24.95.

☐ *Galactic Trader* by Doug Carlston. The second episode in the *Galactic Saga.* Your objective is to make a fortune by trading commodities throughout the galaxy, seeking out their places of origin to buy them cheaply, then bartering for goods in far-away worlds. $24.95.

☐ *Galactic Revolution* by Doug Carlston. Third episode of the *Galactic Saga.* Strategy game for 1-3 players. Ignite or suppress the impending revolution by swaying the allegiances of various power groups throughout the galaxy. $24.95.

BudgeCo, Piedmont, CA

☐ *Raster Blaster* by Bill Budge. Detailed simulation of pinball, with full color hi-res graphics, animation, and sound effects. $29.95.

California Pacific, Davis, CA

☐ *Ultima,* by Lord British. The next generation in hi-res adventure, fantasy role-playing games. Superb color graphics. Span time itself as your player evolves from medieval castles and dungeons to space war in future galaxies. $39.95.

☐ *Akalabeth—World of Doome,* by Lord British. An advanced fantasy role-playing game featuring infinite dungeon levels, imaginative monsters, and true perspective dungeon views. Dost thou wish to be knighted? $34.95.

☐ *Bill Budge's Space Album,* by Bill Budge. Four hi-res space arcade games from the famous Bill Budge's action programs, using 3-D animation techniques. $39.95.

Cavalier Computer, Del Mar, CA

☐ *Bug Attack* is an exciting arcade action game involving ants, millipedes, and malicious medfly invasions. The player defends his three gardens against attacking arthropods. Animated with smooth hi-res color and spectacular sounds. Includes special challenges for expert debuggers. $29.95.

☐ *Asteroid Field* brings arcade action to the Apple. The player must avoid the moving asteroids with thrusters and destroy them with torpedoes. Alien spacecraft may enter, seeking destruction of the ship and its mission. Offers two levels of play and five game-control options for paddles or keyboard. $24.95.

☐ *Star Thief* is a game where two players can work co-operatively or one can work alone to protect a supply of fuel pods from alien spacecraft that attempt to steal the valuable pods. Has one or two player options, and a unique training mission mode. Full color hi-res graphics and sound effects. $29.95.

CE Software, Des Moines, IA

☐ *Mission Escape!* by Jim Jacobson. An exciting hi-res action game. You must fight your way through ten rooms filled with deadly imperial stormtroopers, robots, and drones. $24.95.

☐ *Wall Street* by Donald Brown. Up to nine players buy and sell stocks in a hyperkinetic stock exchange. Not recommended for the faint of heart. $24.95.

☐ *SwordThrust #1: The King's Testing Ground* by Donald Brown. Your character's life begins. You'll find stores with the equipment you'll need as an adventurer, as well as a novice cavern to test your skills. $29.95.

☐ *SwordThrust #2: The Vampyre Caves* by Donald Brown. Your foe is the Prince of the Undead himself. You'll need every edge you can get to escape with body and soul intact. *Sword-Thrust #1* required. $24.95.

☐ *SwordThrust #3: Kidnapper's Cove* by Donald Brown. You've been hired to rescue a sick child from a gang of vicious kidnappers. Time is short, and half of your gold is at stake. *SwordThrust #1* required. $24.95.

☐ *SwordThrust #4: The Case of the Sultan's Pearl* by Donald Brown. A guard is dead, and the pearl that controls the sultanship is gone. Can you figure out whodunit . . . in time? *SwordThrust #1* required. $24.95.

☐ *SwordThrust #5: The Green Plague* by Donald Brown. The scourge of the Middle Ages—plague—is back. You must find the cure, or perish along with thousands of others throughout the kingdom. *SwordThrust #1* required. $24.95.

Compugraphics Software, St. Louis, MO

☐ *Sight 'n Sound.* Music/sound from a stereo or cassette player is synchronized with a light show of the user's design on the hi-res screen. Demos include laser design, kaleidoscope, EKG, and guitar player. No hardware modifications. $24.95.

Computek, Canyon Country, CA

☐ Very relaxing yet challenging games of *Solitaire,* by Art Carpet, each in hi-res graphics. Realistic card movement, single-key input for fast play and game response. If you enjoy card games, this is a must. Look for the Queen of Hearts on the package. $29.95.

Computer Products International, New Orleans, LA

☐ *Whatzee.* Up to eight players; like Yahtzee. Has the ability through special coding to access adult games. *Pohtzee,* for gamblers. *Fuhnzee,* adult party game. *Erotzee,* for liberal adults only. Lots of sound and graphics. Game paddles. $39.95.

Continental Software, Culver City, CA

☐ *3-D Skiing,* by Jeffrey Stanton. *3-D Skiing* is an arcade game where one maneuvers a slalom skiier down a three-dimensional course. The object is to run the staggered gates, which advance toward you as you ski, in the fastest time. A second game, ski-jumping, where 1 to 4 players compete on a 70-meter jump, is included. $24.95.

Cross Educational Software, Ruston, LA

☐ *Dinosaurs.* Five hi-res graphics games and educational programs including a dinosaur fight and fast action hangman; plus paddle graphics. $15.

☐ *Blitzkrieg II.* A fast hi-res war between you and the bombers. Shoot down the airplanes before they blast your gun! 32K. $15.

Dakin5, Denver, CO

☐ *Dragon Fire.* Fantasy adventure. Player must slay dragon Salmadon to acquire wealth. Short story, sound effects, ten levels of difficulty. Good for beginners. $49.95. *Dragon Fire* and *Kaves of Karkhan* together $59.95.

☐ *Kaves of Karkhan.* Sequel to *Dragon Fire.* Lead adventurers through dangerous caverns. For advanced gamers. Hi-res, color graphics, 3D animation. $49.95. *Kaves of Karkhan* and *Dragon Fire* together $59.95.

☐ *Rings of Saturn*—arcade. Player pilots rescue ship through ice chunks and enemy vessels. Four skill levels, 3D animation, hi-res, color graphics, sound effects. Paddles or joystick control. $39.95.

☐ *Alkemstone.* Find the missing Alkemstone and receive $5,000 from Level-10. Clues appear throughout adventure. Hi-res, color graphics, 3D animation, complete with illustrated short story. $39.95.

☐ *Neutrons*—arcade. Stabilize the neutrons in this game which combines bumper pool with pinball. Score as many points as possible and split the neutron. Hi-res, color graphics, 3D animation, and sound effects. $29.95.

Double Gold, Saratoga, CA

☐ *Rubik's Cube Unlocked* by Jeff Gold. Solve the world's most amazing puzzle with easy to follow moves shown in 3D color hi-res graphics. Written in fast, efficient machine code. Either DOS. $24.95.

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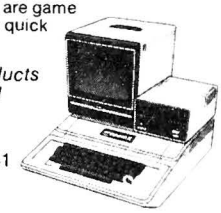
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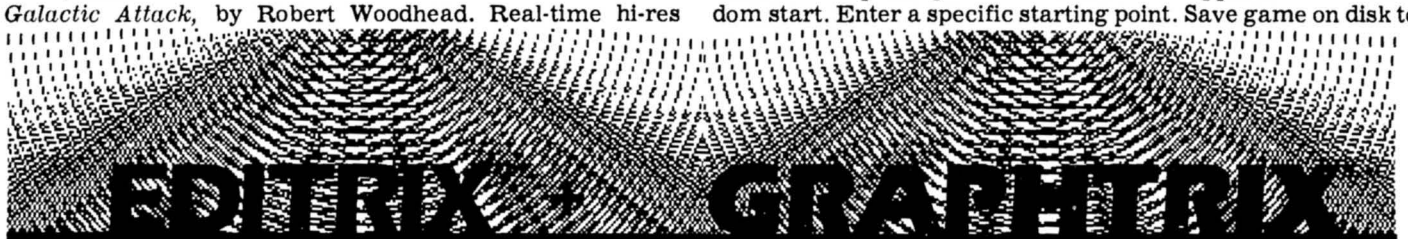
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SubLogic, Champaign, IL

☐ *A2-FS1 Flight Simulator,* by Bruce Artwick. 3D animated flight simulation. Practice take-offs and landings, aerial maneuvers, or shoot down enemy planes in aerial combat. 16K/32K, cassette/disk. $25/$33.50.

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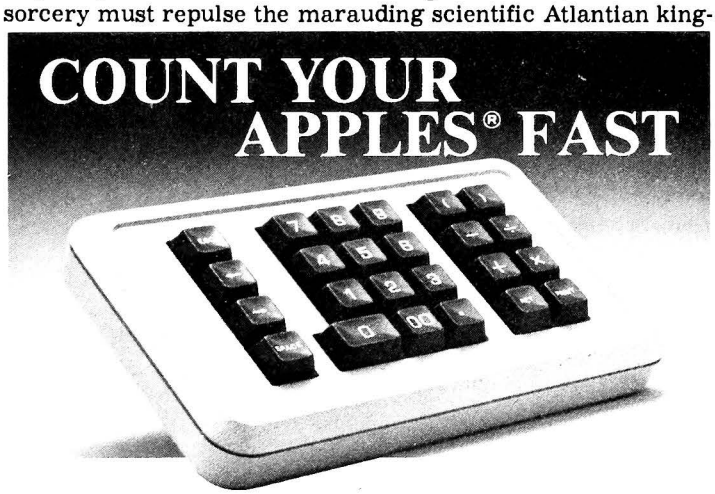
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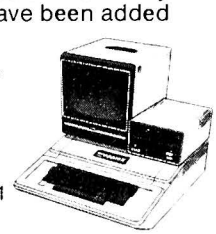
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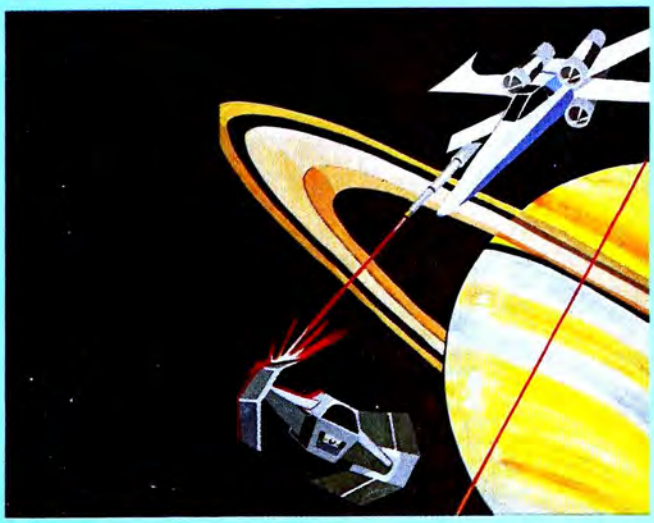
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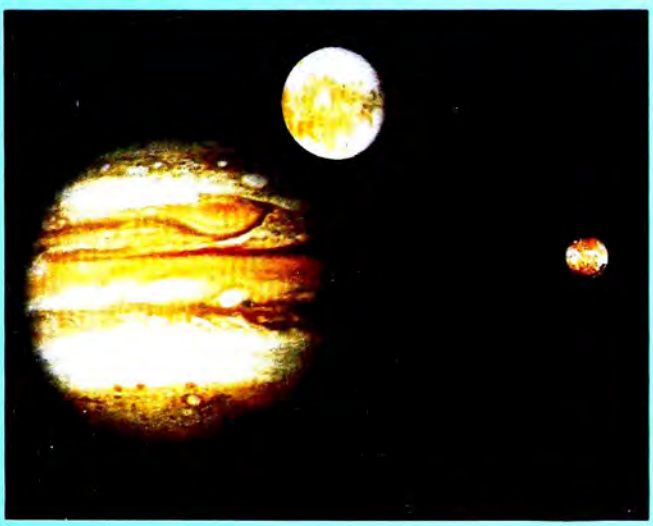
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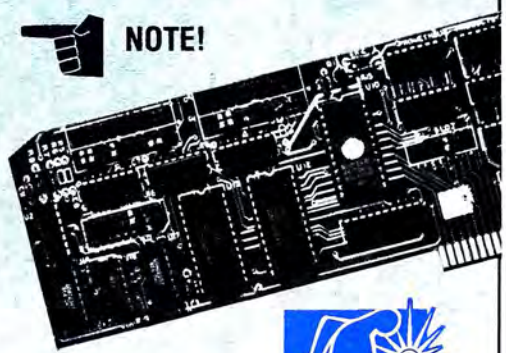
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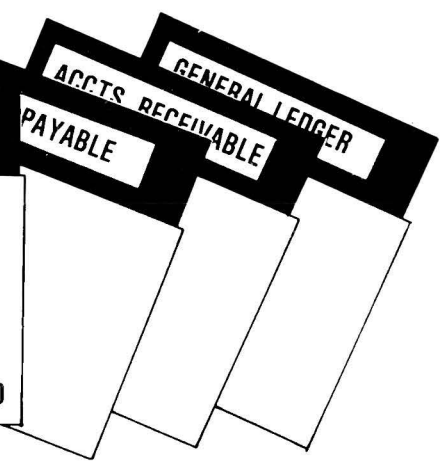
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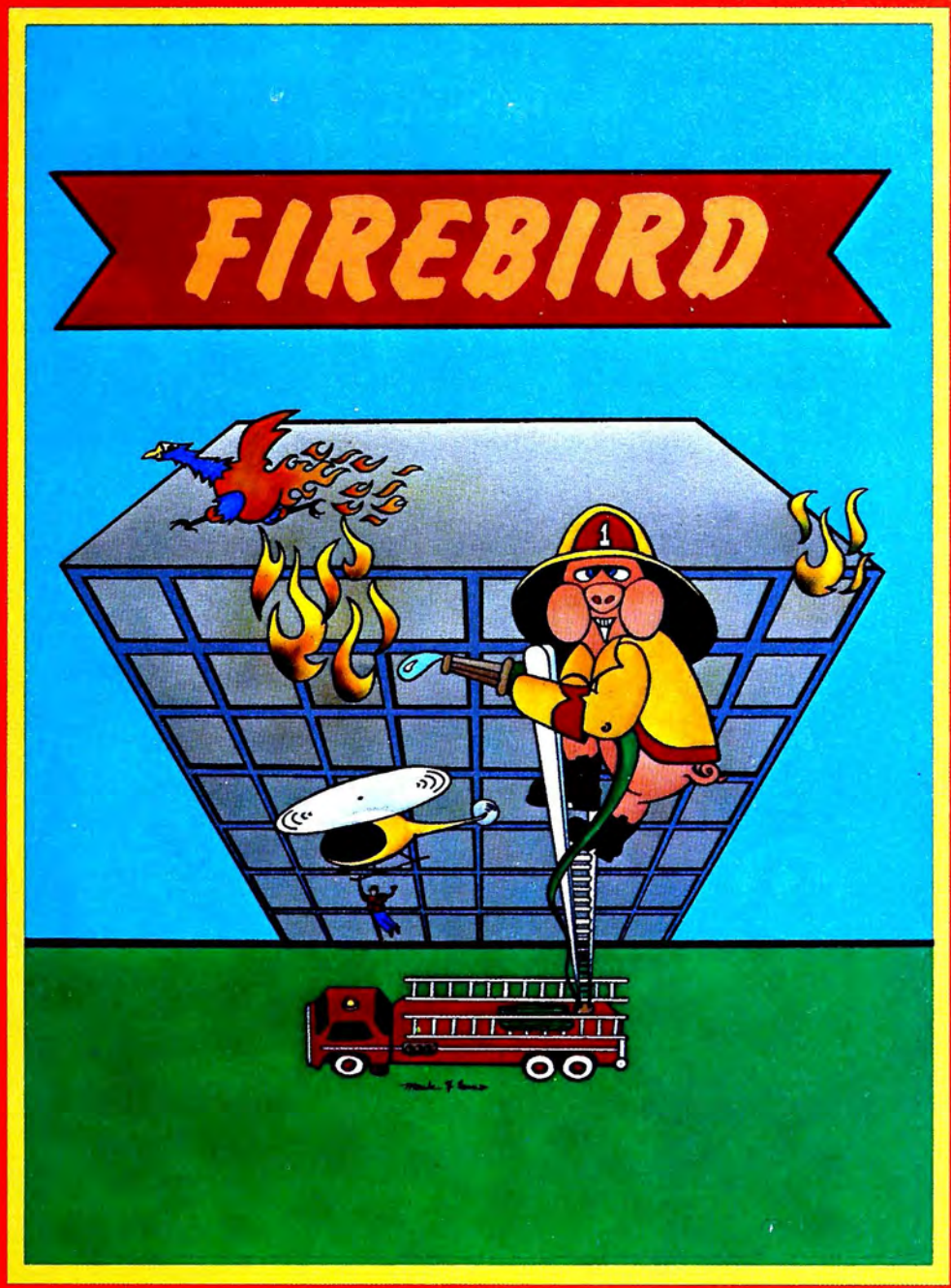


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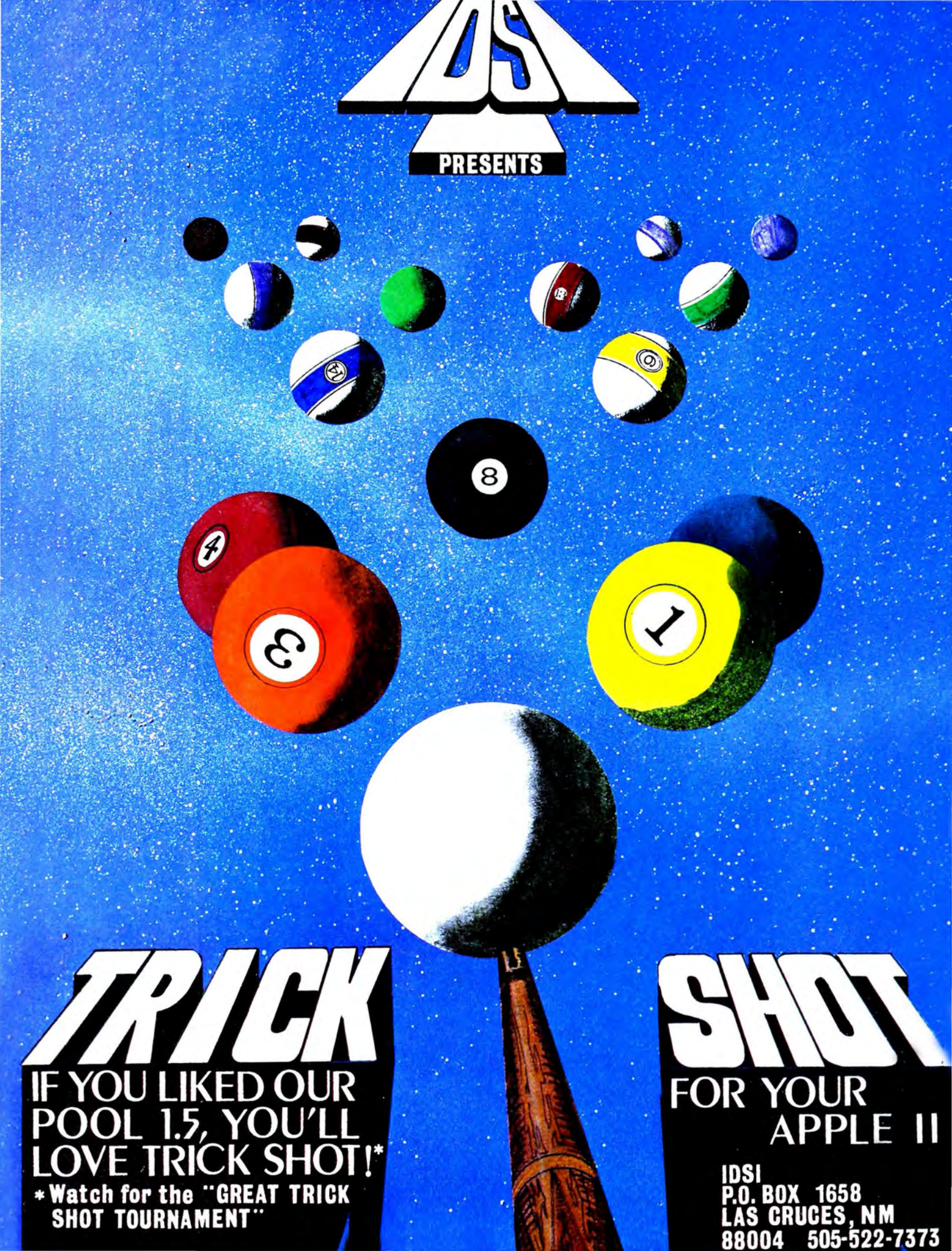
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deliver the ultimate in speed, power, and flexibility for a data base (hard disk compatible). $750.

☐ *The Data Factory* by Bill Passauer. An easy-to-use system with enormous power and flexibility. Data storage within records is the largest possible; uses the full limits of the Apple. One or two disk drives. $150 (January 1: $300).

☐ *The Mini Factory* has the major routines of *The Data Factory* but is a beginning system for those with lesser needs. *The Mini Factory* can be upgraded to *The Data Factory* when the user's needs expand. One or two disk drives. $75.

☐ *The Invoice Factory* isn't just an invoice maker. It generates statements, aged receivable reports, product or customer reports, sales analyses by product in graph or report form, and much more. Two disk drives. $200.

☐ *The Merger* is a utility for *The Data Factory* and *The Invoice Factory.* Merge data from fields in either program into those of another file. Two disk drives. $50.

Micro-Ware Distributing, Inc., Pompton Plains, NJ

☐ *Graph Fit.* Hi-res graphing program for Apple that does pie charts, bar charts, and line graphs, with auto scaling feature. $28.

☐ *Ultimate Transfer.* A telephone software transfer program. DC Hayes Modem. $25.

Money Disk, Richland WA

☐ *No-Nonsense Books.* An accounting system to tally sales slips, separate retail/wholesale sales, charge, cash, and bank card sales. Check account balances for year to date; instant profit and loss statement. Close the books making only eleven entries. $225.

Multi Data Service, Ashland, OR

☐ *The Manipulator*—a textfile utility system by Max McKee. An "exec"able read/write tool—changes file lengths, renames, resaves, reenters, deletes, add/subtracts data fields, resides in memory while currently working on a program, and more. $34.95

☐ *The Liberator*—a subroutine library system by Max McKee. An "exec"able working tool that is a systematic and fully documented approach to subroutine libraries. Over fifty time-saving subroutines and add-on capability for your favorites. $29.95.

Muse, Baltimore, MD

☐ *Super-Text II* by Ed Zaron. One of the most powerful word processors/text editors for the Apple. Vastly improved documentation, dual disk protection. Unlimited time replacement policy. Either DOS. $150.

☐ *Data Plot* by Ed Zeidman. This plotting program, unknown by most, is a hidden gem. Creates and modifies a wide variety of full color graphic representations. Bar and pie charts, too. Statistics displayed automatically. Either DOS. $59.95.

On-Line Systems, Coarsegold, CA

☐ *The Dictionary* is the perfect gift for anyone with a word processor that uses a standard DOS. *The Dictionary* checks your spelling of over 25,000 words with over a thousand more for you to define. $99.95.

☐ *The General Manager* is the user-friendliest, easiest accessed, most powerful data base management program available. The *General Manager* uses the hierarchical structure of the mainframes to give you the power you need to get the job done. $99.95.

☐ *Superscribe II* offers true upper and lower case, seventy columns and a keyboard buffer, all without any hardware. Plus full editing capabilities usually found only in processors at twice the price. Finally a professional processor at a reasonable price. $129.95.

Omega Microware, Chicago, IL

☐ *Locksmith-4.0.* Nibble copier for reliable backups of almost any disk. New version also includes: Nibble Editor, Bulk Erase, Media Surface Analysis, Quick-Scan, and Disk Speed utilities. $99.95.

Personal Software, Sunnyvale, CA

☐ *VisiCalc* displays a huge electronic worksheet to solve automatically nearly any number problem. Type in labels, numbers, and mathematical formulas and the *VisiCalc* program instantly calculates the results. Change one variable and the *VisiCalc* program automatically recalculates the problem so you can see the effect. $200.

☐ *Desktop/Plan II.* A highly organized financial planning, budgeting, and analysis package. Guides you from the original layout of your financial model to final printout of a boardroom-quality report. Line chart and bar chart graphics; can receive information from the *VisiCalc* program. $200.

☐ *VisiFile* stores, searches, sorts, calculates; prints reports and labels—all with the most "user-friendly" interface available. The *VisiFile* program is able to easily communicate with *VisiCalc, VisiPlot, VisiTrend/VisiPlot* programs, and have files transferred by the *VisiTerm* program. $250.

☐ *VisiPlot* automatically creates hi-res graphs and charts more quickly than ever before. Without programming, you can visualize data in six graphic formats and six different colors. Graphs include line charts, bar graphs, pie charts, high-low chart and scatter chart. $180.

☐ *VisiTrend/VisiPlot* allows you to perform business math operations on time-series data. Operations include multiple linear regression, and various transformations which let you create new, meaningful time series. Incorporates the *VisiPlot* program package for graphing the results. $260.

☐ *VisiDex* is a flexible way to let the computer do the remembering. The *VisiDex* stores and retrieves information in a free-form manner through the use of keywords which you can assign to each screen of information. Because you decide on how to cross-reference your information, the *VisiDex* program thinks the way you do. Clock and calendar functions. $200.

☐ *VisiTerm* allows your computer to communicate with larger computers or other personal computers and permits transferring disk file information over the phone. Requires Apple Communications Interface, D.C. Hayes Micromodem or California Computer Systems' 7710 Asynchronous Serial Interface. $150.

Professional Computer Store, La Crescenta, CA

☐ *Medical Billing System.* Provides efficient and easy management of your accounts receivable. It prints out MediCare, Medi-Cal, Universal AMA insurance forms, and generates reports to track your finances. Corvus hard disk system, 80-column printer. $1995.

Progressive Software, Blue Bell, PA

☐ *VU #3* by Marc Goldfarb. Converts text files into *VisiCalc* data files; loads directly into *VisiCalc.* Transforms *VisiCalc* print-to-disk files into ordinary text files. Eliminates keyboard entries into *VisiCalc* and allows complete restructuring of data. $89.95.

☐ *V U Printer* by Marc Goldfarb. Will control the printing of data from *VisiCalc* print-to-disk files or serial text files. Allows the setting of each individual column width. User's format can be saved and reused. Prints extra pages if printer's column width is exceeded. $89.95.

☐ *The Graphics Printing System* by Paul W. Mosher. Permits high-quality, fast printing of Apple II hi-res screen onto Diablo and NEC printers. Magicframe allows any portion of hi-res screen to be printed in variety of sizes, formats and aspect ratios. Language Card. $109.95.

☐ *Print User* by Jonathan Ashwell. Allows the user to format tables and charts easily with numbers that are right-margin justified. You can define multiple formats in one string, and can change P$ in the program. Rounds off numbers to as many places as specified. 32K. $26.45.

Rainbow Computing, Northridge, CA

☐ Statistics with *Daisy* by Kevin C. Killion. Excellent user convenience. Offers full range of statistical capabilities: basic stats; correlations; hypothesis testing; multiple regression (six procedures); non-parametric stats; data/time series transforms; analysis of variance. $79.95.

Donald Robbins, C.P.A., Little Neck, NY

☐ Easy-to-use *Payroll Program* by Donald Robbins. Payroll summary, employee's cumulative earnings, prints checks, any pay period, hourly, periodic and tipped employees payroll computation; piece work and restaurant employees, too. $175.

Saturn Systems, Ann Arbor, MI

☐ *VC-Expand*—Memory Expansion for *VisiCalc*. *VC-Expand* works with Personal Software's *VisiCalc* and Saturn 32K RAM Board to increase *VisiCalc* workspace. 32K or more memory is added to *VisiCalc*. Requires Saturn 32K RAM Board and 16-sector *VisiCalc*. $100.

Slipshod Software, Bad Nation, SD

☐ *Crop Duster,* by George Spelvin. The ultimate fast-action arcadelike business simulation for the Great Plains. Fantastic 3-D landscape sweeps under as you buzz past bewildered farmworkers, hi-res cows, pickup trucks, bars, and high-voltage power lines. A real charge. For keyboard, paddles, or joystick. SoftCard, 132-column printer. $149.95.

Softape, North Hollywood, CA

☐ *Magic Window.* Get 80-column word processing without expensive hardware. Full cursor and line control, global search, justification, and centering. Full-color editing guide and documentation. $99.95.

☐ *Basic Mailer.* Merge your *Magic Window* documents with a data file to get custom letters and forms. Menu selection for easy use. Fully documented. 32K. $69.95.

☐ *Magic Spell.* Now an electronic proofreader can check your *Magic Window* documents. Any misspelling or unfamiliar words not in its 14,000 word dictionary are flagged. Fully documented. $69.95.

Soft CTRL Systems, West Milford, NJ

☐ *Format ROM.* Word-processing power for Applesoft programs. Has print statement formatting, right-hand justification, defining of margins, length of print statement lines, text centering. Includes print using, allowing formatting of alphanumeric strings. Compatible with all 80-column boards. Requires Mountain Computer ROMPlus board or Andromeda ROMBoard. $49.95.

SoftHouse, Rochester, MN

☐ *FileWhiz,* by Steve Goss. Versatile and affordable information management system, designed and priced for home and small business use. Either DOS. $59.

Software Publishing Corporation, Mountain View, CA

☐ *PFS* by John Page. The *Personal Filing System* lets you store and retrieve information with forms that you design. User customizable. Forms-oriented. Learning time: one hour. $95.

☐ *PFS:Report* by John Page. Produces professional quality reports with sorting and calculations from your *PFS* data files. Auto-formatting. Fully compatible with *PFS*. Learning time: 1.5 hours. $95.

Software Technology for Computers, Belmont, MA

☐ *Advanced Payroll Package.* Designed expressly for the Apple; maintains a payroll for up to 125 employees. Provides quick and easy payroll generation, comprehensive reporting and check printing. All federal, state, and FICA deductions are included, along with the ability to generate W-2s, quarter reports and more. Two disk drives and printer. $240.

☐ *Apartment Manager Program.* Maintains financial data for up to six apartment, rental, or condominium complexes on each set of diskettes. Complexes can be as large as one hundred thirty units and contain up to eight different types of units each. Complete rent or condo fee journal, expense journal and managerial reports are generated. A complete operating statement and more provided in this comprehensive package. Two disk drives, 132-column printer. $325.

☐ *Professional Time and Billing.* Maintains time and billing data for up to three hundred clients. Up to one hundred twenty rates/employees on file at any time. Rates may appear as time/expense/fixed fees. Provides comprehensive reporting, statement generation, more. Two disk drives, 132-column printer. $325.

☐ *Mailing List Program.* Maintains mailing list for up to eight hundred names sorted or searched in any order. Select range of zip codes, repeat labels, generate phone listings and much more. Printer. $50.

☐ *Inventory Program.* Maintain critical data for up to 1,000 items. Dozens of reports including minimum quantity, recorder point, sorting, searching, profit margin and more. Maintains your inventory; reports dollar value, average cost, profit margin, more. Two disk drives, 132-column printer. $200.

☐ *Order Entry.* Maintain point-of-sale and inventory data as well as order processing and customer listings. Produces invoices and shipping labels. Complete package interfaces to the A/R module. Three disk drives, 132-column (or condensed) printer. $350.

☐ *Accounts Payable/Accounts Receivable/General Ledger.* A complete accounting package for the Apple. Prints checks, statements, P/L report, and trial balance. Completely integrated package written in assembly language and Applesoft that responds with lightning fast speed. Two disk drives, printer. $750.

☐ *Ifo—Data Base Manager.* Version I. It organizes information files and manipulates them to perform various applications. *Ifo* generates various report formats for maximum flexibility. Custom tailored with large record capacity. The original data base for the Apple computer. Printer. $120.

☐ *Ifo—Version II.* All the features of the *Version I* but also supports the 80-column board, Epson printers, unique VTRS cross-indexed files and the unique Soundex routine. A truly sophisticated data base for the serious user only. Two disk drives, printer. $200.

☐ *Ifo—Version III.* All the features of *Version II* but runs on the Corvus hard disk. Dozens of unique report options that make full use of the hard disk. Corvus 5, 10, 20 Meg hard disk, printer. $450.

Solutions Softworks, Roselle, IL

☐ *Business Papers Kit.* Graphics-artist designed program prints out personalized stationery for one or more businesses. Includes letterheads, invoices, memos, purchase orders, business cards, and more. Supports I.D.S., Centronics, and MX-80 printers. $39.95.

Sophisticated Microsystems, Northfield, IL

☐ *Investor.* Complete package for maintaining investment portfolios. Keeps track of purchases, sales gains and losses. Even prints the detail for 1040 Schedule D. 32K, printer optional. $75.



THE PROFESSIONAL BLACKJACK SIMULATOR is a HIRES TEXT driven program that allows you to turn your home computer into a professional blackjack game.

This program has the following capabilities, including the VIDEO BLACKJACK MACHINE which acts like the blackjack slot machines in Atlantic City and Vegas.

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- 1–8 decks
- Programmable Card Counting System
- Three levels of pre-programmed computer players
- Computer calculates each players wins, losses, ties & totals with print options.
- Number of cards left, card count, casino name & table min and max displayed while playing
- Enter and exit player
- Change table min & max
- Shuffle
- Borrow money
- Surrender
- Insurance
- Resplit Aces
- Dealer hit or stand on soft 17
- Double on any two cards
- Double only on two cards, nine, ten, eleven
- Double after spliting

Fast Response Time – no reading or writing from disk
Game can be reconfigured after every hand
Full user backup capability

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contemplating a byte



For one full year, many of you have been wondering how long we would continue sending you *Softalk* free without trying to put the touch on you for something, whether a subscription, software, peripherals, kidney beans, defective grommets, or spare Edsel parts. Now comes the magic moment.

Softalk commissioned graphics artist Robert Zraick to do August's cover with a poster in mind. The robot contemplating a bite is evocative both of Rodin's *The Thinker* and the Genesis passage on the Garden of Eden . . . not to mention the possible significance to our favorite technological fruit.

The artist and *Softalk* are sharing in the profits from the poster. *Softalk* will distribute its proceeds to individuals developing Apple tools to help the handicapped. *Softalk* guarantees 100 percent distribution of its monies.

In addition to the posters, which are being sold at $6.00, (plus $1.50 to cover shipping and handling), two hundred artist's proofs, signed by Robert Zraick, are available at $75 each.

The size of the poster is 24 inches by 34 inches. The artist's proof will be hand-numbered and hand-signed and be accompanied by a certificate giving its number and guaranteeing that only 200 are being distributed.

Robert Zraick's art will grace any computer room, and your purchase will help others become more self-sufficient.

Orders may be sent to:

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Dealer inquiries invited.

Spectrum Software, Sunnyvale, CA

☐ *Microaccountant.* This general ledger accounting program is ideal for the small business. It generates a transaction journal, account ledger, balance sheet, and income statement. It will handle up to 1000 transactions per month. $49.95.

Synergistic Software, Bellevue, WA

☐ *Mailing List Data Base.* Enter your name and address files and sort them quickly and easily by any field and print labels or lists. Unbelievably fast and easy for anyone to work with. $50.

☐ *Modifiable Data Base.* Popular general purpose customizable data management program, self-modifying at your direction. Can become an accounting program, inventory package, personnel files, etc. Rapid access. $79.50.

☐ *The Data Reporter.* A complete information processing system including a text editor, data graphing and statistical analysis program, label maker utility, and a powerful, easy-to-use data base. $220.

☐ *Inventory Manager.* Inventory package to keep inventory, statistics, vendors, reorder points, back orders, master order status. The program lists wholesale and retail value, generates summary and suggested order reports. $150.

Southwestern Data Systems, Santee, CA

☐ *Online* lets your Apple become a private-access dial-up system with four levels of passwords for complete security. Fifty user accounts; ideal for electronic mail or announcements by clubs or businesses. $89.95.

☐ *ASCII Express.* The prototype in complete communications software with more transfer modes than the others, including editor for files, keyboard macros, built-in directory and many other features. $79.95.

☐ *Z-Term,* a sophisticated, full-feature terminal package for the CP/M Apple; send files of any size, receive files up to 41K, auto-save mode, terminal emulation and much more! $99.95.

☐ *Z-Term the Professional.* All *Z-Term* features plus supports Novation Apple Cat, Christensen and Pan transfer protocols, 1200 baud, auto-answer, unattended transfer, slow printer buffer and more. $149.95.

Thunderware, Oakland, CA

☐ *DOS-Dater.* Automatically times and date stamps DOS files whenever they are saved or modified, using the Thunderclock Plus. 32K. Requires Thunderclock Plus. $29.

West Side Electronics, Chatsworth, CA

☐ *Time-Clock II,* by Jeff Mazur. This program automatically keeps track of the time you spend on your computer for each job, client, or program, then prints out a detailed report. Requires Super Clock II. $30.

Home&Hobby

Accent Software, Palo Alto, CA

☐ *Accu-Shapes.* The ultimate shape builder. Construct in lores, view in hi-res. Move back and forth between the two. Page through shape tables. Combine shapes from different tables. Fast assembly language. $39.95.

☐ *Soft Step.* First debugger for Applesoft Basic. You have control as you single step through your program or stop at break points. List or trace lines, examine or define variables or memory. 32K. $39.95.

Advanced Business Technology, Sunnyvale, CA

☐ *ABT Pascal Tools I and II.* A must for the Pascal programmer. Includes cross references generator, version compare, split and concatenate, patch, binary file compare, disk verify, and more. $75 each.

Finally: Hard Disc CP/M® for your Apple®.

The Sabrina is the SCS-10 8" Winchester Hard Disc Storage System. When interfaced to an Apple II Computer using the Microsoft Softcard and the SCS-10/F combined 8" Hard Disc Floppy Subsystem, most any standard 8" CP/M diskette program will run with your Apple II machine. And best of all, our Sabrina Subsystems are available in quantity now!

OTHER FAMILY INTERFACES:

In addition to Apple, the SCS-10 Hard Disc Subsystem can also interface with TRS-80 I, II, III, Altos, S-100, Multibus, LSI-11, Motorola 6800, and the IBM Personal Computer

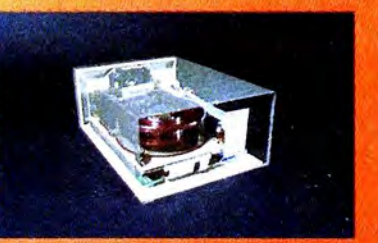
SUPPORTED HARD DISC PROGRAMS:

Apple II: DOS 3.3, Pascal 1.1, CP/M, DB Master, Compu-Law, Accounting Plus, Peach Tree Accounting, SuperCalc, Medical Management, Stockbroker, Real Estate Manager, Word Star, Farm Plan, and all other CP/M programs • Radio Shack: TRS-DOS and Oasis • S-100/Multibus: CP/M • LSI-11: R-11 3B & 4.

COMPARE FEATURES:

The Sabrina SCS-10 Series beats the socks off the toughest competition for speed, capacity, delivery, and pricing.

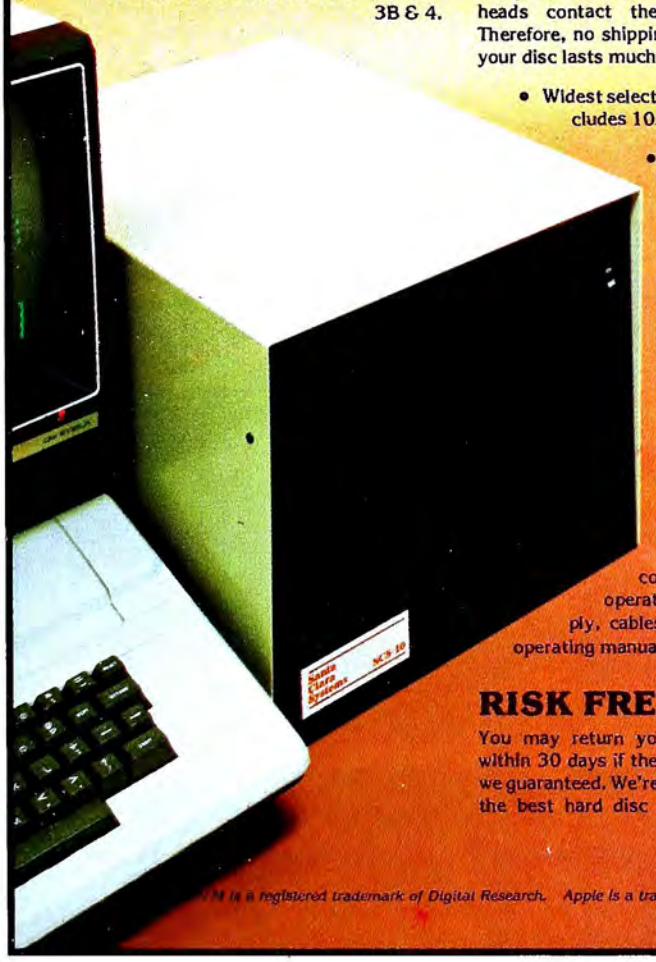
Exclusive ECC (Error Correction Coding) provides a unique internal hard disc backup system, where media errors are corrected and go undetected by the host system.



FEATURES	SCS-10 8" HARD DISC	SCS-10/F Combined 8" Hard Disc & Floppy
Transfer Speed	596.6 kBytes/sec.	596.6 kBytes/sec.
Average Seek Times	70 mSec.	70 mSec.
Capacity	10 mBytes to 120 mBytes	Hard Disc 10 mBytes to 120 mBytes Floppy 1.2 mBytes
Delivery	30 days or less	30 days or less
Suggested price for 10 mByte System	$4,995.00	$5,995.00

MORE FEATURES:

- Special lubricated media lets the recording heads contact the disc surface directly. Therefore, no shipping locks are required, and your disc lasts much longer.
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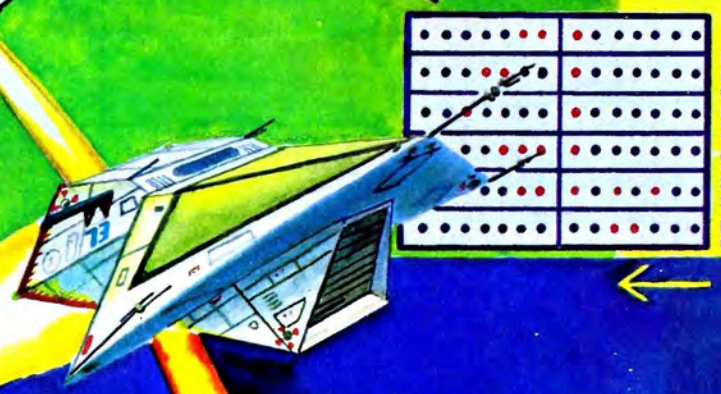
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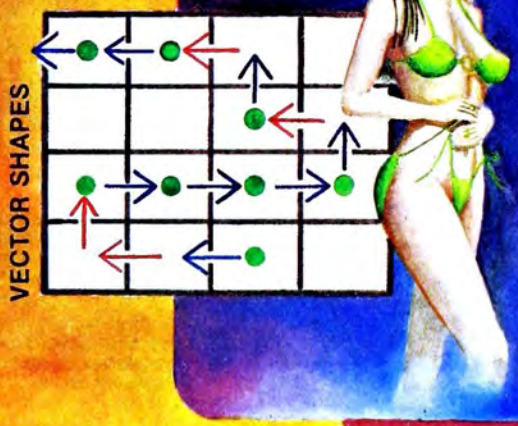
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Apple Computer, Cupertino, CA

☐ *Utopia Graphics Tablet System,* by Utopia Graphics. Expands your Graphic Tablet's capabilities by offering easy-to-use tools and techniques for creating and displaying pictorial information. The program includes a wide array of brush types and provides 64 color options that can generate 40 unique brush shades. Also has programs to help you design patterns, charts, graphs, and animated screens. Requires Graphics Tablet. $75.

☐ *Diet Analysis,* by Tess Enterprises. Designed to provide an accurate analysis of your daily dietary intake. It helps you analyze your diet for carbohydrates, calories, and protein, as well as for 21 vitamins, minerals, and other compounds such as saturated fats and fibers. The program produces daily analyses, weekly averages, and monthly comparisons for up to 10 people. $45.

☐ *Personal Finance Manager,* by Software Dimensions. An easy-to-use budget management program. It helps you keep track of all of your expenditures (you can flag those that are tax deductible), analyze spending patterns, and validate checkbook statements. *Personal Finance Manager* also lets you print out your data for future reference. $75.

☐ *Bridge Tutor,* by Compubridge. *Bridge Tutor* is a highly interactive program that helps you develop your skills as a beginning bridge player, or improve your skills as a more experienced player. It helps you learn the Standard American bidding system, and in the expanded version, the Precision Club and Scientific Bidding Systems. Integer. $40. Expanded version $60.

☐ *World's Greatest Blackjack Program,* by Irwin, Cooper, and Humble. Based on *The World's Greatest Blackjack Book,* this program teaches you the best betting and playing strategy. Two built-in practice drills enable you to learn and practice basic strategy as well as the Hi-Opt I system. The program enables you to choose from nine standard sets of rules, or set up your own. It acts as the dealer for you and up to five other real or imaginary partners. $50.

☐ *Musicomp.* Provides you with an electronic music sheet that lets you compose, arrange, store, and play your own tunes, using the Apple's built-in speaker, or an external sound system. Integer. $45.

☐ *Hand Holding Basic,* by Neil Bennett. Employs a graphic approach to teaching programming and debugging in Basic. It has four distinct learning levels that let you learn Basic at your own pace. It is a full implementation of the ANSI 78 minimal interpreter for the Apple II. $100.

☐ *Artist Designer,* by Howard Ganz. *Artist Designer* lets you draw and paint virtually any color graphics composition you wish, using your color monitor or color television screen as a canvas. *Artist Designer* lets you produce, with the use of game paddles, irregular shapes, curves, and other forms. Pascal. $65.

☐ *DOS Tool Kit.* A collection of programs and subroutines designed to aid in the development of Applesoft Basic and 6502 assembly language programs. Included are an assembler, source editor, and two programs to help you create, edit, and display hi-res graphics character sets. $75.

☐ *DOS 3.3 Upgrade Kit.* Expand your Apple's capacities so you can run both 3.3 and 3.2.1. programs. The kit contains two PROMs for you to install on your disk controller card, an IC puller, instruction and reference manuals, DOS 3.3 System Master diskette, and a Basics diskette that allows you to use diskettes written under earlier versions of DOS. $60.

Aurora Systems, Inc., Madison, WI

☐ *QuickTrace* by John Rogers. Machine language debugger with single-step, trace, and background modes. Shows all registers, stack, processor status, flags, last and next instructions, and settable break points. Relocatable, works with Basics, DOS, and graphics. $50.

Avant-Garde Creations, Eugene, OR

☐ *Action Sounds & Hi-Res Scrolling.* Machine language sounds for space or combat games plus scrolling routines and our *Superfont* program with characters in nine sizes and eight styles. All sounds are easily put into your programs. Either DOS. $18.95.

☐ *The Creativity Tool Box.* A graphics tablet on disk with circle, ellipse, instant people, poetry, music-writing, action sounds, fonts, and several useful utilities. Easily save all creations in text files or binary files. Either DOS. $44.95.

☐ *Hi-Res Secrets* (including block shapes for Applesoft or assembly.) A learning package that reveals assembly and machine language graphics. Four disks and three hundred pages of information to animate vector shapes, Hplot-shapes, text file shapes, data array shapes. Either DOS. $125.

☐ *Supershape Draw and Animate.* Easily draw and animate vector shapes using eight keys: up, down, right, left, plus four diagonals! Includes shape viewing program, complete editing, address option, information output to your disk. Menu driven; two disks and two manuals. Either DOS. $34.95.

Beagle Bros., San Diego, CA

☐ *DOS Boss* by Bert Kersey and Jack Cassidy. Rename DOS commands and error messages, protect programs from being copied, run programs with one keystroke, change disk volume headings and customize your catalogs. $24.

☐ *Utility City* by Bert Kersey. Twenty-one Applesoft utilities including multi-column catalog printer, command hider, ille-

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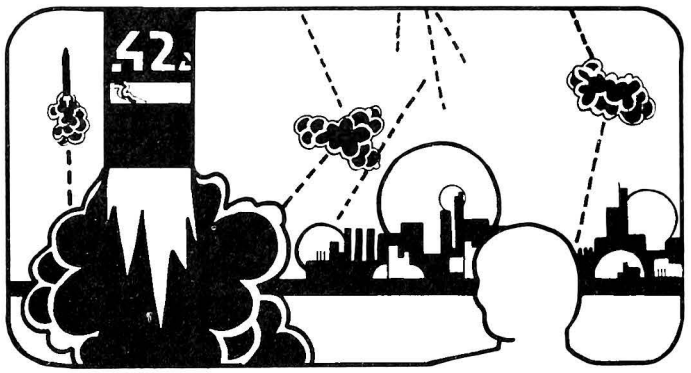
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C & H Video, Hummelstown, PA

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☐ *Ultra Hi-Res Graphics* for the IDS Paper Tigers or the Epson MX80/100 Printers. Turns your Apple and printer into an intelligent plotter unrestricted by the 280x192 resolution of the Apple's screen. A utility for programs using *hplot* commands. $49.95.

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☐ *Pascal Graphics Software* for the IDS Paper Tigers. Anadex 9501/9500 and Epson MX-80*/MX-100. *With Graph-trax. Our famous Basic graphics dumps are also available in Pascal. Supports a variety of interface cards. Pascal Language System. Specify printer. $44.95.

Continuum Productions, Granada Hills, CA

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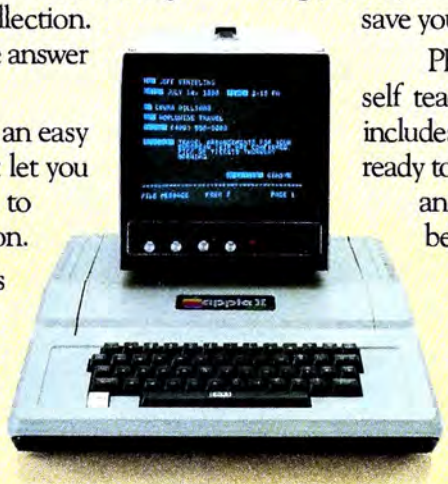
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☐ *Presbyterian plus Bible Books plus Hymn Book.* A full disk of programs including the Presbyterian child's catechism game, games and songs teaching the Bible books, and hymns with a bouncing ball. Applesoft or Integer. $15.

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Data Transforms, Denver, CO

☐ *Graphtrix,* by Steve Boker. Combination screen dump and text formatter. Provides hard copies of Apple hi-res screen to any of eleven matrix line printers; normal, inverse, hi-low crop marks, titles. Menu driven or access from your own Applesoft program. Formats *Apple Writer* text files to include graphics in your report. $65.

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☐ *The Accountant.* Finance data base system. Prompting enables those with no accounting background to use this double-entry system. Fast retrievals, automatic transactions, formatted reports. Interface to *VisiCalc* available. $89.95.

☐ *DBCalc.* Extracts data from the *Accountant*'s data base, creating a *VisiCalc* file. Sample tax estimation worksheets included. $20.

The Denver Software Co., Aurora, CO

☐ The *Pascal Programmer* is a collection of pre-tested modules (Pascal functions and procedures) used for program development applications plus sample programs that show the use of the modules, and complete documentation. Language System. $125.

Earthware Computer Services/Geocomp, Eugene, OR

☐ *The Electric Semicolon* by D. R. MacCaskie. A Pascal programming tool. Automatic variable declarations, indenting, control, correction of punctuation, identification of all ENDs, typing aids and more! Supports full Pascal language. Language Card, Pascal 1.1, two drives. $115.

Empire Software, Wynnewood, PA

☐ *The Professional Blackjack Simulator* by Joe Cimino. Hi-res text, various rules, player options and fast response time make this a must for blackjack fans. Program must be seen to be fully appreciated. Either DOS. $34.95.

Formula 1 Computers, Salem, OR

☐ *Huebsch Checkwriter.* Custom create check format, register and print checks or use defaults. $34.95.

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☐ *128KDE Softdisk.* The first 128K RAM card for the Apple II. Requires only one slot to emulate a complete, almost instant access, floppy disk drive. As much as 300 times faster than the standard Apple II disk drive. $750.

☐ *Legend LCG I and LCG II.* The Legend lower-case generator is a plug-in hardware device that displays the entire 96-character ASCII set, including lower case with descenders. Works with Apple shift-key mod and is compatible with any software designed to work with a lower-case generator. *LCG II* is for revision 7 and later. $49.95.

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Insoft, Portland, OR

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LJK Enterprises, St. Louis, MO

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Masterworks Software, Lomita, CA

☐ *Masterdisk.* Disk utility that allows editing on a byte-by-byte basis. Read any sector, display it in any of four formats, edit any byte, write back to any sector. Also includes undelete, single-drive copy, screen print capability, and reconstruct VTOC. Either DOS. $29.95.

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Dann McCreary, San Diego, CA

☐ *Disk-O-Tape* and *Disk-O-Tape/Pascal* by Dann McCreary. Save money on media—backup, archive, even *mail* your diskettes on durable, inexpensive cassettes. Read-after-write verification. Simple, self-booting operation. 32K. Either DOS. Cassette $15, disk $19.95.

☐ *Cosapple Disassembler and Apple-80 Disassembler* by Dann McCreary. Provides absolute address disassembly listings from machine language on screen or printer. Uses standard 1802 or 8080 mnemonics. Similar to Apple's 6502 disassembler. 16K, Integer. Cassette $15; disk (32K) $19.95.

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☐ *Tax-Manager,* by Taso, will help you prepare your federal income taxes and print the schedules. This easy-to-use program includes the latest tax laws and will remain current with our extended warranty option. $150.

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Microsoft, Bellevue, WA

☐ *TASC, The Applesoft Compiler* compiles and runs larger Applesoft Basic programs, executes them faster and minimizes code expansion. Compiles most programs without modification; compatible with various systems configurations. Supports but does not require the Microsoft RAMCard or Apple Language System. $175.

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Omega MicroWare, Chicago, IL

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On-Line Systems, Coarsegold, CA

☐ Assembly language development system *Lisa 2.5* is a proven method for 6502 assembly language development, in use in the homes and offices of programmers for over two years. *Lisa* includes an assembler, disassembler, cross reference and single-step tracer. Either DOS. $79.95.

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☐ *Expediter II.* The perfect utility program for any Applesoft programmer. *Expediter II* changes your Applesoft programs into machine language, increasing speed of execution by two to twenty times. $99.95.

Passport Designs, Half Moon Bay, CA

☐ *Notewriter.* A computer program that turns Soundchaser into a realtime music transcriber. The notes you play on the keyboard will be written on the screen in standard music notation. The advanced editing features facilitate quick changes in tempo, key signature, phrasing, thematic material, and all other aspects of music notation. Using a graphics printer the score can be printed out in its entirety. $100.

Pegasys (Gnosis), Philadelphia, PA

☐ *P-List,* by Steven Cherry. A full-list interpreter for Apple II/II+, now including floating point and hi-res graphics. 32K. $99.95 until February 1, 1982; $199.95 thereafter.

☐ *The P-List Tutorial,* by Steven Bogley and Jeff Shrager. The tutorial to complement *P-List.* Package includes disk of all programs in text. Price will be $20 until February 1, 1982; it will be $25 thereafter.

Penguin Software, West Chicago, IL

☐ *Complete Graphics System* by Mark Pelczarski. Screen drawing with lines, circles, ellipses, 108-color automatic fill routine. 3-D graphics with visual input and manipulation. Shape builder. Paddle/joystick version $59.95; as *100-Color Drawing System* or *3-D Drawing System,* $34.95; Tablet version $119.95.

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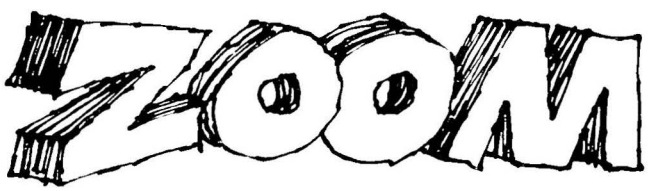
Practical Software Ltd, Pomona, NY

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Rainbow Computing, Northridge, CA

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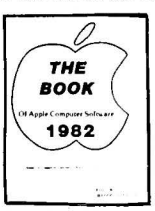
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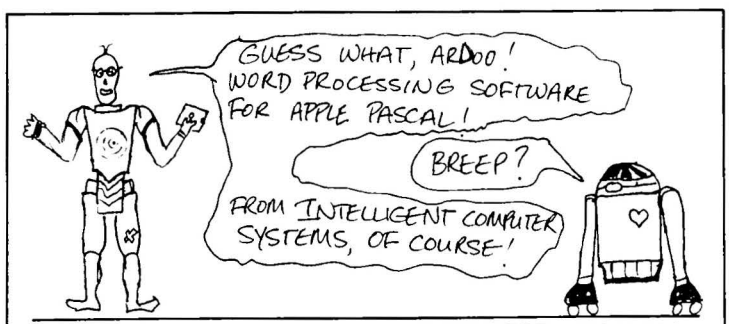
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Software Technology for Computers, Belmont, MA

☐ *The Coloring Board.* A complete low-cost graphics software program for the Apple computer. Now you can create, store, change, letter (upper and lower case), and retrieve colored or black and white drawings in hi-res graphics as easy as writing your name. Entirely software driven. Requires no special add-ons. It is easy to learn and fun to use. A truly unique package with virtually unlimited uses. $60.

Southwestern Data Systems, Santee, CA

☐ *Applesoft Command Editor (A.C.E.)* is a combination of co-resident utilities for quick and easy entering or modifying of existing program lines, including keyboard macros, variable occurrences, and much more! ROM Applesoft. $39.95.

☐ *Apple-Doc* is a versatile package of powerful utilities including variable, line number, and constant cross-referencers, replace and lister, plus a handy thirty-page tutorial manual. ROM Applesoft. $49.95.

☐ *List Master* includes a REM remover; shortens variables; smart renumber retains logic, merge routines, and will compare Applesoft or Integer programs for lines added, deleted or changed. ROM Applesoft. $39.95.

☐ *Merlin,* new macro-assembler from SDS makes assembly language programming easy; user-oriented manual, powerful editor, twenty-eight pseudo-ops, eighty-column and RAM card support, compatible with TED II files, and much more! ROM Applesoft. $64.95.

☐ *Roger's Easel,* a paddle-oriented lo-res graphics package plus a linker to easily install your pictures in any Applesoft program. A nice little program! ROM Applesoft. $24.95.

☐ *Speedstar,* a full-function Applesoft compiler with the most options and features; designed to easily convert programs to fast and efficient 6502 machine language. ROM Applesoft. $134.95.

Spectrum Software, Sunnyvale, CA

☐ *Home Finance Pak I.* A comprehensive home financial accounting system for Apple II. Includes check register, budgeting, savings and credit card account management systems. Includes reconcile, budget, search and sort functions, and printed reports. $49.95.

SubLogic, Champaign, IL

☐ *A2-3D1 Graphics Package* by Bruce Artwick. Sophisticated graphics utility programs for 3D or 2D object and scene creation. A complete technical manual describes functions and applicational uses. 32K. $59.95.

☐ *A2-3D2 Enhanced Graphics Package* by Bruce Artwick. The best 3D graphics available for the Apple II. Color capabilities, hi-res line generation, independent object manipulation, and much more. A2-3D1. $24.95.

☐ *A2-GE1 Graphics Editor* by James Bozek. This versatile program interfaces the A2-3D1/A2-3D2 with the non-technical user. Motion programmer and playback, slide show programmer, Basic interface included. A2-3D1 or A2-3D2. $34.95.

Synergistic Software, Bellevue, WA

☐ *Higher Text II.* Colorful, customized text, ten character sets provided or define your own. All features of normal text screen plus ten colors, lower case, no hardware modifications. 32K. $40.

☐ *Higher Fonts I.* A collection of twenty-five hi-res graphic character sets for use with *Higher Text* and *Higher Text II.* Includes foreign languages, special graphic symbols, and a variety of alphabetic styles. 32K. $15.

☐ *Higher Graphics II.* Performs hi-res functions of hardware devices. Create and edit shapes and shape tables for animation. Produce games, business, and educational displays. Stunning detail and color. $35.

☐ *Directory Manager.* Turn your disk catalog into a menu. With just two keystrokes, lock, unlock, load, save, delete, undelete, etc. Transfer, sort, rearrange. Fast and easy. $30.

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To help Santa, you will need a 48k APPLE II (Plus or Integer) with a 3.3 disk drive.

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Your Hovercraft await you at your homebase island. The mission? To seek out and destroy your enemy! How? By getting under way, cruising the straits of The Cluster Islands, and, upon coming into visual contact with your opponent, blast him out of the water!

This new, exciting game employs a concept never before used in the home computer industry. The color goggles that come with this game allow two players to view one color screen and see only their own situations, until that critical moment when the two antagonists come within line of sight of each other.

Then the chase is on! The aggressor chases his fleeing opponent firing all the while, attempting to damage or destroy him!

The craft that runs is not defenseless either. He may drop an invisible mine as he makes his escape. And, by simply turning a corner, he will again disappear from his pursuer's sight.

When one player has destroyed all three of his enemy's hovercraft fleet, he wins the battle!

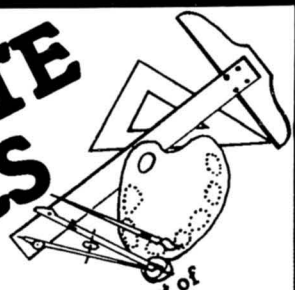
Runs on an APPLE II or II+ with DOS 3.3 and Game Paddles. APPLE II is a registered trademark of Apple Computer, Inc.

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All new graphics utilities for the Apple. Where "CGS" combined and improved existing ideas, Special Effects leads the way in new approaches. Create "dithered" pictures by hand with a set of 96 brushes and 108 colors. Magnify pictures 2 or 4 times and edit point-by-point. Swap colors, use mirror images, and move parts of pictures. Pack pictures on disk or in RAM so more fit in less space, and, as always, you can use the graphics in your own software. Available in paddle/joystick version ($39.95) or for graphics tablet ($69.95).

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case on your Apple II without any additional hardware. This flexible utility can be added to your own programs. $50.

☐ *G.A.P. (Game Animation Package).* Finally available, a dual purpose graphics utility package for game production. Generates detailed multi-color shapes for arcade games as well as tables of hundreds of full screen sketches for adventure games. $50.

Telephone Software Connection, Torrance, CA

☐ *Answering Machine.* Automatically answers modem phone line with your name, takes messages, gives outgoing messages to friends. Displays or prints detailed system log. Micromodem. $35.

☐ *Terminal Program.* Memorizes and repeats your log-on to most systems! 16K capture buffer can be reviewed/printed on/offline. Upload text easily. Micromodem, ROM Applesoft card. $35.

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☐ *Programmers Library.* Select the function you need from a library of over one hundred highly useful math, calendar, sound, and Apple utility functions. $25.

Thunderware, Oakland, CA

☐ *Thunderware BSR-X10 Interface and Scheduler.* Allows you to control lights and appliances on a predefined schedule, using your Apple II. Requires Thunderclock Plus. $49.



Advanced Logic Systems, Santa Clara, CA

☐ *Smarterm.* Transform your Apple into a powerful, professional computer with *Smarterm,* the intelligent 80-column video board. *Smarterm*'s state of the art design offers you the most features, highest reliability, and most value for only $379.

Apple Computer, Cupertino, CA

☐ *Apple Disk II Drive.* Faster disk copying, easier Pascal, expanded memory capacity—once you've used two drives, you'll wonder how you ever got along with just one. Disk II Drive $525. Disk II Drive with controller card $645.

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☐ *Monitor III.* Now available in both black and white and green phosphor. Produces sharp, highly readable text and graphics on a twelve-inch screen. Suitable for Apple II, Apple II Plus, and Apple III systems. $320.

☐ *Hand Controllers.* Face it—you can only blast those invaders so many times before your game paddles start to suffer fatigue. Maybe it's time for a new set. $29.95.

Aurora Systems, Madison, WI

☐ *Omniscan Laser Video Disc Interface* allows an Apple to duplicate the control panel of an inexpensive Pioneer LaserDisc under program control. Can give data-base-type access to color, moving information, with bilingual or stereo sound. Requires Pioneer VP-1000 Laser Video Disc. $250.

☐ *The Flipper* switches electrical signals—two in to one out, or one in into either of two outs. Use as a softswitch for 80-column boards or controller for other devices. Leaves game port open, has a connector for the shift key. $50.

B-K Technology, Rock Hill, MD

☐ *Gameport Extender.* Provides a three-foot RFI and strain-protected extension of the internal game I/O connector for

ready external access. Will mate with new series of project kits. $20.95.

Cavri, New Haven, CT

☐ *The Cavri Interactive Video System.* For integrating computer interaction with random access control of industrial-quality VCRs. Includes I/O board, cabling, authoring software (Applesoft, Pascal, or prompted), and a manual for educators and trainers. Selected VCR color monitor with audio. $995.

Computer Micro Works, Dayton, OH

☐ *The DOS Switch.* Burn your Basics disk! Flip the DOS Switch and boot DOS 3.2 disks directly on DOS 3.3 systems. End the Basics hassle for your valued unmuffinable DOS 3.2 software. Easy to install and use, compatible with standard and plus Apples. DS-1 gives you P5 and P5A PROMs: $28.95; DS-2, 3.2 PROM installed: $44.95.

Computer Station, St. Louis, MO

☐ *Dithertizer II.* High-speed binary video digitizer which uses external sync camera to load detailed contoured or dithered (pseudo gray scale) images to either hi-res page. Paddles. $300. With camera, $650.

☐ *Fast Floating Point Board.* Greatly increases the arithmetic speed of the Apple II with Applesoft, UCSD Pascal, and/or Apple Fortran by relieving it of higher math function tasks. 16K RAM card or Language Card. $475.

☐ *Boot Button.* Permits the DOS 3.3 user to access DOS 3.2 diskettes without double-booting. Fits on the controller card so needs no motherboard modifications. Great time-saver. $34.95.

Creative Micro Systems, Los Alamitos, CA

☐ *9670-110A Bushel Disc R.* Ten megabyte Winchester mass storage unit with one megabyte flexible diskette drive backup for the Apple II. The system is supported by DOS 3.3, Pascal 1.1 and CP/M. $5995.

Eclectic Systems, Addison, TX

☐ *OMNI Board.* A computer input/output board that expands the capabilities of the Apple II and II Plus. $268.

Faxscan, Dayton, OH

☐ *Model AD-3* does A/D (four ports), D/A conversions, sixteen I/O lines, two timers for real-world applications. Works in any Apple. Includes two ribbon cables. $199.

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☐ *Cool Stack.* A proven well-accepted quiet cooling system for the Apple II computer, also providing convenient and attractive steel shelves for 1-2 disk drives, monitor, and adjustable library rack. $69.95.

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Great Lakes Digital Resources, Detroit, MI

☐ *64KC RAM Card.* The Legend 64KC boasts a full 64K of dynamic RAM memory per card; makes powerful memory management an economical way of life and is easy to install. $349.

☐ *64KDE Disk Emulator.* The *Disk Emulator* software configures the RAM memory on both 64KC cards as a single 128K byte fast access disk drive. Package includes two 64KC cards, manual, DOS 3.3 system diskette, *Memory Master*, and firmware selector program. $700.

Happ Electronics, Oshkosh, WI

☐ *Hi-Fi Adaptor.* Connects Apple speaker output to your stereo or hi-fi. Game sounds become exciting. Create your own computer music or do voice synthesis inexpensively. Unit features isolation circuit, switchable mode, and adjustable output level. $25.

☐ *Game Socket Extender.* Connect your paddles to a zero-insertion force socket which mounts on the outside of the computer. Changing between paddles, joysticks, and other I/O devices becomes a snap. Helps prevent damage to equipment if paddles are pulled on during an exciting game. $14.95.

Hayes Microcomputer Products, Norcross, GA

☐ *Micromodem II* allows an Apple II to communicate over telephone lines with other microcomputers, large time-shar-

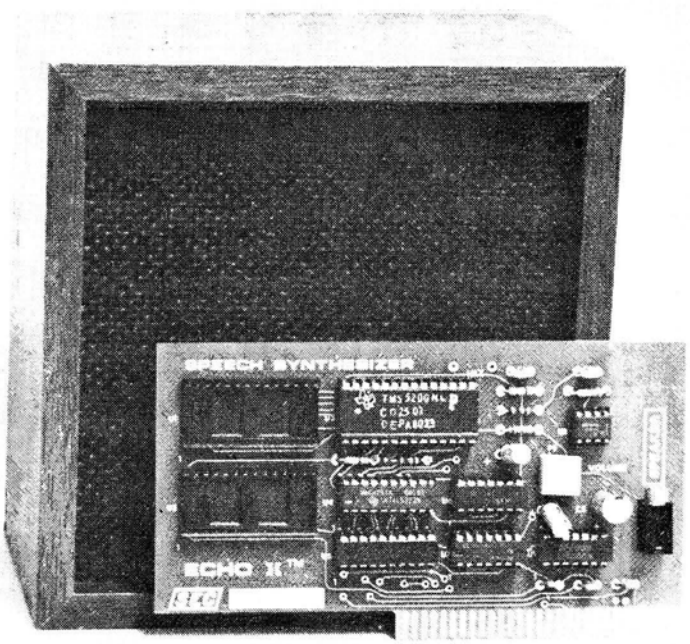
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☐ *Hayes Stack Smartmodem* is an auto-answer/auto-dial, direct connect data communications system. Features touch-tone or pulse dialing, audio monitor, seven LED indicators, two-year limited warranty. Requires RS-232C serial port, RS-232C cable with DB-25 male connector. $279.

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High Technology Software, Oklahoma City, OK

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Interactive Microware, State College, PA

☐ *Adalab Interface Card.* For collecting data and controlling laboratory instruments. Includes 12-bit analog voltage input and output, eight digital-sense inputs, eight digital control outputs, a 32-bit real-time clock and two 16-bit timers/counters, Includes *Quick I/O* software and manuals. $495.

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☐ *PSIO (Programmable Serial Input/Output).* The PSIO is a fully programmable asynchronous serial interface for the Apple II featuring RS-232 and current loop drivers. Unique to the PSIO are software-selectable baud rates, automatic incoming baud recognition, printer formatting, and Telex dial capabilities. $199.95.

The Keyboard Co., Garden Grove, CA

☐ *Numeric Keypad.* The TKC numeric keypad enhances your Apple II. For *VisiCalc* users, there are special keys for entering data, deleting entries and cursor movements in four directions. The numeric keys are positioned to enhance the numeric data and calculator entry speed. $149.95.

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LJK Enterprises, St. Louis, MO

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☐ *SoftCard.* Complete hardware/software system that gives the Apple II and II Plus the ability to run CP/M programs. Includes a circuit card, Microsoft Basic-80, CP/M operating system. Use with Microsoft RAMCard or Apple Language Card to obtain a 56K CP/M system. $395.

☐ *RAMCard.* 16K memory card economically expands memory of Apple II, II Plus. Use with or without Microsoft's SoftCard. Ideal for program applications requiring large amounts of memory. $195.

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☐ *MicroStand MS-II, MS-III;* Original metal organizing shelf for the Apple II and III. CS-I; metal copyholder typing aid—all match Apple color and texture. MS-II, $39.95; MS-III, $49.95; CS-I, $15.95.

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☐ *Tymac Double DOS Plus.* 3.2-3.3 DOS switch allows you switch select 13 and 16 sector ROMs. No soldering; plugs on disk board and doesn't interfere with any slots. $39.

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☐ *Soundchaser.* Performance software combines with state-of-the-art synthesizer cards and a music keyboard to become a dynamic polyphonic synthesizer. Fully programmable, the sounds are constructed graphically, using a game paddle to draw the waveforms and contours of your sounds on the monitor screen. The sequencer can record up to 3,000 notes with one sound and be played back as an accompaniment for live performance with a different sound. $1,350 (six voices with keyboard and software).

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☐ *The Joyport* allows expansion of the Apple game paddle port to four paddles (with all buttons) or allows the use of one or two Atari type joysticks. $74.95.

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☐ *Paddle-Adapple.* Game I/O adaptor enables the user to switch between two I/O devices or use both simultaneously. Also enables user to reconfigure game I/O socket. Compatible with almost all hardware and all software. $29.95.

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☐ *Computer-to-Video Disk Interface.* Video disk controller card is designed to provide computer interface for control of video disk player and video tape player. It will control DVA players 7820-1, 7820-2, and 7820-3; Pioneer VP 1000; Sony Videodisk Player; or Sony Video Tape Player. $350.

Syntauri, Palo Alto, CA

☐ Jingle your own bells! Record a Bach cantata! The musical instrument of the future is at your fingertips with the *alphaSyntauri* digital synthesizer. Record, save, playback music and your own sounds as never before. The *alphaSyntauri* system is available at select Apple dealers for $1495.

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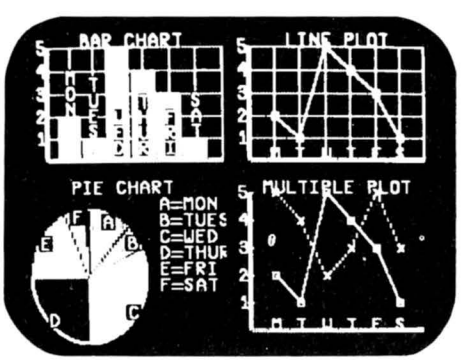
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☐ Tovatech presents *Ventop,* a metal cooling panel that replaces the plastic cover supplied with the Apple II. Lowers the operating temperature inside the Apple II and extends its reliable operating life; requires no fans or auxiliary power. $45.

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☐ *Geometry and Measurement,* by Charles Lund. *Geometry and Measurement* is recommended particularly for students in the sixth grade. The program tests users on areas, perimeters, lengths, angles, polygons, volumes, circles, and clocks. $50.

☐ *Apple How To!* A collection of programs useful for learning about computers, including tutorials on how to program in assembly language and how to produce scrolling windows in Basic—plus a program that emulates an RPN (Reverse Polish Notation) calculator. $50.

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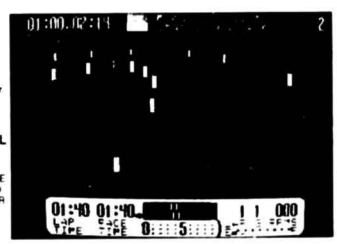
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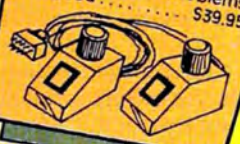
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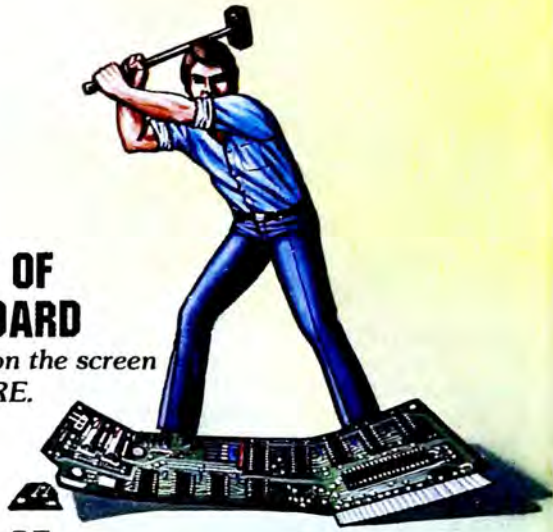
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The Apple Directories, Chicago, IL

☐ *The Apple II Resource Directory,* published by WIDL Video. A "where to find it" book of boards, peripherals, hardware, and accessories that also lists publications, user groups, clubs, time sharing systems, dealers, and more. $5.95.

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Book Company, Lawndale, CA

☐ *The Book.* A complete critical analysis of most Apple software available. Experts review, rate, and evaluate the programs on eleven separate points. Covers games, education, business, and utilities, as well as hardware. $19.95.

Bourbon Street Press, New Orleans, LA

☐ *The Dirty Book.* Quarterly issues reviewing all current sensual and pornographic computer programs, in addition to interesting writeup material and promotional contest. Award winners to visit New Orleans. $9.95 per issue.

CompuSoft Publishing, San Diego, CA

☐ *The Basic Handbook,* Second Edition, by David A. Lien, CompuSoft Publishing. Explains nearly five hundred Basic words. Each is alphabetically listed, with test programs, sample runs, variations in usage and alternate spellings. Special section—"Converting Programs from One Computer for Another." $19.95.

Computer Station, St. Louis, MO

☐ *Programmer's Handbook* for the Apple. Contains reference sections on Applesoft, Pascal, Basic-80, DOS, CP/M, Apple Monitor, *VisiCalc, Macro-Sced, Apple Writer,* and much more. Saves time and trouble searching through multiple volumes. $29.95.

The Computerist's Directory, Forestville, CA

☐ *The Computerist's Directory* makes the perfect gift for anyone involved in computing. White Pages has listing by individuals, clubs, bulletin boards, and users groups. Yellow Pages has categories covering every aspect of computer products and services. Published in January and July with quarterly updates. One year subscription $10.

Vital Information, Overland Park, KS

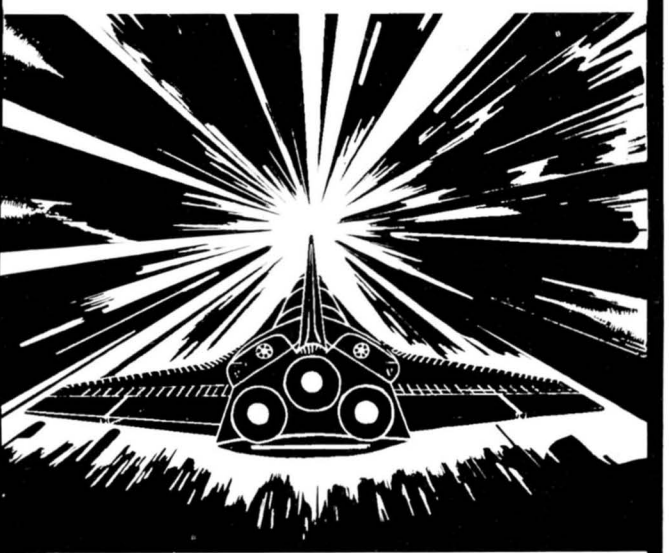
☐ *Vanloves Apple II/III Software Directory.* The most comprehensive directory of software for the Apple II and the Apple III. Divided into thirty-three categories, book also includes 6809 software that will run with 6809 cards and CP/M software available through use of the SoftCard. $19.95. ◨

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TRADE TALK



☐ **Mike Markkula,** president, and chief executive officer of Apple Computer traveled to New York last month for a press tour for the new profiled hard disk for the Apple III. **Will Houde,** vice-president and manager of personal computer systems division, and **Fred Hoar,** public relations, joined Markkula for the tour. In addition, new software packages for the III, including a word processing system, mail list manager, and business graphics, were introduced. Markkula also spoke to a group of security analysts sponsored by the Dean Witter Reynolds company. The press tour to the Big Apple came barely after Markkula had landed back in California from a trip to Singapore, where he visited Apple's new 125,000-square-foot assembly plant. Only his scretary, **Kathy Lane,** can keep track of him.

☐ A Christmas present from **Cavalier Computer** (Del Mar, CA)! Cavalier is sending a copy of their game *Ring Raiders* free to anyone who requests it. Just send a blank diskette plus sufficient postage (a self-addressed stamped envelope will do) to Cavalier Computer, Box 2032, Del Mar, CA 92014. Cavalier will make a copy of the program as well as "a bunch of other fun little things" for the user to enjoy, says a company spokesman. Documentation will also be included.

No Scrooges at this company.

☐ **On-Line Systems** (Coarsegold, CA), who are always throwing some party of some kind, recently had a legitimate one. The occasion was president **Ken Williams's** twenty-seventh birthday party. His birthday present was a complete remodeling of his office from top to bottom, and according to brother **John Williams,** "It finally looks like a real president's office." On-Line is planning a big bash for the industry this February to celebrate **Roberta's** birthday. More details about that next month.

☐ "We built up a lot of favors over the past year, so we expected most of the people we invited to come," says **Dave Wagman** of **Softsel** (Inglewood, CA). The company held its first anniversary party last October 24, with more than two hundred twenty well-wishers in attendance. The guest list included all of Softsel's suppliers, as well as other software publishers, customers, and personal friends. **Fred Pool** and **Ralph Sanches,** from **Muse** (Baltimore, MD), traveled the farthest for the festivities. "Everyone was dressed up, some people danced, and there was a fantastic buffet," Wagman recalls. "Just a great big, fun party, and everybody enjoyed themselves."



"Frankly, Mrs. Pilkins, it'll be a lot easier for your to pay the $27,300 telephone bill than it will for us to find the mistake."

Moir/The Bulletin/Sydney
Reprinted from World Press Review/September 1981

☐ According to **Ed Friedland,** chairman of **Krell Software** (Stony Brook, NY), Massachusetts Institute of Technology has granted licensing agreements to distribute its Apple version of the Logo language to Krell, Microsoft, Borg-Warner, and Creative Computing.

☐ **Lou Long** of **Stoneware Microcomputer Products** (San Rafael, CA) has been promoted to general manager. The announcement was made by **Kevin Klein,** executive vice-president. Long will be helping the company cope with their rapid growth; since the company's beginning, they've undergone three expansions—one in which the Stoneware crew had to say good-bye to their sauna to make room for more computer equipment. Their latest expansion doubles the size of their offices from two thousand to four thousand feet.

☐ **Pegasys Systems** (Philadelphia, PA) is changing its name—or at least trying

GOTO 130

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Mind Your Business

BY PETER OLIVIERI



Welcome again! Here we are into December and it's mighty cold up here in Boston. May the sun be shining warmly on you wherever you are.

As we close out 1981 and get ready to usher in the new year, it seems appropriate to talk about getting financial records in order.

In the last issue, we discussed some features that are common to computer-based accounting systems. We looked in particular at the balance sheet and the income statement and we touched on the use of a general ledger. Continuing with this discussion, we'll examine additional accounting concepts that will help you become more informed and put you in a better position to understand the nature of some of the accounting software now on the market.

The Building Blocks: Accounts. The method that's used to record accounting data in its most basic form is called an *account.* A business might have one account for assets, another for liabilities, several accounts for expenses, and so on. It's helpful to visualize an account on paper as being represented by the letter T (hence such an account is often called a *T-account*). Increases to the account are recorded on the left side and decreases in it are recorded on the right side of the T. In accounting, this process is called making *debits* and *credits.* While these terms have many meanings outside of the world of accounting, within this world they simply mean entries on the left side of the account (debits) and entries on the right side of the account (credits).

The ledger is no more than a grouping of accounts. A business may have many account ledgers. There may be one called an accounts receivable ledger and another referred to as the accounts payable ledger. The ledgers contain accounts that record information about amounts due to be received by the business (receivables) or amounts to be paid by the business (payables).

The Chart of Accounts. Every business needs to set up a chart of accounts at some point in time. This is usually done prior to setting up an accounting system for the firm. The list of all the accounts to be included in the accounting system is called the *chart of accounts.*

If the account numbering scheme is selected carefully, such a list can be used by the organization to retrieve valuable financial information. For example, a firm may decide to use three digits to represent an account number. The first digit might represent a general category (for example, 1 = assets, 2 = liabilities, and so on). The second digit would represent subcategories within a particular major category. For example, under assets would be receivables, inventory, property, and so on. Each of these categories could be given a unique digit. A third digit could represent an actual account. To clarify these points, let's look at an excerpt from a chart of accounts.

1	Assets	12	Inventary	2	Liabilities
11	Current Assets	121	Raw Material	21	Current Liabilities
111	Cash	122	Work in Pragress	211	Accounts Payable
112	Savings Account	123	Finished Goods		

Thus, the code 121 identifies that the account is an asset (1); it is an inventory account (12), and it is raw material (121). As you can see, this scheme allows you to extract a variety of summary information about accounts. For example, by listing all accounts with 1 for a first digit, you'd get a listing of all the asset accounts.

The number of accounts depends entirely on how much information and detail managers of the business wish to have access to.

A Journal. The journal is simply a chronological record of any transactions that have taken place. It lists the names of the accounts affected by the transactions and the amounts involved. Thus, the journal tells what changes are to be made to certain accounts. When the account balances are changed, the process is called posting. The order of operations, then, is as follows:

1. Make an entry to the journal.
2. Post these entries to the appropriate accounts.
3. Use the ledger to summarize account data.

The Role of the Computer. Obviously, all this can be a time-consuming, complex, difficult task. The computer is well suited to such applications. Some of its particular advantages over bookkeeping by hand are the ability to process information quickly; the ability to interact with several files (accounts, journals, ledgers); greater security and control; more accurate information; and the ability to produce a variety of useful management reports.

More Accounting Packages. Of course, it's not possible to describe here all aspects of the accounting field, but even so much information as we've discussed can be helpful in evaluating the features of the various software packages currently on the market.

We'll now review these packages, employing the method we used when we reviewed data base management systems. We'll review the features of the major packages, then present a summary evaluation of all the packages for your reference and review.

Westware System II Software. The *Westware System II* software (Westware Software Inc., Ontario, OR) is a completely self-contained package that performs most of an organization's financial record-keeping functions. This very comprehensive package features programs for handling inventory, payables, receivables, payroll, general ledger, general journal, chart of accounts, vendor list, and customer list and performs several system maintenance functions—such as making backup disks and changing dates.

The system requires 48K with DOS 3.3 (although you can send for a DOS 3.2 version) and two disk drives. Most business applications are best designed around a two-drive system, so this should not be considered a drawback. A printer is a practical necessity for programs that produce financial reports, paychecks, and invoices.

Included in the package are two manuals, the first of which is a lesson manual that takes the reader step-by-step through an actual application. The second manual is a detailed operations guide, explaining all the features of the package. In addition, a circuit board (called a KSAM card) is provided for installation in your Apple. KSAM stands for Keyed Sequential Access Method. This technique is used by some of the programs in the package to organize and then retrieve stored data efficiently. It is really ROM (read-only memory) on a board. The board is inserted into slot 7 of your machine and makes possible two-second access to any record you search for by looking for a key field. While it's somewhat unusual for a circuit board to be included as part of a package, you can expect





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What else?...Creative Financing & Real Estate Analyzer.

to see much more of this in the future. It allows a manufacturer to include more options as part of a package and it provides a certain measure of security to the user.

As is the case with most systems, it's imperative that you make backups of your disks. Westware provides an option on the main menu that carefully guides you through the process of making backups.

As an additional measure of security, you have the option of creating passwords to control access to the programs and data that make up the system. Since some of the financial operating data of an organization is meant to be confidential, having the ability to control access to it is useful.

The Components of the System. The chart of accounts program includes options for adding an account number, deleting an account number, searching the account file, listing the contents of the file, and changing the information in a record. A record contains a six-digit account number (structured to provide for a variety of subaccounts), a descriptive title for the account, an account budget, a beginning balance, and two year-end amounts. The chart of accounts may contain up to four hundred records. The system gives you the ability to find out quickly the status of the file, that is, how many records are in a particular file and how much room is left.

The inventory component of the package has all of the required file maintenance options (add items, delete items, change information about items, search the file, and so on). An inventory record contains information about the part number, description, manufacturer, last transaction date, unit of measure, quantity on hand, reorder level, unit cost, extended cost, retail price, reorder quantity, and margin. There's also an option that allows the user to add an amount that has been received to the current amount of that item in inventory. Furthermore, a point-of-sale feature prints out an invoice for purchases, refunds, and quotations, with discounts if desired. A reorder report that searches the entire file and prints out a list of items whose current inventory levels have dropped below reorder points can also be requested. The system allows up to one thousand inventory records.

Both the vendor file and the customer file utilize all the file maintenance options described. These files contain name, address, and miscellaneous data about the vendors or customers. Each file may contain up to four hundred records.

The primary financial features of the package center around the accounts payable, accounts receivable, and general ledger programs. As you may recall, the general ledger is used to produce the balance sheet and the income statement. Some of the features the accounts receivable program provides are the abilities to generate and print bills, print a past-due report (for thirty, sixty, ninety, or one hundred twenty days overdue), apply monthly interest, enter payments received, and produce month-end reports. Both the accounts payable and the accounts receivable files can contain up to four hundred records. In addition to the general ledger, a general journal can contain as many as eight hundred entries.

Another program provided with the system produces a payroll and maintains employee salary data. This program handles up to one hundred employees, four hundred fifty pay transactions, and four hundred fifty deductions or miscellaneous transactions. Several different payment methods can be used, including hourly, salaried, and commission plans. The user can choose whether the pay period is weekly, biweekly, semimonthly, monthly, quarterly, semiannually, or annually. The user can maintain both federal and state tax-table information, miscellaneous pay deductions, W-2 forms, and so on. Of course, actual checks to employees can be printed.

To round out the features of the system, a variety of additional programs is provided. With these, you can make back-up copies of programs and data, copy disks, establish printer characteristics, and even create company letterhead at the top of every report.

Westware's programs are available on 5¼-inch and 8-inch floppies as well as on hard disk. This is nice to know, particularly if you anticipate that your needs may grow and that you may at some time be upgrading to a larger computer system.

Report formats were designed to a 132-column printer and are "not guaranteed" if another size printer is used. However, information about what kinds of forms and checks are needed to use the system most effectively is very helpful.

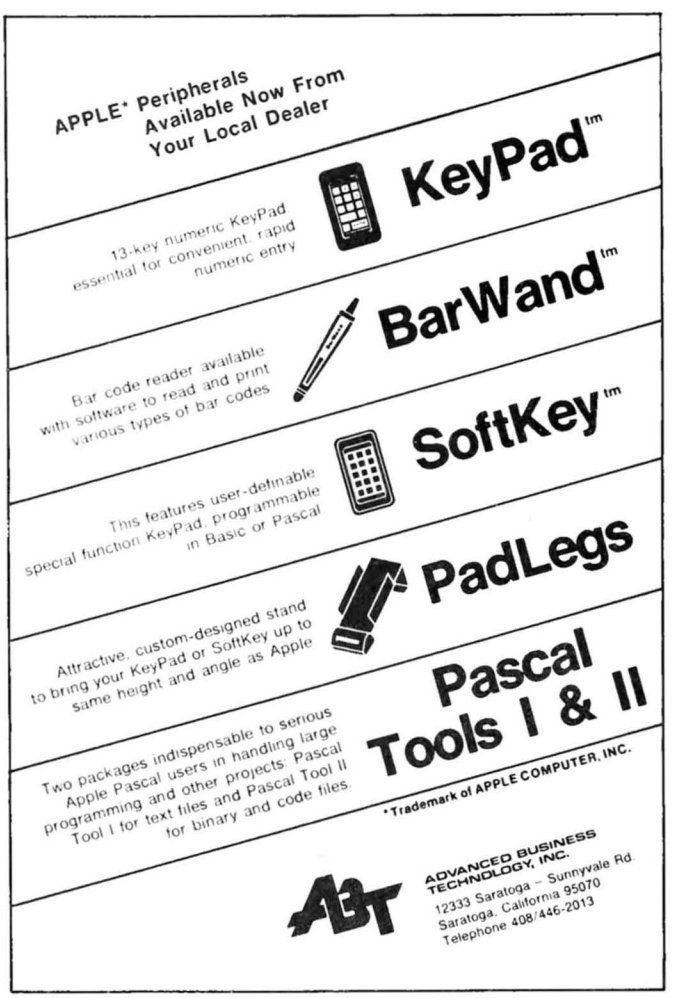
The entire Westware package interfaces with another Westware product, the *Universal Data Base.* This set of programs allows you to produce various other management reports using the data created by the programs in the accounting package. Altogether, the *Westware System II* is a very comprehensive set of programs.

Looking Ahead Next Month. Next month, we'll continue our review of accounting-oriented systems. We'll look at Spectrum Software's *Business Series,* Software Technology for Computers's *Accounts Payable* package, *The Accountant* by Decision Support Software, and Micro Lab's *Invoice Factory.* We'll also present a chart that compares, contrasts, and evaluates each of the packages.

The Readers Speak. "An associate of mine is thinking about buying an Apple computer system. He is calling and writing dozens of places in an effort to get the lowest cost possible. I am concerned that it may not be in his best interests to get the cheapest system. I wonder about warranties, service, and all the rest. Is there any information available about the best approach to take?" P.L., Burlington, MA

This is a very controversial question. It's not uncommon for the consumer to be faced with the price-versus-service decision. A couple of factors make the microcomputer marketplace unique. First, most consumers aren't able to repair their own machines. Second, microcomputers are a major expense.

Thus, the buyer is faced with a difficult choice. The Apple is relatively expensive, so, quite naturally, consumers would like to pay as small a price as possible. In fact, many people would not be able to enter the market if they couldn't find a discount





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Version 5.0 being unveiled January 1st – buy it in December and SAVE $120.

The 4.0 version of The Data Factory is being sold now for $150. Our new 5.0 version will retail for $300. Save $120 from the cost of the new edition by purchasing the 4.0 version and our Extended Warranty for $30. You can then update The Data Factory to get the new 5.0 copy in January.

The new version offers so much power and control that it's difficult to imagine what else you'd want in a data base. The 5.0 version of The Data Factory includes a personal input routine that allows you to completely customize your inputs; a new output routine brings pin point control to your printouts; a new sort feature works with amazing speed (1000 names in under six seconds); multi-data disks on-line; and other new features never before offered on micro computers. Micro Lab leads the way.

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Just for Fun

A Holiday Present from Peter Olivieri for Softalk*'s Readers*

Enjoy a *Softalk* word search with an Apple twist! You have to figure out what words are hidden before you can search for them. All words have appeared in *Softalk* and are fairly common to avid *Softalk* readers. To help, some clues are provided. Answers appear below.

This isn't a contest, there are no prizes and nothing to send in; it's just for fun.

S	V	I	S	I	C	A	L	C	U	D	P	E	N	T	O
T	C	M	O	K	S	I	D	O	I	R	A	R	X	S	P
I	N	I	F	F	U	M	R	S	N	A	D	O	P	E	B
N	P	R	T	H	I	R	D	R	I	C	D	S	R	F	C
S	K	L	A	T	E	D	A	O	T	T	L	S	E	E	H
O	S	P	L	U	S	D	B	M	S	F	E	E	V	L	I
N	M	M	K	S	P	E	A	K	D	O	S	C	I	P	P
B	U	T	T	O	N	W	O	O	D	S	T	O	E	P	S
L	D	Y	L	B	M	E	S	S	A	S	E	R	W	A	E
C	L	A	C	S	A	P	P	L	E	E	K	P	S	K	T
I	B	I	V	H	I	R	E	S	R	N	R	D	F	O	Y
S	R	E	S	E	T	C	P	M	O	I	A	R	R	R	B
A	O	R	O	T	I	N	O	M	T	S	M	O	E	A	C
B	E	G	I	N	N	E	R	S	C	U	S	W	E	M	A
S	I	D	I	S	K	E	T	T	E	B	A	C	K	U	P
S	E	R	U	T	N	E	V	O	S	B	O	J	P	O	T

1. The _ _ _ _ _ Basic.
2. 3.3, for example.
3. A business bestseller.
4. A certain kind of line.
5. A most obvious one.
6. Disk area.
7. Beginners' author.
8. Not tradewinds, but Trade_ _ _ _.
9. Cost of *Softalk*.
10. Tells what's coming next.
11. Apple show in Boston.
12. Type of modulator.
13. Data base management system.
14. Random access memory.
15. Mind yours.
16. Apple executive.
17. Follow this path.
18. It's really a hard card.
19. Not root beer but graphics.
20. Essential for your favorite programs.
21. Apple II _ _ _ _.
22. Editor's initials.
23. Regular interview article.
24. California Highway Patrollers.
25. Beginner's All-purpose Symbolic Instruction Code.
26. An automatic letter writer.
27. Do not accidentally press this.
28. Game controls.
29. A tree on Wall Street.
30. Quiet speech.
31. Sara Operating System.
32. Rhymes with mom.
33. A program or blueberry.
34. News_ _ _ _.
35. You have them with VisiCalc or after an ad.
36. Civil War ship.
37. It's a drive.
38. Not a 45 RPM.
39. Command to print your program.
40. Whose corner?
41. Two different kinds of talk: news and reviews.
42. Write with a light _ _ _.
43. Do it to a book or a file.
44. Must do it before using a disk.
45. Directly follows bol.
46. Don't _ _ _ _ off more than you can chew.
47. 1024

price. They feel they must take the risks associated with lack of service.

Discount consumers are, nevertheless, new Apple owners and, as such, they're likely to be in the market for additional hardware and software. Even if dealers who're level 1 service centers (which are obligated by agreement with Apple Inc. to service warrantied Apples) did not sell a machine, they would in all likelihood service the machine in an effort to secure followup business. Of course, the dealer's first obligations are to regular customers.

Put yourself in the position of a dealer. A potential customer comes into your store, asks about Apples, and consumes a fair amount of your time. Then, when it comes time to buy, the customer goes to a bargain basement source. Later, when service is needed, the customer returns to your store. How would you feel?

I think it's critical that dealers be supported. It's important to maintain this network, strengthen it, and use it whenever possible. Good dealers take care of their regular customers; customer service is important to them. It's not unusual for customers' problems to be solved while they wait.

The impact of microcomputers is just beginning to be felt. A strong dealer network is essential to accelerate the growth and development of the industry.

Have a nice holiday! ■

Apple Word Search Answers: *1: Third; 2: DOS; 3: VisiCalc; 4: Assembly; 5: Apple; 6: Sector; 7: Stinson; 8: Talk; 9: Free; 10: Previews; 11: Applefest; 12: RF; 13: DBMS; 14: RAM; 15: Business; 16: Jobs; 17: Pascal; 18: Softcard; 19: Hires; 20: Backup; 21: Plus; 22: MOT; 23: Exec; 24: Chips; 25: Basic; 26: Word Processor; 27: Reset; 28: Paddles; 29: Buttonwood; 30: Softalk; 31: SOS; 32: ROM; 33: Muffin; 34: Speak; 35: Ventures; 36: Monitor; 37: Disk; 38: Diskette; 39: List; 40: Beginners; 41: Market; 42: Pen; 43: Read; 44: Init; 45: CP/M; 46: Byte; 47: K.*

LISP for the Apple II

Pegasys Systems' new P-LISP interpreter is a full implementation of the well-known Artificial Intelligence language. Written in machine code, this powerful interpreter includes the following features:

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P-LISP is supplied on disk with User Manual for $99.95. The manual is available separately for $10.00. Please specify DOS 3.2 or 3.3.

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Unless otherwise noted, all products can be assumed to run on the Apple II, Apple II Plus, and Apple III in the emulator mode and to require 48K and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card.

☐ **Borg-Warner Educational Systems** (Arlington Heights, IL) is offering a leasing agreement to make it possible for schools to enter the microcomputer era. Schools can now lease MicroSystem80 computer-assisted instructional courseware as well as Apple II microcomputer components for the programs. Courseware programs include *Word Structure,* the *College Entrance Examination Preparation* series, and *Critical Reading.* Prices vary.

☐ The second edition of *Instant (Freeze-Dried Computer Programming in) Basic* has been released from **dilithium Press** (Beaverton, OR). The book by Jerald Brown, first released in 1977, has been updated with annotations and additional text. Includes graphics, instructional sequences without heavy math, graphics, and end of chapter activities to see how well the reader is learning Basic. 200 pages. $10.95.

☐ Manage investment portfolios of stocks, bonds, and other financial tools with *The Stock Portfolio Program* from **Charles Mann & Associates** (Yucca Valley, CA). Package includes a file management system for the entry, updating, and printing of investment portfolios. Reporting system allows for the preparation of value studies on portfolios by owner, by brokerage firm, and according to time period. Quotation management element allows user to obtain quotations periodically on the investments in the portfolio from sources such as local newspapers or Dow Jones. 2 disk drives, printer. $139.95. Documentation, available separately, $25.

☐ *Questab* from **Software Consulting Services** (Allentown, PA) was developed for a hospital cancer ward. Program solves data collection and tabulation problems typically faced by medical researchers and other scientists, according to company. *Questab* is sold in the Epoch line of general time and information management programs which include a document tracking system and an executive scheduling overview. Complete set of seven programs, $250. Any three programs, $150.

☐ **Portware** (Edina, MN) introduces an integrated system for portfolio management. *Portware* is suitable for serious investors, investment advisors, trust departments, investment clubs, business finance courses, and others. System consists of three modules for analysis, accounting and performances. System operates from generally available financial data which is easily input and corrected. Records are concurrently updated from latest prices, transactions, and stock splits/dividends. Provisions for margin positions and tax-lots. All transactions affecting cash are tracked, analyzed, and summarized. $195.

☐ *Apple VisiCalc Info Printer* from **Micro SPARC Systems** (Lincoln, MA) reads *VisiCalc* files and produces listings of the formats, formulas, and other *VisiCalc* grid elements; labels and formulas are visible in their complete form. Examine individual elements, selected areas of the grid, or the entire *VisiCalc* sheet. Files may be listed in either row or column sequence, and may be sorted alphabetically by column. Output may be directed to the screen or to the printer. Either DOS. $21.95.

☐ Printing a variety of type fonts is possible with *Graphic Writer* from **Computer Station** (Saint Louis, MO). Designed to be used in conjunction with *Apple Writer,* program allows for hard copy of the character sets found in Apple's *DOS Tool Kit.* For the Epson MX-80 (with Graf-Trax installed) and MX-100 printers. Also available for the Silentype printer and the Paper Tiger printers from Integral Data Systems. Requires *DOS Tool Kit,* and supported interface card (Apple parallel, Apple Centronics, and Epson's Apple parallel for the new version). $34.95.

☐ *Disk Library* from **Modular Media** (Miami, FL) is a user-oriented system for creating and maintaining a thorough, cross-referenced index of a user's collection of disk-based programs and data files. Sorts, searches, prints summaries and reports, edits, and deletes entries. Company says introductory tutorial will have new users operating program in less than ten minutes. Special introductory price $39.95.

☐ An updated version of the *Blocks II Authoring System,* developed by the **San Juan Unified School District** (Carmichael, CA), is now available. Program allows teachers with no programming experience to develop their own computer-assisted instruction lessons. Includes graphics library, where teacher combines images with text for presentation to the student. Resulting programs provide significant student interaction. $500.

☐ A five thousand dollar reward for the return of the Alkemstone is being offered by **Level 10** (Denver, CO). *Alkemstone* is a combination adventure game and treasure hunt. First person who solves the riddle will receive the cash reward. Players must go through underground paths and decipher unusual messages and fragmented clues. If all bits of information are

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Your Apple can also join you in the Scrabble® brand crossword game, the world's best-selling word game.

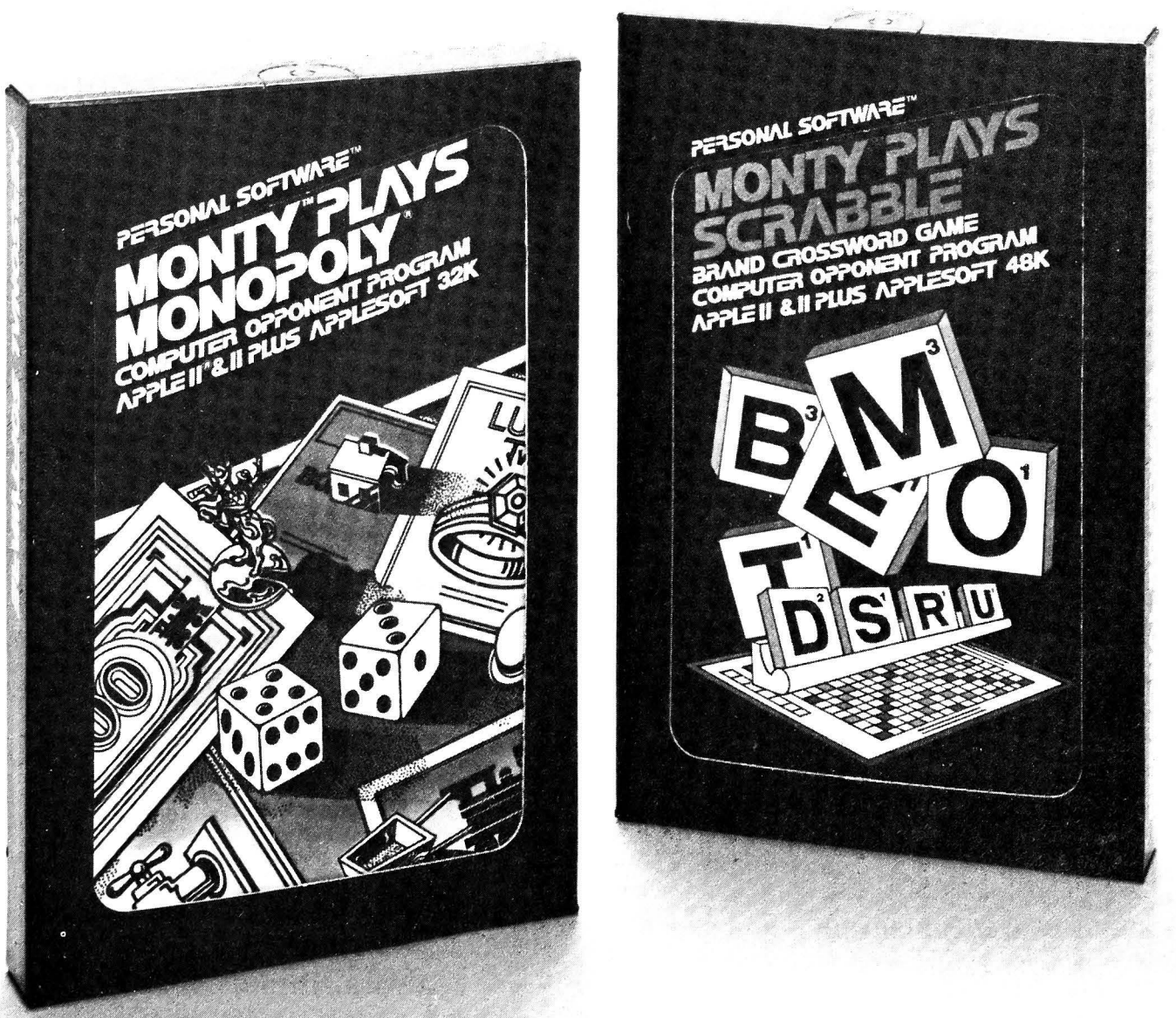
MONTY® Plays Scrabble® has a vocabulary of over 54,000 words and plays at four levels of difficulty. Up to three people can play with MONTY, who will keep score for everyone. Available on diskette for the Apple II with 48k, one 16-sector disk drive and a Language card or AppleSoft card, or the II Plus with 48k and 16-sector disk drive.

Both programs act as computerized opponents rather than being computer reproductions of the games themselves. The complete Monopoly and Scrabble sets are required.

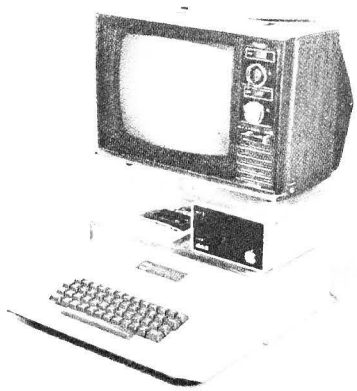
Both computer programs were created by Ritam Corporation. See them at your local retail computer store.

MONTY is a trademark of Ritam Corporation; Monopoly is a registered trademark of Parker Bros., which does not sponsor or endorse MONTY Plays Monopoly; Scrabble is a registered trademark of Selchow & Righter Company for a line of word and sentence games, and it does not sponsor or endorse MONTY Plays Scrabble. Apple and Applesoft are trademarks of Apple Computer, Inc.

Introducing two old favorites that won't fade with the fads



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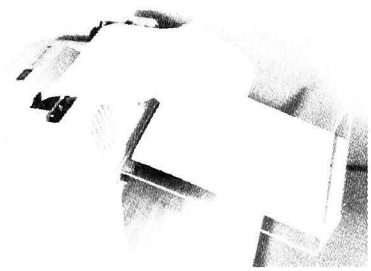


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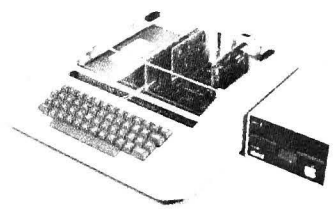
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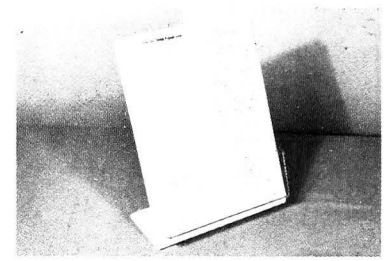
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pieced together correctly, then the location of the Alkemstone will be obvious, according to company. Game is available this month for $39.95, at a fraction of the possible reward money.

☐ **Orange Cherry Media** (Bedford Hills, NY) introduces a line of fifty-nine programs designed for the elementary market, grades K-8. Programs include *Sharks and the Underwater World, Saving our Environment,* and *Staying Healthy and Safe.* Prices vary. Brochure available from company.

☐ A new product that enables the Apple II microcomputer to communicate with the International Business Machines (IBM) mainframe computers has been introduced from **Micro Plus** (Minneapolis, MN). *The 3270 Emulator* permits the Apple to function as an IBM 3270 terminal with binary synchronous protocol over leased or dial-up communications lines. Enables the Apple to communicate with IBM 360, 370, and 303X central processing units or with any non-IBM device equipped with remote BSC3270 communication capabilities. $795. Also from the company, a new datascope for use in byte-oriented binary synchronous communications applications. Can be used for monitoring bisynch communication lines of frequencies up to 19.9 kHz or as an interactive simulator for testing both data terminal equipment and data communications equipment. System consists of an interface card and software. $595.

☐ **Arrow Data Systems** (Los Angeles, CA) is introducing *Arrowcode 15,* a new programming language for mills, lathes, and punches that gives flexowriter, terminal, and time-share capabilities to numeric control programming. Includes on-screen plots of code words and coordinates, complete editing, and nine subroutines. Post processors available for most N/C Control Units. $1,950.

☐ *Stock Forecasting System* from **Urban Aggregates** (Columbia, MD), determines when risk is low enough to buy, when risk is high enough to sell, and when to cover short sales. User can select his own risk and stop-loss limits. Information may be entered manually from the keyboard or automatically using a modem and the Dow Jones data base. Updating can also be accomplished via the graphics tablet. $175.

☐ Through forests and monasteries of merry old England, *The Quest for the Holy Grail* from **HHH Enterprises** (Kenner, LA) takes gamers on encounters with dragons, killer rabbits, wanton wenches, black knights, fair maidens, and wise wizards. Game is fully modifiable as an aid to learning programming. HHH solicits modifications and will pay royalties if used.

☐ **Legend Industries** (Pontiac, MI) announces the development of the first 128K RAM card for the Apple II. The *128KDE Soft Disk* can be put into any slot and can be accessed with the standard commands. Enables your Apple to triple its RAM capability. $750.

☐ *Gameport Extender* from **B-K Technologies** (Rockville, MD) provides a three-foot RFI and strain-protected extension of the internal game I/O connector for ready external access. Will mate with new series of project kits. $20.95.

☐ *The Micromodem II Disk and Tutorial* by **First Software Co.** (Scottsdale, AZ) is a telephone communication software package that enables an Apple to dial and answer a telephone; operate a remote computer over phone lines; send and receive programs, binary material, sequential text files, or random access text files; communicate with a mainframe computer, and make totally automatic transmissions. *Hayes Micromodem II* required. $115.

☐ **Apple Computer** (Cupertino, CA) has introduced a personal computer system for the entire family. To the business of running a home, budgeting, investment management, file organization, as well as serving the ends of education and entertainment, *Apple's Family System* combines an Apple II Plus computer, disk drive with controller card, game paddles, RF modulator, a new keyboard tutorial, the owner's guide, an educational software directory, seven software programs, and the complete library of Apple II manuals, plus growth path suggestions for additional software as the family needs it. $2,495.

☐ The new plotting utility from **Avant-Garde Creations** (Eugene, OR), *Ultra Plot,* combines a unique map chart creator

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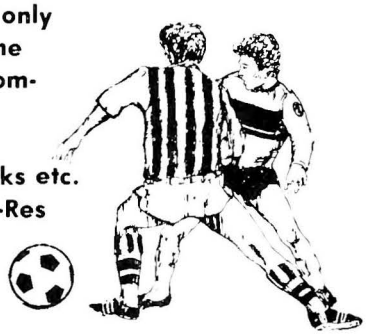
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program with its abilities to create pie charts, scatter charts, line graphs, bar charts, and others. The charts are in color, but work perfectly on black and white or green monitors. Statistics include mean, standard deviation, slope, Y intercept, regression line formula, range. The utility can interface conveniently with the *Complete Mailing Label and Filing System.* 1 or 2 disk drives. $70. ☐ Also from **Avant-Garde** comes *Race for Midnight,* in which you, the adventurer, risk becoming excessively lupine when the full moon rises, unless you can locate the ingredients for a werewolf antitoxin, which may or may not be found within a nearby dungeon. $29.95.

☐ **H&H Trading Company** (Clayton, GA), investment advisor and tax practitioner, has released an Apple computer version of its new *Market Tracker* program. Creates a composite index of six popular technical market indicators to determine intermediate swings in the Dow Jones Industrial averages. For use by anyone trading in American stocks or stock options. Includes list-selectable commands, automatic calculation of profits, fully editable disk data files, and a 50+ page instruction manual. $190.

☐ After a successful first year, **Computer Camp East** (Vernon, CT) is planning residential programs in Connecticut, Houston-Dallas, and the Chicago area for the summer of '82. Three sessions, June 17-August 22. Deposits now being accepted. $759 per two week period.

☐ **Crane Software** (Huntington Beach, CA) unveils its *Menu Generator,* helping you develop menu programs by requesting information to be input on several screen forms. No programming required. Consists of screen display, command processor, and operation processor. Prompt to be displayed and operation to be performed can be defined when prompt is selected; run Basic or machine language programs and boot disks to run protected programs. Can store inputs for one hundred and fifty menus. $39.95.

☐ Exploding up from the depths of **Earthware Computer Services** (Eugene, OR) comes *Volcanoes,* for 2-4 players who must attempt to predict the volatility of various types of volcanoes. A hi-res game that teaches cooperation rather than competition; can be played on differing levels of educational/geological expertise. $49.50. ☐ Also from **Earthware** is *The Electric Semicolon,* a Pascal programmer's utility that automatically inserts semicolons, finishes such ofttyped words as Begin, Writeln, and End. $68.50

☐ For the greater convenience of all operators of computer terminals, **FSI** (Reseda, CA) has produced the *PKay Keyboard Companion,* a copy stand that places the work directly in front of the operator. Can accommodate any configuration of minicomputer. Specify type of risers or pedestals. $68.50.

☐ **Creative Computing Press** (Morris Plains, NJ) announces publication of *The Creative Apple,* edited by Mark Pelczarski and Joe Tate, harvesting three years of Apple-oriented articles from the pages of *Creative Computing* magazine, all revised and updated. Much of the information, written by leading Apple programmers and reviewers, is not available elsewhere. 320 pages. $15.95.

☐ From the **Denver Software Company** (Aurora, CO) comes *Financial Partner,* a modestly priced package for small business or family finances. The user doesn't have to be a professional bookkeeper or accountant; all necessary instructions included in the package. Produces vendor payable and chart of account reports, trial balance, income statement, balance sheet, batch proof listings, and checks registers. Either DOS. $245.

☐ Adding the dimension of precise timekeeping to computer systems, the *Hayes Stack Chronograph* from **Hayes Microcomputer Products** (Norcross, GA) is the latest addition to the *Hayes Stack* line of stackable microcomputer component systems. The *Chronograph* enables the computer to control lights, burglar alarms, and sprinkler systems; log programs and reports by day, date, and time; and, combined with a modem, batch messages during the day and send them out at night when telephone rates are lowest. Features quartz-crystal control and battery backup, 300 or 200 baud operation, and automatic baud rate, parity sense, and word size detect. $249.

Don't Let Your Apple Miss the Boat



On June 5, 1982, a luxurious cruise ship will depart from Vancouver, Canada, with several Apples on board. For seven days, these privileged Apples will be learning such arcane arts as assembly language from Roger Wagner and graphics from Ken Williams, as well as compiling Applesoft programs into assembly code with Dennis Goodrow.

Besides coming back more intelligent, the Apples will be treated to the usual shipboard conveniences by a professional staff dedicated to providing everything a microprocessor might desire. The Apples will enjoy some of the most dramatic scenery north of Silicon Gulch, stopping in Ketchikan, Juneau, and Skagway, some of the last frontier communities. They'll cruise past Glacier Bay—giving the Apples a look at a true hi-res graphic.

Amazingly, in keeping with Softalk's policies, the Apples will be taking the tour free. Apples craving the companionship of their owners may inquire about the cost of human participation by writing to:

Softalk Cruise
Attention: Donna Siebert
11021 Magnolia Boulevard
North Hollywood, CA 91601

This tour is exclusively arranged for Softalk readers by Valencia Plaza Travel Agency of Newhall, California. Roger Wagner, Ken Williams, and Dennis Goodrow are committed to giving seminars on this cruise unless extraordinary business contingencies arise.

☐ **Fiberbilt** (New York, NY) is manufacturing a line of *Apple II Computer Cases.* Heavy-duty hardware, weather-tight rubber gasket, continuous hinge, and wraparound aluminum valance. Aluminum shipping case, $173.75; polyplex carrying case, $112.50. (Bell & Howell models ten dollars more).

☐ **Link Systems** (Santa Monica, CA) has been busy: *Datafax,* an information management program that allows the user to enter and access information without programming, is now being marketed. The Pascal program allows screens to be cross-referenced, retrieved by associated keywords, or chained together for hard copy. $250. ☐ Also available is *Datalink,* designed to give the Apple mainframe communication. The system can recall or transmit any sequence up to a thousand characters with one command. Up to 1200 baud over phone lines and 4800 baud computer to computer, with full error-checking. $100. ☐ Enabling the user to learn the Pascal language easier and faster, *LinkSampler I* includes twenty-one user-modifiable teaching programs that mix simple business programs with basic math and a few games. $60. ☐ And finally, three micro software tools for mainframe programming in Apple Pascal: *LinkIndex,* a rapid key retrieval unit based on the B-tree indexing method. $150. ☐ *LinkDisk,* a free-standing Pascal utility, will compare any two Pascal files or volumes byte by byte, change data at the nibble level, and translate files from DOS 3.3 to Pascal. $70. ☐ *LinkVideo,* a multi-functional screen utility that reduces user I/O programming time up to 90 percent; provided in source and p-code, creates terminal independent programs, validates, filters, prompts input. $55. Most **Link Systems** software is available for the Apple II and Apple III.

☐ **Media Service Concepts** (Chicago, IL) has introduced a new radio ratings analysis software package called *Recall,* enabling a radio station to organize quickly and interpret data furnished by Arbitron, the major ratings service. Analyzes up to four stations or rating books simultaneously; provides full-color graphics and extensive print-outs. Includes 100 page manual and expert support consultation. $750.

☐ The fifth edition of *The Software Vendor Directory* has just been published by **Micro-Serve** (Nyack, NY), completely revising and expanding the previous edition (from way back last March) with 5,579 additional entries. Includes hardware index, alphabetical listing of microcomputer software vendors, appendices that cross-index software categories to compatible hardware and operating systems. Fifth Edition, $57.95; *Subscription Service Plan* (editions 5-7), $100.

☐ Two new publications from **Sams Books** (Indianapolis, IN): *The Hexadecimal Chronicles* by Don Lancaster, a group of tables covering the fifty-two most important personal computing calculations, including 8-, 16-, and 24-bit conversions. 304 pages. $17.95. ☐ Also, *The 68000: Principles and Programming* by Leo J. Sandler, providing the first systematic description of the 16-bit microprocessor for design engineers, programmers, and students who want to learn the latest in 68000 principles. The instruction set, its fourteen addressing modes, and its six basic addressing groups are explained; the fifty-six microcoded instructions and sixty-four integrated circuit pins are grouped by function; processing/privilege states are covered, and a survey of available hardware and software support products is provided. 240 pages, softbound. $14.95.

☐ From **The Keyboard Company** (Garden Grove, CA) comes *Joystick II,* with momentary switches rated for one million cycles of operation, and *Cursor III,* a joystick for the Apple III. $49.95.

☐ **Synergistic Software** (Bellevue, WA) introduces *The Data Reporter,* a rapid response, general purpose data management system that can be automatically customized to particular data storage, access, and manipulation requirements for data-base, inventory control, accounts receivable, sales analysis, bibliography, and memo programs. Data files can be reformatted without reentering data; output commands for printer control, graphs, statistics, and more are provided. Hard or floppy drive. $220. ☐ *Odyssey,* **Synergistic**'s popular adventure game, expanded into three separate but interlocking programs, is now available in Applesoft Basic as well as Integer. $30. ■



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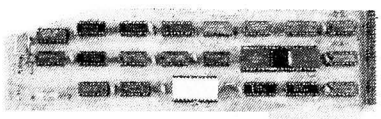
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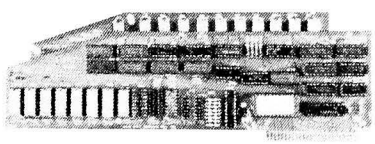
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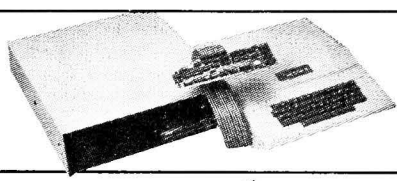
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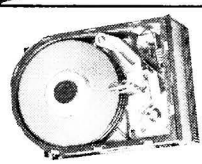
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System Software: Pearl application development, unmodified Apple DOS, Pascal and CP/M smallest drivers in town.

Data Base: Desktop/Plan, DB Master, dBase II, CCA Data manager.

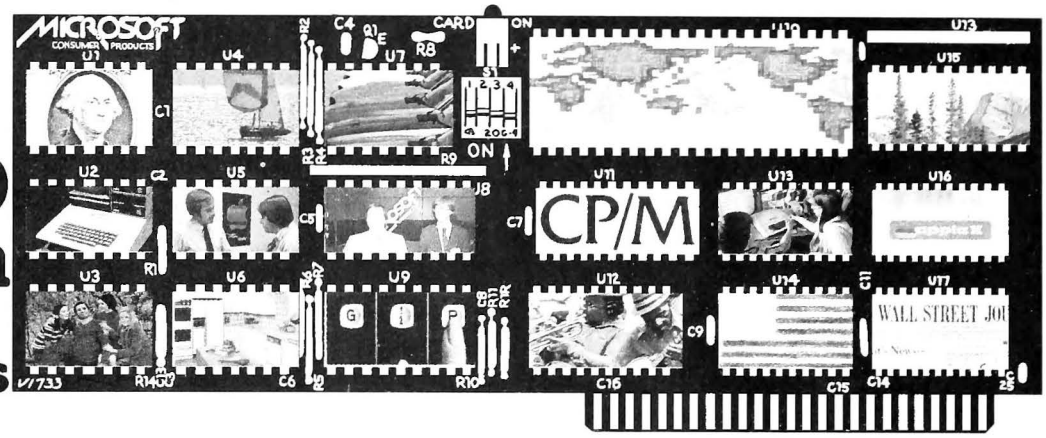
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SOFTCARD Symposium

by Greg Tibbetts



Welcome to the fourth and final installment of our continuing series on Basic-80. This month we'll deal with the functions supplied in Basic-80, and, following that, we'll discuss some of those miscellaneous things that have been passed over in our previous discussions.

The difference between functions and commands in any of the Basic languages is often difficult to define. A function is generally an operation performed on a single, specific operand (usually a numeric variable), returning a specific result. Normally the result must be placed in a numeric variable to be recoverable—as, for example, in the case of X=SQR(Y), where the square root of Y is assigned to the variable X. The operation is usually mathematic, but, regardless of its form, it always returns the same result for a given operand.

Commands, on the other hand, such as the ones we've dealt with up to now, may or may not have arguments to act upon, and may either return an answer or cause the computer to perform a specific action.

The definitions are very close, and there is some overlap between these two operations.

Now let's look at the specific functions available in Basic-80 that are not found in Applesoft or Integer Basic: *button, cdbl, cint, csng, cvi, cvs, cvd, eof, fix, hex$, inkey$, input$, instr, loc, lof, lpos, mki$, mks$, mkd$, oct$, space$, string$, varptr,* and *vpos*.

In the interest of space, examples will be provided only where the use of the function is not obvious or has not already been thoroughly treated in the manual.

Button is the function that returns the current value of a specified game controller pushbutton—1 if it's being pressed, 0 if not. *Button* replaces the peeks required to gain this information under Applesoft.

Cint, csng, and *cdbl* are functions that convert numeric variables from one type to another—to integer, single precision, and double precision respectively. Generally, when you're converting from a less precise value to a more precise one, as from single to double precision, for example, a rounding error will be introduced because of the inability of the computer's binary storage method to reflect decimal values with 100 percent accuracy. Note the example listed under the *cdbl* function in Volume II of the SoftCard Manual.

Cvi, cvs, and *cvd* are paired with *mki$, mks$,* and *mkd$,* and provide the means to convert numeric variables into a form that can be stored easily in a random disk file. Essentially the *mk* functions convert integers, single-precision, or double-precision values into a coded string form that can be placed in ASCII disk file and subsequently can be typed out to the terminal—avoiding the garbled output that straight numeric data would produce. The *cv* functions convert those coded string values back to their numeric counterparts.

Eof, loc, and *lof* also have to do with disk files. *Eof* is designed for use with sequential files; it's the means by which the end of a sequential file is detected during input from the file. By testing for *eof*—which changes to −1 when the end of the file has been reached—you can avoid the INPUT PAST END error that occurs if more input is requested than exists in the file.

Loc and *lof* are for use with either random or sequential disk files and return different results depending on the type of file being accessed. *Loc,* when used with random files, will return the next sequential record number following a *get* or *put* statement, provided these statements don't themselves specify record numbers. That is, when you are repeatedly inputting to or outputting from a random file without specifying record numbers, the *loc* function will always return the next record number to be accessed. With sequential files, *loc* returns the total number of 128-byte sectors that have been accessed since the file was opened.

Lof returns the total number of records contained in the last extent of the file in question. If the file is no more than one extent in length, then *lof* returns the true length of the file in records. If the file is longer than one extent, then you will have to add the appropriate number of records contained in the preceding extents.

Fix, hex$,* and *oct$ are for the conversion of numeric values. *Fix* is nearly identical to *int,* since it truncates the noninteger portion of floating-point values; but it doesn't return the next lower number for negative values. See the example in Volume II of the SoftCard manual for clarification.

Hex$* and *oct$ return strings that are the hexadecimal and octal equivalents, respectively, of the argument. In cases where you wish to print the numeric values in hexadecimal or octal, these functions are the only easy way to do the job.

Inkey$* and *input$ are additional methods of getting character input from the keyboard or, in the case of *input$,* from the keyboard or a disk file. Neither function echoes characters to the display, so if you want echoing you have to set up print statements. *Inkey$* is similar to peeking the Apple keyboard strobe from either Apple Basic, in that it performs a one-time check of the keyboard to see if a key has been pressed. Either the null string (""), if no key has been pressed, or the character corresponding to the pressed key will be placed in the string variable used in the function. For example, X$=INKEY$ will return the character pressed or the null string in X$. This function is often used to check for a response to a "hit any key to continue" statement in a program. Combined with *while/wend,* such a device might look like this:

```
100 Print "Hit any key to continue":X$="":While X$="":X$=INKEY$:Wend
```

No argument is required with *inkey$.*

Input$, on the other hand, may have either one or two arguments and will get a set number of characters—the number specified in the first argument. This input will be taken either from the keyboard, if only one argument is present, or from a disk file, if a second argument of the form *#x* is given, where *x* is the file buffer of the file in question. All characters except control-C are accepted and placed in the assigned string variable; control-C will prematurely terminate the input sequence. *Input$* is generally the only way a carriage return can be input without terminating a multiple-character input statement. Another important use of *input$* is for the gathering of data via keyboard entry at times when you want the user to restrict his entries to a set number of characters.

The advantage of *input$* over *inkey$* is that with *input$* it's not necessary to set up a loop for multiple-character input. The

advantage of *inkey$* is that your program can test each character of input as it's entered, to detect illegal input or special user-selected delimiters. Choose the function that's appropriate for your needs.

Instr is a function that searches a named string for the occurrence of a second named string, then returns the character position where the match was found. It's often used for searching through tables of keywords that have been stored in a series of strings, rather than in string arrays. In this use, it is much faster than a for-next loop with a sequence of equivalence-type tests. For example:

```
100 X$="DROPSAVETAKEKILLJUMPDIVESWIM"
110 Input "DO WHAT";Y$
120 X=Instr (X$,Y$):If X=0 Then 40:Rem 40 is errar routine.
130 Y=Int(X/4)+1:On Y Gota 200,300,400,500,600,700,800
```

Lpos is a function whose only purpose is to return a value corresponding to the current print position in the line printer character-buffer. Because of differences between printer configurations, the position returned by *lpos* may not be the current physical location of the print head on the paper. The primary purpose of this function is to insert carriage returns and/or linefeeds at certain line lengths for nonformatted output. Because of the wide number of different printer-interface card-printer driver combinations, *lpos* may not be totally usable in your system. A few seconds of experimentation will let you know.

Space$* and *string$ are functions designed to shorten the Basic code needed to print lengthy repetitions of spaces or other characters. *Space$*, as its name implies, will assign the number of spaces specified in its argument to the assignment variable; this variable can then be printed, as, for example, X$=SPACE$(50):PRINT X$. These statements will cause fifty spaces to be printed at the terminal.

*String$* has two arguments. The first gives the number of repetitions, and the second supplies the ASCII code for the character to be repeated. Alternatively, the second argument may hold the character itself, enclosed by quotes. The statement X$=STRING$(50,32):PRINT X$ is equivalent to the *space$* statement in the previous paragraph. Both can, of course, be used with *lprint* statements as well. One very handy use of either function is to form an auto-center subroutine. For example:

```
1   X$=Space$((40-Len(Y$))/2):Print X$;Y$;X$:Return
.
.
.
450 Y$="Program Output Of Any Kind":Vtob 6:Gosub 1:Rem Assign Output
    String, Pasitian Cursor And Go Print String
```

Varptr is a function used to find the memory address of the first byte of a variable stored by Basic-80. This is most often done so that the data can be altered or otherwise accessed—either by a Basic program using peeks and pokes—or by a machine language subroutine. The address is returned as an integer in the range −32768 to +32767, and the result, if negative, must be added to 65536 to obtain the correct address.

Varptr can also be used with an argument of the form *#x*, where *x* is a file number. In sequential-access mode, this will return the memory address of the beginning of the disk-file I/O buffer for the file specified. In random-access mode, the function will return the address of the beginning of the file's field buffer (see last month's column for the difference between field buffer and I/O buffer).

Varptr can be used with any type of variable; however, with string variables, the function returns not the memory location of the first byte of the string, but rather the memory location of the length and pointer set that, in turn, points to the string.

Using *varptr* with strings is a special case and is the one situation where this function is most often used. A very common use is to locate the starting addresses for short machine language routines that have been placed in memory by coding them as strings. Once they've been located, a simple call will execute them. Here's an example:

```
XOR   A          ;zera occumulatar
LD    HL,F400    ;locatian af stort af Apple text screen
LD    DE,F401    ;start + 1
LD    BC,03F8    ;repetition count
LD    (HL),A     ;load fill volue
LDIR             ;repeat till done
LD    A, (HL)    ;get last fill value
INC   A          ;value + 1
JR    NZ,F0      ;da until overflow to 0 again
RET              ;then return
```

The 18 bytes representing this program in hex are:

```
AF 21 00 F4 11 01 F4 01 F8 03 77 ED B0 7E 3C 20 F0 C9
```

The following Basic-80 program captures this routine as a series of elements in a data statement in line 10. It then builds the string X$ from these elements in line 20, thereby putting them in memory; finds the length and address pointer in line 30, using *varptr*; converts the low- and high-order bytes of the actual string address and assigns the address to variable Y in line 40; makes sure that Y is a two-byte integer and calls the routine in line 50. As an exercise, you might wish to type in the Basic program; the result may amuse you.

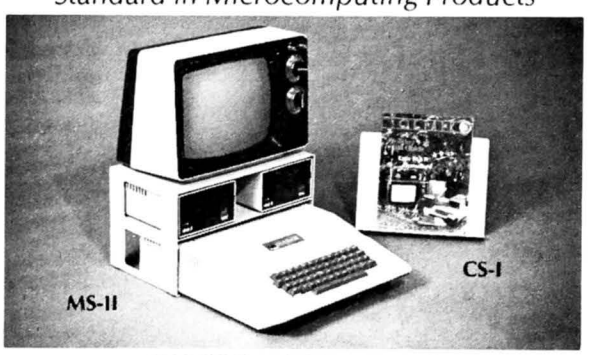
```
10 DATA &HAF, &H21, &H00, &HF4, &H11, &H01, &HF4, &H01, &HF8, &H03,
   &H77, &HED, &HB0, &H7E, &H3C, &H20, &HF0, &HC9
20 FOR I = 1 TO 18 : READ A : X$ = X$ + CHR$(A) : NEXT I
30 X = VARPTR (X$)
40 Y = PEEK (X+2) * 256 + PEEK (X+1)
50 Y = Y - 65536! : CALL Y
60 END
```

Note: this program affects the Apple 40-column text screen only. Its function with an 80-column board installed may be unpredictable.

The final function we'll talk about is *vpos*. This function returns the current vertical position (1 to 24) of the cursor on the screen. It can itself be used as an argument to *vtab* for relative movement of the cursor, as in VTAB VPOS (0)−1.

GOTO 123

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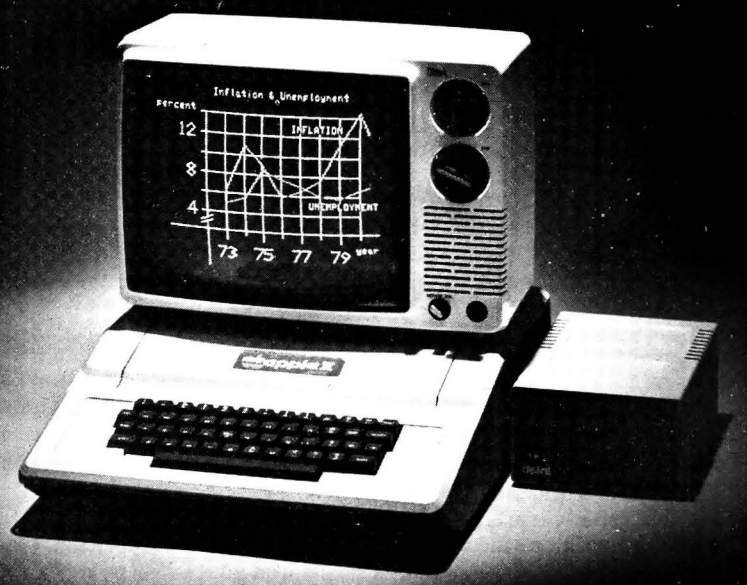
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AN INDEX OF SOFTALK SOFTWARE REVIEWS



The index, compiled for *Softalk*'s readers by business editor Peter Olivieri, covers all software reviewed in *Softalk* since Volume 1, Number 1, in September 1980. Listed items appeared in Marketalk Reviews and Impressions or in special review articles. No hardware is included.

We hope you'll find the index useful in locating information on older programs you may be considering purchasing.

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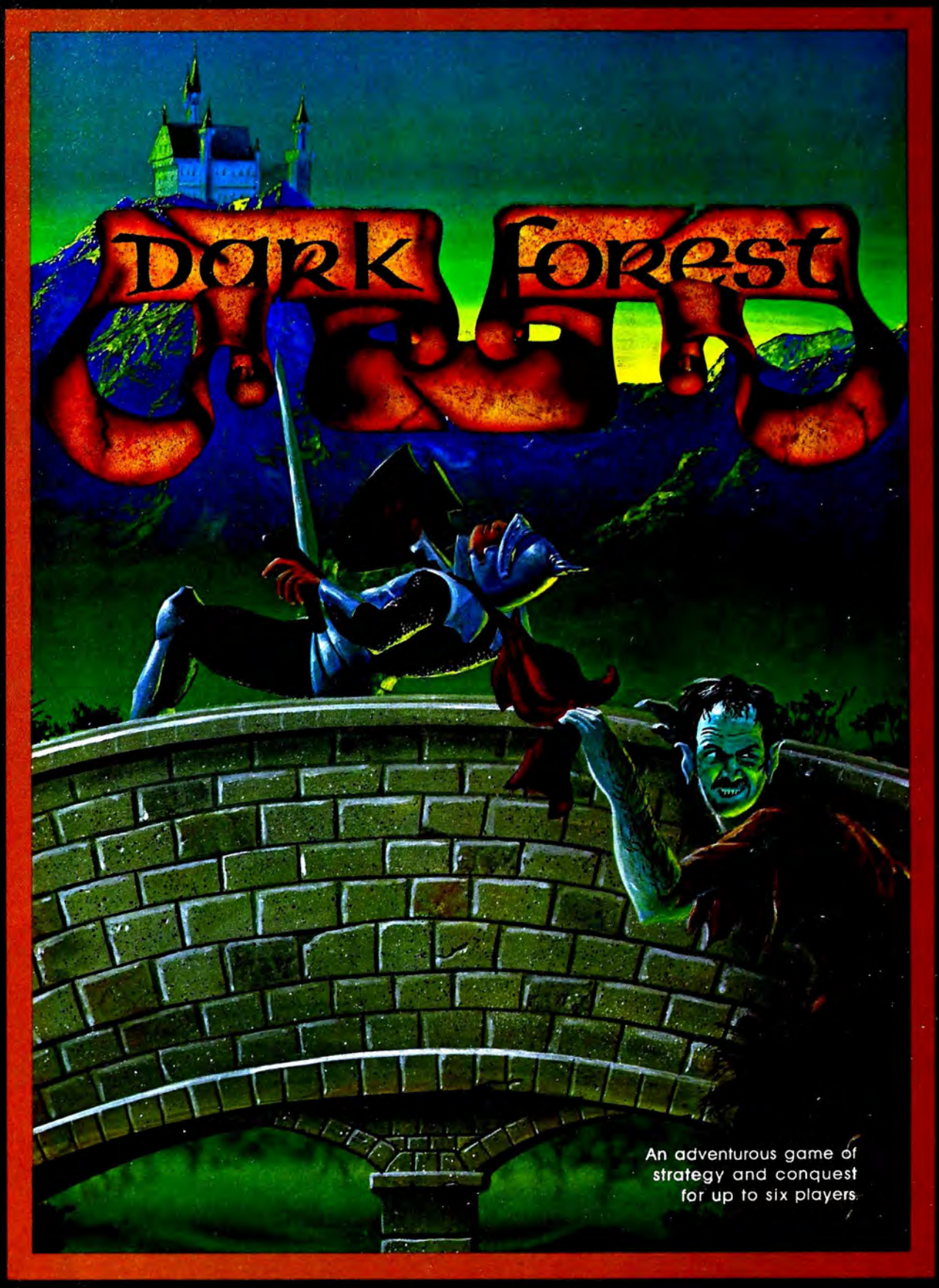


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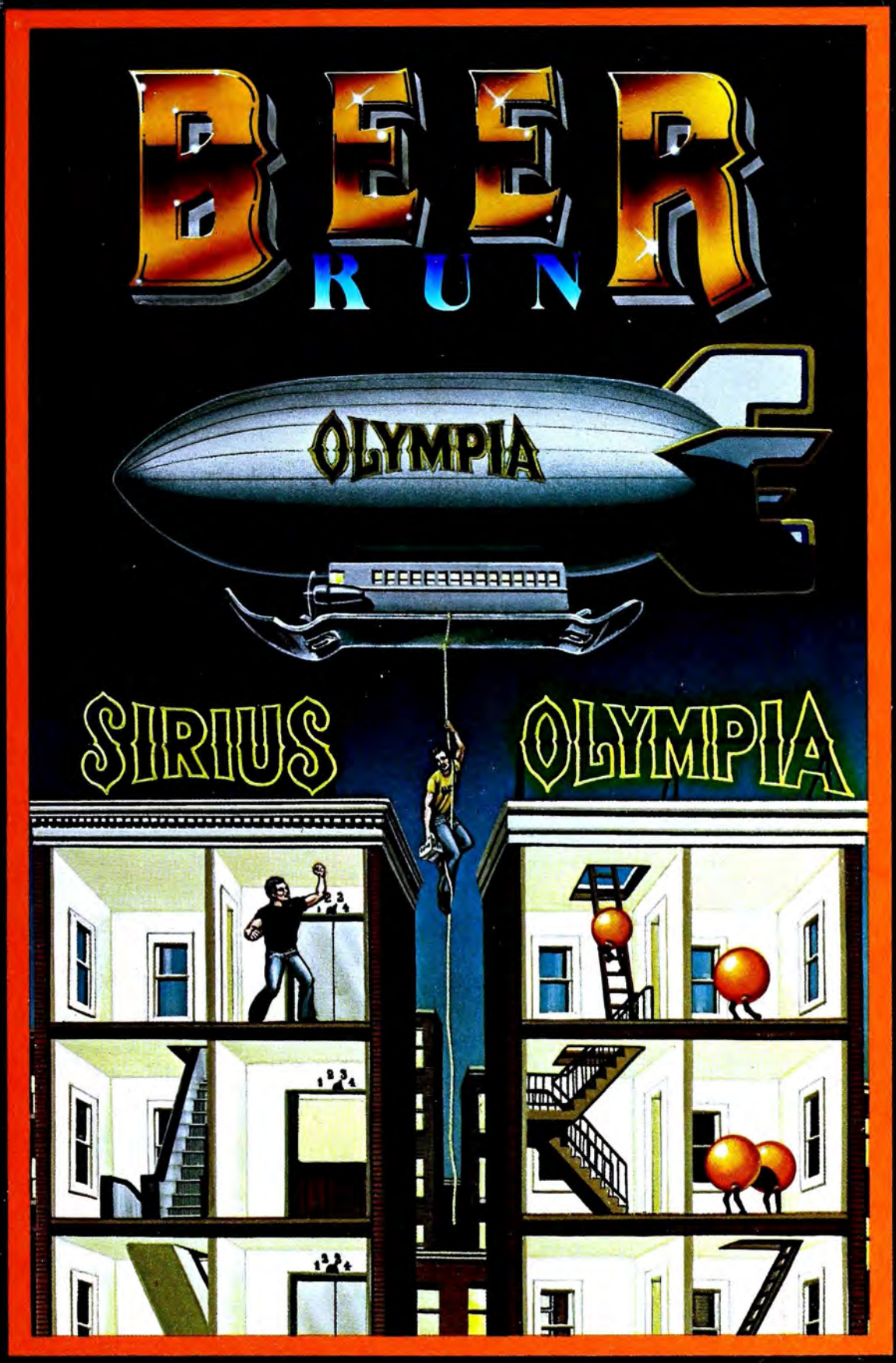
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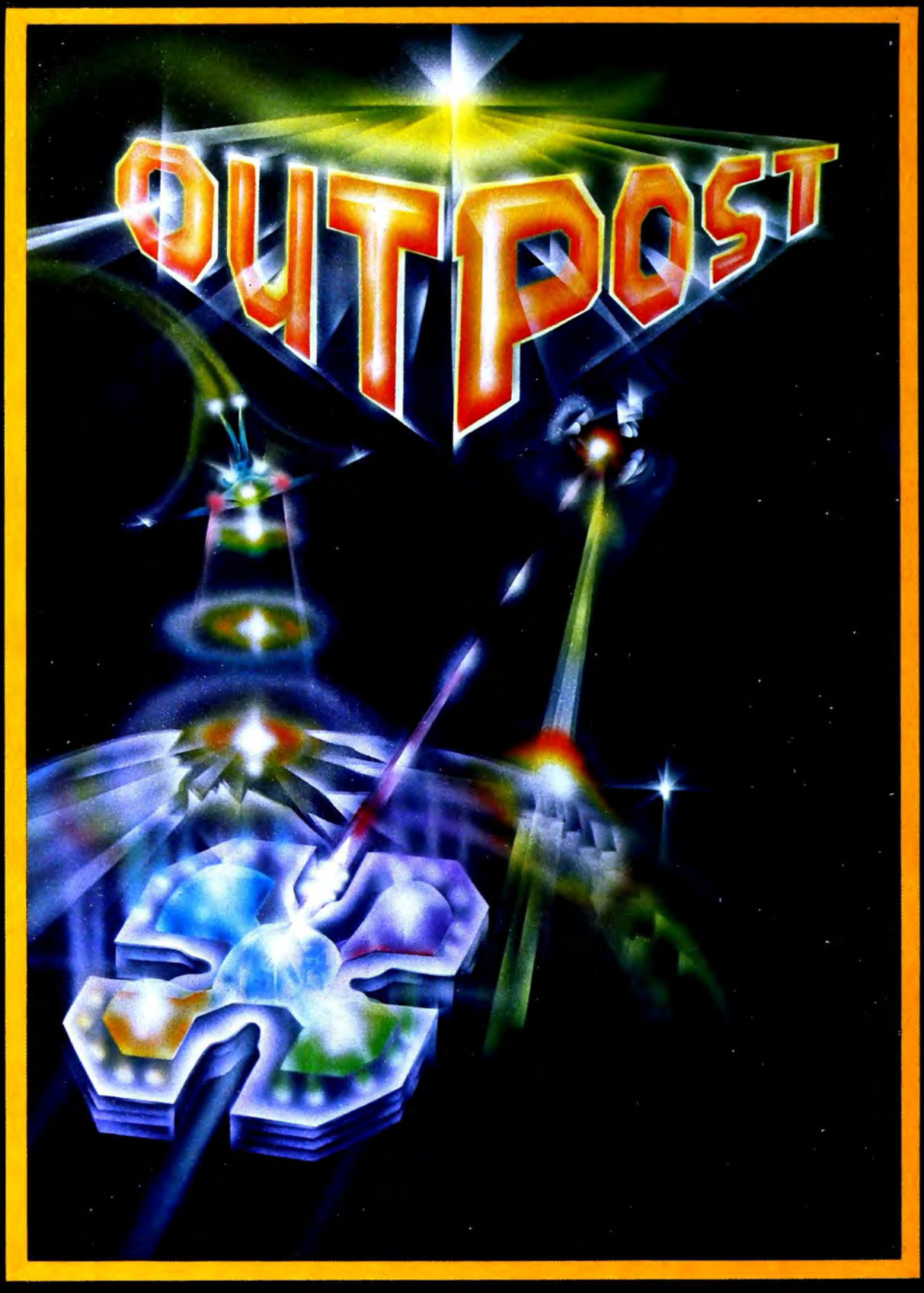
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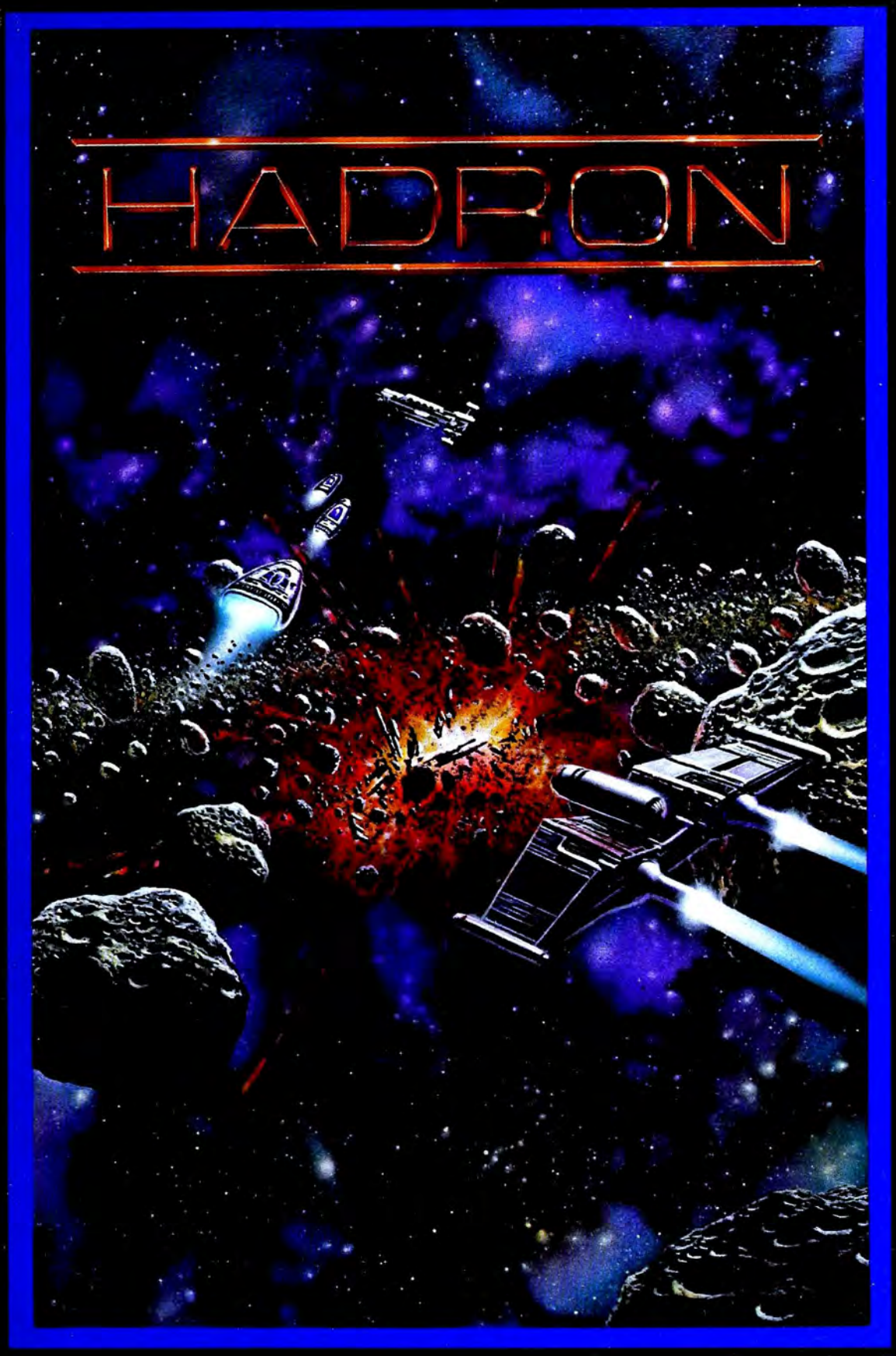
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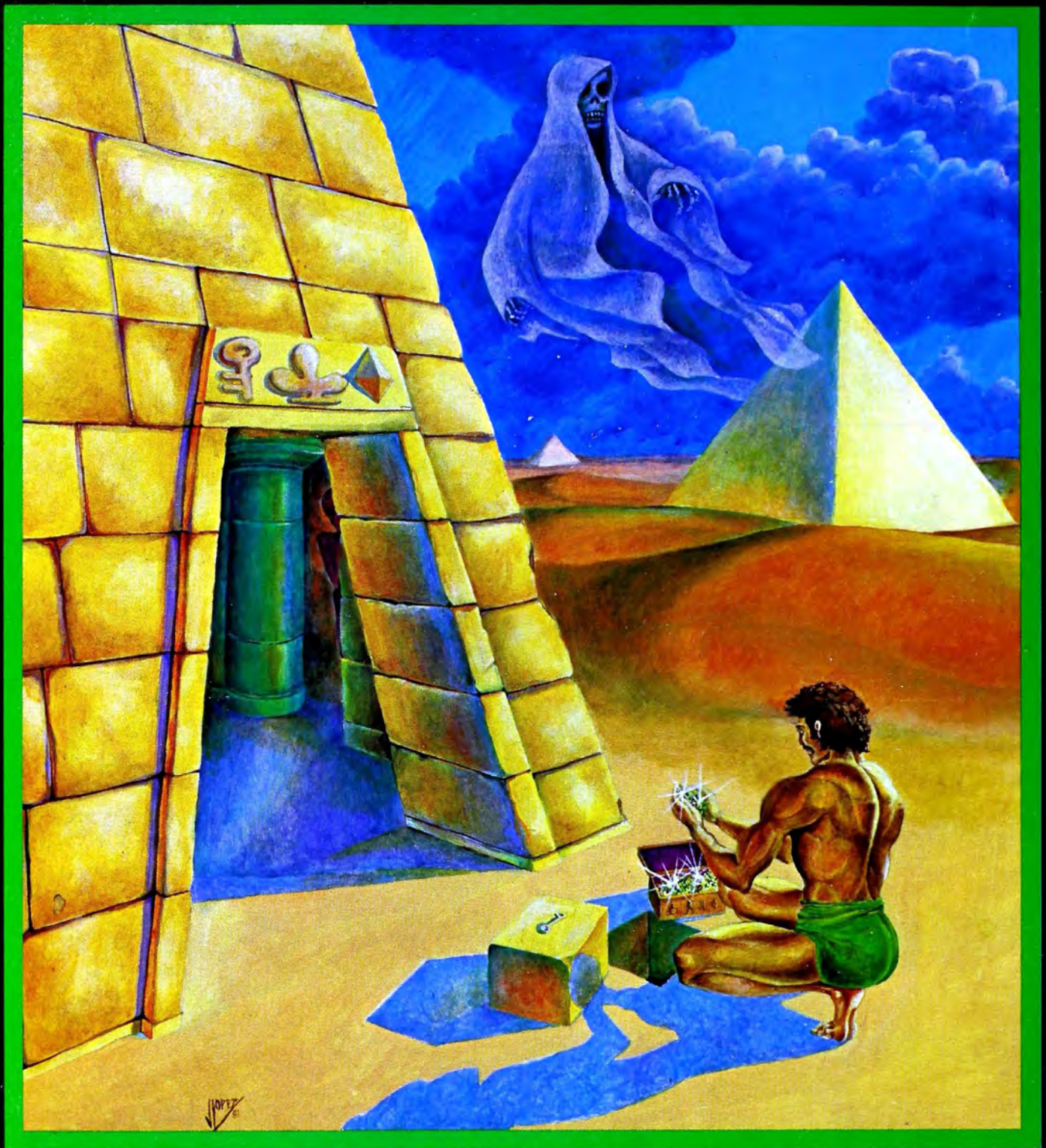
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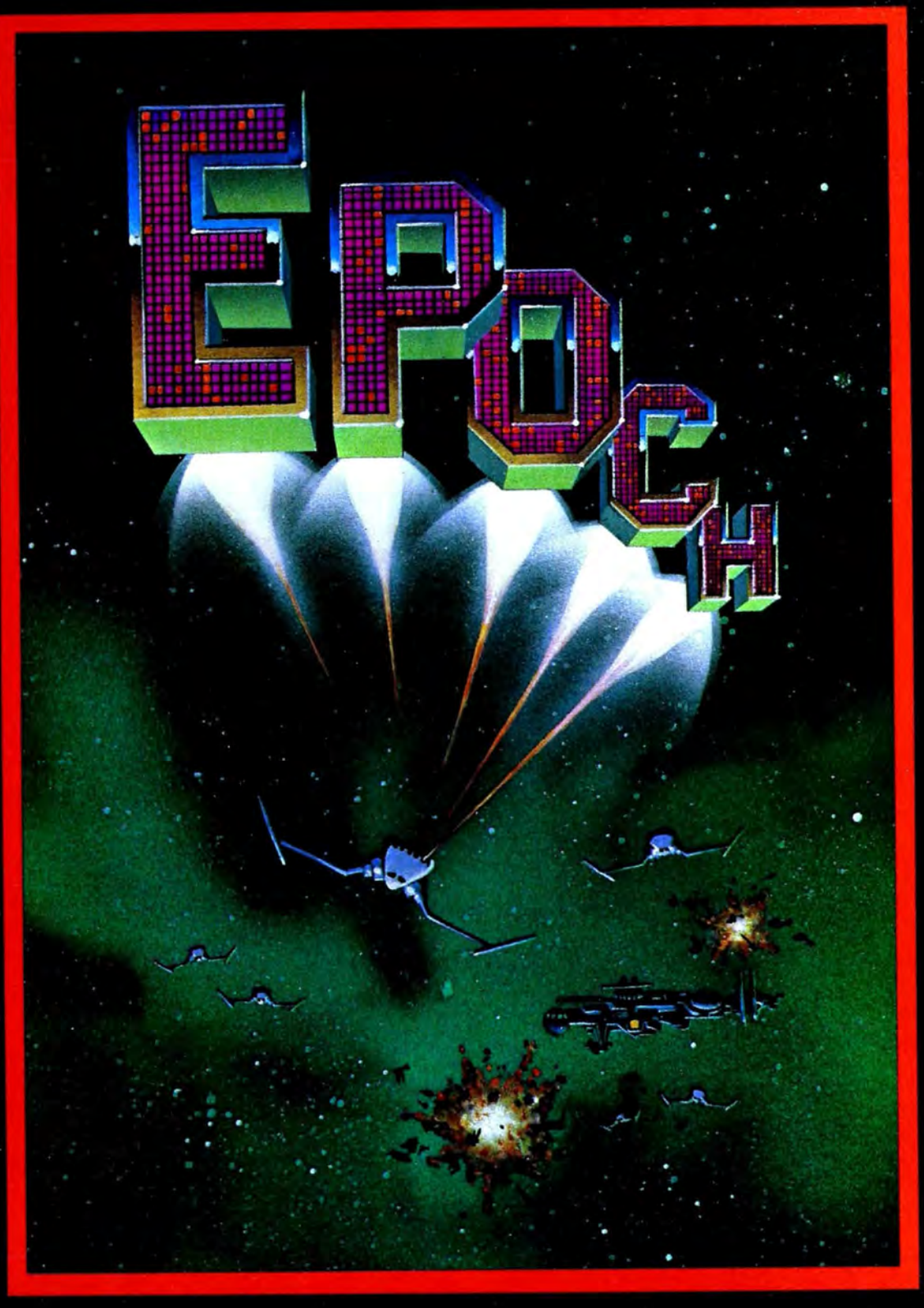
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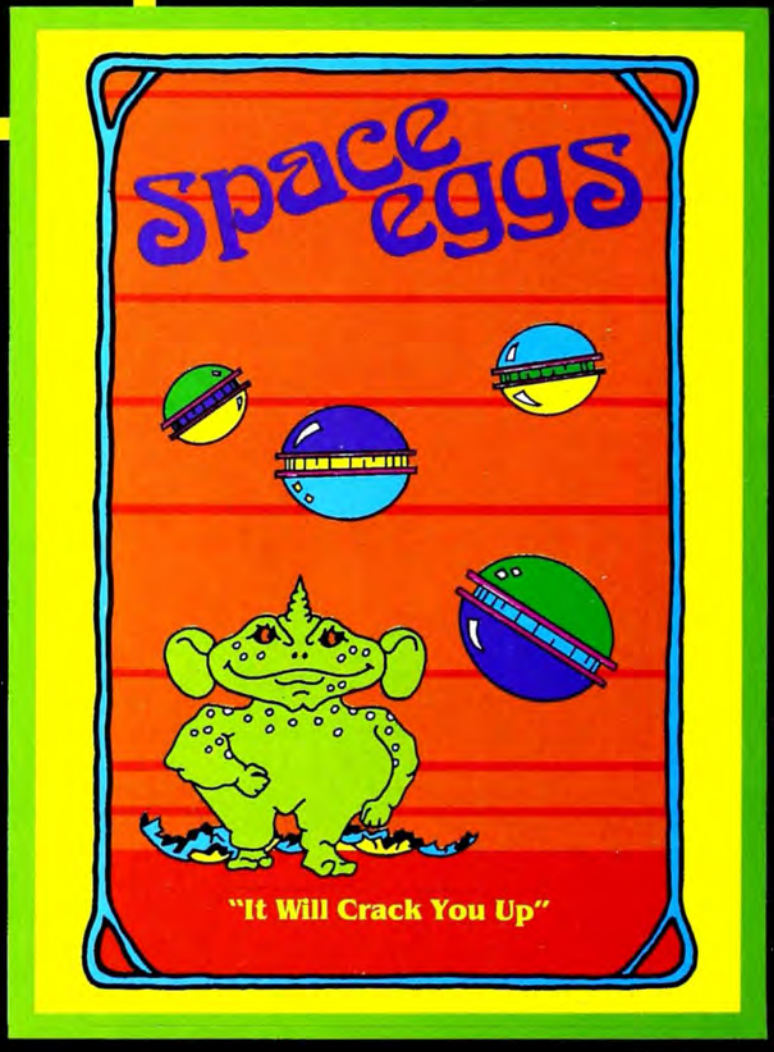
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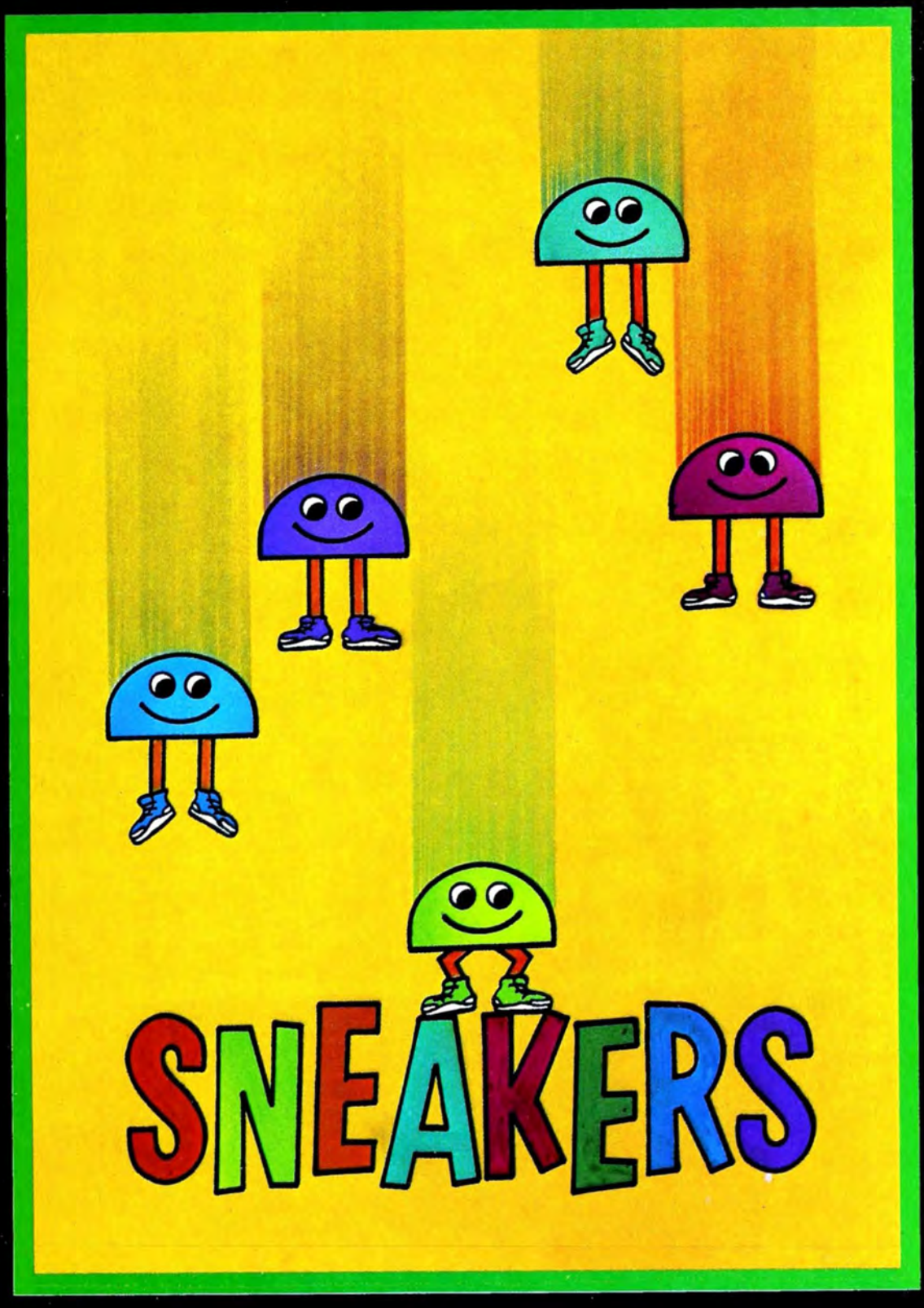
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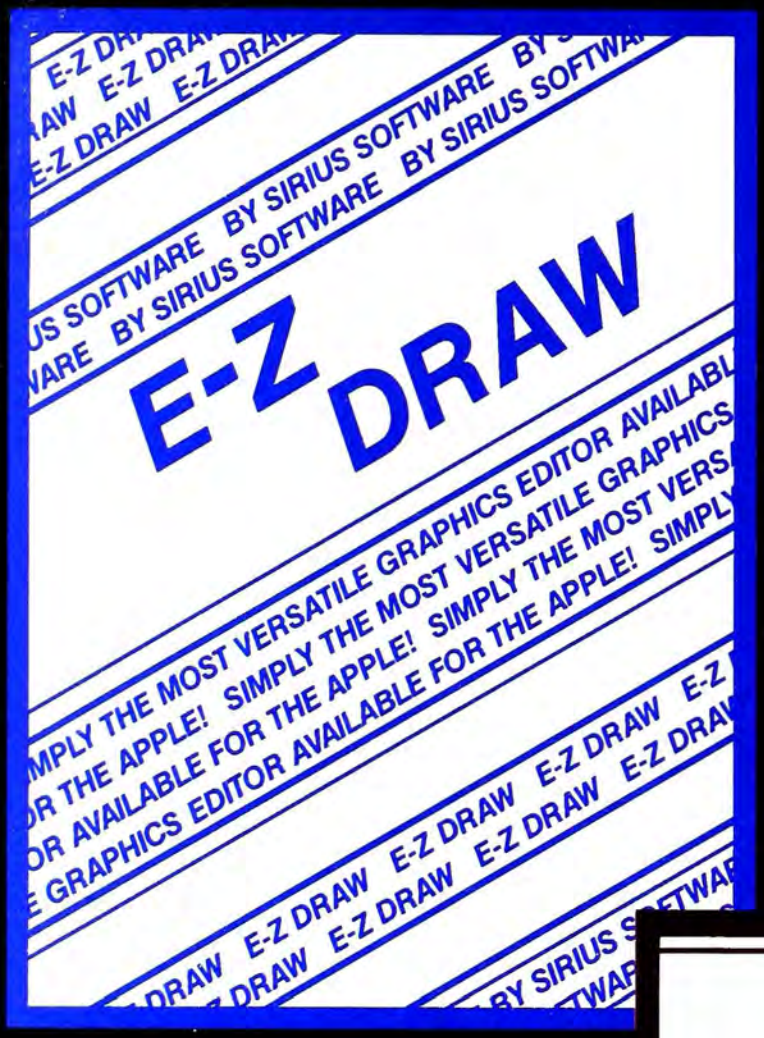
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PULSAR II

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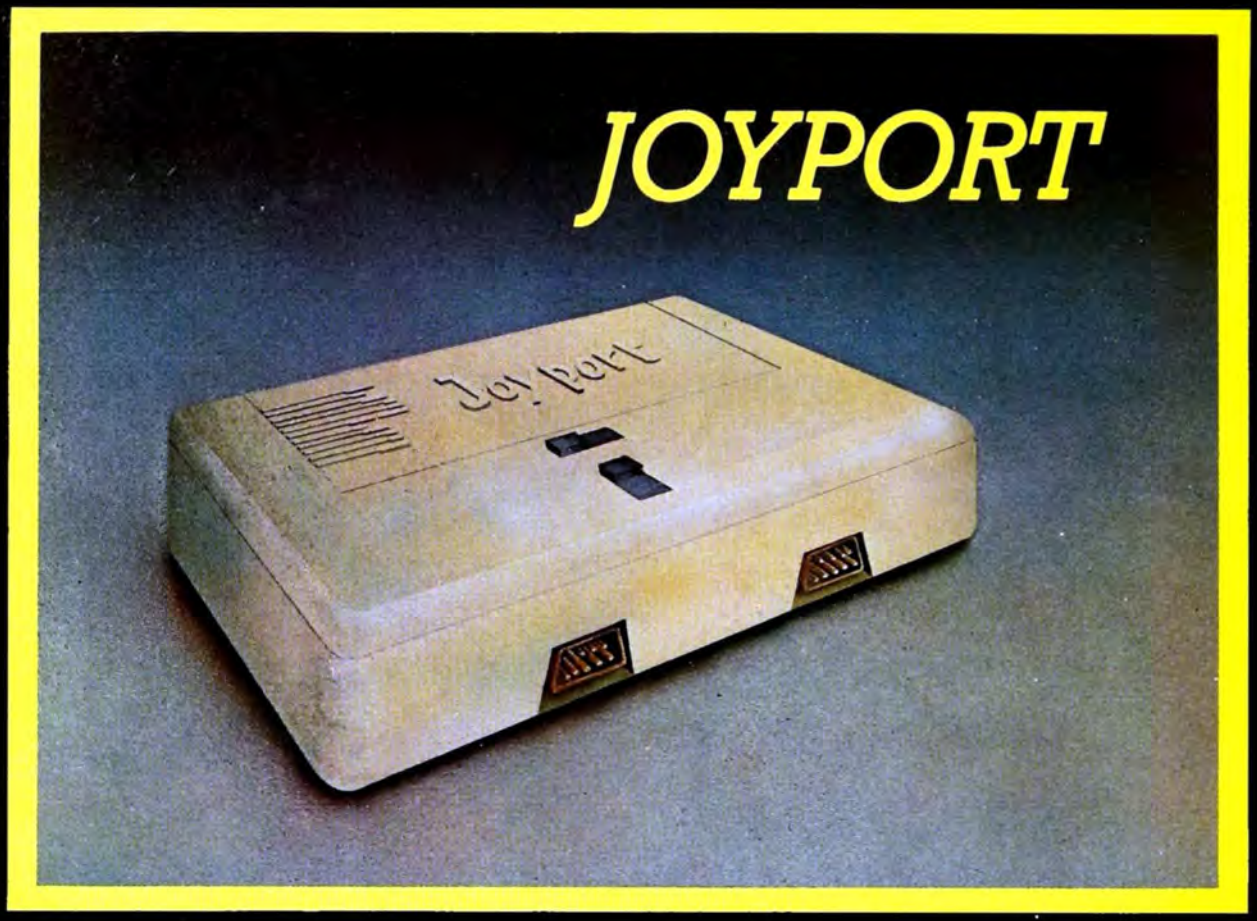
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PROGRAMMING: Copts & Robbers was programmed by Alan Merrell and Eric Knopp. Epoch and Hadron were programmed by Larry Miller. Orbitron was programmed by Eric Knopp. Gamma Goblins was programmed by Tony and Benny Ngo. E-Z Draw was programmed by Nasir Gebelli and Jerry Jewell. Pascal Graphics Editor was programmed by Ernie Brock. Sneakers and Beer Run were programmed by Mark Turmell. Gorgon, Phantoms Five, Space Eggs, Both Barrels, Star Cruiser, Cyber Strike, Autobahn, and Pulsar II were programmed by Nasir. Outpost was programmed by Tom McWilliams. Dark Forest was designed by Jerry Jewell and programmed by Tom Mornini. LeGreedy was programmed by Robert Oates and Andrew Korsak. Audex was programmed by Peter Kosel.

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A Special Present for Melody



This is not a Christmas story, although it is about birthdays. This is not a story about gifts, although many families are the richer today because of this birthday. This is not a Dickensian story about the rehabilitation of some modern-day Scrooge, although it has something to do with commerce. And, finally, this is not a story about a piece of bestselling software, but it does touch on software.

The dramatis personae of this particular tale are Melody Huntington, her father Fred, and her mother Barbara. Center stage is Corcoran, California, although other locales span the nation. The software in question is *Hodge Podge*, a lo-res pre-kindergarten educational program published by Dynacomp.

There are other elements that need to be understood to grasp the short tale that's about to unfold.

The first is that the Huntingtons are the founders and proprietors of Huntington Computing, one of the largest purveyors of mail-order software in the country. This came about when they noticed that they had nowhere to go close to home to purchase software.

Fred is principal of Mark Twain Elementary School, and Barb taught in the Corcoran school system. They reasoned that if they could be distant from computer stores in the middle of California, there must be other computer owners who weren't close to a computer store that stocked a full line of software.

So, for a ridiculously small sum of cash, they went into business less than eighteen months ago and have built a megabucks firm that Barb now tends full-time, along with nearly thirty employees.

You also need to know more about *Hodge Podge*, written by Marsha Meredith. It's programmed in colorful lo-res graphics and teaches basic recognition and number skills for preschoolers. Many of the pictures are accompanied by a couple of bars of songs familiar to tiny tots.

No one will mistake Meredith's programming techniques for those of Bill Budge or Nasir. The lo-res graphics are appropriately colorful for the intended audience, but both the graphics and animation are strictly early Apple. It's a program done with the preschooler in mind and, as such, eschews the bells and whistles that would keep even a first grader interested.

As it happens, Melody's second birthday was July 25 and Fred and Barb were contemplating how to celebrate it. They noted that her favorite program on the Apple was *Hodge Podge* and they likewise knew that *Hodge Podge* was not a program that many retailers were carrying.

So they conducted an advertising campaign in most of the national computer magazines in August, offering *Hodge Podge* for the price of $18.99, marked down from $23.95, to anyone who would call and say "Happy birthday, Melody."

The campaign succeeded beyond their wildest expectations. Some families even got on the phone together to sing Happy Birthday to Melody. Huntington probably moved more copies of *Hodge Podge* in August than the rest of the country combined.

Because it happened in August, this can't qualify as a Christmas story. But it has all the elements. Birthday best wishes for a little girl from all parts of the country. Children now enjoying and learning from a program that they might otherwise not have had. New life breathed into a deserving product.

In a way, every time one of those dozens of kids boots up *Hodge Podge*, they're celebrating Melody's birthday. So this isn't a Christmas story, but it sure would be a good one if it were.

ART



ON-LINE SYSTEMS introduces arcade gaming as an art form. THRESHOLD, by WARREN SCHWADER and KEN WILLIAMS, features fast smooth animation, HI-RES graphics, and more challenge than you'll find in any other arcade game on the market.

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Unless otherwise noted, all products can be assumed to run on the Apple II, Apple II Plus, and Apple III in the emulator mode and to require 48K and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card.

Hi-Res Adventure #4: Ulysses and the Golden Fleece. By Bob Davis and Ken Williams. Once again, On-Line Systems, like only a few others, takes adventuring out of the dungeon, this time to the sunlit climes of ancient Greece and the Aegean islands. And, once again, On-Line has chosen to present an adventure with a story rather than a race for score or treasures.

A couple of months ago, Bob Davis was a fat and sassy Coarsegoldian, innocent and computerless. Then one day, he wandered unknowingly into the offices of On-Line and there encountered a virulent virus; he was badly bitten by the adventure bug. Now, Bob Davis is a sleek and sophisticated Coarsegoldian, worldly wise and Apple addicted—and (truth at last) the author of the first Classical adventure, *Ulysses.*

The roots of this adventure in mythology are loose to say the least. But who cares? The famous characters are there, the flavor is there, the good adventure riddles are there, and it all melds into a lot of fun.

As Ulysses (that's you), you must gain the favor of the king, acquire provisions, hire a crew, and leave no stone unturned before you even board your ship. Once sailing, you must weather hurricanes, lorelei, even wicked water kings.

You'll visit islands of fascination and danger and find clues and treasures and labyrinthine caves. You'll have to use imagination that looks outside the norm for means of transportation and for tools.

All in search of a golden fleece. When you find it, you'll do so with the help of something very beautiful but fleeting. And you'll get credit for fulfilling your quest.

The multicolorful hi-res graphics we've come to know and love from On-Line are not standing still. Williams and staff have made quantum leaps in some respects. A nice feature, apart from the graphics but enhanced by them, is the ability to communicate, if briefly, with the people who populate the adventure.

On-Line Systems has two new winners in *Ulysses:* the adventure, which is the best from On-Line since *Wizard and the Princess;* and Bob Davis, a new author from whom we hope we'll be seeing many new adventures. MCT

Ulysses and the Golden Fleece, by Bob Davis and Ken Williams, On-Line Systems (Coarsegold, CA). $34.95.

Arith-Magic. By Joanne Benton Rudnytsky. *Arith-Magic* is a program for those who like to tinker with math. Three games, *Diffy, Tripuz* and *Magic Squares,* make learning math fun. As well as strengthening skills in addition, subtraction and multiplication, *Arith-Magic* helps the user see relationships and patterns in math puzzles. You need to excercise faculties in logic and deduction to solve the problems.

Tripuz, the easiest of the three, gives the player a puzzle involving either addition or multiplication. As with the other two games, *Tripuz* gives instructions if requested. The instructions work backward in this case.

The game is laid out in a triangle of six numbers, three known and three unknown. Three numbers forming the corners of the triangle are unknown. Between any two corners is a number which is the sum of those two corners. The three sums between the corners are the given numbers and from them the player must determine the unknown numbers in the corners.

The computer lets you know if you chose a wrong number. "Try again," it says. "Do you want a hint?" Such a helpful computer. Discovering the pattern is challenging to figure out but once you have it, it's a breeze.

The most interesting and educational of the games is *Magic Squares.* Magic square puzzles have been published in many a math puzzle book, but the program's advantage as a guide is that if offers you hints, prodding you to make intuitive or logical discoveries for yourself. The computer tells you when you're right or wrong and moves you through step by step until you discover the secret of the magic squares.

Nine numbers in a three-by-three grid make up the magic square. In a given square, any three numbers in sequence always add up to the same sum. You can add three numbers across any row, down any column, and through either of the diagonals and you will always get the same result.

The problem then is, given only four numbers, you must determine the remaining five. The difficulty of the problem depends on which four numbers are given. By the time you solve the most difficult of the problems, the computer declares you a champ. You will then have learned some interesting relationships among the numbers that make up a magic square.

Diffy is a dilly. A mysterious case of the disappearing differences, the game challenges you to choose four numbers that will form the corners of a square. The differences between those numbers will beccome the four corners of the next



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Edit screen text other than Basic program	YES	–
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List one screen page at a time	YES	–
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KEYBOARD-MACROS		
Editing commands within a macro	YES	–
Automatic chain to another macro	YES	–
Macros available in edit mode	YES	–
LOWER CASE CAPABILITY		
Lower Case entry from keyboard	YES	YES
L C mode on off also under program control	YES	–
OTHER FEATURES		
Dump screen contents to printer (in edit mode or under program control)	YES	–
Search Replace any string in FP Basic program	YES	–

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square to appear on the screen—of course you have to do the subtraction yourself. The object is to pick numbers that will give you the most rounds of play before all the differences between the remaining numbers become zero. It may sound easy, but if you can last more than six rounds, you're good. It takes a lot of thought or a lot of luck to come up with long lasting numbers. The secret of this game remains a mystery at this office with a record high of nine rounds.

Arith-Magic is a good math tutor and offers programs of different levels of difficulty that will entertain anyone who enjoys math, whether a beginner or an eager puzzle prober. CV

Arith-Magic by Joanne Benton Rudnytsky, Quality Educational Designs (Portland, OR).

Palace in Thunderland. By Dale Johnson and Ken Rose. If you've read the works of Lewis Carroll, no matter how long ago, you'll have an advantage in this pun-filled adventure.

Micro Lab's follow-up to their extremely frustrating but well-done *Mad Venture*—which also bears resemblances to the history of Alice—is perhaps not as difficult but it's just as enjoyable.

Resembling in setup the Scott Adams Adventures, *Palace in Thunderland* doesn't stoop to setting pointless traps just to kill you off. In fact, the ways to get killed are few, but those few are real posers to get past.

When you begin the adventure, for example, your moves are numbered; you have just so much daylight, and, as you'll soon discover, circumstances conspire to rob you of indoor artificial light. Numerous discoveries must be made and numerous logical-in-context steps taken before you can avoid or survive the darkness.

By that point, you'll have had a lot of brain-teasing fun, and you'll still be only beginning.

The object is to get rid of the wicked Queen of Hearts—another poser with with multiple steps required for solution. Even after you've achieved all this, you're apt to have a pretty weak score. How to achieve the full score is the biggest riddle of all. MCT

Palace in Thunderland, by Dale Johnson and Ken Rose, Micro Lab (Highland Park, IL). $25.00.

Birth of the Phoenix. Trusted friends have been immersed in it for months now; your favorite computer magazine gave it a glowing review. So yesterday, you went to your local retailer and bought—*The Magician's Curse*—your first adventure game.

Now, you sit down at your computer, barely able to contain your anticipation. You turn the computer on, reverently place the disk in the drive, and settle in for what you expect will be a memorable experience.

It's memorable all right, but not in the way you'd expected. To your dismay, you discover that you're unable to get the computer to understand anything you want to say. All you're trying to do is get past the courtyard gate, but your computer, firm, ever patient, and forever unbending, keeps giving you messages like "I don't understand" and "I don't know how to through."

How much plainer can you be, you wonder, exasperated. Doesn't this game speak English?

Now there's help. *Birth of the Phoenix* (Phoenix Software), described as a class-one tutorial adventure, is just what the aspiring adventurer ordered.

This program is loosely based on the ancient legend of the Phoenix. According to legend, the Phoenix is reborn every 500 years out of the ashes that result from the burning of the old Phoenix.

In addition to being fun to play, this game offers the novice a gentle initiation into some of the basic conventions, common phrases, and essential-to-know idiosyncracies that come with the territory in adventuring.

You learn, for instance, that most adventure programs are set up to recognize a verb followed by a noun (drop key, get note, and so on) and you learn how to look for clues hidden in the various descriptions. You're introduced to the ins and outs of finding your way around in an adventure, as well as to the basics of mazes and maze mapping.

Birth of the Phoenix also has an especially useful help/hint option that refers you to the appropriate page(s) of a thoughtfully written manual for guidance. (The verb/noun tables at the end can also be helpful if you get stumped.) Even though you're being guided, you never feel condescended to or as though the answers are just being given away; you still have to work to solve the adventure. This ensures feelings of genuine involvement in the playing and accomplishment in the solving.

This program's super-reasonable $14.95 price tag may be disconcerting to buyers who think that for a program to be really good, it must be expensive. Don't let this line of reasoning steer you away from this excellent program. Instead, be grateful and grab it.

If you're new to adventuring, *Birth of the Phoenix* will challenge and delight you, and will bring you the bonus of a valuable tutorial that will facilitate your enjoyment of adventuring long after the phoenix has been reborn. JV

Birth of the Phoenix, Phoenix Software, Zurich, IL. $14.95

The Night Before Christmas and Christmas Songs. By Dr. Rick Coleman. **The Christmas Story.** By Mark and Connie Cross. In Sweden during the holidays people dance around the Christmas tree. In America the custom may soon become dancing around the computer.

Two new Christmas programs are available this year that seem primarily for children, though adults might get into the yule spirit with them also. *The Night Before Christmas and Christmas Songs* and *The Christmas Story* provide the traditional songs, poems, fables and biblical readings associated with this holiday. Although slanted towards children, very young children will need the help of their parents to read the text accompanying these programs. *The Night Before Christmas* has a simple structure—printed text and accompanying lores graphics for the different verses of this all-time favorite holiday poem. The second part of this program merits the



dance around the computer—Christmas songs with six traditionals from which to choose, ranging from "Jingle Bells" to "The Twelve Days of Christmas." The fun comes in with the change pitch or tempo feature of this program. When determining the tempo, the user picks a number from one to one hundred, with one being very slow and one hundred being extremely fast. The program warns that either extreme could distort the song, but at any rate, it's fun to play with. Young or old musician can play around with the pitch just as easily—high, low, or average, or anywhere in between. Although parents might get tired of hearing the same songs over and over again, at least it'll keep the kids from peeking into the packages under the tree.

The second program, *The Christmas Story,* uses scripture, hymns, and hi-res graphics to tell the story of the birth of Jesus. The program is divided into three parts; *The Prophecy, Shepherds,* and *The Wise Men.* Some of the songs included in this program are "Joy to the World," "The First Noel," and "Hark the Herald Angels Sing." The entire program takes about thirty minutes to run through, but the user can choose to see only individual sections.

Both programs gave us a little bit of a problem when booting up, so be sure you try out the disk you intend to buy while in the store. MM

The Night Before Christmas and Christmas Songs by Dr. Rick Coleman, $15; *The Christmas Story* by Mark and Connie Cross, $12. Cross Educational Software (Ruston, LA).

Threshold. By Warren Schwader and Ken Williams. Perhaps it was inevitable that someone would come up with an arcade game that attempted to be all things to all arcade addicts. But, had you been wont to mull such an eventuality, chances are you would have looked to Sirius or Broderbund/Starcraft to bring it about.

Instead, that game is here, but its perpetrator is the master publisher of hi-res adventuring, On-Line Systems. The game is *Threshold*, and the prognosis is many hours of great home-arcade fun.

Only one thing remains the same from game to game in *Threshold*: you always shoot from the bottom. What you are shooting at varies enormously both in form and personality. In form, you'll encounter everything from maple tree helicopters to Volkswagen Bugs. In personality you'll enjoy—or be consumed by—slow, even spaceships that nearly disappear as they turn on their own axes or supersmooth airplanes speeding by in goose formation; kamikazes that bounce erratically and intelligently before bombing you or lacy snowflakes that float just out of reach; and many, many more.

On-Line expects few to see all the characters there are to see; but should you manage it, they promise you will recognize the last set. That fact alone is enough to create a good impetus to keep at it. If you do make it, and live through it, you will have won.

That the creatures shoot at you is not the only danger in *Threshold*. Some are not even super shots, although others are diabolically sharp in aim and timing. Unvarying is your finite supply of fuel and your laser's potential for overheating. When you overheat, you must simply wait, dodging bullets and watching your fuel supply wane until your weapon cools down. If you run out of fuel, you're through.

Every four sets of creatures earns you a rendevous with an honest-to-Mehitabel mothership, complete with Model-A Ford flower vases. Despite mother's rather garish taste, mother's milk is pure fuel and readies you for the next set of four creatures.

The hi-res graphics on *Threshold* are finely drawn and extraordinarily varying. Animation is at the forefront of progress: extremely smooth in individual motion, in objects passing over one another, and in collision. The potential for problems in these areas is so well handled as to put anticipation of them out of the realm of consideration.

Most important for the game player, collisions are accurate. These are sneaky adversaries, and many must be hit very precisely to be killed, but when you hit one, it's hit; and

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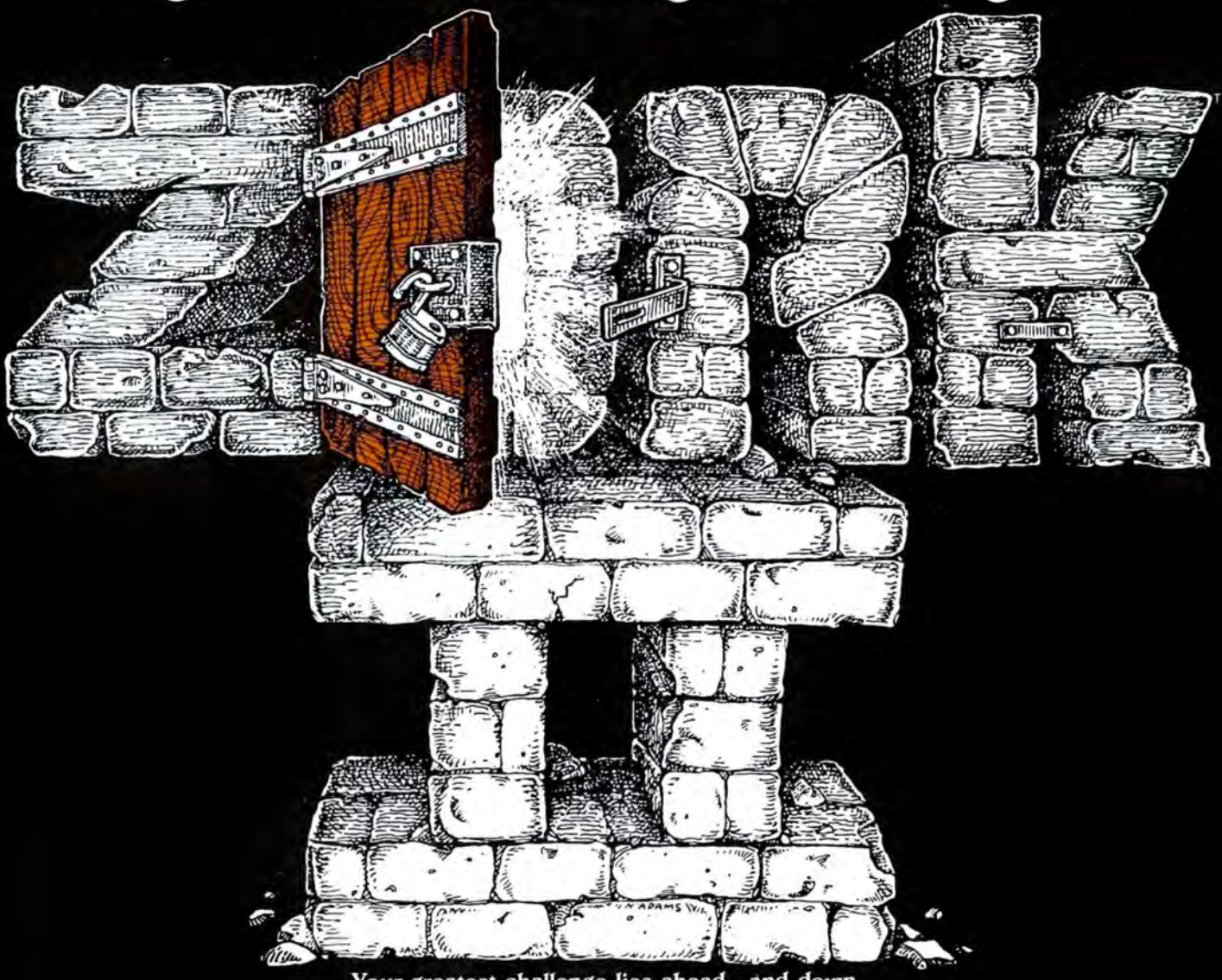
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never will you be done in by a *near* bull's-eye.

This is a superbly executed and marvelously playable shoot-'em-up—the epitome of home-arcade gaming yet devised. MCT

Threshold by Warren Schwader and Ken Williams, On-Line Systems, Coarsegold, CA. $39.95.

The Landlord Apartment Management Software. This package will be of interest to anyone who is involved in the operation of apartments. It is divided into two distinct parts: the Resident Manager and the Financial Manager. The Resident Manager keeps track of all the information relative to the units themselves and the tenants, past and present. The Financial Manager keeps track of income and expenses. The package will handle a total of 400 units of up to ten different types in up to ten different locations.

Among the many reports that can be generated are an apartment and resident listing that shows the name of the tenant with the pertinent apartment information. Another is the resident payment report, which tabulates all the tenant payments received during the month. A summary of this activity can be generated. A listing of tenants with outstanding balances is available. Also available is a monthly summary of the different types of expenses incurred during that month. For tax preparation, there is a summary of income and expenses for the month and the year to date. This also shows gross spendable income, gross equity income, and taxable income.

Each month's financial activity is saved to a separate disk for filing when the month is closed. The program will also post the new rents due at the same time. Data on up to forty former tenants is also available. To save the most recent past tenant data, if forty are already recorded, one of the older records must be deleted.

Those landlords who collect first and last month's rent at the start of tenancy will have no direct way to handle the last month rent other than to show the tenant overpaid for the entire tenancy.

With each of the ten available apartment types, a rental rate must be assigned. If a specific unit is rented for a rate other than the one assigned for its type, a rent can be assigned to that unit. Unfortunately, when the rent is extended in the reports, the rate for the unit type is shown, rather than the actual rent. In the actual record-keeping it does use the actual rent.

High praise is due the publisher! This package is designed to be useful to a person who has never seen a computer before. Step-by-step directions start with an Apple still in its box and move to *init*ing spare data disks and running the program. Error trapping is excellent. It is nearly impossible to blow the program. The only technical flaw is that it is needlessly slot dependent, requiring your disk drive to be in slot 6. The speed, accuracy, and convenience of *The Landlord* should make it a welcome tool for any apartment owner/operator. Even the long disk access time for, say, ten units, can be lived with when you know that they aren't any longer for 400 units. JH

The Landlord, MIN Microcomputer Software, Norcross, GA. 2 disk drives, 80-column printer. $795.

Race for Midnight. By Steven Sacks. This hi-res game, from Avant-Garde Creations, is somewhat a cross between an adventure and a fantasy game. The player has been changing into a werewolf and must attempt to find a recipe and ingredients for a potion in a nearby dungeon. The potion, if all is done correctly, will cure the player of his lycanthropy. Of course, strange and unusual monsters stand in the way, and they must be destroyed. It's a very unique plot and makes for a very fun game. There's also a time limit, so you can't waste time examining unimportant things.

The program accepts the usual two word commands and allows the player to switch between text and graphics with a press of the return key. The text portion is very similar to Scott Adams's, with a room description, objects, and exits followed by the last several commands. But the graphics are where *Race for Midnight* really comes through. Each room is drawn in full color, looking somewhat like the On-Line adventures. As

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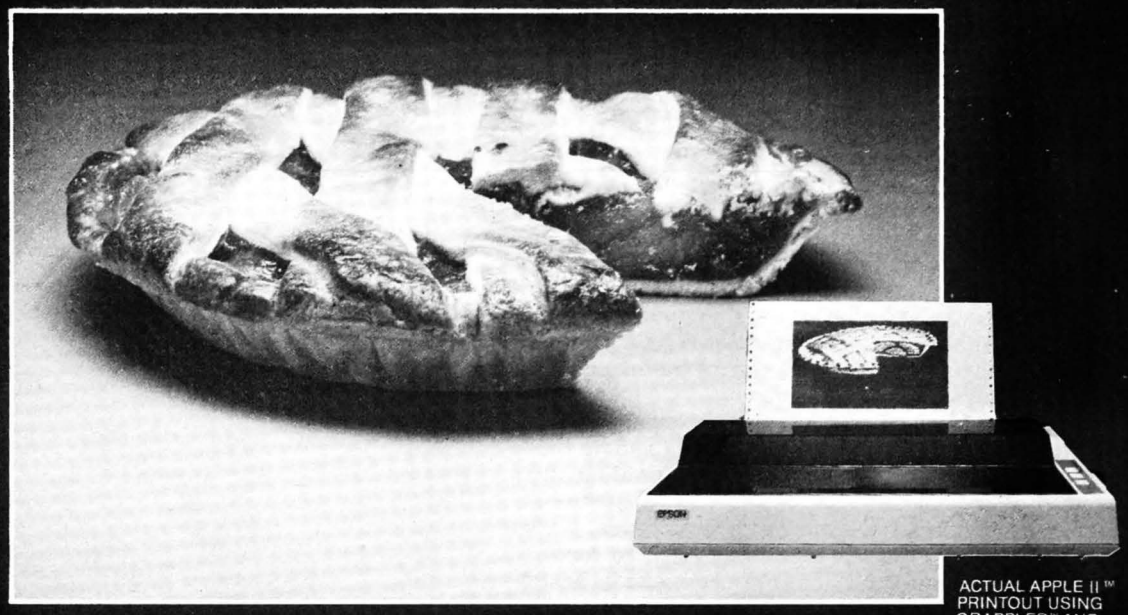
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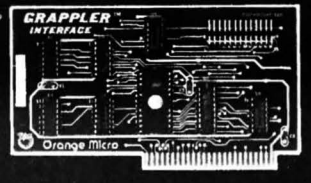
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an estimate, there are at least thirty different colors. When you kill a monster, the room turns a bloody red color that looks really good.

There are some interesting sound effects, too. There aren't many adventures with sound effects, but this one has them at every turn. "The Funeral March" when you get killed is especially hilarious. Killing a monster, dropping an object, knocking on a door, and cursing at the computer all invoke various other sounds.

Race for Midnight is faster in many ways than other hi-res adventures. This is because it does not go back to disk for every room. Usually there is about a three-room interval between accesses. Generally, the colors fill faster than on any earlier program; according to Avant-Garde, the key to this phenomenon is revealed for all in that company's comprehensive package, *Hi-Res Secrets.*

The only problem with *Race for Midnight* is that the adventure is not as long as it could have been, but the graphics and sound more than make up for that. We look forward to author Steven Sacks releasing another adventure in the near future. PS

Race for Midnight, by Steven Sacks, Avant-Garde Creations, Eugene, OR. $29.95.

Norad. By Ron Smailes. The enemies of the United States are barraging it with intercontinental ballistic missiles and it's up to you to direct the antiballistic missile defense effort for the entire country.

Sound familiar? Don't count on it.

Norad treats the simulation of national defense in a totally fresh, new way for the Apple, beginning with the graphics. The screen shows a fine-drawn map of the United States, looking slightly up toward Canada, which is considerably foreshortened by the angle. The curve of the planet can be seen above. Upon the map are nine major cities indicated by circles; each city supplies a nearby missile site.

A healthy city can supply a site with five missiles every so often; a damaged city is able to produce only three missiles because of the effort required in extensive rebuilding. Some rebuilding is possible without decrease in missile productivity.

When ICBMs appear over the polar cap, you choose by number from which base to send an ABM, then guide it with the arrow keys and detonate it with the space bar. You can send up as many ABMs in close succession as you wish, but you can only guide and detonate the first one extant. Key destruction of useless ABMs is part of the strategy.

The enemy missiles come in waves. After each wave, any injured cities that aren't totally destroyed are rebuilt and missile sites are resupplied. When you've survived a certain number of waves, Congress may approve the building of an MX site—a mobile missile station that can't be hit. Even later, further aid comes from a submarine firing waterproof missiles; it too cannot be destroyed. The catch is that crews of both the sub and the MX site get mighty uncomfortable if all the mainland cities and regular missile sites are destroyed; and they abandon ship.

Norad offers an opportunity for far more strategic thinking and planning than the home-arcade games that take off from the same reality. Yet it plays more simply mechanically and it makes more sense. MCT

Norad, by Ron Smailes, Western MicroData Enterprises Limited, Calgary, Alberta, Canada. $29.95.

Impressions

☐ **Santa's Sleigh Ride.** By Bob Johnston and Al Iapicca, Energy Games (San Francisco, CA). The Yuletide was bound to bring a game like this. Flying Santa's sleigh on the Christmas run is a real ordeal. The age of technology has even affected Santa's job. Now he must avoid abandoned satellites as he darts through the sky, not to mention soaring birds and the Christmas grinch.

You must steer Rudolph clear of these Christmas Eve menaces while you attempt to drop Christmas goodies into the chimneys below. There goes a TV—and a doll, all sorts of stuff. Narrower chimneys pose a bigger problem and therefore give larger scores.

To speed up the delivery route, Rudolph's flashing nose has been equipped with a photon laser. Rudolph's been shoved around enough in his lifetime, and he gets hot and nasty when those satellites get in his way. Santa jumps up and down for joy in his sleigh with each direct hit on a satellite or Christmas grinch.

Timing is the key, when you hit the return key to drop packages into the chimneys below. Luckily the arrow keys allow you to reroute packages once they have been dropped.

Guide Rudolph clear of those oncoming birds. You lose points for each one that crashes into your sleigh. Don't be tempted to shoot them; you lose even more points if you mistake a bird for a satellite and zap it with your laser. You score the most points shooting down the Christmas grinch who will stop Santa at any cost including running into Santa's sleigh to blow it up.

One would never have imagined a sleigh ride to be so violent but the pace of the space age has affected everyone, including Rudolph and Santa. $29.95.

☐ **FileWhiz,** by Stephen Goss, SoftHouse (Rochester, MN). Managing your files can be a lot of work. Shuffling papers, getting them out of order, losing them—sometimes it's easier to be disorganized. But one day a microcomputer was invented, and not long after that, computerized data base management systems came to be.

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☐ **Firebird.** By Nasir, Gebelli Software (Sacramento, CA). The firebird whizzes by overhead, dropping firebombs on an unsuspecting building. Apartments burn and occupants leap for their lives.

Your job is to control Piggo, the amazing firepig who scurries up and down his ladder to douse flames, catching falling victims and carrying them to the top of the building where they can be rescued.

Arrows move the ladder back and forth across the building while A and Z keys move Piggo up and down the ladder.

After some practice you might be able to keep ahead of the firebird, who drops one bomb with every pass over the building. But if you arrive too late the occupants must jump to the ground as the building goes up in smoke. Sorry, Charlie, no points for you.

The victims wear an agonized scowl as they plummet downward, but you can change that expression to a broad grin if you catch and carry them to the top of your ladder where they are rescued by a circling helicopter. The former victim happily waves good-bye as he or she is carried off the screen to safety. The helicopter returns with a new unit to replace the old one that burned.



Try as you might, you just can't keep ahead of the firebird. The longer you fend off the flames that attack the building, the faster the firebird flies. The object becomes to put up the best battle you can in a losing performance.

You score in three ways. You can douse a fire before it destroys a unit. You can catch a falling victim. Or you can safely escort the victim to be picked up by the helicopter. Prevention is not rewarded in *Firebird*. You get twice the points for catching a falling victim as you do for putting out a fire, and four times as many points for carrying a victim up the ladder to be rescued.

Don't let Piggo work under a falling victim or he will be knocked off the ladder and fall to his death. You only get three little Piggos per game so be careful. Also you can't quench fire while holding a victim that you've caught. The helicopter only picks up victims when moving left across the building. If your timing is bad two victims could be burned while one waits at the top of the ladder to be picked up.

Once two columns have burned to the ground, the structure collapses and the game's over. The best you can hope for as the fires reach down to the lower levels of the building is to save the bottom row of apartments so that those nine units alone remain. This feat will award you 5,000 bonus points and you get a chance to start on a new building with your present score intact. A Piggo's work is never done. Will the firefighting pig ever get a chance to rest?

Special features include sound off and escape to pause keys. $29.95.

☐ **Hodge Podge**, by Marsha Meridith, Dynacomp (Rochester, NY). Assuming that preschoolers can get the computer away from their parents, and assuming that an older person is there to boot up the program with a Basics disk, *Hodge Podge* can provide some enjoyable and educational hours for the user who is truly a micro.

Hodge Podge is a combination of Sesame Street, Mother Goose, and data processing that can be played by children old enough to sit on an adult's lap and punch the keys. The program pops up colorful graphics of letters of the alphabet, numbers, animals, and musical scales and plays some favorite nursery school songs. Preschoolers will probably be delighted when they learn mom and dad's computer can actually do more than *VisiCalc*.

A great deal of learning possibilities are inherent in the program. Each letter and number on the keyboard corresponds to a different picture; kids will have to recognize these letters and numbers simply to see and hear their favorites. For instance, F stands for Old McDonald's Farm, and the song will play over and over again each time the key is hit. The different animals of McDonald's farm also pop up on the screen as the song progresses; somehow an elephant found its way onto this McDonald's Farm, along with the traditional sheep, goats, and cows.

The program uses lo-res graphics beautifully, and the pictures are as complete as possible. The I key is for ice cream, which comes in different flavors each time the key is pressed, including chocolate chip complete with chocolate chips and cherry ice cream with cherry chips.

Hodge Podge also has a keyboard feature that the adult can help set up. Hitting 0 turns the first eight number keys on the computer into a keyboard that will play the musical scale. A graphic representation of the notes played adds to the fun of this computerized piano.

Adults can also introduce children to math with *Hodge Podge*. Shift-1 through shift-9 will display the word corresponding to the number. The symbols < and > are used in conjunction with animals to demonstrate the relationship of big and small. Addition can be made a game simply by hitting the "+" key.

Hodge Podge seems to have a lot of possibilities. Unfortunately, we hadn't any preschoolers to test it more completely, but the adults in our office liked it just fine. DOS 3.2. $23.95. ◨

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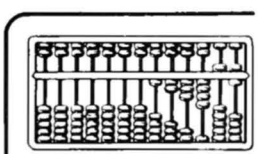
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SOFTCARD Symposium

from page 95

This completes our discussion of the new functions available to you in Basic-80. Obviously we didn't treat them in any kind of true depth. In later columns, we'll be looking at how these functions are used in specific circumstances, when we discuss programming techniques that take advantage of their features.

Now we proceed to the subject of converting existing Applesoft and Integer Basic programs to Basic-80, using *Apdos*. The first thing we should mention is that you have to turn an Apple Basic program into a text file before making the transfer to Basic-80. This is necessary because each language has its own set of single-byte tokens to represent Basic keywords when the program is stored in memory or on disk. Although *Apdos* would transfer the tokenized file properly, Basic-80 doesn't use the same set of tokens; consequently it couldn't translate the Apple Basic tokens back into their corresponding Basic-80 reserved words. When the program is turned into a text file, however, the word *print* gets stored on disk as the five bytes corresponding to the ASCII codes for the five letters. Although the Apple Basics could not recognize such an ASCII file as a valid program, Basic-80 has a built-in feature that allows it to save and load programs in this format. To place your Applesoft or Integer Basic program into a text file, you need to add the following line:

```
1 Print "Open APPLENAME" : Print "Write APPLENAME" : Poke 33,30 : List :
  Print "Close APPLENAME" : End : Rem the three prints must have a control-D as
  the first character inside the quotes.
```

When you run your program, it will create the text file APPLENAME, and that file will contain a listing of your program in ASCII. It is this new file that you transfer with *Apdos*. In practice, the Apple text files you create this way are best named the same as their Basic counterparts, with the addition of a single T on the end to indicate that they're text files.

Since *Apdos* is designed to transfer all types of text files, it makes no assumptions about the need to insert linefeeds after carriage returns or to make any of the other alterations that are needed to make Basic programs compatible with CP/M file conventions during the transfer. It is therefore advisable to load the program into Basic-80 once and save it back to disk in ASCII format, using the ,A option. This will restructure the Basic program file to fit CP/M's format. It also will provide a good opportunity to get rid of the extra line you added to perform the text-file conversion under Apple DOS. Now that you have the file in proper format, you can make the necessary alterations using a text editor.

It makes little difference which editor you use, providing that it's sophisticated enough to have global find and global find/replace capability. This is by far the easiest method of converting programs written in other Basics to the lexical and execution conventions of Basic-80. Although ED.COM is rather primitive in some respects, it does have both of these necessary functions and will work quite well for this purpose.

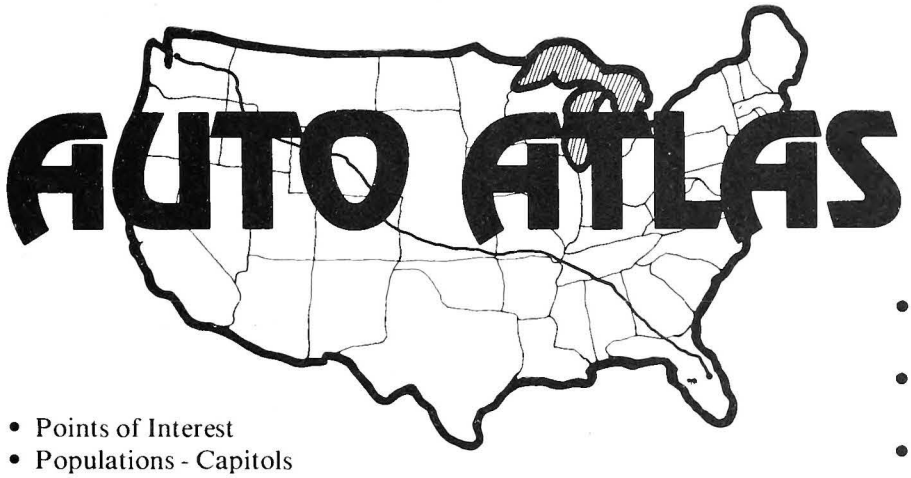
Although our primary purpose is the conversion of Applesoft or Integer Basic programs, other Basics can be converted just as easily, once they have been entered from listings or downloaded from another CP/M system. Be sure that any program to be edited has been saved to disk in ASCII format.

We have spent a lot of time in these past four columns discussing the differences between Basic-80 and the Apple Basics. We'll now put that knowledge to use.

Because of the development of the Apple computer phenomenon, many Apple Basic programs make use of machine language routines in ROM, such as the statement CALL −936 used so often to clear the screen. Such call statements will not work under Basic-80 without modification; many, in fact, will not work at all. In most cases, there are sufficient additional commands available in Basic-80 to perform such functions. HOME, for example, can be used to replace CALL −936. In any case, it will be necessary to locate all such call statements and replace them one by one, either with Basic statements or with

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the necessary alterations in syntax and addressing to make the call work. Appendix C in Volume II of the SoftCard manual discusses the subject of calling both Z-80 and 6502 machine language subroutines from within Basic-80. You should read it thoroughly before attempting to convert programs with this type of statement.

Another problem is posed by programs that have machine language routines appended to them. These, of course, would not even transfer properly, using *Apdos*. If you have the machine language routine in a separate disk file, you can transfer it to CP/M with *Apdos* and then write a short Basic loader routine to load it into memory for later calling. Appendix A of Volume II of the SoftCard manual provides an example of such a loader for hi-res pictures. The principle and operation are the same for other types of binary file.

So far, the only kind of statement we've identified that will require alteration in every program, is *call*. Peek and poke statements belong in this category as well. Again, because of differences in addressing, these statements will not be looking at the same area of memory for which they were originally designed. In most cases, the peek and poke statements in the Apple program will not work at all under Basic-80, for the same reason the call will not work; the ROM routines and/or temporary storage locations for the ROM routines are seldom still active and many times not even accessible. You can certainly try them after applying the offset value to take care of memory differences, but don't be surprised if they don't function.

In addition to calls, peeks, and pokes, all I/O statements have to be reworked. The entire PR#x:PRINT "xxxxxxx": PR#0 string must be replaced with an LPRINT "xxxxxxx" statement, for example. Therefore, all PR# statements must be searched for, identified by function, and altered. Disk I/O also must be changed. To find disk I/O statements, search for control-D, since all such statements contain this character. In most cases, other peripherals that are accessed from an Apple Basic program will not be accessible from Basic-80 without some rather large reconfiguration. This subject is complex enough that we will reserve discussion of it for a future column.

Once you've identified the obviously unsupported commands mentioned here, you'll need to move on to the less common ones. Wherever possible, use ED or your own text editor to perform the alterations, since it is so much easier to make changes globally than one at a time via Basic-80. Spend some time getting familiar with the material in the appendices to Volume II of the manual. They provide good direction for determining the conversions that will be necessary. At some point, however, you'll need simply to run the program, looking for syntax errors and routines that don't function exactly as they do under the Apple Basics. As you encounter these, refer to Chapter One of the Basic-80 manual for explanation. Some forms of incompatibility are rather subtle, so be sure to monitor output carefully before you assume the program is functioning 100 percent properly.

Although we've made it sound somewhat complex, conversion is generally not that difficult—just time-consuming. It does, however, require a thorough understanding of what the original program is trying to do and a knowledge of the operation and syntax of both languages.

Here are some examples of familiar programs that were converted from Apple Basics to Basic-80:

Brian's Theme: This program required no modification.

Animals: this program required modification of all disk I/O routines, substring functions, and clear-screen calls.

Color Demo and *Color Demosoft:* portions, like Kaleidoscope, required no modification; other portions had to be rewritten almost entirely, because of pokes and peeks.

With this we complete our treatment of Basic-80, hoping we've provided you some good material for your use of this language. Obviously no column or series of columns can properly point out all the features of a piece of software this complex. For those of you wishing to pursue the topic further, there are several books available, on Basic in general and on Basic-80 in particular. ■

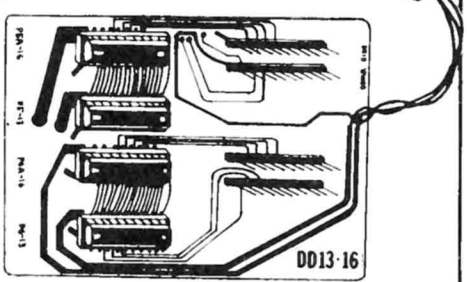
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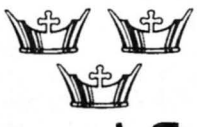
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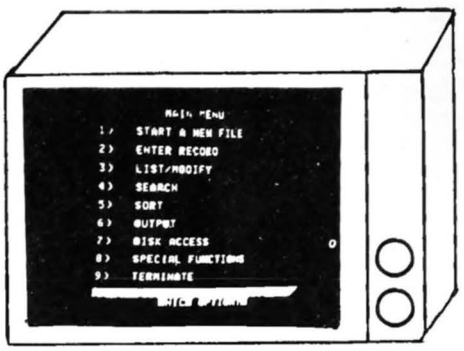
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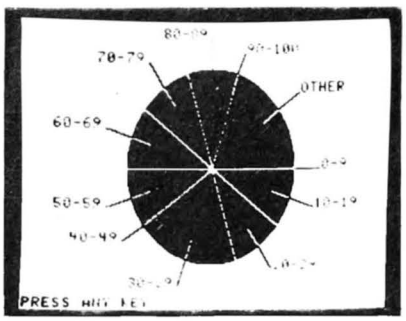
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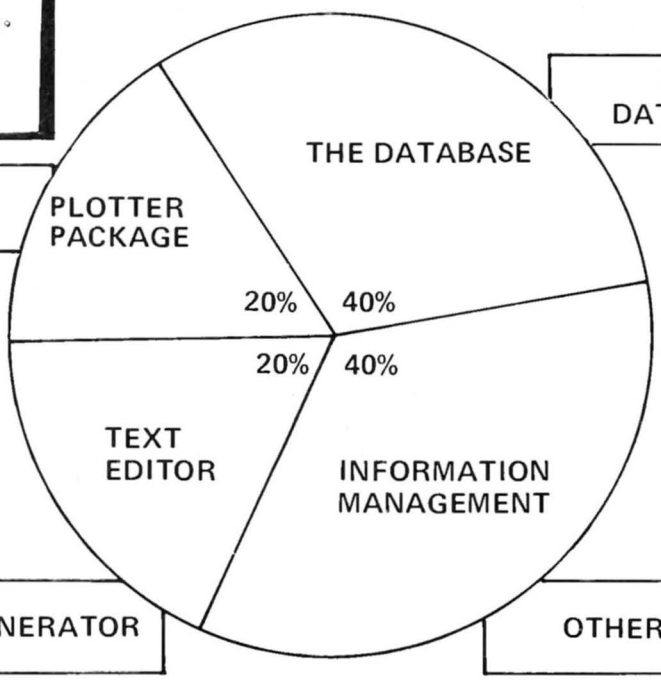
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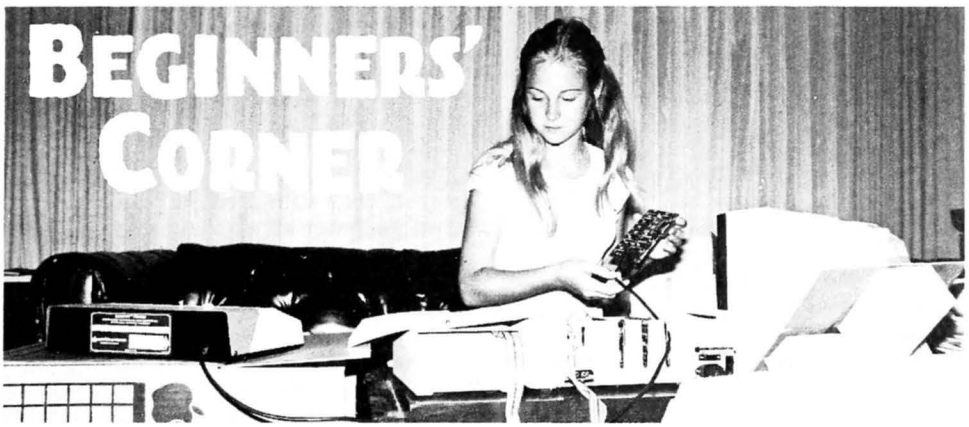
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BY CRAIG STINSON

"Try to remember a kind of September, when grass was green and . . ."

Can you finish the line? Chances are, if you know the song but haven't heard it in a while and you can't quite recall what words come next, the first thing you'll do is start humming the tune to yourself; and hearing the tune again in your head will take you straight to whatever distant pocket of your brain happens to store the missing lyrics.

How we find our way around in the incredible storage vaults of our minds is one of the most fascinating mysteries of psychology and physiology. Associations obviously play a big role; a line of lyrics brings up a bit of melody that, in turn, serves to retrieve a few more words, and so on. Much too quickly for you to see the process, the combination of music and language evokes feelings and thoughts—maybe a feeling about autumn in general, or a way you felt one particular September, or something related to the last time you heard the song. And just as quickly, the images evoked lead to something a computer person might describe as output—some piece of overt behavior perhaps, maybe just a change in facial expression, or something even more subtle, like a relaxing of muscles or a momentary quickening of the heartbeat.

This whole complex chain of events occurs in approximately no time at all, which is what it has most in common with computer events. When you ask your Apple to do something elementary, like computing the sum of two and two and printing it on your monitor screen, the 6502 has to do quite an impressive number of things to make that happen—including consulting its memory to find out what's meant by *plus* and *print*. Even the so-called echoing of your command on the screen—the appearance of your letters and numbers on the monitor as you type them—is a many-stepped process. But all this complexity takes place on a time scale far removed from our ordinary experience; it happens so fast that we perceive it as a singular, instantaneous event.

Our Memories Are Bigger. In contrast to the human mind, however, the Apple has a very limited extent of memory to deal with. The connections between the various elements of its memory are straightforward and easy to understand; as with everything else having to do with this machine, the Apple's memory is organized according to a numerical scheme.

Each element of memory—each individual place where a piece of information may be stored—is given an I.D. number, called an address. Because the 6502 is designed to read or write data in eight-bit chunks, called bytes, the individual unit of memory also holds eight bits. Memory capacity is customarily measured in kilobytes, abbreviated K, with a kilobyte equal to 1,024 bytes.

When you're new to computers and to the language associated with computers, one of the things that can sometimes be confusing is the distinction between a value stored in a memory location and the address of a location. Often you'll see these two very different concepts thrown about in the same sentence or the same paragraph in a manner that may be bewildering.

Suffice it, we hope, to say that a memory location is like a message box that can hold a single eight-bit message. The address is the identifying number, the means by which the 6502 finds its way to a particular box.

6502 Takes the Bus on Memory Trips. The memory locations we're talking about are physically separate from the 6502. They're scattered about in RAM and ROM chips on the motherboard of your Apple (actually, any given byte in RAM is spread out over a row of eight RAM chips). Within the 6502 itself are some other holding areas, each of eight-bit capacity, called registers. It is the registers that hold the data to be processed by the 6502 at any given split second. The 6502 spends most of its waking life fetching data from memory, storing it in its registers, doing something with it, and shoveling it back out to memory. The physical connection between memory and the microprocessor—the path over which the data travels—is called a bus.

The address of a memory location is a sixteen-bit quantity, which means that the 6502 has to look at two bytes within its internal registers to discern where it's going. If this were not the case—if addresses were only eight bits—then the 6502 could have only 256 addresses available to it at any given time, since eight bits can be arranged to represent only 256 unique numbers.

The way to tell how many different numbers you can represent with a specified number of bits is to take two to the power of the number of bits in question. With eight bits you get 256, since two to the eighth power is 256. With sixteen you get two to the sixteenth power, or 65,536—rather a sizable increase.

A kilobyte, you'll remember, is 1,024 bytes. If you divide 65,536 by 1,024 bytes per kilobyte, you arrive at 64K, which is the maximum addressable memory of the 6502. Another way to see that the maximum addressable memory is 64K is to realize that a kilobyte is two to the tenth bytes; two to the sixteenth divided by two to the tenth is two to the sixth (because sixteen minus ten is six), and two to the sixth is sixty-four.

48K = 64K = 96K = 64K . . . Good Grief. You may have been told when you were shopping for your Apple that the maximum amount of memory you could put on the computer is 48K. That's true in a way, if by memory you mean random access memory; a fully configured Apple II motherboard will hold 48K of random access memory. Most of the remaining 16K available to the 6502 is taken up by the six ROM chips planted on the



motherboard between the RAM area and the microprocessor. Those ROMs hold 2K apiece, so the six of them *ensemble* account for 12K. The other 4K of memory doesn't normally reside in any kind of chip at all. It's devoted to the control of various kinds of input/output operations.

You may also have heard about people putting much more than 64K on their Apple IIs. This indeed is possible; there are a number of peripheral cards available now that provide additional RAM in increments of 16K, 32K, 64K, or even more. The fact remains, however, that the 6502 can only look at 64K at any one time. The RAM cards expand memory by a process called bank switching, in which two or more areas of RAM share a common range of addresses. The user can then select, usually by way of a program, which bank of memory will be active at any given time.

RAM cards, then, function as a kind of auxiliary storage device, much like a disk drive. They have the great advantage over a disk drive that material can be written into auxiliary RAM or read from it in an instant, without the delays occasioned by disk access.

When you're running a program on your Apple, the 65,536 possible memory addresses must suffice to hold your program instructions, the data that is generated or used by the program, and the elementary instructions that tell the computer how to operate. This last category would include such things as the system Monitor and the instructions that tell the computer how to interpret Applesoft or Integer Basic, depending on the species of Apple II. Most of this system information is stored permanently in ROM and occupies the highest 12K of addresses, from 53,248 to 65,535. Some of the lowest address space, from 0 to 2,047, is also reserved for system functions.

Memories Are Made of This. Without going into undue detail, here's a sketch of the memory layout on a 48K Apple II and Apple II Plus:

The top 2K, from 63,488 to 65,535, is occupied on the Plus by the autostart ROM. This is the set of routines that gets your machine going when you turn it on. Among other things it puts the Apple in text mode, selects the keyboard and monitor as input and output devices, respectively, beeps the speaker, and leaves you in Applesoft Basic.

On the standard Apple II, the same area of memory holds the Monitor ROM, sometimes affectionately known as the old Monitor ROM. The Monitor ROM performs many of the same functions as the autostart Rom, but it leaves you facing the system Monitor's asterisk prompt rather than putting you in Integer Basic.

Both the Monitor ROM and the autostart ROM comprise the set of routines known as the system Monitor—the routines that, among other things, allow you to examine, alter, or otherwise rearrange the contents of memory.

On the Apple II Plus, the 10K directly below the autostart ROM, from 53,248 to 63,487, stores the Applesoft Interpreter. This is the program that translates Applesoft code into a more primitive code that the 6502 can execute directly. When you run a program written in Applesoft, the interpreter translates your program statements, line by line as they are executed, into machine-level binary code. We'll have more to say about languages and interpreters in a later installment.

Much of the same region of memory on the standard Apple II is occupied by the Integer Basic Interpreter. Integer, however, is a more compact language than Applesoft, and its interpreter requires less room in memory. The rest of this region on the standard Apple II includes, among other things, the Programmer's Aid #1.

So far, we've accounted for the 12K held by the six ROM chips that sit directly in front of the 6502 on your motherboard. The one all the way over on the left is the autostart or Monitor ROM; the other five, on the Plus, are entirely dedicated to Applesoft.

In Again, Out Again, Finnegan. Immediately below the Applesoft Interpreter is a 4K region that controls I/O functions. Among other things this part of memory, from 49,152 to 53,247, contains the so-called soft switches that determine whether your Apple will be displaying text or graphics—or both at once.

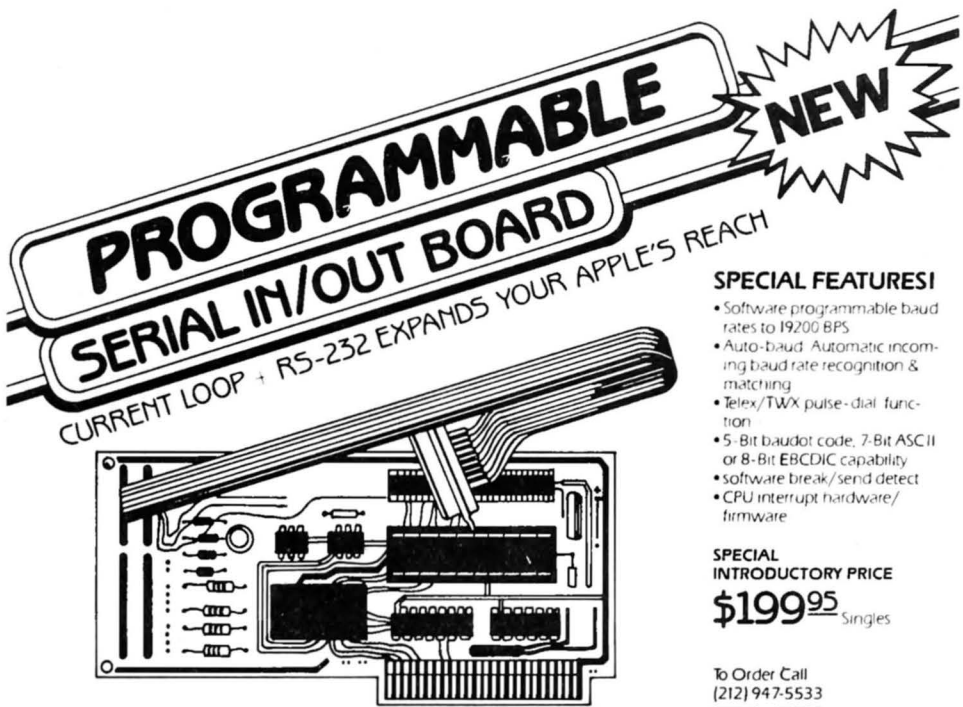
Below this I/O area is a vast region of free RAM, extending all the way from 2,048 to 49,151. This is where your programs and data get stored.

Certain system functions, however, do intrude into this area. For example, if your system uses a disk drive, DOS will claim the top 10.5K of RAM, from 38,400 to 49,151. Hi-res graphics are controlled from two functionally equivalent zones of memory, called the hi-res page one and hi-res page two. The hi-res pages take up 8K apiece and extend from 8,192 to 16,383, and 16,384 to 24,575, respectively.

On Apples with less than 48K of RAM, the region of memory that's not available lies directly below 49,152. On a 32K system, for example, the highest available address in RAM is 32,767. DOS, in this case, still claims the top 10.5K of available RAM, which now includes part of the second hi-res page. Hence a 32K system will not be able to use both hi-res pages and DOS at the same time.

Below the free RAM area, from 0 to 2,047, is another 2K of memory devoted to system functions. The upper half of this area is the region of memory that controls the display of both text and lo-res graphics.

We'll have a bit more to say about memory, and particularly about the control of text and graphics display, in the next installment.



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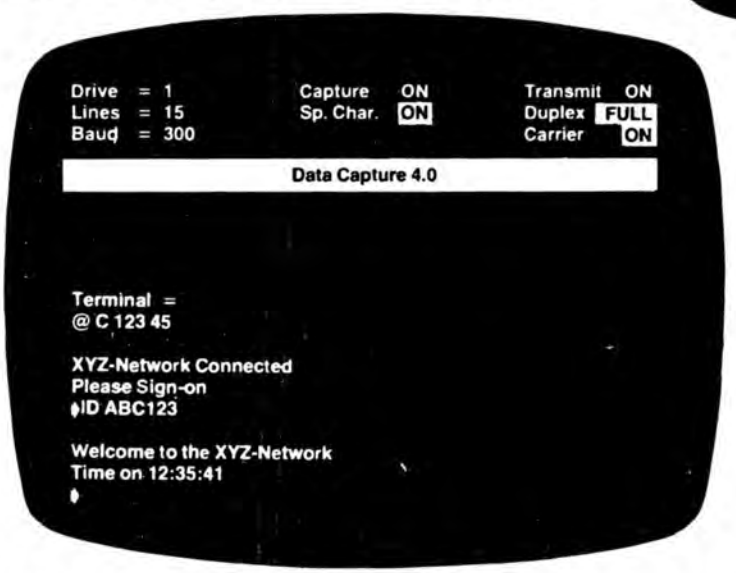
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TRADETALK

from page 80

to—after discovering Pegasys Software in Honolulu and Pegasus Data Systems. The first choice, Thesis, was nixed because a small computer retail outlet in Michigan bore the name. According to **Stu Shiffman**, the second choice, **Gnosis** (from the Greek word meaning knowledge), will stick and take effect probably in January.

☐ **WIDL Video** (Chicago, IL), the publisher of five Apple product directories, has signed **Bob Burns and Associates** (Park Ridge, IL) as national sales manager. Burns has years of solid experience as a sales representative organization in the electronics industry. In addition, eight new regional sales reps have been assigned to territories around the country. The Apple directories are now being represented in Texas and Oklahoma by Chet Wells & Co.; in Kentucky and Indiana by Green Wissler Sales; in eastern New Jersey and New York City by Baum and Epstein; in northern Illinois and Wisconsin by Bob Burns and Associates; in California, Arizona, Nevada, and Hawaii by Bidwell Sales; in southern New Jersey, Pennsylvania, Delaware, Maryland, Washington, D.C., and Virginia by L. D. Lowrey; in Florida, Louisiana, Arkansas, Tennessee, and Mississippi by Cartwright and Bean; and in southern Illinois, Kansas, Missouri, Nebraska, and Iowa by Kathrinus, Kelly, and Baumhauer. According to WIDL, these new sales reps will be calling computer stores and electronics retailers. "We are working to develop a good, strong relationship with our dealers around the country, and that can only be done with good reps calling on them directly." The Apple directories are complete "where to find it" books of available software, hardware, and accessories for the Apple.

☐ **Computer Expo '82** is coming to Orlando, Florida, February 26-28, 1982. The exposition in the Tupperware Convention Center will feature microcomputers, computer graphics, computer peripherals, accessories and supplies along with data processing equipment, electronic typewriters, and telecommunication equipment.

☐ Two new employees have joined **Sirius Software** (Sacramento, CA). **Ernie Brock** will be the new product manager, with responsibilities ranging from product acquisition and development, to technical support and management of all preproduction tasks. Brock comes to Sirius with an extensive background in management, programming, and technical detail. And **Jerry Dingman**, whose experience includes text-graphics systems designing and electronic engineering, has been appointed product engineer. His duties include new product engineering and development.

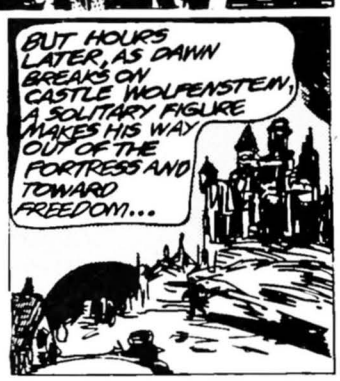
☐ **Horizon Simulations** has also moved to larger quarters. Their new address is 7561 Crater Lake Highway, White City, Oregon 97503. Phone: (503) 826-4640. According to **Vince Zausky**, Horizon's shipping department, programmers, and advertising staff are much happier in their new eight-thousand-square-foot facility.

☐ **Datel** (New York, NY) has taken on three new employees. **Ed Krane**, sales manager of single user desktop computers; **Don Metzger**, microcomputer marketing analyst; and **Melody Newrock**, microcomputing analyst. All three were formerly with Computer Factory (New York, NY).

☐ **Timothy H. Hanson** has been named director of marketing and sales by **Micro-Sci** (Tustin, CA), manufacturers of high-performance floppy disk systems. Hanson gained several years of sales experience in management working for both Datapoint Corporation (Irvine, CA) and Honeywell Information Systems. He lives in nearby Laguna Hills with his wife and two children. ■







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by Silas Warner

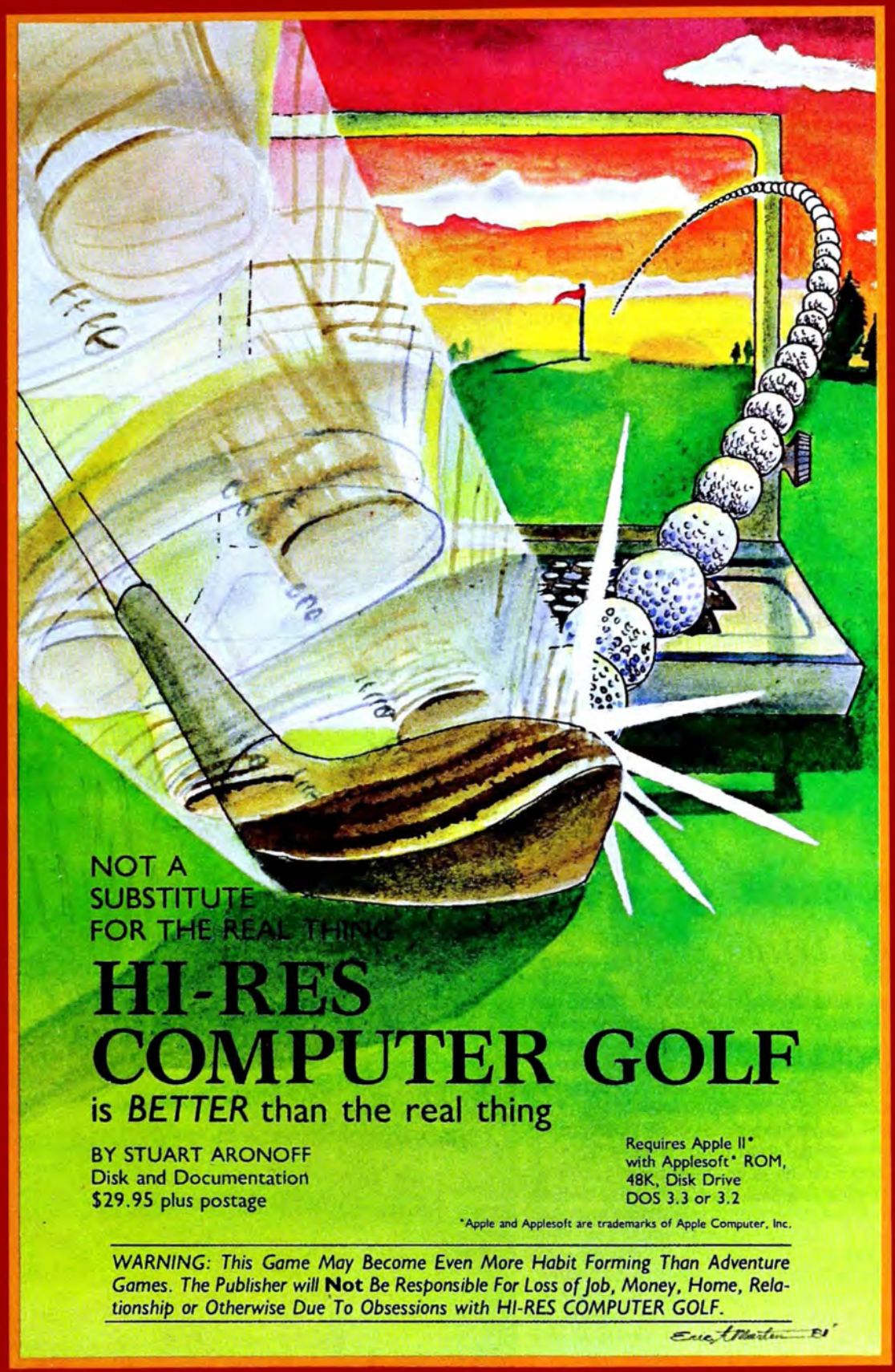
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Mike Markkula

Apple Computer *(Cupertino, CA)*
"The introduction of personal computers is going to have as profound an effect on the world as the printing press."



Bob Clardy

Synergistic Software *(Bellevue, WA)*
"If we can have a tremendous information exchange with other countries, war will be less likely. National boundaries are going to ease, nationalism will decline, and political differences between countries will fade. Countries will be much more dependent on each other for information about technology. Bringing these advances to third world countries that have the most instability will be challenging to do before a war breaks out. But if these countries can handle the blow to culture new technology will bring, that same technology will increase the possibility of world peace."



Paul Lutus

Insoft *(Medford, OR)*
"You've heard of the book, *Why Johnny Can't Read*? Well, the future version of that book will be *Why Johnny Can't Compute*, or *Why Johnny Can't Keyboard*. Essentially, the power of academicians and mathematicians will be lost forever. Everybody will become math literate through the computer. It will show the most abstract concepts of math in such simplified form that no one will fail to understand it. Math will be learned from the top down instead of the bottom up—people will understand concepts and applications of math without knowing how to do long division. I took this idea from a science fiction writer, but it will be everybody's constitutional right to have access to a computer."



Sam Cottrell

Applied Analytics *(Upper Marlboro, MD)*
"A lot of computer geniuses are groveling around in accounting and word processing systems and not thinking of the real exciting things that can be done with our new technology. I think the real advances will come not from computer giants, but from people who think like Walt Disney or science fiction writers. I believe that we'll be able to re-create everybody in human history and mythology on a computer screen. Using



LOOKING

Shapers of the Future

COMPILED BY MELISSA MILICH

There's a history in the human race and a future. And given the chance to look into the future, to glimpse it briefly as a landscape through the windows of a speeding car, if it was there for the taking, wouldn't it be profound to snoop?

The following is a compilation of almost fifty interviews with prominent individuals in the computer industry, business, and sciences. They were asked to predict what would be in store for us five, ten, fifty, even a hundred or more years from now. Editorially, these are just predictions. Realistically, they are just a little bit more.

The future is taken seriously by those in the computer industry, whose job, in essence, is to program the future. Of course, their predictions might sound just like "predictions," way too wild to ever come true. But remember, these people support themselves by coming up with what are oftentimes considered very unusual ideas.

Thus, something curious journalistically took place with this story. As these fifty made their predictions, we began to wonder whether their ideas were truly predictions or whether



FORWARD:

Tell How They See It

they were giving us a clue to what they, as individuals, would be working on in the future—or are working on even now. Of course, these robotics experts, software publishers, and industry giants, couldn't give out their secret plans, but . . . in the guise of an innocent predictions story?

So what can we expect in the future? How about automatic transport between New York and California in five seconds . . . robots preparing our dinner . . . conversation with the microelectronic reincarnation of William Shakespeare, Thomas Jefferson, even Marilyn Monroe? Or maybe a pollution-free world?

Some people out there probably like these ideas enough to make them a reality. And when we hear someone like Owen Garriott, Skylab astronaut, making predictions about outer space, it's hard not to take him seriously. After all, he's been there.

All of our futurists-for-a-day contributed enthusiastically—some predictions were philosophical, others frivolous, a few scary. No restrictions were placed on the type of material we solicited. People didn't even have to talk about computers if they wished. But decide for yourself which is imagination and which is, omigosh, tomorrow.

People are working on it. Anything is possible.

very hi-res, high-speed technology, we'll be able to make exact representations of characters—their appearance, their voices, their actions, their philosophies, their emotions, their personalities. We'll insert every bit of information we know about Abe Lincoln, Socrates, Katherine the Great—whoever you want—and then, in the form of a movie, we'll be able to witness conversations among them. Just think about it. What would Shakespeare say to Romeo and Juliet? What would happen if you put John F. Kennedy at a restaurant table with Adolf Hitler? (Okay, then, with Marilyn Monroe.) This is an extension of what Walt Disney has been doing for years. But the potential for misuse is truly great. We obviously can't set these digitally processed people loose on the world. This will be solely for entertainment and education, and I predict we'll be doing it, in a crude way, before the end of the decade."



Bill Budge

BudgeCo *(Piedmont, CA)*

"In fifty years there's going to be an ERA for computers. That's going to have all sorts of impact. Computers are going to be paid the same amount as humans for the same amount of work—and since they work faster than us, computers will be millionaires. Computers will also start requesting paid vacations. They'll be just like people and then we'll have to start all over again and invent something that will take their place."



Michael Berlyn

Photo by Paul Biles

Sentient Software *(Aspen, CO)*

"Within one hundred years we'll no longer be human beings. Microcomputers the size of a thumbnail will be implanted in our bodies, probably in the medulla region of the brain. This will provide a second brain to access. By definition we're going to cease to be a biological organism. We'll be a biological/mechanical organism—cybernetic to a degree. I'm not saying we'll have a second personality, an electric personality, but who can tell? An electrical interaction will interface our organic brain to our electronic brain. We'll be able to communicate with others somewhat telepathically through our electronic brains, which will relay information instantly to our organic brains. This will take the place of telephones. As a matter of fact, videophones will be a joke compared to this. People who don't have computers transplanted in their brains will be outcasts from society. It will probably be people in the back-to-nature movement who resist this technological invasion of their biological bodies. These "puries" will be ostracized by the majority of the society who have consented to these transplants. Puries will be unable to get jobs and be forced to live in isolated societies."



Joel Billings

Strategic Simulations *(Mountain View, CA)*

"In fifty years we're going to have an Apple XXVIII comput-



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The SoftCard™ Solution. SoftCard turns your Apple into two computers. A Z-80 and a 6502. By adding a Z-80 microprocessor and CP/M to your Apple, SoftCard turns your Apple into a CP/M based machine. That means you can access the single largest body of microcomputer software in existence. Two computers in one. And, the advantages of both.

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er. One of its extra features will be a computerized form of dating, but this will be just for fun. Say you want to go out on Friday night. You'll just access your master data base and a name will flash on the screen. Then it'll spit out pertinent information on that person—like where you met, their likes and dislikes, and a suggested place to go that's sure to impress them. I guess I stole this idea from *Saturday Night Live*. Computer-aided dating would be a good resource for us.



Stan Goldberg

Micro Lab *(Highland Park, IL)*
"World disputes will eventually be settled through simulated war games on a computer. One country's government can have a match between another country's government somewhat peacefully this way."

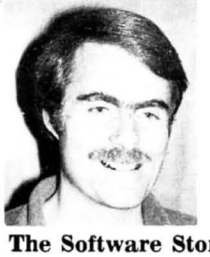
Steve Sherman

L & S Computerware *(Sunnyvale, CA)*
"People will not be able to survive without computers. Kids will not be able to get through school without computers. The academic system is getting more and more competitive. I see this in my son's elementary school where the kids are required to learn about computers. This year one of the schools in the district closed, and they transferred all the children from that school that didn't have computers to the school my son attends. Needless to say, the kids that have been learning on computers all along seemed to be a lot more advanced than those kids from the old school. It took a while for the new kids to catch up just in the sense of being able to run the computer. My son is in first grade and he is already learning programming. I predict he's going to be so smart by the time he gets out of high school, after spending all those years on a computer, that I probably won't be able to talk to him."



Jim Howard

Howard Software *(La Jolla, CA)*
"There will be a new renaissance in thinking. Since computers will be taking care of all our manual and menial tasks, people will be a lot more free just to think. There will be a luxury class of deep thinkers in the tradition of Aristotle and Socrates. But then again, if people do have all this free time, maybe they'll just play and follow the tradition of the Romans instead."



Bill Hoffman

The Software Store *(Huntington Beach, CA)*
"People are going to have to learn to cope with the changes that are happening so quickly now in our lifestyles. I see some problems ahead. I see kids starting to relate with computers, but they're not learning to cope with people. That's a fault of our school system. People are saying computers are the greatest thing since sliced cheese, but we're going to have to temper our computer involvement with human interaction."

John Victor

Program Design Institute *(Greenwich, CT)*
"The entire educational system will radically change. Classrooms won't look anything like they do now. People will be taking lessons at home and attending college classes at home via computers. We are moving toward a technology-based society, where performance and not degrees is important. Certification will probably become meaningless, and, to get a job, people will probably have to show what projects they've completed, rather than the schools they've attended."

Craig Vaughan

Software Sorcery *(McClean, VA)*
"Paper is going to disappear, since we probably won't need it. We're going to learn a less paper-oriented way of doing business with computers. Doctors will record medical histories on a computer, the military will plan strategies on a computer. Instead of doodling with a pen and paper, people are going to learn to doodle on a computer. The amount of paper wasted by business is ridiculous. Computers are going to save trees, and they'll save all the energy that was put into producing paper. With care and forethought we can enhance our environment. There'll also be a raising of computer consciousness. People are going to feel as naked without a computer as they do without a calculator."

Terry Bradley

Sirius Software *(Sacramento, CA)*
"We're going to evolve from a mobile society to an immobile society. We won't be able to afford to pay somebody enough to drive to and from work, since gasoline will probably cost three hundred dollars a gallon. So, many jobs will be done at home with people tied in to their work places by a computer. And since gasoline is going to be so expensive and people will still want to travel occasionally to another part of the country, we will develop an automatic transport system, like on *Star Trek* when they say, "Beam me up, Scotty." I think in the future I'll be able to throw a watch on the ground and stomp on it and end up in New York. Of course, then we'll have to invent a replacement for the watch."



Lord British, a.k.a. *Richard Garriott*

Author of *Ultima*
"Here's one people aren't going to like. In twenty years, we're going to have an almost one hundred percent computerized monetary system. Funds will be electronically transferred from one account to another. The next big step will be when a store stops taking cash. That's going to be the hardest one to implement. That's why I give it twenty years."



Lore Harp

Vector Graphic *(Thousand Oaks, CA)*
"From a business point of view, I see telecommuting networks linked on a global scale. People throughout the world will be able to attend meetings and make negotiations over a computer screen, instead of wasting fifteen hours on a plane in order to conduct business."



Gerald Van Diver

Vital Information *(Overland Park, KS)*
"There will be a computer in every bathroom."

Gary Hoffer

Software Technology for Computers *(Belmont, MA)*
"I specialized in biomedical engineering in college and I can foresee computers programmed to do operations, computerized hearts, and special technology that can clean up clogged arteries. At a medical conference I attended recently, they mentioned that the average life span of a human being has climbed from seventy to eighty years old. In the future, with medical breakthroughs that will wipe out the major diseases, I don't think it will be impossible for someone to live one hundred forty years. Everybody will stay healthy, so we can boost the retirement age to eighty or ninety years old."



Donald Brown

CE Software *(Des Moines, IA)*
"Bottom line, entry-level computers will someday be selling for under one hundred dollars to enable curious people to find out about them without having to invest a lot of money."

Andy Thompson

Spectrum Software *(Sunnyvale, CA)*
"Sociologically there will be a big shift. Instead of moving things around, people will be moving ideas around. Robots will be assigned all the menial jobs, so humans can devote themselves to all service- and knowledge-related industry."

Jim Tennyson

Advanced Business Technology *(Saratoga, CA)*
"Computers will humanize our society, by keeping elaborate records on each individual. People have a fear of being numbered and tracked, but I see this as being to our advantage. It'll be a huge version of *Who's Who* that we can plug into. Suppose you like to ride bicycles. You can ask your computer if there are other people in your neighborhood who share your interest; and the computer will tell you about the guy that lives two blocks away who owns six bicycles. We can become more known to one another and this will strengthen relationships among each other."



Barney Stone

Stoneware Microcomputer Products *(San Rafael, CA)*
"Technology can destroy us, but it can also improve our lifestyle. If we don't implement technology carefully and selectively, we'll do more damage to the environment. If third world countries can import technology, they can skip over the development phase struggling countries are subject to, such as being exploited for cheap labor. Technology can enable developing nations to leapfrog ahead in their standard of living."

Jim Hinds

Stellation Two *(Santa Barbara, CA)*
"Back in 1970 when I was taking automata theory at Oregon State, I learned there was no way to predict the future so I won't. What's automata theory? It's predicting what computers can and cannot do. The future could be radically different from what we know of life today, but I'm more than happy to sit back and let it run its course."



Ron Unrath

Phoenix Software *(Lake Zurich, IL)*
"I think we're almost beyond *The Jetsons*. Remember how George Jetson used to come home and complain to 'Jane his wife' that he had a hard day at the office and that his button-pushing finger really hurt? Well, we're reaching the point where we won't have to punch buttons on our computer. We'll be able to program the computers by voice—tell it what you'd like to do and it'll do it. The computer will write its own programs."



Roger Wagner

Southwestern Data Systems *(Santee, CA)*
"Of course this is arguable, but given long enough, the computer will evolve as its own life form. However you define life, computers will probably be able to match that definition in the future."



Scott Adams

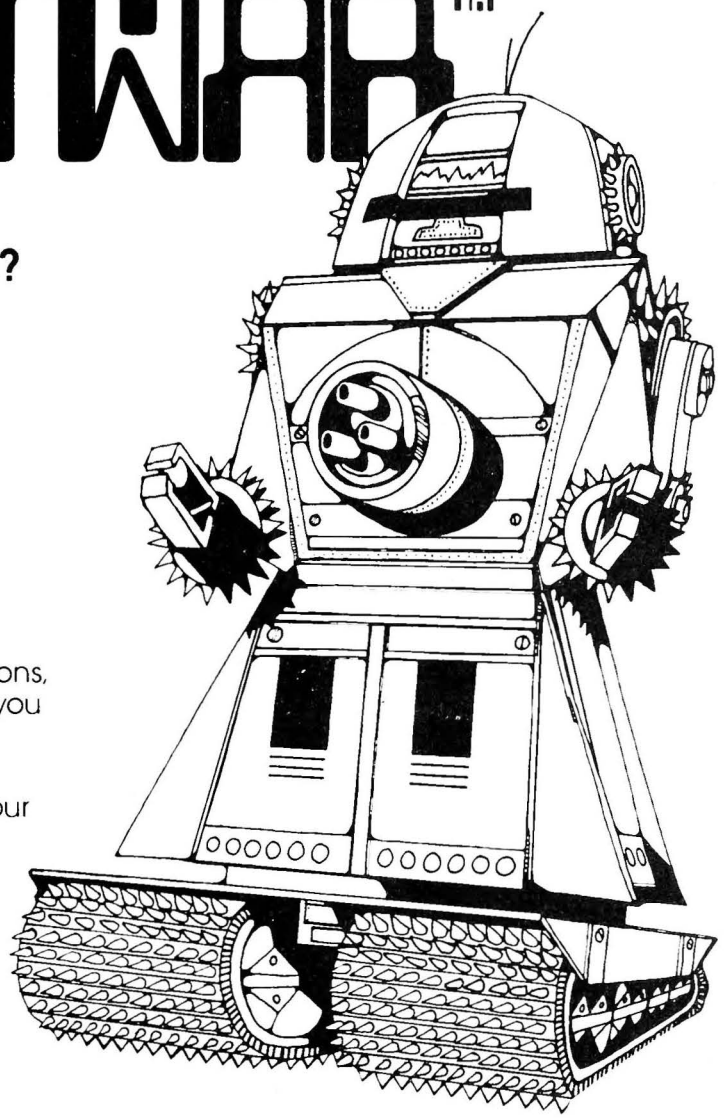
Adventure International *(Fern Park, FL)*
"Computers will be in every aspect of the home. The stove will tell you that you're supposed to be on a diet this week and cut down the amount of sugar in your coffee. When the high school boy comes by to mow your lawn, the automated teller on the side of your house will pay him."



Richard Orban

Riverbank Software *(Denton, MD)*
"Solar energy will be competitive with other forms of energy. Within thirty years energy will be free and available to anyone who wants it. The technology will be there to make solar energy a reality. People don't want to pollute the atmosphere, so we'll have energy banks. This will be a decentralized system

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that is supplied by windmills, hydroelectric power, and the sun. People can plug into this storage area if they need more energy at night. This decentralized system will also provide a form of defense to us; there is no way an enemy country will be able to knock out our energy supply. This could provide a peaceful alternative to building missiles."



Gene Sprouse

Rainbow Computing *(Northridge, CA)*
"The architecture of the future will be designed with robots in mind. Robots will be patrolling the streets, doing the grocery shopping, and cleaning the home. I'm working with a company on the design of a robot now. Ours will be able to plug itself in, wash floors and windows, and not trip over the dog."



Paul Warme

Interactive Microware *(State College, PA)*
"It will be commonplace to rent time on a robot. In order to work in hazardous climates, such as under the ocean or in outer space, people will be able to climb into a body suit that will control a robot anywhere in the universe; you'll be able to control the robot's actions. From the safety of your own home, you'll be able to project yourself into outer space and experience the sensation of being there."



Sherwin Steffin

Edu-Ware Services *(Canoga Park, CA)*
"Computer and holographic technology, coupled with other display technology, will make it possible to visualize your own environments for your own entertainment. Somewhat in the tradition of television's *Fantasy Island*, people will be able to generate their own world—using a computer. It will be a totally created environment that you can smell, hear, taste, see, touch. These total environments will be much like Fantasyland and Adventureland at Disneyland, but to a much larger degree. If someone wants to be a big-game hunter, we can essentially create an African veldt, complete with attacking lions and elephants. Of course the jungle won't be real, but it will be too realistic to be able to tell the difference easily. This is doable in the next twenty years; it's doable now, but it would be extremely expensive."



Doug Carlston

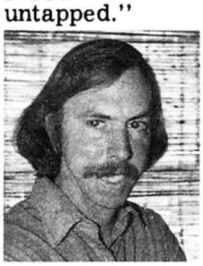
Broderbund *(San Rafael, CA)*
"More and more criminals will be going into computer crime. This is an intriguing field, because you can be anywhere from ten to ninety years old and rob a bank from the comfort of your own home. There's a subtle respect for people going into computer crime—when they get caught, they usually are hired by the business they robbed in the first place. You have to be pretty intelligent to be a computer criminal. In addition, the world is going to be less violent because of computer crimes. First of all, they keep the dangerous element off the streets since most of them will want to stay at home to do illegal things with their home computers. No one usually gets hurt when a computer robbery is committed, nobody's dignity is harmed, just a few zeroes get transferred from a memory bank.



Lynn K. Busby

Computer Station *(Saint Louis, MO)*
"The next generation will provide a significant change in the attitude of women toward computers. Unfortunately, today's women are still afraid of computers because they haven't given themselves a chance to enjoy them. Tomorrow's homemaker will teach her children the ABCs with a keyboard and color graphics and sound. Then while the baby naps she'll be using her ABCs teaching machine to access a data base for the latest developments in child care or stock market trends, or dialing into her work computer to finish the programming project she's working on, or writing a book on her desktop word processor, or composing music, or updating the household budget with her custom-designed financial model, or playing adventure games for relaxation and intellectual stimulation. All of the above is available to her now, but she'd rather have a new couch than a personal computer. Up the road, she'll pass up the new couch for a desk in the kitchen so she can conduct business and cook a roast without missing a beat.

Young people are now being exposed to computers as a part of everyday life. Traditionally in school, girls are good in English, picking up on foreign languages, and math. All these subjects are quite useful in the computer age. Logic has been something reserved for the male gender, but that's becoming poppycock. Women have great potential that today is often left untapped."



Jerry Jewell

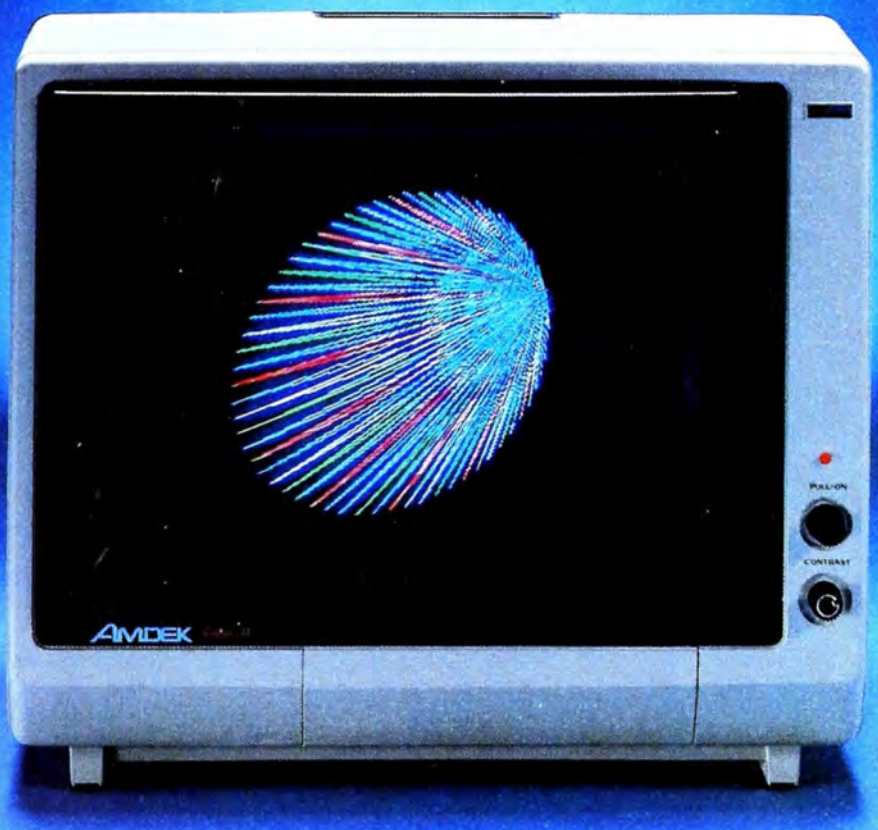
Sirius Software *(Sacramento, CA)*
"Kids growing up with computers are going to be a lot smarter than their parents—and earning a lot more money. I have several fifteen- and sixteen-year-old kids working for me that are making ten thousand dollars a month. There's going to be a lot of funny effects on the parents when their sixteen-year-old kid buys them a car for their birthday."



Owen K. Garriott

NASA Skylab Astronaut *(Houston, TX)*
"In the next few years, we're going to have permanent habita-

The High-Resolution Color Monitor for Apple II



Amdek's new Color-II monitor with DVM interface board

No video monitor has ever combined Apple II compatibility with exceptional performance like the new 13" Color-II monitor from Amdek.

Color-II features our optional new DVM peripheral board for easy interfacing with your Apple II. And look at the other top-of-the-line features Color-II offers:

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So if you want to get the most from your Apple II system, get the "most" monitor. Ask your dealer about Amdek's new Color-II monitor with the optional DVM interface board.

What is DVM? The DVM, or "Digital Video Multiplexor," is a low cost interface that allows the Apple II computer to be used with an RGB monitor, such as our Color-II.

Amdek's DVM is software programmable to allow transparent operation, and is parallel with existing Apple text and graphic modes. Three of its channels are used to multiplex the existing Apple text, low resolution and high resolution graphics. The 4th channel allows the use of an 80 character line video board.

Our DVM is also color channel software programmable, enabling you to turn the three color channels on or off by software control. For example, the red and blue channel can be turned off when the 80 character channel is turned on, resulting in a green phosphor video presentation.

For convenient operation, the DVM board may occupy any slot in the Apple II. The DVM also features low-power consumption and low-power schottky logic.

AMDEK

Amdek Corporotion, 2420 E. Ookton Street, Suite "E" Arlington Heights, Illinois 60005 (312) 364-1180 TLX: 25-4786

tions in space. These will be closed communities like Skylab and the Russian Salyut, with visitors and crews being shuttled back and forth. One of the main advantages will be to the scientific community—some experiments can be conducted much more easily and more cheaply up in space than on earth."

Ed Zaron

Muse Software *(Baltimore, MD)*

"In the future, people are going to be spending all their extra money on software. The software industry is to the computer industry what stereo stores are to the recording industry. The big programmers like Silas Warner and Bill Budge are going to be the superstars of the eighties. They're going to share the status of rock stars and have a nice part in the money warp. The next threshold is when microcomputer magazines and periodicals start hitting the local 7-11 newsstands.



Jim Sadlier

Continental Software *(Culver City, CA)*

"Computers are going to make as much of a change in our society as television. Everybody who has a television set now will be able to afford a computer in the future. People will be more easily linked by communication devices, and interaction with other humans anywhere in the world will be as easy as turning on a television. The isolating effects of computers that everybody seems to be worrying about will be offset by the communication advantages."

Ken Berry

LJK Enterprises *(Saint Louis, MO)*

"I see man as becoming a great big fat lump of coal. I was in a pre-med program in college and I still look at things from an evolutionary standpoint. As we evolve as a species, parts of our bodies we don't use drop off or become smaller in size. In the future, computers are going to be doing all the hard work and all the running around—any physical activity imaginable. Things we don't need like our arms and legs are going to disappear and we are going to evolve into one big head, one big brain mass. We'll have no physical activity, sex will be reduced to nothing. God knows how we'll reproduce. But the fittest in our future society will be the smartest people with the biggest brains—that's the law of natural selection. I think they had a program on *Star Trek* once on this very subject. A big bowling ball shape was controlling an entire planet."

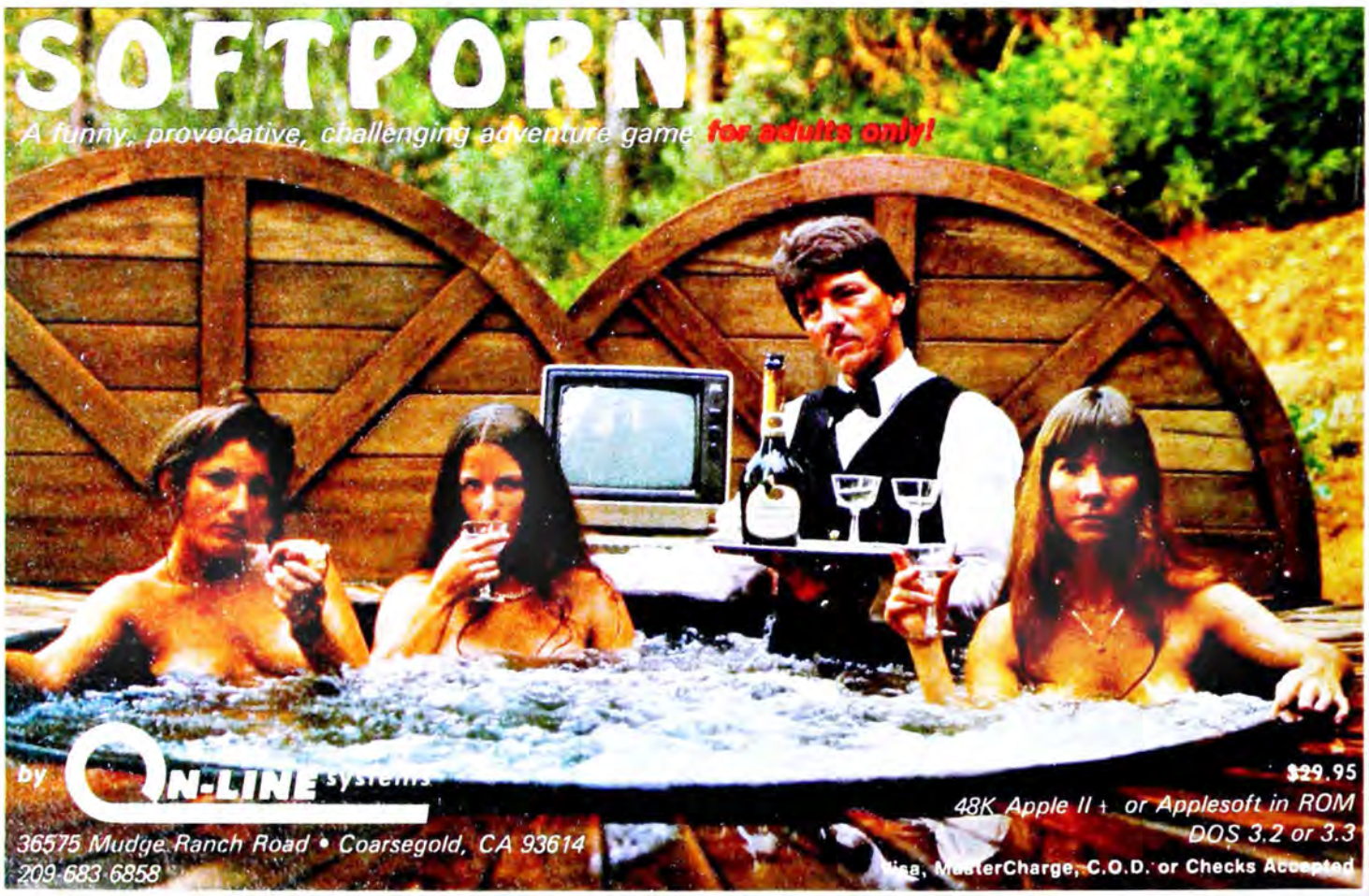


Ken Williams

On-Line Systems *(Coarsegold, CA)*

"Well, one thing that I'm sure will never happen is that there will never be a machine that will be able to do the vacuuming and the dusting and all the housework. Robots just will not be able to do that.

I'm pretty tame when it comes to making predictions. But one thing I'd really like to see is gaming with multiple households hooked up to a central computer. That would be fun and I don't understand why that couldn't be done."



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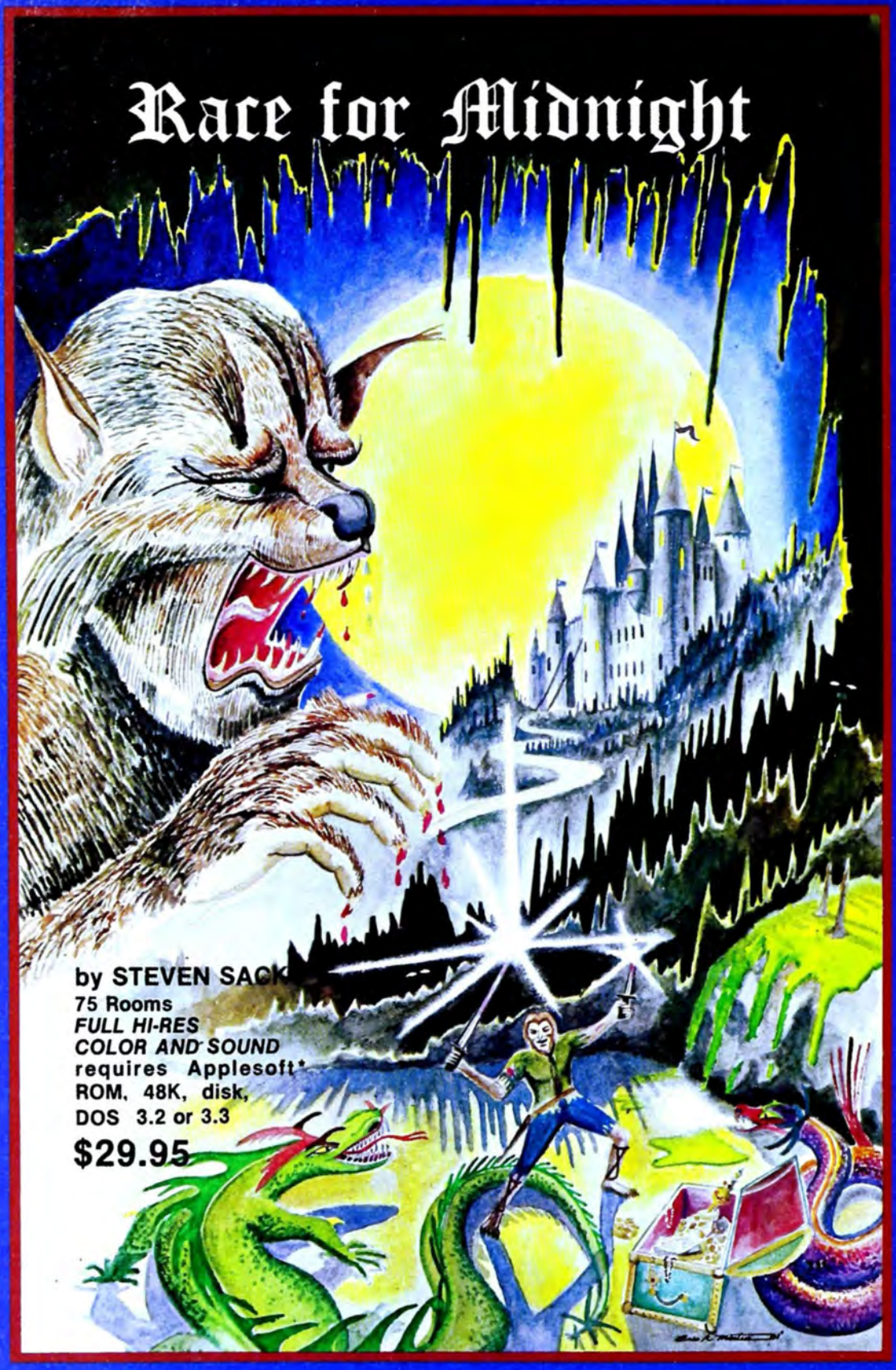




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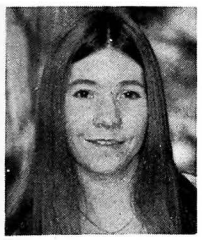
You live in a small town in the 14th century. You were awakened this morning by a terrible pain in your arm. Upon examining your arm, you find a bloody gash in it. Wisely you cover it so that nobody will see it. Later, you find that the townspeople had seen a werewolf last night and one person had shot an arrow at it, but evidently he had missed, because the werewolf continued running. You instantly deduce that you must have been the werewolf and realize that you must find an antidote.

You decide to go to a nearby dungeon that is deserted. Legend says that a powerful wizard, Evro, once lived there, but he became a victim of his own experiments. The rumor is that he had strange and deadly creatures under his power. You decide that you might be able to find some sort of recipe for a potion to cure your affliction.

Unfortunately, it is right around the time of the full moon, and you know that you will almost certainly become a werewolf tonight again. In fact, the moon rises tonight at exactly midnight, which has always had a mystical aura about it. You arm yourself with a fine sword and a full lantern and set off in search of the dungeon. After finding the ruins which used to be Evro's castle you look for some sort of entrance, such as a stairway.

While searching, the ground suddenly gives way under you. Breathing heavily, and trembling with fear. . .

PRESS (RETURN) TO CONTINUE



Roberta Williams

On-Line Systems *(Coarsegold, CA)*
"I think in ten or twenty years, robots will be doing the vacuuming and dusting and replacing the menial jobs. Every household will have one. This household certainly will."



Zena George

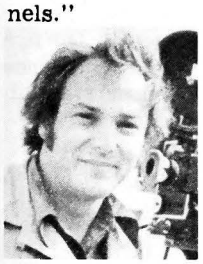
Zena Micro Engineering *(Renton, WA)*
"I sort of envision coming home at the end of the day and being met by a robot at the door who says 'Dinner will be ready in ten minutes.' "

Mary Carol Smith

Avant-Garde Creations *(Eugene, OR)*
"We need to look at our value system and ask ourselves what's important and follow that instinct. But this society is caught in a survival trip of making money with technology. People will sell out for dollars and ignore some of the truly important things that can be done instead. Technology can be used or abused. Our future on this planet depends on our actions now."

Rob Barnes

Cable News Network *(Atlanta, GA)*
"I predict the death of local network affiliates. Television will be taken over by cable and viewers will have a lot more to choose from, somewhere in the range of forty different channels."



Alan Gornick

Cinematographer *(Los Angeles, CA)*
"Within one hundred years, people will be wearing small computers on the sides of their heads, somewhat similar to a set of headphones. They'll attach these little sensors and instantly be able to conduct business, do their banking, and watch movies."

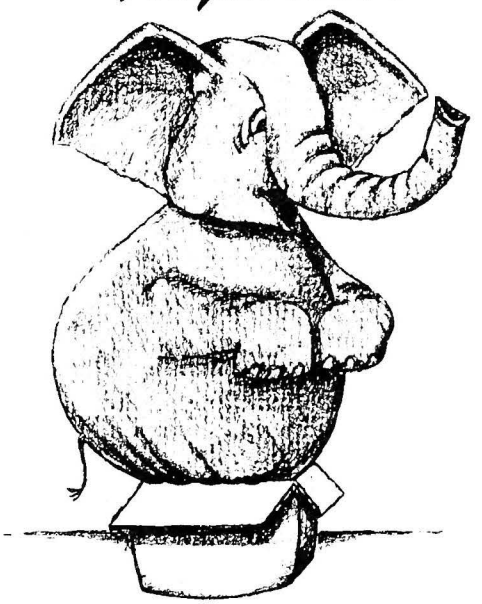


Paul Martin

GameMaster *(Fort Wayne, IA)*
"I am looking at a poster that has two seagulls floating across it. In the lower right corner of the picture is an inscription. It reads, 'They can because they think they can.' This statement summarizes how I feel that future will unfold in front of us in the next few years. The masses of people now have at their fingertips a tool that will allow many of their dreams to become reality. That tool is the microcomputer.

The educational community is probably one of the biggest

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markets that will be impacted initially. I think what we will be seeing in the next couple of years is the students teaching the teachers. The students will demonstrate to the teachers the ways in which they use their computers at home. These teachers will then attempt to apply the use of microcomputers to their daily teaching methods.

Also, every prediction I've read concerning the future has always included some thoughts on the introduction of robots into our lives. We'll see the introduction of robots into our homes in the next five years, but they won't be as they are commonly depicted. They will be the toys our children play with! With the introduction of voice synthesis, we'll now see robotlike toys being developed. These toys will share conversations with our children in ways we never dreamed possible."



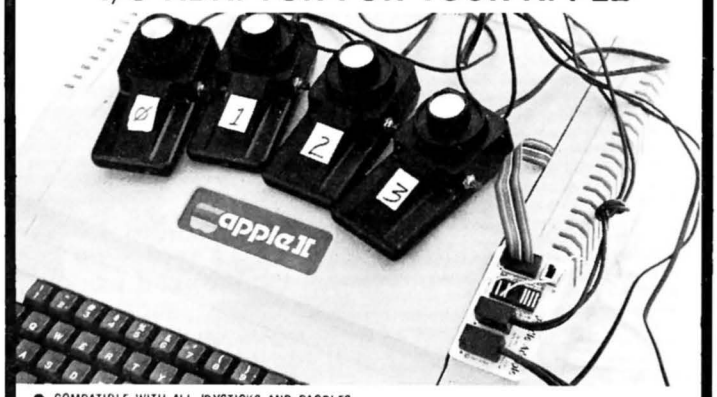
Steve Heath

Human Dolphin Foundation *(San Francisco, CA)*

"Our research with cetaceans is an exciting project in communications, and its results will have direct implications for solving some of the major problems of the world. However, for our project to be successful we must listen to the dolphins very carefully. For humans to be successful in ridding ourselves of these four scourges: hunger, pollution, energy, and nuclear arms; we must listen to each other very carefully. Perhaps we can devise a technology that requires our unprejudged listening in order to communicate! History as a review of technology is a rather bland subject, I feel. What gives our history its zest is the drama of individual participation in a complex series of ethical considerations—their ramifications and permutations. The macro as well as micro sine qua non problem of human existence is to interact successfully with others as we would have them interact with us. The future will be the same."

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Jean Richardson

Apple Computer *(Cupertino, CA)*

"New technology is causing people to realize their potential. Technology has certainly improved the lot of the housewife. Nobody wants to do housework anymore; you can't even pay people to do it! Housewives have found themselves in a different role, somewhat freed of the drudgery that used to monopolize their entire day. Microwave ovens, washing machines, and dishwashers are things of the past already. Now shopping by computers is close to becoming a reality. Technology will continue to develop that will free people's time for more creative things."



Bob Leff

Softsel *(Inglewood, CA)*

"This could be a gross understatement of the effects computers will have on our life. Things could go totally beyond our imagination in the next two to three years. But I truly expect within the next twenty years we'll have totally controlled living environments. Virtually everything will be integrated into a total system. It'll be quite the norm when a new nice house, not a tract home, is built, for it to be totally equipped with computers. Conceivably, these computers can be tied into a larger network, enabling the entire house to be monitored by the fire department or police department. If someone enters the house who doesn't belong there, like a burglar, the house computerized security system will alert the police computer."



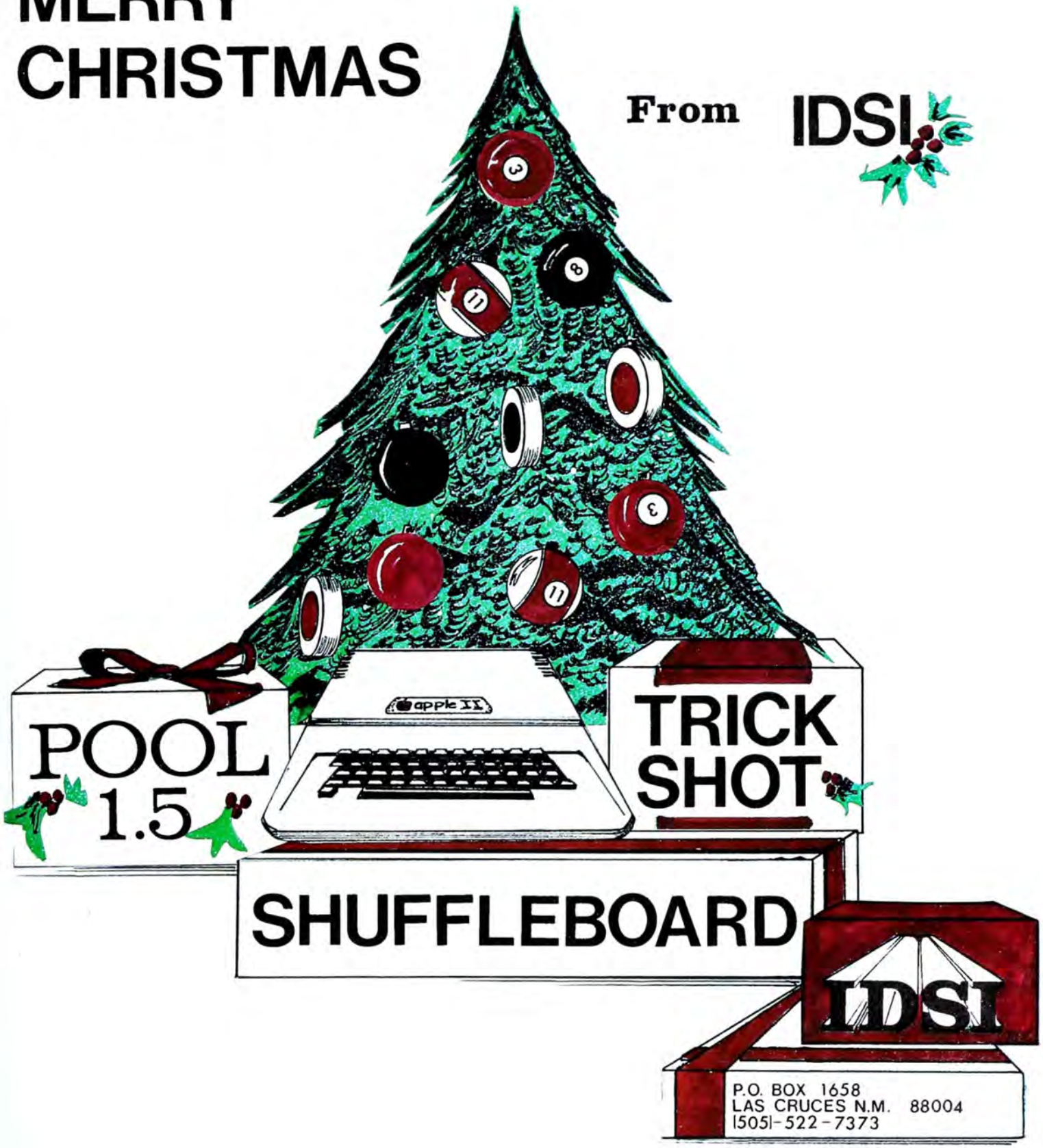
Al Remmers

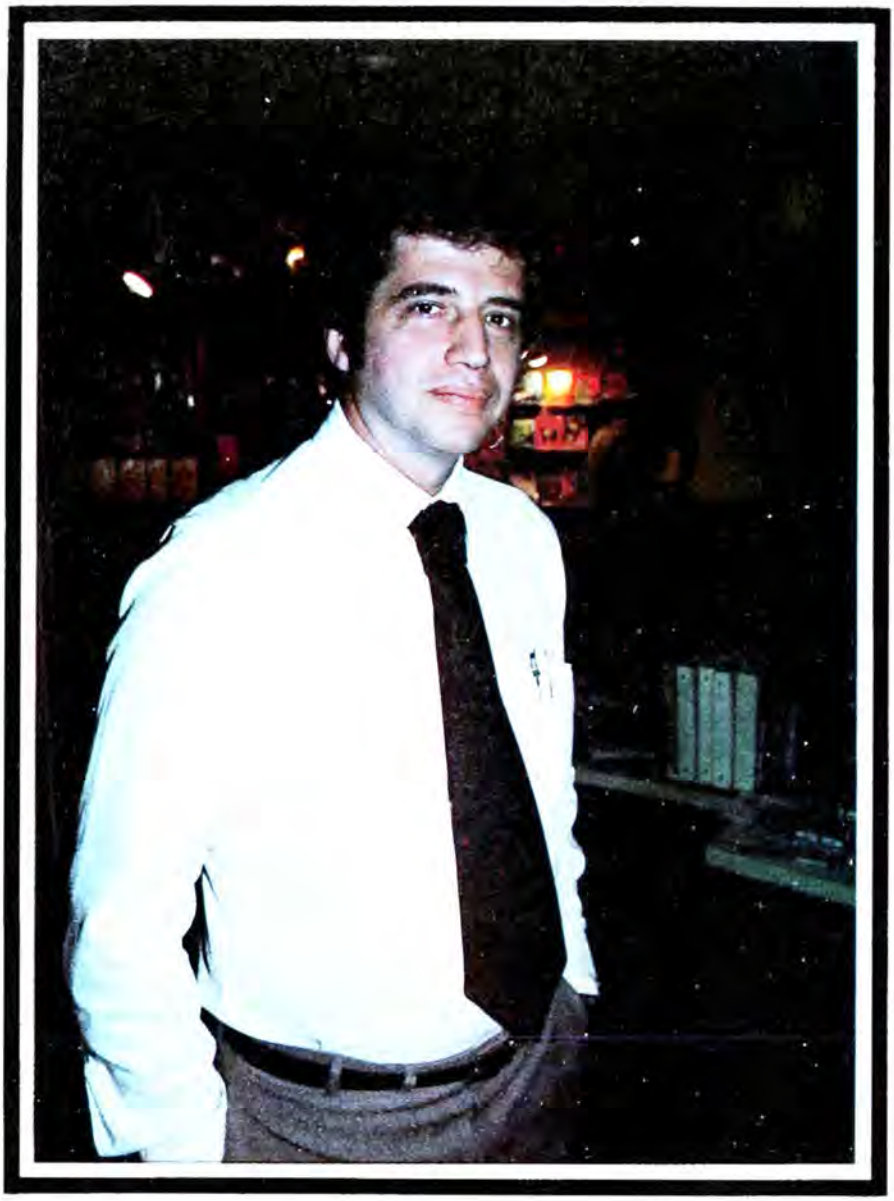
California Pacific *(Davis, CA)*

"Ten years from now, disk drives as we know them will be passe. Instead, they will be replaced by bubble memory packs and read-write laser disks. Floppy diskettes will be to the 1990s what the 78 RPM phonograph is to us now. Also, by then, computers should be thinking in terms of complete pictures as the human brain does. They'll know and understand their owners so much better that way. Ninety percent of all computers will probably be hooked up to cable television. Now imagine this: Suppose the owner is away from the house one night. Well, the computer will have kept track of the television programs he missed, maybe an old detective movie of the kind of which the owner is a real fan. The next morning, when the owner stumbles down to breakfast, the computer will greet him with something like, "Good morning. Boy, do I have a treat for you. I have saved an old detective movie that you missed when you went out on the town last night." With the proper programming a computer will be able to sort something like that out."

MERRY CHRISTMAS

From IDSI





One of the more thankless professions now extant may be the retailing of personal computers. Consider the plight of the hapless retailer who stocked up on Paper Tiger printers just in time to see Epson hit the marketplace. Or contemplate the woes of the merchant who received his shipment of thirty *Star Cruisers* in the same mail as the demo of *Apple Galaxian*.

Even the knowledgeable, conscientious retailer can be whipsawed by marketplace forces beyond his control. Witness last year's holiday season debacle, when all of Apple took two weeks off, leaving the retail trade with an inadequate supply of Apples to get through the Christmas season and into January.

A Motley Crew. It's been difficult to assess either the triumphs or the tribulations of the personal computer retailing trade with any degree of accuracy because there has seldom been a more discrete group gathered in the same branch of commerce than you find in this one.

Some retailers can, and at the drop of a hat will, discuss with a prospective customer the difference in nanoseconds in the response times of the 6502s found in the Apple and Atari personal computers. Obviously, these owners had a strong grounding in computers and computer science prior to the development of the personal computer.

Other merchants have a vague idea of where the power switch lies, although they're more likely than not to go for the power light. These are the businessmen who have seen the commercial power of the personal computer and jumped in for the ride, although their own expertise may be limited to the simpler functions on a hand-held calculator.

A third group of sellers are those who have bought a personal computer, found it opened new vistas hitherto unimagined, and decided that some commercial involvement in this new industry and with this new equipment was a must. Not being experts in either hardware or software, members of this group have always found selling the path of least resistance.

It's interesting to note that each of these groups coped with the problems of communicating with customers by using their own specially developed language.

Who's Minding the Store?

Pioneer Retailer Jim Sadlier Looks at Business

BY RICHARD KNUDSEN

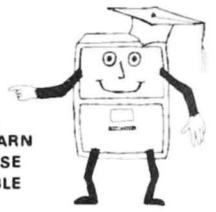
The computerniks speak in basic computerese, dropping in technical jargon at every conversational turn. The businessman speaks to his customer in basic layman, eschewing all words that might even hint at something technical. The hobbyist group speaks advanced layman, which metaphorically means the addition of bells and whistles to the basic version.

Quick Study Required. While the pitfalls facing each group varied, make no mistake that each group has needed to learn a lot in a hurry to stay in business. The computerniks have had to learn to adjust their pitch to the lower level of expertise of the computer newcomer. The businessmen have needed, at the very least, to learn the importance of various amounts of memory and the implications thereof. The hobbyists probably were closest to speaking the right language but needed to learn some business fundamentals to survive.

If you doubt the vicissitudes of the marketplace, even in growth periods of such growth industries as the personal computer market, just look in the yellow pages in any major metropolitan area for any two consecutive years and note the drastic change in entries. There may be as many or more stores listed, but the list will be radically different in terms of which stores are listed. In late 1979 in the San Fernando Valley in southern California, an area of about 1.5 million persons, more than half of the computer stores listed in the yellow pages pub-

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lished in March 1979 had gone belly up. That's a fact that would give even the foolhardy pause for thought.

The personal computer industry has been growing at such a rapid rate that there has never been established a real selling season in which results will definitely outstrip the rest of the year. Each month, there are respondents to the *Softalk* bestseller poll who report their best month in history. Regardless of that caveat, the Christmas season remains the consistently strongest period. It spans November, December, and January and offers real opportunity for the businessman to close out one year and start the next in a big way.

Leaders Emerge. In the three years that personal computer marketing has been established as its own unique brand of retailing, a handful of retailers have emerged as the trendsetters in the industry. These are the folks who assess each package on its merits, giving thoughtful and conscientious consideration to new software and hardware products as they become available and providing impetus for the makers of those new products that are found exceptional.

Without exception, these trendsetters exist in metropolitan areas where there are dense populations of personal computers. It isn't so much that the metropolitan retailers are more intelligent or more conscientious, but they did get a head start on their country cousins and



when they act, it makes a greater impact on the marketplace.

One of the retailers who was an early trendsetter was Jim Sadlier at Computerland of South Bay in Lawndale, California. Now he relies heavily on the judgment of Softsel as to which new products to stock, but in the early days, one of the keys to success was the accurate evaluation of new software as it became available.

Most southern Californians have a tendency to supplant the first letter in Lawndale with a Y to epitomize all the excitement that Los Angeles suburb offers. But the location was exactly right for a computer store. It sits on Hawthorne Boulevard, one of the most heavily traveled streets in the country, and is centered among wealthy suburbs such as Palos Verdes Estates. Also in the immediate vicinity are industrial parks and high technology firms such as TRW and Northrop.

To say that the location was a natural understates its potential. It's now the center of a computer store row that finds between fifteen and twenty stores in a three-mile radius. That Computerland of South Bay has survived the competition is a testimony to the acumen of Sadlier in negotiating the shoals of merchandising in a sea of discounters.

The Vision To Recognize the Future. While Sadlier fits the description of those retailers who come from the business world and speak basic layman, his fundamental grounding in business has allowed him to overcome his lack of technical expertise. That experience includes time holding a seat on the American Stock Exchange as a partner in a small brokerage house; he also served a term in Merrill Lynch's institutional sales department, which is where he first became aware of the personal computer industry.

Commodore and its Pet line of products came to his attention. He visited the company to research its investment potential for Merrill Lynch clients and came away convinced that he had seen a harbinger of the industry of the eighties.

This was 1977, and though Sadlier had a strong grasp of business and finance, he lacked computer knowledge—to this day, when the conversation turns to *gotos* and *gets*, he disclaims any expertise. But Computerland was then beginning an aggressive push to add franchisees; their computer expertise meshed well with Sadlier's finance and business prowess.

He was the fourth Computerland in southern California, following a now defunct West Los Angeles store on La Cienega Boulevard and stores in Tustin and San Diego.

Sadlier was in the business early enough to have seen distinct marketplace shifts. In the beginning, there was the supermarket approach of handling everything available. Computerland was carrying Amsai, Northstar, and Cromemco as well as an Apple II without disk drives.

The market soon shifted to an emphasis on the lower-priced Apple, which was attracting members of the technical community as well as the hobbyist. Today, the hobbyist market in southern California seems about tapped. Most of the sales are to small business, a statistic that Sadlier believes reflects the large quantity of high quality applications soft-

GOTO 159

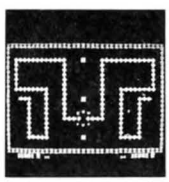
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BY GREG VOSS

If Janek Kaliczak seems enthusiastic about his computer, it is not without reason. He has the largest Apple in the world.

It's hard to get Kaliczak to talk about anything but his Apple. It's not as though he has nothing else to talk about. The techniques he used for designing the projection patterns for the television version of *Cosmos* would be interesting enough. He could probably intrigue people by revealing how he designed lighting for MCA Universal Tour attractions like Castle Dracula, the Special Effects Sound Stage, Airport 77 Screen Test Theater, and Dracula's Stakehouse and Womphopper's restaurants. It would be fun to hear him talk about special effects for the movies he's done, like *Hangar 18* or *Galaxina*, or about how he helped with the first geodesic dome projects and conferences in the late sixties. But Kaliczak would rather talk about CP/M.

Kaliczak has designed multimedia systems of lights and slide and movie projectors for churches and auditoriums. He's designed lighting for film and stage, Disneyland, the Hollywood Bowl, and the Greek Theater. Concert performers of genres from ballet to rock 'n' roll have benefited from Kaliczak's talent, including Leonard Bernstein, Carole King, and Supertramp. But, to Kaliczak, one of the most exciting things to happen in the last few months is the introduction of a 256K App-L-Cache card that will triple his retrieval speed and quintuple his memory.

How do we know Kaliczak's claim to fame is true? How does he know for sure that he has the world's largest Apple? "You know anybody who's got a bigger setup?" Kaliczak replies, waving his hand over the ribbons of spaghetti that connect his system's components. You have to admit, you don't see something like that every day.

Modest Milieu. Kaliczak's office in the Mount Washington area of Los Angeles doesn't have the same impact as the stage sets he designed. There are no spacemen hiding in the shrubs waiting to zap you with a rainbow of lasers. And the beautiful starlight covering overhead isn't even a projection; those are real stars up there. There's not even a wide-mouthed shark to pop out of the ivy and scare the nightlights out of you. Just a long climb up the stone steps to the door where two friendly dogs wait to greet you.

There's likely to be a friend sitting on the sofa as you walk down the long hallway and into the kitchen where Kaliczak's mother is preparing dinner for the dogs.

"He treats them better than he treats me," she says.

Hang a left from the kitchen, and there you be, standing in the doorway of the lifestyle of the future: the electronic cottage—home and office of Janek Kaliczak, lighting designer and consultant.

Kaliczak moves quickly from one set of shelving to another. He pulls a box of eight-inch floppy disks from beneath the console, then reaches up to his left for the five-inch disks. He puts them in their respective drives and stretches out to grab one of the project specification notebooks from overhead.

He boots up a graphics program and turns around to focus the video camera that sits on the drafting table behind him. He adjusts the drawing below the camera, then checks the color monitor to see if he's got the composition he wants. "Okay, that looks pretty good. Let's save it." Kaliczak hits several keys on his Apple and the red light on the disk drive goes on.

Kaliczak's office looks like a cross between a library reference room, an engineer's design quarters, and a film lab. He is surrounded by walls of notebooks and files. Behind him stands a drafting table strewn with theater blueprints and scrolls of drafting sheets. Sketchbooks lie open, revealing drawings of light fixtures, cabinets, and schedules. Overhead a row of half a dozen floodlights beam down on the drafting table and heat up the room. And snuggled in the corner opposite the table is Kaliczak's pride, his tool, and his toy.

The World's Largest Apple Lights Up the World



The system takes up most of the desk space in front of him. On top of two five-inch drives sits a black and white monitor with a blue-green lighting gel taped across the front to cut down on glare. Beside it stands the unit containing the two eight-inch drives. To the left is the color monitor with a control panel between the two monitors so that Kaliczak doesn't have to reach around back of the Apple to boot the system.

Anyone for Pinochle? Below the drives and monitors, sitting on the desk like an overstuffed turkey, is an Apple chassis so full of cards and interfaces that it takes an extra power supply to keep it from blowing its noodles. The modified chassis has plugs and adaptors sticking out the side with wire cables snaking along to the various components. Kaliczak's Apple can do just about everything except keep a friendly dog out of the room.

Anya, representative of that very breed, ambles up to Kaliczak's chair to rub her nose against his elbow. But no furry beast is tolerated in this sanctuary for long.

"Out," he says. "Get out." Anya shuffles away with her tail between her legs. "I don't want your hair in my disk drives." He smiles apologetically, not liking to be harsh with the affectionate animal. "She's shedding. So anyway," he says, "you have to have a look inside."

Kaliczak takes the lid off his Apple II Plus to reveal a circuit board full of cards.

"I bet you've never seen anything like that. Look at this. I've got a 16K RAM card and language system, an I/O serial parallel clock card, an IDS-460 printer. Here's the phone modem and an eighty by twenty-four video card, a SoftCard and a disk controller card connected to two eight-inch Shugart drives and a chassis power supply. Over here I've got two five-inch Apple drives and. . . ."

As if all that weren't enough to drain the juice out of an Apple, in slot eight Kaliczak's got an expansion interface that connects to the big box just to the left of the computer. What's in that box? Eight more slots for cards to hook up to the main chassis. There's an arithmetic AM-9511 card that Kaliczak built himself. There's a hi-res light pen and a video digitizer card with a 12K EPROM card next door. He's got a bit pad interface for a graphics tablet, an EPROM programmer, and an NTSC interface card that gives 280-by-240 hi-res in sixteen colors with two levels of grey on a full screen and . . . an empty slot. He must have run out of cards.

"No, that's for my peripherals," says Kaliczak, pulling out a box containing thirteen more computer cards.

All over Again. "Then there's my other system in the living room." He calls the living room setup *system two.* Kaliczak's wife Irene uses system two to do the book work for his consulting business. It also has four drives and various peripherals—but no expansion chassis. Irene says she bought the second Apple for herself.

"I bought the other Apple because I couldn't get access to this one," she says nodding at system one. "Now I can't get access to either one."

Both systems are up most of the day. When Kaliczak runs across a problem that he needs to let sit for a while, he goes to work on the other system. One thing is certain; Kaliczak puts in a lot of time at the keyboard.

"The new production system," says Alvin Toffler in the *Third Wave,* "could shift literally millions of jobs out of the factories and offices . . . right back to where they came from originally: the home." Kaliczak is already living Toffler's prophecy. He spends twenty hours of his workweek in his home office and the rest on location. The computer has freed up time so that Kaliczak can work on four or five projects at a time where before it would be tough to handle more than one. When he tires of one project, he pulls out the disk and works on another for a while.

Tooling Along. As a consultant, Kaliczak explains, he is a tool fanatic. "You have to be. You always have to be looking

out for the client's best interest. I have to be good. I have to produce the best lighting design possible. Not only that, I have to convince my client that my design is the best. If he doesn't buy it, then it's not the best."

Kaliczak uses the computer as a laborsaving device to do planning and word processing. He has to redo a lot of work, both schedules and drawings. "A drawing is never final. I may have to revise it ten times. I am always rearranging, adding new lights to the setup. All that revision means a lot of paperwork. I used to spend hours at the typewriter typing over an entire set of plans just because I changed one light. I either need an elaborate set of tools, or I have to hire a large support staff. With a computer I have more control."

At night, Kaliczak receives visits from experts in various fields. Music or sound designers come to talk about projects or maybe just about computers. One minute Kaliczak might be talking to a headhunter for the electronics industry, the next with someone designing promotional computer graphics for the Apple III. But Kaliczak's contact is not limited to those who drop by. He often sends and receives information from other consultants over his modem. Or you might just find him calling up computer bulletin boards around the country picking up free CP/M programs or looking for equipment he can use.

"I think CP/M is going to take over," he says. "It's so much easier to use." Kaliczak ties into two networks that distribute CP/M programs at no charge to user groups. All programs are donated by the users themselves and the material donated becomes public domain. The object of the networks is to spread the operating system around so that more people start to use it.

A Proselyte. Tonight one of the people who is visiting Kaliczak is another lighting designer, Darryl Palagi. Although Palagi is here largely by accident—his car broke down, leaving him without transportation—he's taking the opportunity to benefit from some of Kaliczak's extensive design experience.

Palagi has done most of his lighting work with rock 'n' roll tours. Lately, he's been getting into a field he calls theme park design. Kaliczak has much more experience with theme park projects like the Universal Tour attractions.

"This is a whole new design concept," Palagi explains. "In the past, most lighting work has been done in theaters or auditoriums where the whole lighting system is already installed. In a theme park, you have to deal with more architectural problems. You have to install everything from control panels and cables to the fixtures that hold the lights. You have to do all that as well as decide where you want the light to fall and what effect you want. You've got a show that's performed hundreds of times a day before thousands of people. That requires an entirely different design than a theater.

Lighting design is more complicated than one would suspect. There are sketches to be made. In a theme park project, the architectural structure must be designed. Schedules and blueprints must be drawn, indicating where lights are to be placed and the type of light and cable required. Plans and specifications are finally turned over to the master electrician, who installs the system. Standardized forms facilitate communication between designer and electrician. In fact, the field of lighting has developed its own language and protocol.

"An *electricians' schedule.*" explains Palagi, "is something you can take down to any theater from the Mark Taper Forum to the Greek Theater and the master electrician there will be able to read it and know what you're talking about."

Almost half of Kaliczak's work involves planning. Because he believes in putting all plans into writing, he finds the word processor invaluable. He thought that this use of the computer might also help Palagi in his work, so tonight Palagi gets his first look at the word processor at work. Until now, he'd only seen its achievements.

"First you have to set the tabs where you want them. We'll use six. Now the first column is the dimmer, then we have the control, followed by the light number. . . ." Thus the lesson begins.

The electricians' schedule is a standard lighting design form that has been used in theaters for more than seventy years. It tells the master electrician where to install the lights, what switches to hook them up to, the type of cables to use, the routing of the cables, and the area the lights will be focused on. The light numbers correspond to switches on the panel that control various lights.

Palagi shakes his head as he watches Kaliczak work his magic. Kaliczak decides to change headings and move them around to get a better layout for the form.

"You mean you can just move a whole line over like that?" asks Palagi.

"That's nothing. Suppose you want to change a word; you just wipe it out." Kaliczak strikes a few keys. "You want to change a light number? No problem. Just wipe out the old one and retype. How 'bout that? Also, you can print out blank forms so that you can pencil the information in on the first draft and then type it later."

"Geez," says Palagi, "this is so hot it gives me chills."

Coordinating Many Tasks. It's a feeling many people get the first time they see what a word processor can do for editing. But the electricians' schedule poses some particular prob-

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lems; these too are almost eliminated by the computer.

"The way we used to do it," says Palagi, "you'd have a diagram that would say 'pipe one with lights one through eight' on it. Then you'd have pipe two with another set of lights—maybe one through ten. If you decided that you wanted to add one more light, you'd have to draw up a whole new electricians' schedule and a whole new cue sheet because the lights would have to be in order on the sheet. Each sheet took about three hours. And usually you have to make four or five revisions on a project."

But now, if a change in the lighting setup is required, the corrections can be made on the word processor, and a new set of sheets printed. Since four or five copies of the schedules are necessary for the different people involved, print-outs save a lot of time.

But Kaliczak and Palagi know from experience that it's hard to get designers and electricians to accept the new computer printed form. Often houses have their own forms that light consultants are required to use. It will take time to convince people in-house that it will be to their advantage to use the computer, but with some talking, it can be done.

The traditional working arrangements in lighting design involve three primary people: the lighting designer, an assistant, and a master electrician. The lighting designer decides the effects required, and where to place the lights. The information is conveyed to the assistant who draws up the paperwork and revises whatever forms are necessary. The design specifications are then given to the master electrician, who solves the technical problems of installing the system.

Kaliczak's degree in civil engineering and television gives him more latitude than most lighting designers. Because he knows the technical side of electronics so well, he is highly respected by the electricians he works with. He is sympathetic toward the needs of those who'll be installing the system he designs. Consequently, he's given a lot of freedom that wouldn't be given other designers. Electricians know they can trust him.

Palagi thinks Kaliczak is ahead of his time.

"I think what Janek is doing is evolutionary. I don't know of anybody else who is using computer-generated planning material in lighting. It really helps, especially in California where you don't have the elaborate stage facilities that they have in New York. I think you'll find that as more people are exposed to the concept, it will change the whole industry."

The evolutionary idea parallels the impact that the musical arrangements in the Beatles' "Sergeant Pepper" album had on the theater. "A lot of us heard that album and thought 'My God, we've got to do something like that.' The more you work on a new idea, the more you find other people who have been affected by it as well. From the new concepts in 'Sergeant Pepper,' you see similar techniques emerge in lighting and stage design resulting in projects like *Hair*."

Just as radical changes in music affected theater, changes in planning for lighting will affect other design areas.

"There's no limit to the applications," says Palagi.

Where Do We Go from Here? An acoustic designer who stopped by to see Kaliczak explained that lights were now being installed in speaker cabinets and used to find where sound would project in auditoriums. "There are so many similarities between light and sound anyway," said Palagi. "I think pretty soon computers will be used in all types of design. Computer-generated design is already used in some rock shows. All lighting effects are preprogrammed. It really screws things up though if the group comes back for an encore."

This won't be the first impact that computers have had on the lighting industry. The light pallet, introduced about three years ago, changed lighting technology. A light pallet contains all the information for lighting cues on a floppy disk. Where formerly lighting technicians controlled all dimming effects and light changes by manual switches, the light pallet made it possible to program all changes in lighting so that hitting a *go* button at the proper cue would take care of the whole show. The computer would automatically turn on and off the appropriate switches and dim lights at a preprogrammed rate. *Chorus Line* was the first stage production to use a light pallet successfully. Since then pallets have become increasingly popular.

A lot of union problems sprang up when widespread use of the light pallet began to change jobs in the lighting field. The problems were mostly with job security. Lighting experts had to become computer programmers. The pallets almost eliminated the need for assistants to the lighting designer. "Think about what that does," says Palagi "to a guy who is famous for being able to put tears in your eyes by the way he lights a scene." If they're adaptable, like Charlie Brown at the Mark Taper Forum in Los Angeles, they'll become good programmers. "He became an excellent lighting programmer. He's great with the light pallet." The light pallet has changed Brown's job considerably. Once he's programmed the lighting, all he has to do is punch a cue button during the performance.

There's another problem, this one a poser for the computer print-out schedule. On theme park projects like the Universal Tour, there are language problems: people from three different fields are working together. There are film people, theater people, and television people. Each profession has its own specialized jargon, which causes problems for the lighting designer. What one profession calls a light, another calls a fixture. The third will call it a unit, and the poor consultant who specifies that *lamps* be placed at the foot of the stage is likely to find any one of three objects installed when he arrives at work.

The Graphic Apple. Kaliczak removes the lens cap from the video camera over the drafting table. "Now watch the effects I can get with this camera." He can set his program to interpret one color from the camera as any color he wants on his monitor. Thus the color blue from an original graphic can be changed to any one of sixteen colors from red to green. This facility allows Kaliczak a great versatility in design.

To demonstrate, he copies the robot poster from the cover

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of *Softalk*'s August issue. The poster appears on his screen as chartreuse and green. "Now look what you can do." He manipulates the robot into a high contrast black and white image. "How do you like that?" The ability to reverse colors and manipulate images has made the Apple graphics invaluable to Kaliczak in designing projection screens for special effects.

"My goal is to develop an extremely high-resolution graphics system that is friendly to artists and designers. The problem with the graphics packages on the market now is that you have to know something about computers to use them. Computer programmers don't understand what an artist needs to work with."

Although he would like to see a simpler system for the non-computerist artist, Kaliczak is fond of the Apple graphics system. He believes it is the most complete and advanced graphics system available for microcomputers.

Kaliczak knows of one other man who is using computer generated show materials and planning at this time, and a growing number of consultants who are getting computers for various purposes. "That's why I have just about every word processor available for the Apple. It's not that I use them all myself. I have to be able to communicate with the other consultants I work with. We are constantly exchanging information."

The Fascination of the Dome. Kaliczak has been involved in more projects than he can count, but one of the more futuristic projects happened a while back. In 1969, he and two friends were discussing the geodesic dome that was then owned by a Los Angeles university. They decided to offer the college fifty dollars for the entire structure—that was all the money they had. To their surprise, the college took the offer.

"We sold it to the University of New Mexico. They paid us to come out and put it together for them. We sold it for ten thousand bucks. Cal State will never live that one down."

Among fifty-some other projects, Kaliczak is working on a book covering the technical design of domes for engineers. Drawings of dome structures for the book are now on computer files. Kaliczak has written a program that allows him to manipulate the angle from which the domes are viewed. As the program runs, the dome appears to rotate on the monitor. The perspective moves from a distant view of an entire dome to close-ups of joints for detailed structural study. Kaliczak also organized one of the first international conferences on domes: "Focus: Shelters for Mankind," an alternative architectural and energy conference.

The conference was attended by more than a hundred pioneering domers. Since then, Kaliczak has worked as a structural and civil engineer and contractor for the International Geodesic Corporation and is a cofounder of Dome West, which designed the theatrical system and equipment for the two domes at the University of Mexico in Mexico City.

And His System's Still Growing. But all that's old stuff, and tonight Kaliczak's energy is focused on equipment for sale as he checks the different bulletin boards with his computer. Since he purchased his Apple in June 1980, he has picked up a lot of paraphernalia. It hasn't been cheap. His two systems have set him back about twenty thousand dollars so far. But he does get his use out of the gear. Not only that, Kaliczak is contributing to a new form of production in his electronic cottage in the hills.

No one can predict what Kaliczak will do next with his hybrid Apple. But from the way he's eying the equipment for sale on the computer bulletin boards, it's not hard to guess. He's already started building a third system that will give 560 by 492 graphic resolution. Kaliczak is hooked. And it's a safe bet to say that the world's biggest Apple will probably get even bigger. ❏■

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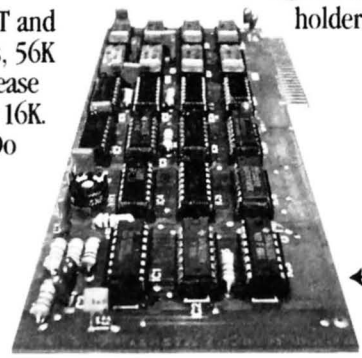
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But don't take our word for it, *Wizardry* received reviews in the May issue of *Creative Computing*, the April issue of *Popular Mechanics*, page 38, and the August issue of *Softalk* magazine.

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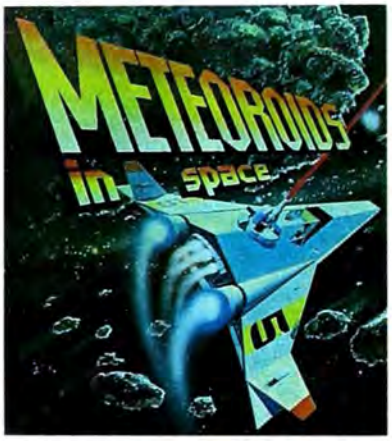
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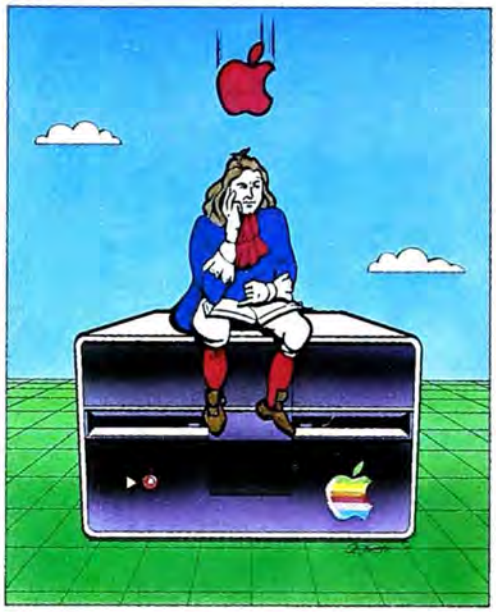
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THE BASIC Solution

By Wm. V. R. Smith

It seems that no matter how much time and effort a programmer spends developing a particular program, within a short amount of time someone figures out a better way, a faster way, or new and fancier functions that the program should perform. This single trait may be one of the most important ingredients to the future growth of computers and software. If you have thought of a new function for one of the software products you've purchased, send the idea in to the manufacturer. You'd be surprised at the number of improvements that have been suggested by Apple owners.

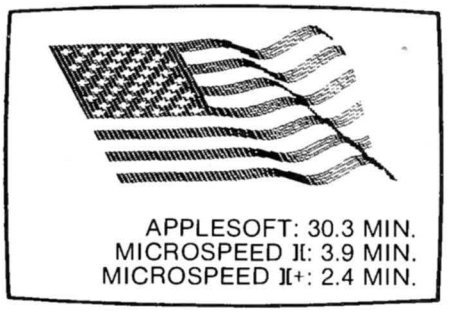
This month's Basic Solution program was written by Brad Stone of Provo, Utah. He read the May issue of *Softalk* and found a way to improve the *Softalk* *Hello* program. His feeling was that the program was too limited in that the users should not only be able to run the program of their choice, but also load, lock, or delete any file on an Apple diskette. He also included instructions at the bottom of the screen so the user does not get confused.

The Basic Solution is anxious to hear from *Softalk* readers about the types of programs they'd like to see printed in upcoming issues. With the starting of the New Year it will be interesting to find out how many of you would like to see more Basic programs or a discussion of the concepts of programming in Basic. You be the judge. Take a moment and write to Softalk Basic Solutions, 11021 Magnolia Boulevard, North Hollywood, CA 91601.

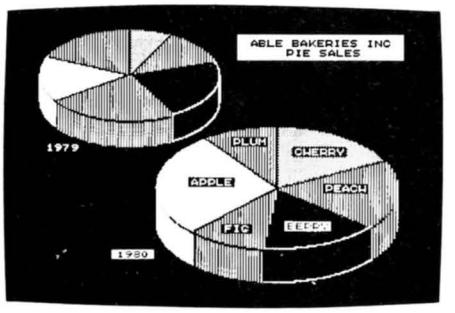
```
100  TEST : HOME :D$ = CHR$ (4): PRINT
       D$;"CATALOG":B = PEEK (37) - 2: IF B
       > 22 THEN B = 22
110  T = 0:CH = 4: FOR CV = 0 TO 23: GOSUB
       1000: IF C < > 160 THEN POKE P -
       1,219: POKE P,T + 193: POKE P +
       1,221:T = T + 1:S =CV
120  NEXT CV: VTAB 24:A$ = "TYPE LETTER TO
       RUN, OR LOAD=1 LOCK=2 UNLOCK=3
       DELETE=4 EXIT=5...."
130  B$ = "RUN": HTAB 1: PRINT LEFT$
       (A$,39);:A$ = MID$ (A$,2) + LEFT$
       (A$,1):K = PEEK ( - 16384): IF K < 128
       THEN FOR K = 1 TO 75: NEXT :K = FRE
       (0): GOTO 130
140  POKE - 16383,0:K = K - 176:IF K < OR K
       > 5 THEN 300
200  HTAB 1: CALL - 868: IF K = 5 THEN GET K$:
       NEW
210  PRINT "PRESS /LETTER/ YOU WISH TO ";: IF
       K = 1 THEN B$ = "LOAD"
220  IF K = 2 THEN B$ = "LOCK"
230  IF K = 3 THEN B$ = "UNLOCK"
240  IF K = 4 THEN B$ = "DELETE": FLASH
250  PRINT B$;: GET K$: NORMAL : GET K$:K =
       ASC (K$) - 48
300  IF K < 17-OR K > T + 16 THEN 130
310  CH = 1:CV = S - T + K - 16: GOSUB
       1000: IF C = 194 AND (B$ = "RUN" OR
       B$ = "LOAD") THEN B$ = "B" + B$
320  FOR CH = 6 TO 39: GOSUB 1000:B$ = B$ +
       CHR$ (C): NEXT : HTAB 1: CALL - 868:
       PRINT B$: PRINT D$:b$: GOTO 100
1000 C 1 = INT (CV /8):CZ = CV - C1 * 8: ⇔ =
       1024 + 128 K CZ + 40 * C1 + CH:C =
       PEEK (P): RETURN
```


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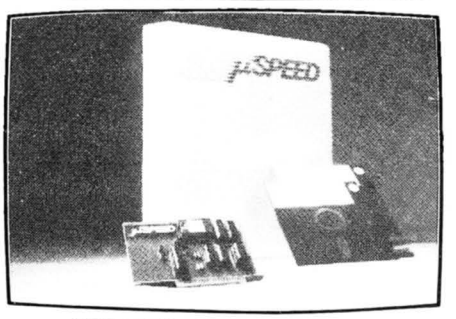
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Pioneer Retailer Jim Sadlier

from page 148

ware coming into the Apple market.

Good Stores Emphasize Support. Through these market shifts, Sadlier has steadfastly refused to change his sales philosophy, which has always been to speak basic layman, a language he believes communicates better to most users. "We've got technicians who are delighted to compare clock rates with the technically oriented users. But the average prospect who comes in the store isn't an expert and he needs information delivered in a fashion he can understand. That means plain English." For this reason, Sadlier populates his sales staff with folks who have a strong sales background but who are not expert in personal computers. This policy has the effect of forcing the sales pitch down to the level of the user who isn't knowledgeable in the workings of computers.

Computerland of South Bay emphasizes support of the computer user. Sadlier perceives applications software as being more important to today's buyer than the hardware, because today's buyer is not computer literate. On the other hand, that lack of literacy forces the store to provide more in the way of support services. It's the emphasis on support that Sadlier believes has kept him in business against the discounters.

Business Apples Can Play, Too. For all that most of the computer buyers are now business oriented, a good percentage of the software sold continues to be entertainment. Apparently, the business user takes the computer home at night for the rest of the family to enjoy.

Computerland of South Bay was one of the stores that suffered from a product shortage last Christmas season. "We ran out of everything last year and took off the week between Christmas and New Year's. We didn't mean it that way, but we didn't have anything left to sell." Sadlier has no intentions of getting caught short again this year. He's ordered what would seem to be an inordinate number of computers and rented more warehouse space to stockpile them until needed.

In addition, the proximity of his location to Softsel leads Sadlier to believe that he's insulated from a shortage of software. "Last year, we were down to the bare walls."

Even though the market has shifted toward the business user, the Christmas season remains the strongest period of the year. "There's a sense of the season that fuels additional sales. We get people in to buy that peripheral they've been wanting but putting off.

"There's also a good business reason to buy before the end of the year to get the tax break. That practicality is strengthened by the sense of the season."

The Seeding of Blossoms Yet To Come. Sadlier credits Apple Computer Inc. for the development of the computer store as a viable retail entity. By providing retailers with a mass market appeal computer at a low price, Apple provided the foundation for many of the retail stores now in existence.

But he doesn't see anytime soon the realization of the vision of a microcomputer in every home. "Until the applications software is in place to allow banking, paying bills, and shopping at home and until data bases from which the home computer user draw are widespread and inexpensive, we aren't going to see mass penetration of computers into the home. The applications will have to be there to justify the expense."

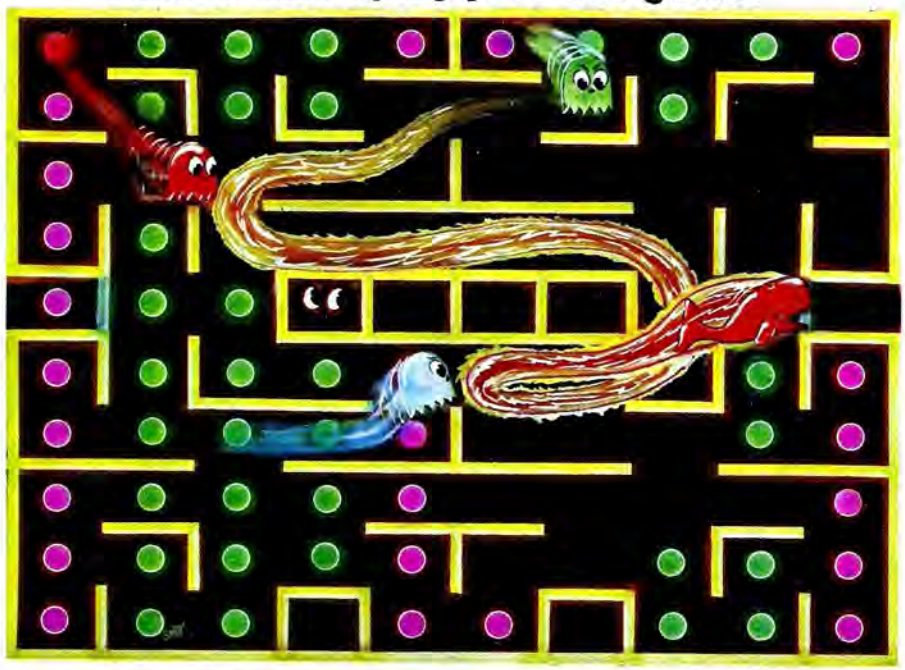
Sadlier believes the small business market is even more important to the retailer today. The advent of additional application software and mass storage devices pave the way for increased penetration into this market. In his estimation, these advances should fuel the microcomputer industry for at least another two years.

During that time span, watching the trendsetting retailers may give us some indication of what will follow.

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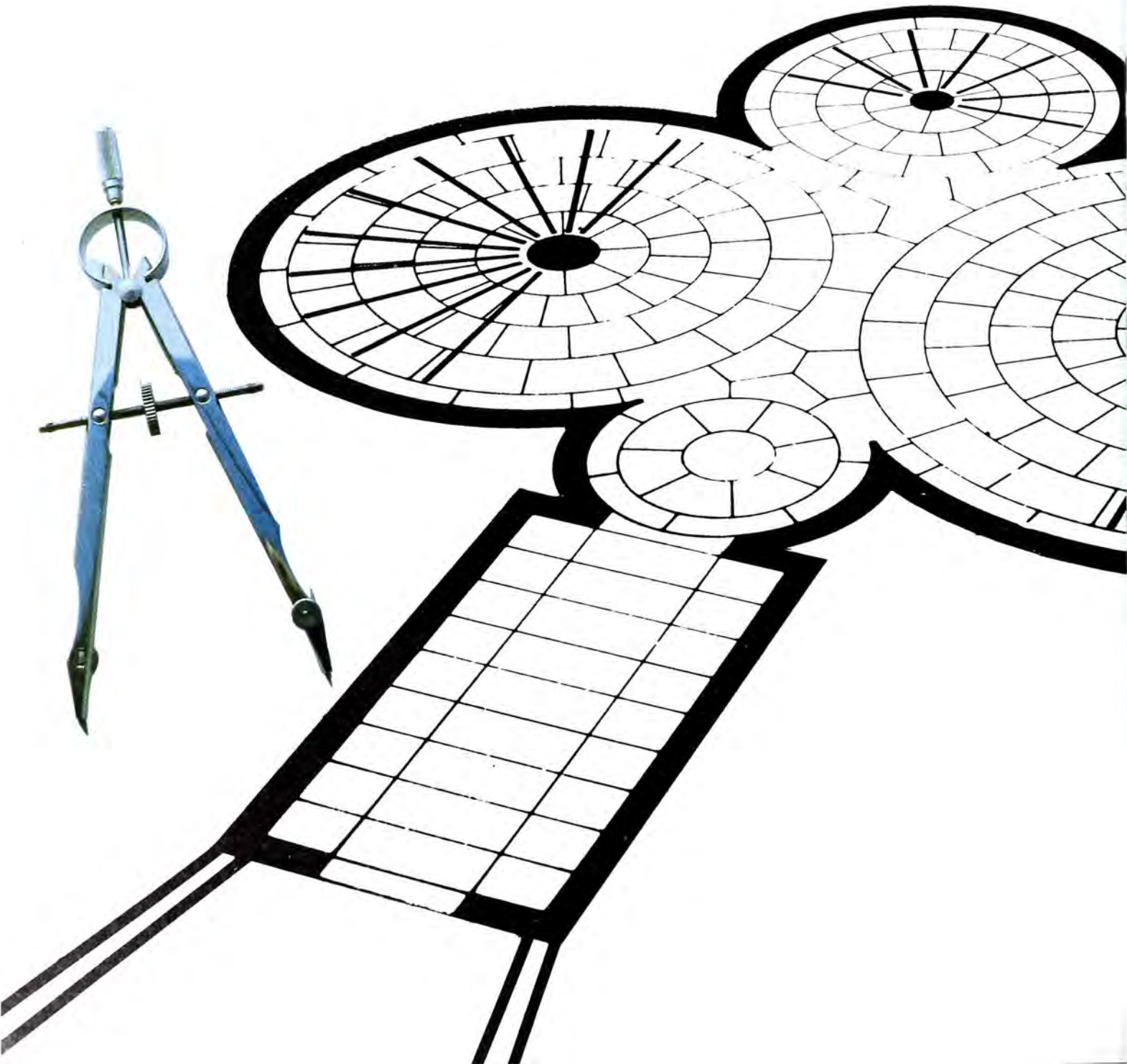
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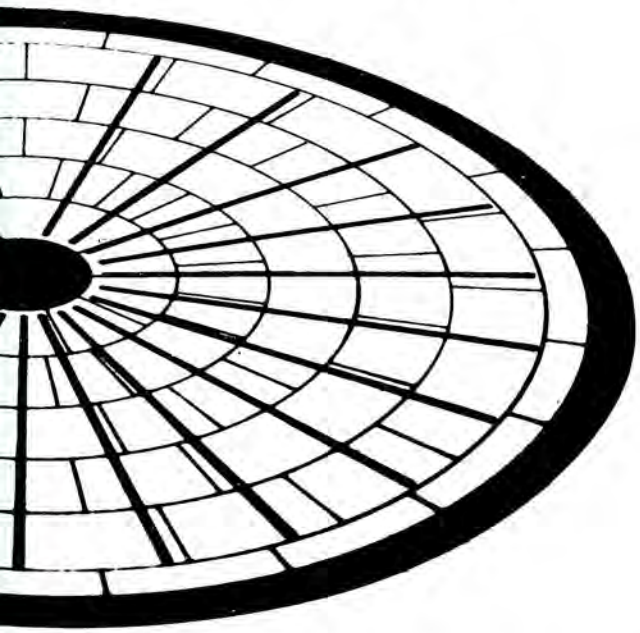
The Hare, The Tortoise, and a



RAN

Spin Through the Mill

by Douglas E. Coats &
Cye H. Waldman



This article grew out of a desire to find out which of the two Fortran language systems available for the Apple II computer, Apple Fortran and Microsoft Fortran, would best suit the needs of the authors. Before long, the effort had been expanded into a full-fledged evaluation not only of the two Fortran languages, but also of the development systems that support them.

The Fortran language was originally developed by IBM for applications involving numerical solution of equations. Fortran is an acronym for *for*mula *tran*slator. It was released for public use in 1957, after which it evolved as a scientific programming language and was standardized in 1966. Literally billions of dollars have been invested in development of Fortran programs since then. As a result of continued evolution and expanded applications involving character and film manipulations, a new standard was announced in 1977 and formally accepted in 1978. It is known semiofficially as Fortran 77. The Fortran language systems supplied by Microsoft and Apple correspond to the 1966 and 1977 versions, respectively.

The fundamental difference between Basic and Fortran is that Fortran is a compiled language whereas Basic is an interpreted language. What this means is that Fortran source statements are converted (compiled) into machine code only once, while Basic statements are converted (interpreted) every time the statement is executed.

The upshot of this is that Fortran normally executes much faster than Basic, sometimes as much as thirty times faster. The price you pay for the increased execution speed is that you must submit your source language program to the Fortran compiler so it can produce object (machine) code. The resultant code must then be linked with other object code routines and the Fortran library to produce an executable program.

This procedure is a high-overhead item for small, quick-running programs, but for larger, longer-running codes it can be a convenient way to program. It allows for the independent development of subroutines and libraries of subroutines to carry out common procedures such as matrix inversion and sorting. This is very difficult to do in Basic because of variable name and line number conflicts.

The extra work and complexity involved in writing and debugging a program in Fortran make it a difficult language for a novice to use. This is especially true on a microcomputer where you have limited resources to use in the debugging process. For example, the lack of a printer would make it very hard to trace an error through several routines. For these reasons, almost no one recommends Fortran for programming novices, and we would not recommend the versions for the Apple for anyone not already familiar with Fortran or a similar higher level language.

Because the steps involved in writing a Fortran program are different from those used to develop a Basic program, we must consider the entire program development process when comparing languages. This is particularly true when the two operating systems differ as they do with Apple Fortran and Microsoft Fortran. In particular, the aspects reviewed here include documentation, operating environment, and program execution.

In the following sections, the discussions of documentation and operating environment have been combined and treated separately for each language, while the comparisons of execution speeds are lumped together. In addition, the introduction of a 6809 microprocessor board from Stellation Two, known as the Mill, prompted the inclusion of its effect on the execution speed of Apple Fortran.

Requirements. Microsoft Fortran requires a 48K system with the Microsoft SoftCard. The documentation gives examples for a one-drive system, but, as a practical matter, two disk drives are required for any serious development work using Fortran. In addition, the CP/M operating system (supplied

with the SoftCard) is required. While not strictly necessary, an additional 16K of memory would allow a wider range of applications to be run with Fortran.

Documentation. The documentation for Microsoft Fortran comes in a three-ring binder and consists of two parts, the *Fortran-80 User's Guide* and the *Fortran-80 Reference Manual.* The first of these takes the user in a step-by-step fashion through the start-up procedures necessary to compile, load (link-edit), and execute a Fortran program. In this respect, it is a very good document.

However, when running Fortran, you can't divorce yourself from the operating system, CP/M, and the documentation on it leaves a lot to be desired. This is especially true of the line editor supplied with CP/M. In fact, you'll probably want to supplement the supplied documentation on CP/M with some from your local computer store.

The *Fortran Reference Manual* is just that, a reference manual. If you're familiar with Fortran and the reference manuals on larger systems, you'll like this manual. It is well laid out and has a reasonable index (not complete, but reasonable). If you're a novice to Fortran or don't like the manuals on the bigger machines, you'll hate this one. The manual is definitely not a learning guide and you would be well advised to purchase one of the books recommended in the *User's Guide.*

There are some deficiencies in the Microsoft Fortran documentation. The most notable of these deals with diagnostic messages for compilation, loading (linking), and run-time execution errors. These messages give the user very little information about what is wrong and none about how to rectify the situation. Also missing are discussions on more advanced features concerning the interaction of Fortran with the I/O routines and the operating system. From comments made in the documentation, it appears that some of this information (if not all) is available in the Assembly Language Development System (an extra-cost item), which includes Microsoft's macro assembler and library manager. For programs with large numbers of subroutines, some sort of library management system is required. Otherwise you will be typing in every routine name used every time you link-edit your program.

Operating Environment. As noted, the basic steps in developing a Fortran program include the use of an editor, compiler, and loader. As suplied by Microsoft, the operating environment consists of the CP/M operating system, the ED line-oriented editor, the F80 compiler, and the L80 loader. Unfortunately, the most used piece of software in this set, the editor, is the weakest from the user's standpoint. If you had never used an editor before, line or screen, then it's possible that you might actually like ED. However, for those who have been exposed to other editors, ED is poorly structured and a pain to use. In considering the overall cost of the system, you should probably include the cost of a better editor.

As an operating system, CP/M is not the world's best; however, unlike DOS, it is a real operating system and not just a language monitor. CP/M has all of the file utilities necessary to create and maintain your data and program files in an orderly and consistent manner. One of the advantages of CP/M is that files written by one language can be read by another. Fortran files can be read by Basic programs and vice versa.

The use of the compiler is straightforward and convenient. The entire compilation process is controlled by a single input command line. This line controls the generation and disposition of both the object file and the source listing. An option is allowed in the compilation process that only checks for syntax errors and thus helps reduce the amount of time required in initial checkout.

Link-80, the name Microsoft has given to their linking loader, is only slightly harder to use than the compiler. Again, the execution is controlled by a single input sequence (this time it can be more than one line), which means that you don't have to wait for the loader to supply it additional information. The major deficiencies in *Link-80*, as supplied, are the skimpy documentation and the requirement that you name all routines loaded with your program. The latter problem can be rectified with the purchase of Microsoft's *Library Manager.* To date, we haven't tried to load any complicated programs or to chain two programs together, so our experience with *Link-80* is limited.

Fortran-80. Microsoft Fortran-80 is a subset of the 1966 Fortran standard along with some fairly common extensions, the most notable of which are the inclusion of the END= and ERR= clauses in I/O statements, the use of the literal form of Hollerith data (character string delimited by apostrophes), and additions to the declaration of data types, which include the *byte* type (poorly documented).

Features of the language that only pertain to the Apple include lo-res graphics routines, paddle and button interface routines, a tone or note-generating routine, and direct cursor positioning routines.

The major restriction in Fortran-80 is the lack of the *complex* data type. The latter is quite common in Fortrans for microcomputers (it's not included in Apple Fortran either) and will only be missed by a very limited audience. The features most missed are hi-res graphics, a generalized I/O routine that would allow the reading of any device, and free-field input routines to allow for easy input of data from the console. The last of these items is a serious limitation of Microsoft Fortran and degrades the usefulness of Fortran on the Apple or any other microcomputer.

Apple Fortran.

Apple Fortran requires a 48K system with the Pascal Language System (including the 16K RAM card) and two disk drives. In principle, one disk drive will work, but in practice two are needed and three would be even better because of the disk space required for the system itself. Apple Fortran, as packaged and sold, is not a complete system and assumes that you have the Apple Pascal system (more on this later).

Documentation. The Apple Fortran manual is handsomely prepared and typeset in a spiral-bound volume, like all of Apple's manuals. It isn't a complete manual, as it requires the *Pascal Operating System Reference Manual* to complement it. Moreover, it is poorly laid out and is difficult to read through in a logical manner. Material is hard to find and sometimes is inadequately indexed, which makes it difficult to use as a reference manual.

Initial setup of Apple Fortran requires transferring some system files from Pascal disks to Fortran disks. The configurations recommended in the manual are poor ones, as they leave the user with a minimal amount of disk space. Also, while the manual appears to lead the user through the process of creating a program from start to finish, the procedure outlined will not work for any program of reasonable size.

Even for those already familiar with the Pascal system, it isn't obvious how to proceed. There are more steps than are apparent and some fancy disk swapping is required to get lengthy programs compiled and linked. As noted, short programs (whose text and code files fit on the boot disk) can be handled easily.

An inherent part of program development is debugging and error handling. The manual contains extensive lists of compile-time and run-time error messages, but these are sometimes cryptic. We have had error messages we never could explain (nor could the folks at Apple) and wound up with programs that never would compile. Oddly, these same program files, when uploaded to another computer system, compiled without a hitch. There is another set of error messages that aren't documented anywhere. These are similar to the segment/procedure/byte error messages in Pascal, but they have no apparent meaning in Fortran.

One final note on documentation: Fortran programs run under Pascal revision 1.1 must be modified with a program called *Fortfix* to compensate for some residual bugs. This is not documented in the manual, but Apple has attempted to spread the word through letters to registered Fortran owners, publication in *Call A.P.P.L.E.*, and distribution by the International Apple Corps.

Operating Environment. The Fortran operating environment consists of the same UCSD Pascal *Editor* and *Filer* used

in the Apple Pascal system. The UCSD *Editor* is a good screen-oriented Editor that allows rapid entry and editing of programs. The *Editor* can also be used as a word processor. The *Filer* has adequate file-handling capabilities and utilities for routine file saving and transfer. The system is sometimes inconvenient when bouncing back and forth between the *Editor* and the *Filer*.

Program execution requires a three-step process once it is entered. The program must be compiled/debugged, linked, and updated (with the *Fortfix* program) to create an executable code file. The *Compiler* and *Linker* are called from the command mode; these files are peculiar to the Fortran system and are different from their Pascal counterparts. Their operation is somewhat complex when dealing with programs too large to fit on either of the system disks. This is where a third disk drive would be handy. Apple Fortran works slightly differently than Microsoft Fortran in that the *Compiler* produces a pseudo-code (or p-code). P-code is a machine code for a pseudo-machine which is then interpreted by the Apple's 6502. This has the advantage of portability of user code, at the expense of being interpreted rather than compiled.

The *Compiler* has a nice cross-reference feature that produces an alphabetical list of program variables and references the line where they are called. This is helpful for both documentation and debugging. The Fortran language does not force variable declarations (strong typing) as does Pascal, so a mistyped variable name compiles without notice and can cause havoc later on when the program is run. But the cross-reference can call attention to spurious variables. For example, any variable used only once would be suspect and could be checked. The *Linker* is relatively fast (compared with the *Compiler*), but it creates rather large (twenty-six-block minimum) executable code files.

Language. Apple Fortran is subset of Fortran 77 and has the features of the new standard. The principal extensions of the new standard are IF-statement constructs, character data types, and standardization of I/O. The new IF constructs permit logical IF, block IF, and IF-THEN-ELSEIF-ENDIF statements. These permit more fluent programs (without GOTO statements) that are consistent with modern structured programming practices. This can have a significant impact on program development time. Apple has also included special units (not in the standard) that provide Turtlegraphics and Applestuff for hi-res graphics, music notes, and paddle controls in Fortran.

The most noticeable items not included in the language subset are the *complex* and *double precision* data types. The very useful practice of passing subroutine names through calling sequences via *external* declarations is not provided for. Most of the other items that are missing are minor and won't be missed when good programming practices are adhered to.

Extensions. Apple Fortran program development can take advantage of the Mill, a 6809 microprocessor board for the Apple. With the appropriate software (*Pascal Speed-up Kit* and *Floating-Point Option*) the operating system and program execution run faster because the instructions are routed through the 6809 instead of the Apple's resident 6502. The performance of the Mill-enhanced Apple is sufficiently different from that of the unmodified Apple that it warrants a separate category in the benchmark tests.

Benchmarks.

The use of benchmarks to measure the relative performance of computers and languages is quite common. Benchmarks are computer programs designed to test out different aspects of the machine, I/O configuration and languages. The only foolproof benchmark program is the specific software you intend to run. Then different machines and configurations can be compared. Any other benchmark is an approximation at best. In using other people's benchmarks, first try to define your own computing requirements so that the benchmarks are relevant to your needs.

Benchmark programs fall into two categories: those that do useful calculations and those that do contrived calculations. Programs of the first type are apt to have meaning and

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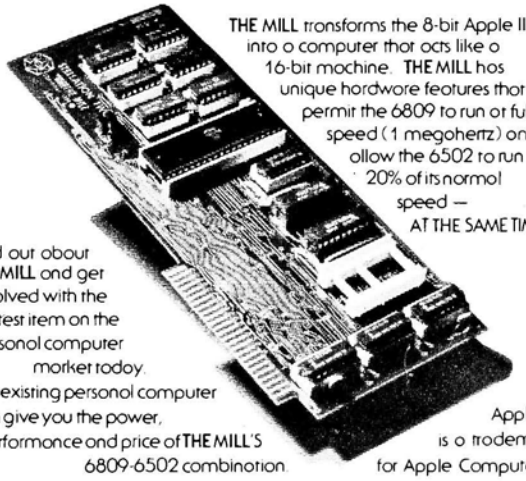
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```
      PROGRAM PRIMEN
C
C     PRIME NUMBER BENCHMARK PROGRAM
C
      REAL L,M
C
      WRITE(*,900)
  900 FORMAT(' STARTING')
      DO 240 N=1,1000
C
      DO 220 K=2,500
C
      M=FLOAT(N)/FLOAT(K)
      L=AINT(M)
C
C       WHEN L=0 THEN K>N WHICH IMPLIES THAT THERE ARE NO
          FACTORS
C
      IF( L .EQ. 0.)GO TO 230
C
C       WHEN L=1 THEN K LIES BETWEEN N AND N/2 SO WE CAN STOP
          TESTING
C
      IF( L .EQ. 1.)GO TO 220
C
C       M IS ALWAYS >= L
C
      IF( M .GT. L )GO TO 220
C
C       FOUND A FACTOR SO N IS NOT A PRIME NUMBER
C
      IF( M .EQ. L )GO TO 240
  220 CONTINUE
  230 CONTINUE
      WRITE(*,910)N
  910 FORMAT(5X,I5)
  240 CONTINUE
      WRITE(*,920)
  920 FORMAT(1X,'FINISHED')
      END
```

Listing 1. Prime Number Generator Benchmark Program.

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relevance to the users. They usually aren't designed to make a particular product look good or to fit a preconceived notion. Contrived programs, however, have the advantage that they can be short, portable, and easy to test out on a variety of machines. All the benchmarks in this article fall into the latter category.

The first benchmark was chosen to test out the speed of the floating point routines used in Microsoft's and Apple's Fortrans. This benchmark (from Tom Fox, "Report Card: Benchmark," *Interface Age*, August 1981, pp. 74-82) was selected because it has had good exposure and is not known to be biased. It has been used on a variety of machines to compare different Basics. Also, it is informative and interesting to see how the Apple stacks up against the competition and how Fortran compares with Basic. The program, shown in listing 1, computes the prime numbers that lie in the range from 0 to 1000. Neither the algorithm nor the coding of the routine is particularly good, and hence they tend to detract from the usefulness of this benchmark. The emphasis in this routine is on the speed of the floating-point divide routines.

The results of the first benchmark are shown in table 1. We have broken the results into three categories; they are the unassisted Apple, which is referred to as "Native Apple"; the Microsoft SoftCard; and the Mill-enhanced Apple with the *Pascal Speed-Up Kit* software, referred to as the "Mill."

Included with the Fortran results are timings for Applesoft and MBasic (supplied with the SoftCard) and Apple Pascal. These results give us an insight into where the differences in speed are coming from. Most people recognize that the Apple's 6502 microprocessor is faster than similar Z-80 chips. The relative quickness of Applesoft Basic, 32 percent faster than MBasic, demonstrates this fact. So why is the Z-80 Fortran faster than Apple Fortran? The answer lies in the fact that Microsoft Fortran is a compiled Fortran while the Apple Fortran generates p-code, which is then interpreted. Hence, the 21.6 percent difference in speed between the two Fortrans is mainly due to the superiority of the software implementation and not the basic hardware differences. In fact, when we look at the next set of benchmarks, we will see that the relative closeness of the timings in this benchmark probably indicates that the floating-point routines for the 6502 are well written. Interestingly, the Mill-enhanced Apple Fortran ran 28.7 percent faster than Microsoft's. This shows the superiority of the 6809 microprocessor over the 6502 and Z-80 for floating-point calculations. This conclusion was substantiated in an additional benchmark that made extensive use of all the floating-point arithmetic routines.

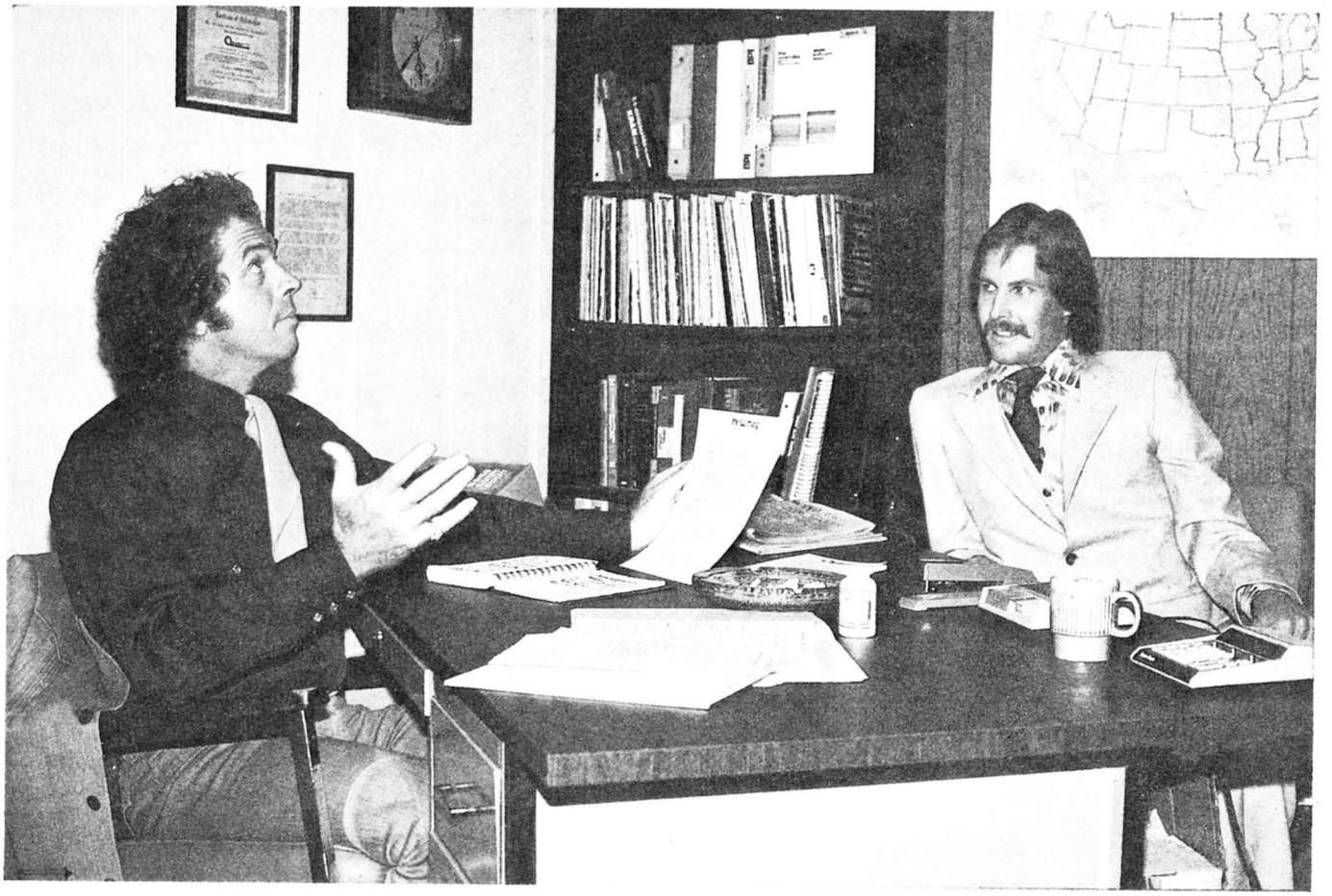
The second benchmark in this study is designed to test a procedure that computers are frequently called upon to do, that is, sort numbers. This benchmark uses very little of the number-generating capabilities of the Apple. Instead, it uses the relational and comparative capabilities to put an array of numbers into their proper order.

This benchmark also illustrates one of the advantages of using a language such as Fortran—the use of canned routines. In this case, it is the sorting subroutine, TSORT, which uses a tree sorting scheme. Routines such as this can be used as black

Configuration/Language	Execution Time in Seconds
Native Apple	
Fortran	524
Applesoft Basic	960
Pascal	684
SoftCard	
Fortran80	431
MBasic	1,266
Mill	
Fortran	335
Pascal	440

Table 1. Prime Number Generator Benchmark.

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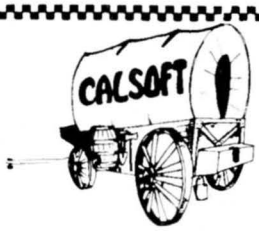
```
      PROGRAM SRTTST
C
C       SORT BENCHMARK
C
      DIMENSION A(100)
C
      LEN=100
      WRITE(*,900)
  900 FORMAT(' STARTING')
C
C       SET MASTER LOOP FOR SORTING
C
      DO 200 I=1,100
C
C       LOAD ARRAY TO BE SORTED
C
      DO 100 J=1,LEN
      A(J)=LEN-J
  100 CONTINUE
C
C       SORT THE ARRAY USING THE TSORT ROUTINE
C
      CALL TSORT(A,LEN)
      WRITE(*,920)I
  920 FORMAT(3X,I5)
  200 CONTINUE
C
      WRITE(*,910)
  910 FORMAT(' FINISHED')
      WRITE(*,940)(A(I),I=1,LEN)
  940 FORMAT(3X,F10.0)
      END
      SUBROUTINE TSORT(L,N)
      REAL L(N),LT
C
C       TREE SORT ROUTINE TO SORT VECTOR L OF LENGTH N
C
      I=N/2
      M=N
      NFLAG=0
      GO TO 40
   20 I=I-1
      IF( I .GT. 1)GO TO 40
      I=1
      M=N
      NFLAG=1
   40 K=I
      LT=L(K)
      GO TO 60
   50 L(K)=L(J)
      K=J
   60 J=2*K
      IF(J-M)70,80,90
   70 IF( L(J+1) .LE. L(J) )GO TO 80
      J=J+1
   80 IF( L(J) .GT. LT)GO TO 50
   90 L(K)=LT
      IF( NFLAG .EQ. 0)GO TO 20
      LT=L(1)
      L(1)=L(M)
      L(M)=LT
      M=M-1
      IF( M .GT. 1)GO TO 40
      RETURN
      END
```

Listing 2A. Sort Benchmark.

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```
      PROGRAM SRTTST
C
C     SORT BENCHMARK
C
      DIMENSION A(100)
C
C     OPEN TEMPORARY FILE
C
      OPEN(9,FILE='TEMP.BIN',STATUS='NEW',FORM='UNFORMATTED')
      LEN=100
      WRITE(*,900)
  900 FORMAT(' STARTING')
C
C     LOAD ARRAY TO BE SORTED
C
      DO 100 J=1,LEN
      A(J)=LEN-J
  100 CONTINUE
C
C     WRITE OUT ARRAY
C
      WRITE(9)A
      ENDFILE 9
C
C     SET MASTER LOOP FOR SORTING
C
      DO 200 I=1,100
C
C     READ IN ARRAY TO BE SORTED
C
      REWIND 9
      READ(9)A
C
C     SORT THE ARRAY USING THE TSORT ROUTINE
C
      CALL TSORT(A,LEN)
      WRITE(*,920)I
  920 FORMAT(3X,I5)
  200 CONTINUE
C
      WRITE(*,910)
  910 FORMAT(' FINISHED')
      WRITE(*,940)(A(I),I=1,LEN)
  940 FORMAT(3X,F10.0)
      CLOSE(9,STATUS='DELETE')
      END
```

Listing 2B. Modified Sort Benchmark.

boxes to perform desired tasks, much in the same manner as we call the SQRT routine to find the square root of a number.

The source code for this benchmark is shown in listing 2A. The basic method used was to load the real array A with one hundred numbers from 99.0 to 0.0 and then sort them by calling TSORT. The procedure was repeated one hundred times to get a good timing. The results are shown in table 2, column a.

The results of this benchmark are somewhat surprising after the results of the first benchmark. The Z-80 Fortran was a full five times faster (2.6 times for the Mill version) than the Apple Fortran. This result clearly shows the superiority in speed of compiled code over interpreted code.

However, it wasn't certain that this benchmark was as fair and informative as it might seem. There are two factors that might influence or bias the results. Normally, large sorts require a lot of disk I/O. The program was modified to write out the array onto a file outside of the main loop and to read it back in before each sort. The new program is shown in listing 2B.

The results from this benchmark are in table 2, column b. The ratio of Apple Fortran to Microsoft Fortran was reduced to 4.6:1, hardly a dramatic improvement. The second factor investigated was the different ways in which the Apple stores real and integer numbers. Real variables require four bytes of storage compared to two bytes for integers. The benchmark was once again modified. This time, the sorted array was declared to be integer and the appropriate modification was made to subroutine TSORT.

The results from this modification are shown in table 2, column c. The execution times for both Fortrans were greatly reduced to 12.3:1. This result indicates that the problem is not associated with real numbers or four-byte fetches and is indeed due to the differences between compiled and interpreted code.

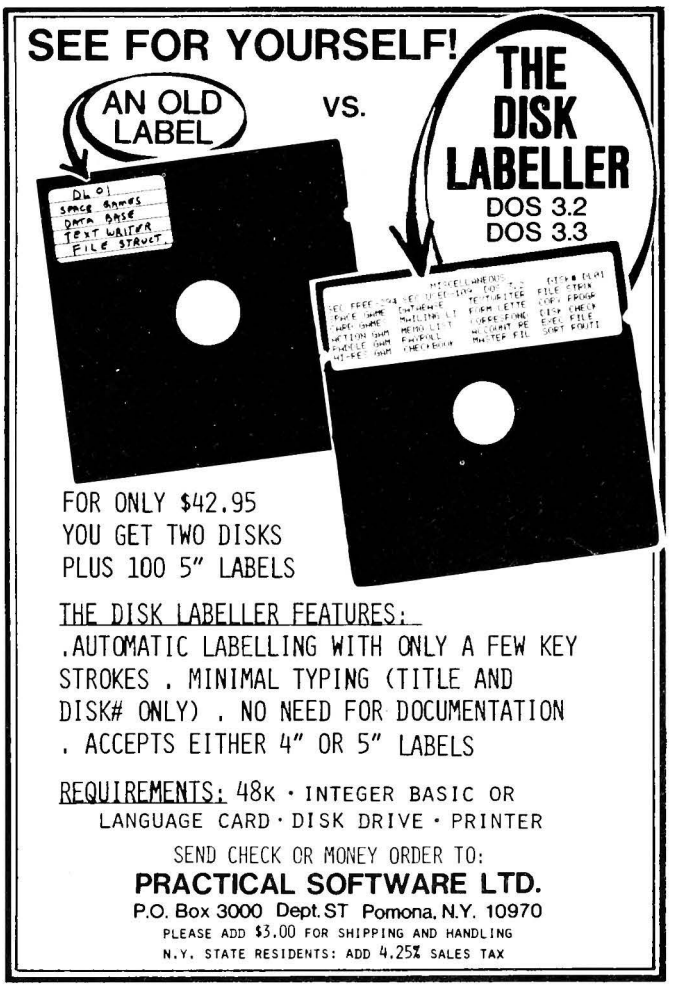
Configuration/Language Sorting Variation	Execution Time in Seconds A	 B	 C
Native Apple Fortran	644.4	933.0	393.0
SoftCard Fortran80	124.0	202.2	28.4
Mill Fortran	313.5	540.7	250.7

Table 2. Sorting Benchmark.

The last benchmark in our series was taken from Jim Gilbreath, "A High-Level Language Benchmark" (*Byte*, September 1981, pp 180-198), in which it was run on a variety of machines using ten different languages. Again this extends the range of interest beyond that of Apple owners.

The algorithm is known as the Sieve of Eratosthenes; the program is shown in listing 3. The program finds all of the prime numbers in the range from 0 to 8191. The process is repeated ten times in the program to obtain the accurate timing. A few minor modifications have been made to the Fortran pro-

```
      PROGRAM SIEVE
C
C     ERATOSTHENES SIEVE PRIME NUMBER PROGRAM IN FORTRAN
C
      LOGICAL FLAGS(8191)
      INTEGER PRIME
C
      WRITE(*,900)
  900 FORMAT(2X,'10 ITERATIONS')
C
```

```
      DO 500 ITER=1,10
      KOUNT=0
C
      DO 50 I=0,8190
      FLAGS(I)=.TRUE.
 50   CONTINUE
C
C       BEGIN SIEVE
C
      DO 200 I=0,8190
      IF( .NOT. FLAGS(I) )GO TO 200
      PRIME=I+I+3
      K=I+PRIME
C
C       WHILE K<8190 DO
C          BEGIN LOOP
 80   IF( K .GT. 8190 )GO TO 100
      FLAGS(K)= .FALSE.
      K=K+PRIME
      GO TO 80
C
C       END LOOP;
C
 100  CONTINUE
      KOUNT=KOUNT+1
 200  CONTINUE
 500  CONTINUE
      WRITE(*,940)KOUNT
 940  FORMAT(1X,I6,' PRIMES')
      STOP
      END
```

Listing 3. Eratosthenes' Sieve Prime Number Generator.

gram as it appeared in Gilbreath's article to make it more readable. These modifications should not materially affect the results as reported in that article.

The results from this benchmark are shown in table 3. They show that Microsoft Fortran is fifteen times faster than the native Apple and ten times faster than the Mill-enhanced Apple.

Configuration/Language	Execution Time in Seconds
Native Apple	
Fortran	509
Pascal	390
SoftCard	
Fortran80	34
Mill	
Fortran	333
Pascal	273

Toble 3. Sieve of Erotasthenes Benchmark.

It's interesting to compare this algorithm with the prime-number generator in listing 1. However, remember that the type of benchmark we're running is to compare the same algorithm using the two Fortrans, not to compare different algorithms.

The main conclusions to be drawn from the execution times of these benchmarks are:

1. Microsoft Fortran and Apple Fortran have comparable execution speeds for floating-point arithmetic.
2. Microsoft Fortran is much superior in execution speed to native Apple Fortran in non-floating-point operations.
3. The Mill-enhanced Apple outperforms the native Apple in all respects, and the SoftCard in floating-point operations (but not otherwise).

It's almost always difficult to interpret the results of benchmarks of this type. First, execution speed is not the only criterion to use in evaluating different systems, and quite often is not even the most important. This is the case when the compute time is small between I/O operations. For example, if you are typing in data, it doesn't matter if the computation takes 0.1 seconds or 0.5 seconds between entries. At the other extreme, if your job takes ten hours to run, you probably

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shouldn't be using a microcomputer anyway. However, if your requirements fall somewhere in between, the best way to use these results is to construct a weighted average of floating-point and non-floating-point operations used in these benchmarks.

Conclusions.

It's by now apparent that both the Microsoft and Apple versions of Fortran have certain advantages and disadvantages. The choice of which system to use will have to depend on your particular needs. Three factors that we consider to be the most important are program development time, proposed applications, and system cost.

Program Development Time. There is more to program development than just typing in statements. There are several points to consider: writing the program (Does the logic of the language flow? Is the program understandable and easy to document?); correcting and updating the program (Is the editor working for you or against you? Is disk storage and retrieval convenient?); and debugging the program (Is the compiler giving informative messages? Is the documentation easy to understand?).

Fortran 77 is clearly superior to its predecessors. In particular, the new IF-statement constructs permit creation of more logical programs in a shorter amount of time (although we wouldn't want to quantify that statement). We haven't reached a consensus as to which operating system is superior since only one of the authors has access to CP/M. However, it's clear that the Pascal language system is a viable operating system, and it has the added advantage that Apple Pascal programmers will find in Fortran no difference from the system they're already using.

In both cases the documentation was found wanting and we recommend that an additional language reference manual be kept handy. Unfortunately, there are no second sources for compiler and run-time error messages.

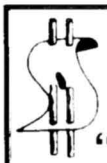
Applications. Choosing a Fortran for your applications requires two considerations: the first is whether the language supports all the features you need; the second is speed of operation. Each Fortran implementation has features that the other lacks; these may be the deciding factor in your case. Microsoft Fortran supports double-precision; Apple does not. Some scientific and engineering problems require double-precision arithmetic, but most do not. Apple has taken advantage of the Turtlegraphics developed for its Pascal package and implemented them in Fortran. It's very nice to be able to see your results right away in multicolor graphics, and many printers will permit a dump of the hi-res screen. Microsoft Fortran supports only lo-res graphics. Another important point is that Apple's Fortran 77 supports character strings, which are a necessity in many applications, while character manipulations using Microsoft Fortran are very laborious.

But the real reason why most of us consider buying Fortran is speed. Here is where Microsoft's Fortran is superior to Apple's. In the benchmarks we ran, the Microsoft version ran from 1.2 to 15 times faster than the Apple. This, of course, is the difference between a compiler and an interpreter.

However, if speed of floating-point operations is your major concern, you should consider the Mill. The Mill is a 6809 microprocessor board for the Apple. With the appropriate software (namely, the *Pascal Speed-Up Kit* with the floating-point option), the Mill can improve the Apple Fortran performance and even exceed that of Microsoft. The benchmarks show a clear advantage of the Mill-enhanced Apple when floating-point operations are the bottleneck in the computations. The Mill also works with the *Editor* and *Compiler* and actually speeds up their operation.

There is a possibility that the Mill could work in conjunction with Microsoft Fortran as well, but it hasn't been done. Anyway, although Microsoft Fortran is generally faster, the Mill-enhanced Apple Fortran may be superior for a broad range of scientific and engineering problems. Another consideration is that Microsoft Fortran is much faster at sorting and other nonnumeric tasks.

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Slot #4 or 5	empty	SoftCard	The Mill with *Speed Up Kit*
		$400	$370
Fortran	$200	$200	$200
Miscellaneous Software	none	none	Floating Point Option $45
Total	$700	$600-800	$1,115

Table 4. Comparison of System Cost.

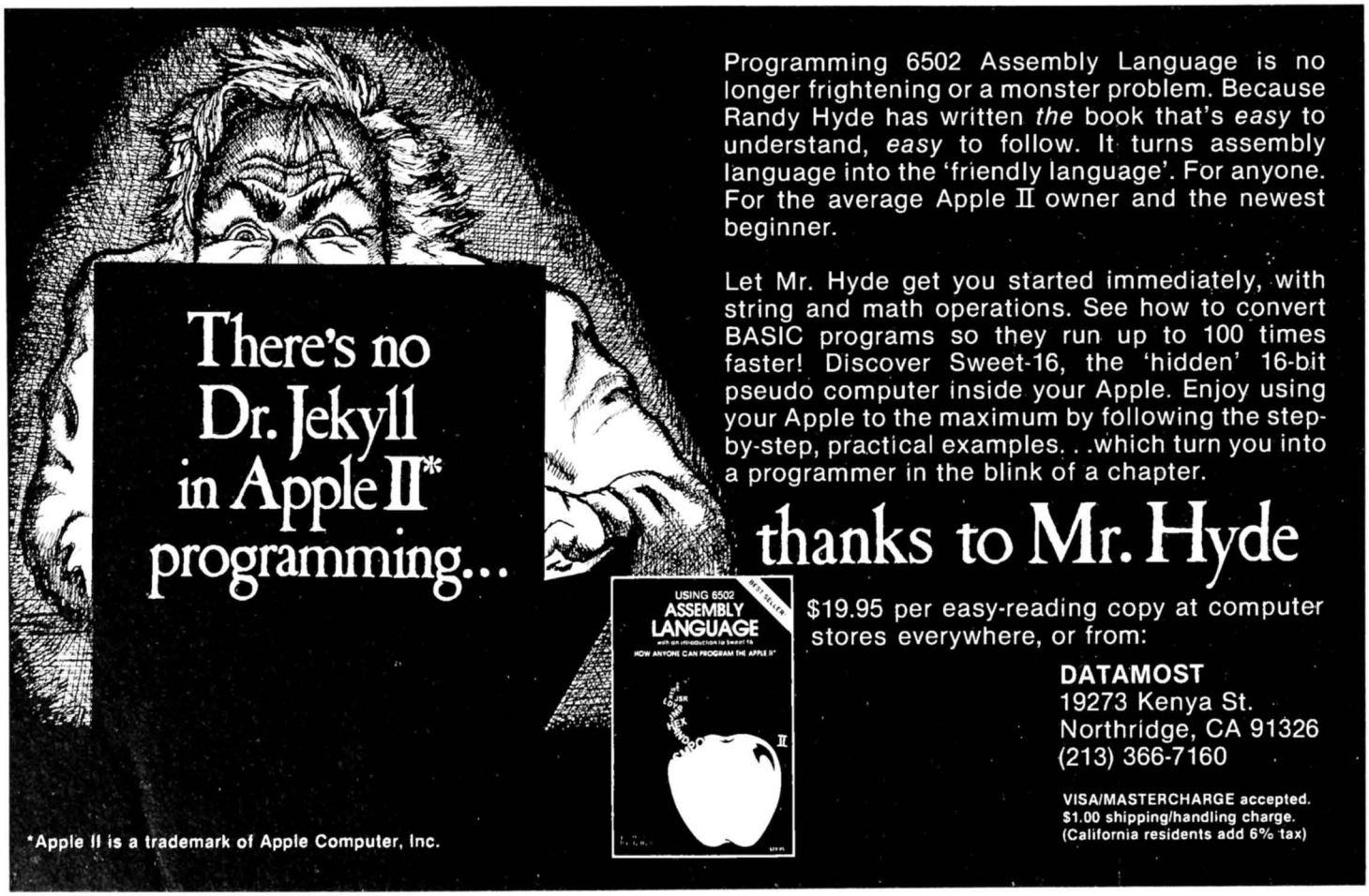
features that are offered. Then give some thought to the following: Are your programs development-time or run-time intensive? In other words, are you writing short programs with long run times or repeated use, or are you writing very large programs that are only run once or twice? If no decision can be made on the basis of these considerations, perhaps the system cost will be the deciding factor in your case.

System Cost. There are many ways to configure your Apple as a Fortran system. For the sake of comparison, we'll assume that you now have an Apple with 48K and two disk drives. Table 4 shows a comparison of three system configurations based on manufacturer's suggested prices (although we took some liberties rounding off the figures). There may be other ways of configuring the system.

The cost of the Fortran systems ranges from $600 for the Microsoft SoftCard and Fortran through $700 for the Apple Language System plus Fortran up to more than $1,100 for a Mill-enhanced Apple. But these systems aren't limited to running Fortran, and we should see what else is included for the price.

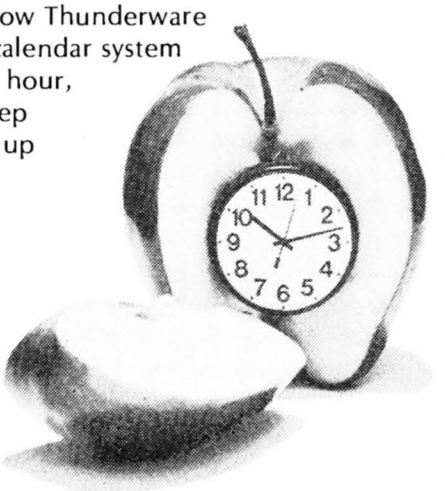
The SoftCard comes with a complete CP/M system and Microsoft Basic. This opens up the entire world of CP/M to the Apple owner. The Apple Language System comes with the complete Pascal language and operating system and a 16K RAM card that works with other Apple programs as well (such as *VisiCalc*); it expands the Apple memory significantly. The Mill is sold with your choice of the *Pascal Speed-Up Kit* or a 6809 assembler. The Mill permits concurrent use of both the 6502 and 6809 microprocessors and opens up a whole new spectrum of possibilities for the Apple.

The choice is a difficult one and may well be colored by the equipment you already have. One of the things that made writing this article enjoyable is that each author has chosen a different route and each is quite adamant in his choice.



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*A 006 CLOCK                06/08 09:07
*A 004 FRAME                06/08 09:08
*A 004 DISK INFO            06/17 16:13
*B 003 BACKOFF              06/17 16:13
*B 005 SCREEN               07/24 17:32
*B 002 TCPUTIL              06/17 16:13
*B 004 SDTIME.O             06/17 16:13
*A 007 ADIGCLK              05/19 08:05
*A 011 SET TIME             06/08 09:08
*I 009 IDIGCLK              05/19 08:05
*A 007 TIME                 06/08 09:08
*A 003 SLOTFINDER           07/07 16:56
*A 014 DEMO                 06/17 16:14
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Apple's First Starring Role on TV



Bank Robber!

BY MELISSA MILICH

"Let me be honest with you, Mister Simon—the boy has somehow managed to get inside the bank's computer system. I don't know how, but he opened a phony interest-bearing checking account. He transfers funds into the account and then out again. While money's in the account, it earns interest. Then he withdraws the interest."

"I didn't know that was possible."

"It's not supposed *to be possible. Maybe he used one of those home computers, I don't know. . . ."*

It's easy to rob a bank. Mild-mannered, unassuming, boy-next-door lookalike Phil DeGuere has it all figured out. And it can be done, in theory, on an Apple.

The scenario that began this article was taken from the first episode of *Simon and Simon,* a new television series on CBS. Although the events depicted were fictitious, DeGuere believes similar incidents are happening more often than bank executives admit.

DeGuere is a producer at Universal Studios in Hollywood, California, and his current project, *Simon and Simon,* is about a pair of brothers who go into the detective business. It stars Jameson Parker and Gerald McRaney.

An Apple Joins the Underground. In that first episode, written by DeGuere, Terry, a fourteen-year-old boy, breaks the code in the computer system at a bank by means of his home computer, an Apple II. Whenever he needs school supplies, birthday presents, or parts for his computer, Terry just transfers money into his account, collects the interest, and transfers the original sum back again.

So how did this pubescent bank robber break the code in the first place? "Just like all the other computer criminals are doing," explained DeGuere, who hopes banks will soon smarten up. DeGuere's story idea was taken from a real-life incident at DePaul University where two college students managed to break into the computerized grading system by writing a subroutine that tried every possible combination of letters until it found the correct password.

"It might take many hours to run through eight million combinations, but computers don't get bored," says DeGuere. "Conceivably anyone can do this—even a fourteen-year-old boy." "But Terry's a good boy. He ends up getting caught and has to apologize and promise to return all the money he stole."

End of story? Not quite. The financial advisor at the bank gets greedy, kidnaps Terry, and forces him to heist seven million dollars from the bank. Much fighting, gun shooting, and falling off cliffs ensues. But Simon and Simon manage to rescue Terry and receive the Apple as a reward. That's Hollywood, after all.

"I'm toying with the idea of making the Apple a regular character on this series, and it would be easy to do since the story ended with the Apple in the hands of the Simon brothers. A couple of years ago I wanted to make a series starring a computer, but nobody took me seriously. I probably could sell it now."

DeGuere was first introduced to computers in 1962 when he was attending Stanford University in Palo Alto, California. Off the beaten track on campus was an IBM computer, a monster machine that filled an entire room. Word got around campus that fun things were going on there after midnight.

"I discovered a lot of people loading the computer night after night with paper tape to play *Space Wars*. So I started staying up all night to join them."

Back to Nature? That was in 1962. Eight years later, DeGuere was living in the Los Altos hills. There he was influenced strongly by a bearded man who lived down the mountain in a log cabin. "Well, almost a log cabin. I'd see him every morning at the crack of dawn chopping wood for their fireplace and wood stove."

Once in a while, DeGuere would travel down the mountainside and help the modern day mountain man. DeGuere would usually manage to get himself invited for breakfast, which was prepared over a wood-burning stove by the woodsman's wife.

"They had electricity, but no running water. That had to be carried in from a well."

After breakfast, when a roaring blaze in the fireplace had sufficiently warmed the living room, the tall bearded mountain man shut himself inside to work.

"You'd expect him to be making belts or pottery, right? Well, this guy had a computer terminal in his log cabin. He was a systems analyst for Stanford. It was the most amazing culture shock I ever had."

Looking back now, DeGuere realizes he was seeing a glimpse into the future—telecommuting—where even devout hermits could work out of their log cabins in the woods.



Jameson Parker, left, and Gerald McRaney, the stars of Siman and Siman. After successfully dadging bullets and falling off cliffs, they're rewarded with an Apple computer.

What a Super Christmas Present. Years passed. DeGuere left his own log cabin existence, got married, and took his present position at Universal Studios. On Christmas in 1979, Linda DeGuere presented her husband with an Apple computer.

"I've always been a gadget freak and I've always liked toys, but I didn't have a clue what to do with this," he recalls.

So he put it together. Years of experience hooking up stereos enabled him to hook up a microcomputer with no problems.

The big moment came to plug it in, and then "like God in a box it said Apple II on the screen," remembers DeGuere. Feeling as if he was communicating with some supernatural being, he typed "Hello" with shaking fingers.

Coincidentally, he spelled hello wrong, and, when the machine beeped and displayed "syntax error," "I thought, God, these things are amazing—they even correct spelling errors. From that point on I read the manual."

DeGuere learned soon enough that he was destined for a life of computer mania. "I started writing programs and it wasn't uncommon for me to be sitting at the computer for twelve hours straight. My wife had to yank me away for dinner."

Costarring Raster Blaster. He also discovered games and managed to wear out three sets of paddles (no exaggeration) playing *Raster Blaster*, which he calls "the best game on the market."

The producer was so impressed with this game he decided to give it a feature role in that first episode of *Simon and Simon*. Hot on the trail of the boy bank robber, the detectives follow him from the automatic teller of the bank where he has just withdrawn some money, stolen, of course.

Terry takes the loot and makes a getaway on his bicycle to the local computer store to buy an RS232 interface for his Apple. Unknown to Terry, Rick Simon of the Simon and Simon detective agency is watching Terry's every move. Until Simon gets distracted by *Raster Blaster*.

The character of Rick Simon is a study in human nature. Played by McRaney, Rick is a swaggering, cigarette-puffing cowboy type who is frequently distracted by women, food, and, in this scene, *Raster Blaster*.

But it could happen to anybody. Rick Simon is trying to appear inconspicuous in this store when he sees the flashing lights and colors of the pinball game on the screen of an Apple computer. He picks up the game paddles and becomes so totally engrossed in working the buttons that he doesn't see the boy escape.

"I'm quite sure all the readers of *Softalk* will get a kick out of it. Certainly all the fans of *Raster Blaster* will," DeGuere says gleefully.



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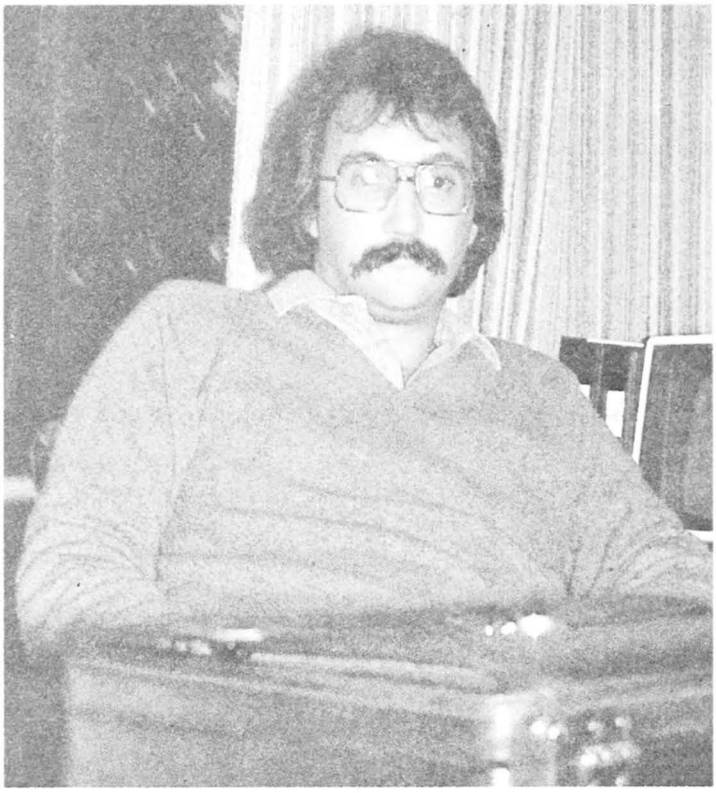
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Phil DeGuere, the moster-mind behind it all, has better things ta do than rob banks.

Order out of Chaos. But won't an episode about computerized bank robbery give computers a bad name?

"They already have a bad name. Everybody has seen computer errors on their bank statements or had telecredit's red light refuse their check. As for computerized bank robbing—that seems to be the bank's fault for not having adequate safety protection against the intrusion of electronic transfer."

But DeGuere is thankful for computers, especially in his own job. "This is basically a chaotic and insane mess," he says, looking around. "Computers make the job possible."

According to DeGuere, shooting a weekly hour-long television series can best be described as shooting twelve little movies, "and it takes a lot longer than a week to create it."

DeGuere listed the problems on his fingers: "The physical act of shooting an episode takes seven working days. We can only start that after we have a start on everything else. There's usually twenty parts to cast, we have to figure out the different locations for the shooting, and the script always has to be rewritten several times to suit the actors and director. And this all has to be done within the constraints of the budget."

"TV series have always been chaos. It's like a snowball rolling down a hill. As time goes on it goes totally out of control."

DeGuere seemed at a loss to demonstrate the avalanche, so a typical day at the filming of *Simon and Simon* did the job for him.

A Visit to the Set. Mexican Street on the lot of Universal Studios proved to be an intimidating place. It's hard not to get in the way there with dozens of people running back and forth, all with an emergency job to do. There's somebody to put a film of dust on the truck: somebody else to dust the lint off the actors, and still somebody else who's delivering hamburgers to the

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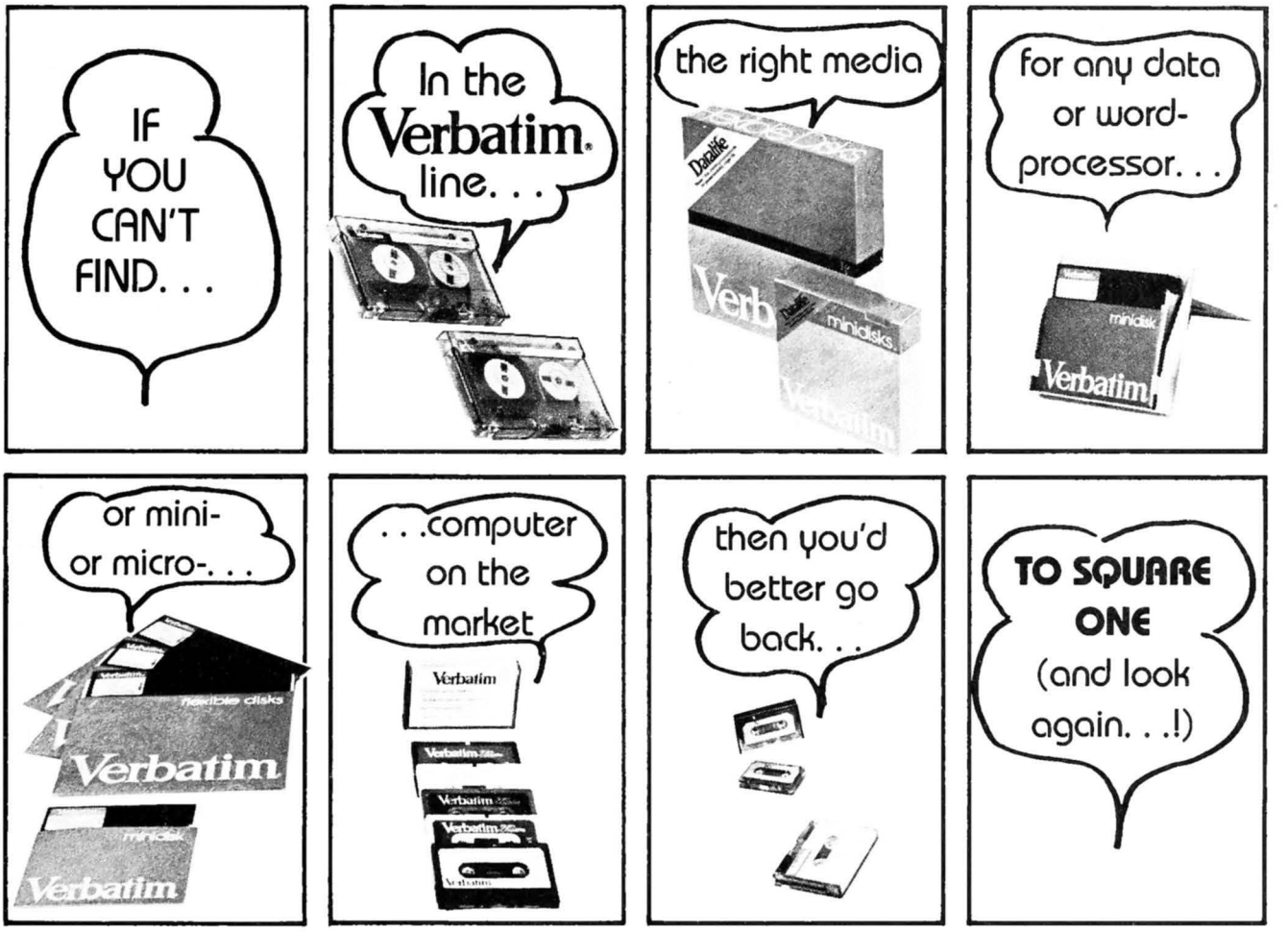
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hungry staff. There's another person whose sole responsibility seems to be yelling at everybody who's running madly back and forth. He's screaming now because the set doesn't look right to him. "There's not enough extras. Get a couple more drunks in there!"

There's a break while the crew scatters off in every direction to round up more actors. Jameson Parker, who plays A. J. Simon, is in the midst of all of this looking miserable—probably not because the scene is going slowly, but more likely because he has a bad case of the flu. But the show must go on—flu or no flu—since no one can replace Parker.

Parker took advantage of the break to sit down for a few minutes and was willing to talk about computers.

"I don't know much about them, but my wife wants to get an Apple computer. She manages me and says her job would be a lot easier if she had one." Parker let out a sneeze, blew his nose and continued. "You think with all this new technology they could invent a cure for colds."

The drunks are in place. The man in charge of yelling has started again. "God, I've been through this so many times before," he moans, pacing nervously in front of the cameras. "All right stand by. Quiet on the set. *Let's try to get it right this time!!!*" And the cameras start rolling.

This time, everybody remembers their lines, nobody drops a prop, not even one unexpected airplane flies overhead. *"All right cut!"* shouts the director. Just in time. Jameson Parker bends over and lets out a giant sneeze.

The Casting Couch Revisited. Computers might not have found a cure for colds or flu yet, but DeGuere has found they prevent a lot of headaches.

From his office, DeGuere manages to keep a lot of hectic things from happening on the set. He's responsible for an eight-million-dollar budget on the show. Fortunately, computers provide an access to quick information and easier manipulation of data.

For instance, on the mini system in his office is a data management system to keep track of actors. If he needs a three and a half foot dwarf to play a part, he can find one almost instantly via computer.

When a script has to be revised over and over again, it saves a lot of secretarial labor to do it on a word processor. And Nielsen ratings are also at the producer's fingertips, via the source. "An insane mess, but it's possible," muses DeGuere.

DeGuere believes that, besides saving the show, computers can straighten out the world. "With union strikes, the diminishing supply of oil, and crime in the streets, breaking the urban congestion of the cities has got to be the future—just like that guy in the log cabin demonstrates."

Brave New World. "It's no longer necessary to bring everybody together within the confines of the city limits to contribute to the economy. Telecommuting will make it possible for more of us to live in our log cabins in the woods."

An insane mess, but it's possible. It's nice to think about. But get DeGuere theorizing, and he'll also reveal some inner beliefs that computers can also *make an insane mess.* Or maybe it's just the plot of a future television program DeGuere's fantasizing about. Maybe there's another Terry out there. Who knows?

"The right person with a micro could bring the entire world to a standstill," DeGuere explains. "Just think. Someone with enough expertise could shut down the defense department's early warning system, short-circuit all the supermarkets' barcoding computers, wipe out the air traffic controllers' computerized flight plans, and rob *all* the banks. It's farfetched, but it's possible."

DeGuere's eyes go a bit wild for a second, and then they reflect astonishment. "You're looking at me as if I'm planning to do that!" he accuses and then smiles, a little bit too slowly.

"Don't worry. I haven't got the time."

Simon and Simon will be on Tuesdays at 8 p.m. Check your local television listings or Apple bulletin board for details. ◨

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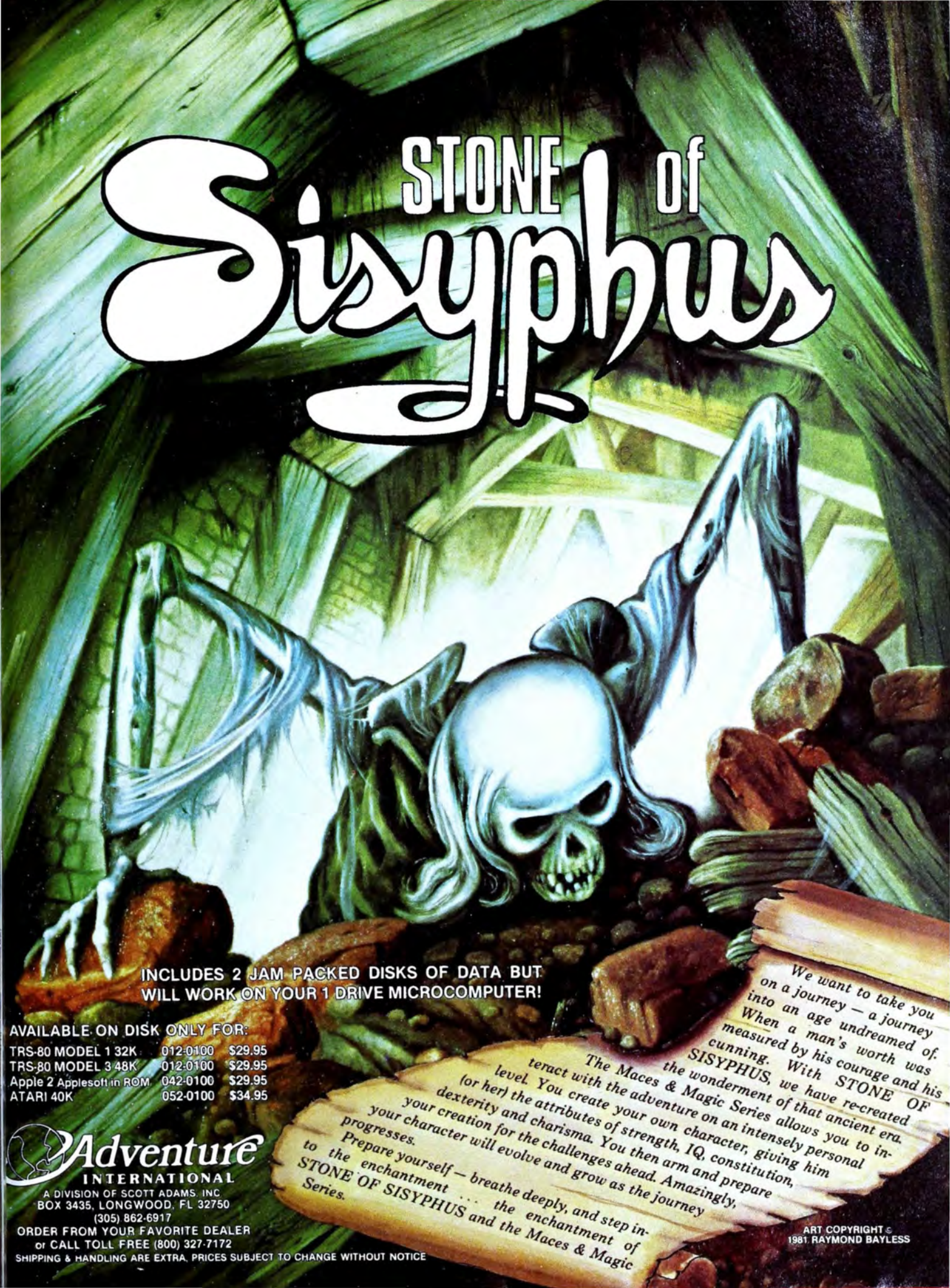
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Wouldn't You Like More RAM?

PART 2 OF AN OVERVIEW OF RAM CARDS

BY JEFFREY MAZUR

Last month, we looked at the Apple Language Card and some of the other 16K RAM boards. With some powerful software to back it, the trend is now moving towards larger memory expansion—such as the 32K board described in part 1. Beyond that, there's a new entry in the field—the 64 KC card from Legend Industries. Using the latest, state-of-the-art, 64K memory ICs, this board provides four times the storage of the Language Card for less than double the price. A *Memory Master* utility program is included with the board, and a *Disk Emulator* program is also available.

The Hardware. Because it uses the higher-density 64K memory chips, the 64 KC board is no larger than a 16K board. Installation is the same as for a 16K board, involving the removal of one IC from the motherboard. The 64K chips actually draw less power than the 16s, although they use the +12 supply. What this means is that you should evaluate carefully the total power requirements of the motherboard and all peripherals so as not to exceed the limits of the power supply.

Like other RAM boards, the 64KC can be installed in any slot and will simulate a Language Card when in slot 0. In fact, the 64KC looks just like four 16K boards bank-switched into the same slot. One of the four banks is enabled by poking a value between 0 and 3 to location $C084. Of course, each of these banks contains two 4K sub-banks for the address range $D000-$E000 (see figure 1).

The price of a 64KC is $349. But a considerable portion of this amount goes for the 64K memory chips, which are new devices and therefore relatively expensive. If past experience holds true, you can look for this price to drop as chip production increases. It seems only yesterday that 16K RAMs were selling for $25 apiece. Today they cost about $2 (in small quantities), which is a 92 percent reduction in less than three years. By rights, the 64K board should replace 16K boards within a year. Don't think this is the end either—256K RAM chips are already in the works! As always, the key to these boards' success will lie in the software.

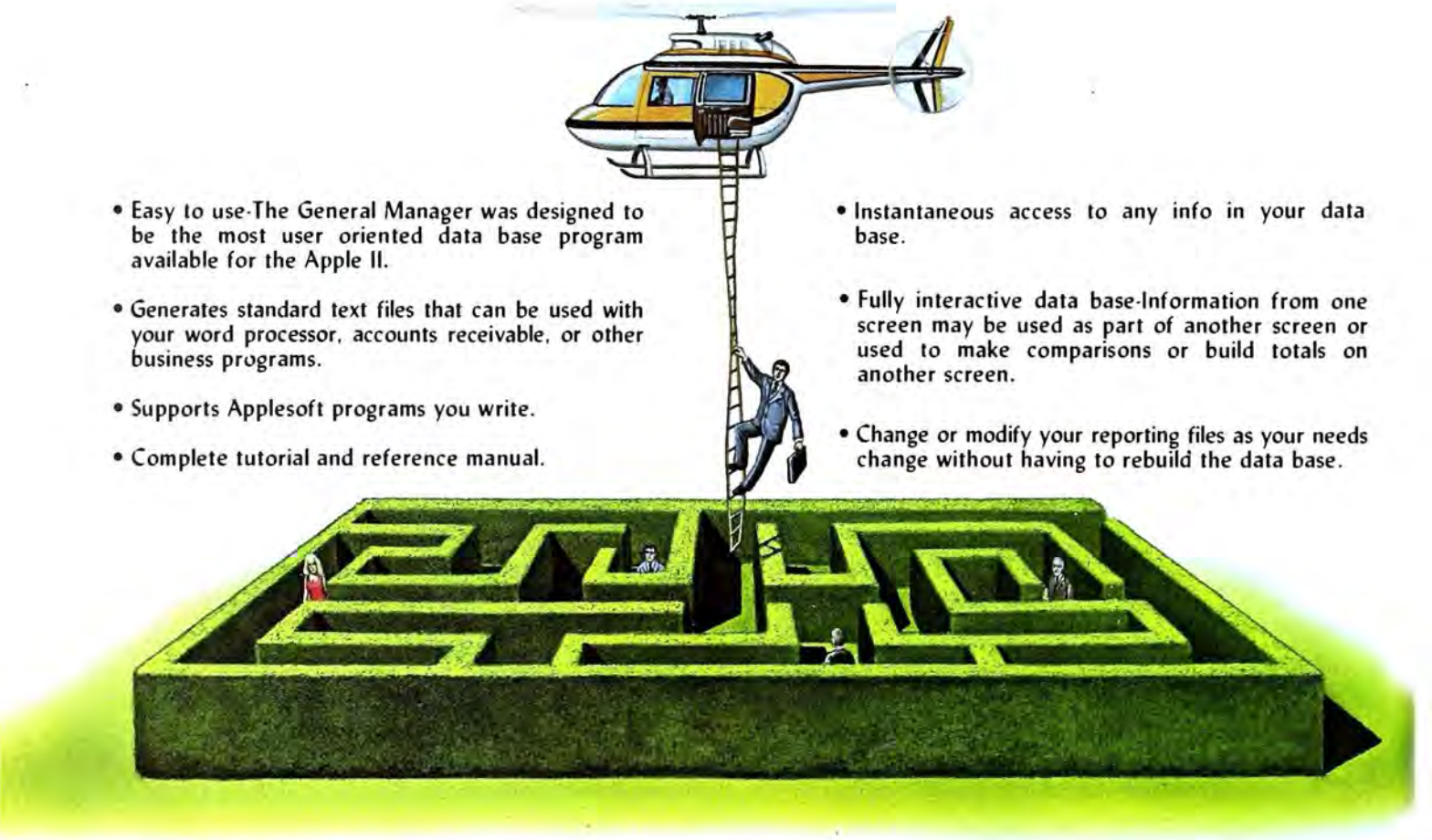
Software. Two impressive programs are included with the 64KC board. The first is a demonstration that loads eight hi-res pictures into the RAM card from disk. This process takes about 73 seconds. Then the images are sequentially read back from the RAM board into the hi-res screen memory for viewing. This is accomplished by means of a simple machine-language, block memory move routine. Since the transfer is from RAM to RAM, the entire sequence can be displayed in one second. The speed of this technique could open up some new areas in animation or game displays.

The second program is called *Memory Master*. Basically this program allows you to move DOS into one bank of the 64K board. Doing so frees up 8.5K of RAM as a short driver routine and the file buffers are left on the motherboard. Several other features are also added, including four new DOS commands.

Running *Memory Master* is as simple as answering three

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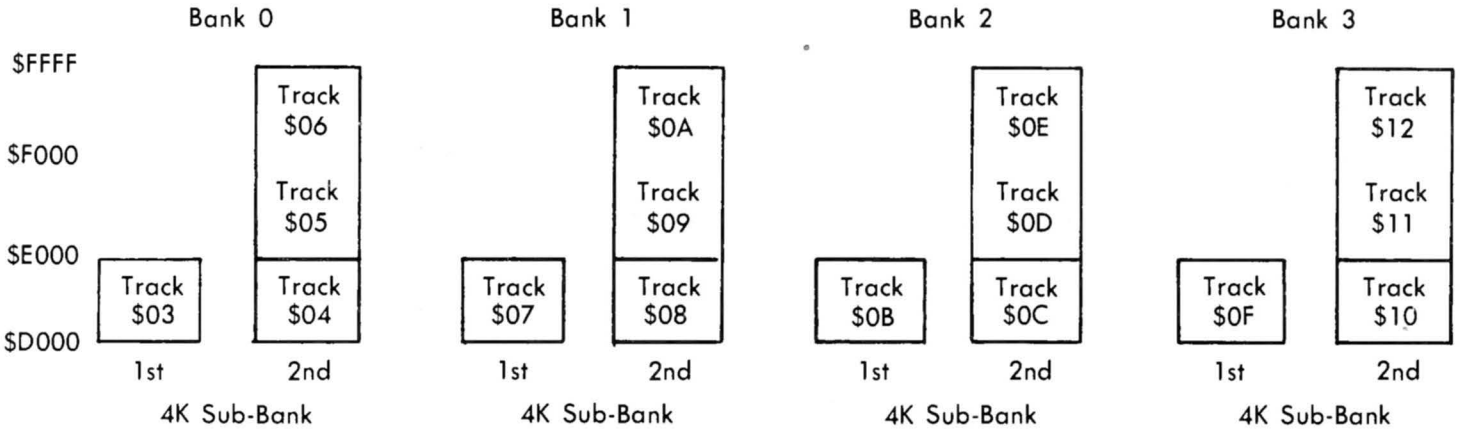
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64KC memory map showing typical sector assignments with Disk Emulator

questions: What slot is firmware card in? What slot is 64KC card in? Which bank should DOS go into?

Responses to the last two questions tell the program where to put DOS. The first question allows you to put an Applesoft or Integer ROM card in any slot and have DOS recognize it. This makes both languages immediately available without your having to load a RAM board from disk and/or give up one bank of the 64KC board.

The only changes to DOS are that the *init* command no longer works and the *catalog* command now displays the number of free sectors. The best part of *Memory Master*, however, is the new commands it adds to DOS:

.F or *.flipdos*—This command allows you to switch between 3.2 and 3.3 since both DOSs have been loaded into the 64KC. The command can be used at any time and does not disturb any program in memory. Thus, it's an easy way to move programs from thirteen-sector disks to sixteen-sector disks and back. Like other DOS commands, this can also be executed in the deferred mode with the usual PRINT "control-D .F".

.S or *.showdos*—This command will display a message showing which DOS is currently in use.

.B or *.bstat*—This will give the starting address and length, in hex, of the last binary file bloaded. This information is necessary for transferring or examining binary files.

.M or *.monitor*—Here's a quick way to get into the machine language monitor. It does the same thing as a Call −151, but it's easier to type.

Disk Emulator. The *Disk Emulator* program uses from one to six 64KC boards to emulate up to three disk drives. Each board represents half a disk; thus, two boards are needed to emulate a disk. If you buy the two boards at the same time, this software is included; otherwise it sells for $50.

Emulating a disk involves setting up one or more 64KC RAM boards to appear as a disk drive or drives (see figure 1). Then DOS must be informed of any new drives. This is accomplished by a set-up portion of the program that asks for the slot number of all RAM boards. Each pair can be assigned any slot number (0-7) and drive number (0-1) for recognition by DOS. As with Legend's other software, Applesoft/Integer ROM cards are supported in any slot. Executing *Disk Emulator* and configuring it for your system can also be accomplished by a *Turnkey* program that's supplied. This can be made the *Hello*, or greeting program, so that it will run automatically when the disk is booted.

Normal Apple diskettes are formatted into 35 tracks, with the DOS image occupying the first three. This leaves 32 tracks for storage, including one for the directory. In DOS 3.3, each track contains sixteen sectors with each sector representing 256 bytes. Thus 32 tracks X 16 sectors X 256 bytes = 131,072 bytes of data on one diskette. This works out to exactly twice the amount of memory on the 64KC board. Thus it takes two boards to hold all the data on one diskette.

One of the easiest ways to use the *Disk Emulator* is with the special *mount* command. After the emulator has been installed, you can issue a command such as .M1,S6,D1. This command will cause the entire diskette in slot 6, drive 1 to be copied into emulator #1. This takes less than 18 seconds and when it's done, a perfect copy of the disk will appear in RAM.

Standard DOS commands can now be used to access and/or change the data at very fast speeds. Since there's no motor to speed up, head to position, or media to read, access can sometimes appear to be immediate. You'll appreciate the speed when you catalog the emulated drive and see the results on the screen before your finger leaves the return key. Since access to the RAM-based, emulated drive is handled through DOS, almost any program designed for disk use will work without modification. All of the typical disk utility programs, such as *Disk Zap*, and *FID*, will work normally, but a lot faster.

An interesting illustration of the *Disk Emulator*'s power is the *Animals* program supplied by Apple on the DOS System Master. This program uses a random access disk file to accomplish a binary-tree search. After each question is presented and is answered by the user, the disk starts up again to get the next question. This makes for a lot of disk action and thus a slow search. With the *Disk Emulator*, there's almost no delay between questions, so the search proceeds at a much quicker pace. Of course, more serious business programs or disk sorts can also take advantage of the extra speed.

After changes have been made to the RAM image of a diskette, the entire image can then be transferred back onto the real floppy diskette with the *update* command. This is similar in syntax to the *mount* command. By the way, in case something should go wrong and the emulator appears to disconnect, you can reinitialize the *Disk Emulator* without destroying any data in the RAM boards.

If you only have one 64KC board, or install one in slot 0 to hold whichever Basic isn't in ROM, then it's not possible to hold an entire disk in RAM. Legend has taken this into account with their *Special Format* program. This program makes it possible to format disks in such a way that the disks only use those sectors that your system can mount and update.

In Summary. With a plethora of 16K RAM boards, many 32K boards, and now a 64K RAM board, there can be little doubt that most Apples will venture beyond the 48K limit of motherboard RAM. Although there are other advantages, one of the key features of the Apple III and most of the new microcomputers is larger memory capacity. This may no longer be seen as an advantage when it becomes possible to put 256K or more on an Apple II.

Although bank swapping is not the most efficient way to expand memory, it does work. With the appropriate software, a great deal can be done. Multi-tasking operations such as print spooling (allowing the computer to operate normally while at the same time sending out data to the printer) may be possible with the added memory. Certainly, memory hungry programs such as *VisiCalc* will be able to take advantage of extra space. Extended RAM may also find use in conjunction with other peripheral boards, such as video display generators or co-processors.

To coin a phrase, "You ain't seen nothin' yet!"

Cheap Tricks

To Make Your Apple More Flexible

BY JEFFREY MAZUR

Before the Apple II was reborn with autostart ROMs, Apple II Pluses, and Integer Cards, a greater degree of consistency existed amongst Apples. In particular, there was only one Monitor ROM, the chip labeled F8, containing the primitive I/O routines and operating system used when the computer is first turned on and when it's in Basic.

Then came the autostart ROM and things changed. The autostart ROM offered definite advantages in turnkey operation and improved cursor movement, but there was a price to pay. Gone were the single step, trace, and mini-assembler functions used by machine language programmers (who were at this point becoming a small minority of Apple owners). A change in the operation of the reset key made that key more versatile but, in the process, stripped away some of its power. The old reset could be counted on to return the computer to a known state; with the new Monitor, the reset key could be disabled or, worse yet, could cause the computer to hang up.

If you've ever had to turn off the computer to regain control, losing any data that might be in RAM, you've probably been a victim of the autostart ROM. Fortunately, this doesn't happen too often and most people feel that the benefits of the new Monitor outweigh its shortcomings. In fact, since most Apple IIs sold today are Pluses, many people are unaware that things were ever any different. Rather than debate the pros and cons of these two ROMs, suffice it to say that there are both, and they aren't necessarily the same for each person.

This article will show you some simple, inexpensive hardware and software modifications you can make that will add flexibility to your Apple, whether it be a standard or a plus, with or without the Language System.

The arrival of Applesoft/Integer ROM cards made things a little more complicated. Each language now had a different Monitor. This brings up the first hardware modification you can make. If you have a ROM board, remove it from your computer and examine the area just to the right of the 74LS09 chip at location B3 (see photo 1). You should see a blob of solder within a circle labeled F8. This solder makes a connection between two semicircular pads on the circuit board. With this connection, the rightmost ROM on the card (labeled F8 at location A6) is active whenever the ROM card's language is in use. However, by removing the solder and thereby breaking this connection, you can select the F8 (Monitor) ROM on the motherboard to be active at all times. For example, with the autostart ROM on the motherboard and the ROM card F8 connection broken, you can have the autostart features with both languages. By placing a switch across the connection, you could gain access to the F8 ROM on the ROM board.

Enter the Language Card. Next, Apple introduced the Language System,

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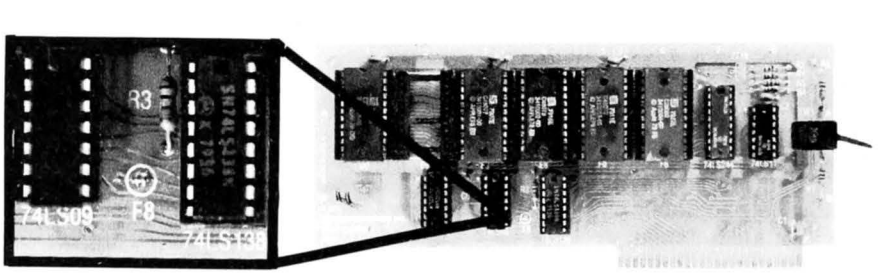


Photo 1

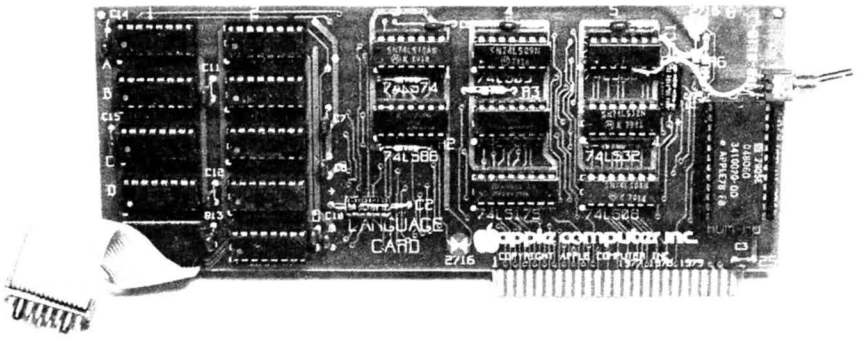


Photo 2

which included a 16K RAM board to replace the ROM board (if you had one) in slot 0. The language card also contained an autostart ROM, which permanently disabled the Monitor ROM on the motherboard. Again, people discovered that they had to pay a price for the new features of the Language System. This time the price was the need to load the alternate Basic from disk and to give up the nonautostart ROM, if there was one, on the motherboard. If nonautostart operation was really needed, it was possible to swap that ROM with the one on the language card, but that was a burdensome chore at best.

Fortunately, there's another way of dealing with the problem—hardware modification number two. Apple decided not to give you this option but, by adding a simple switch, you can gain access to both Monitor ROMs. This modification is shown in photo 2. It should cost less than a dollar and take about ten minutes—including the time for the soldering iron to warm up. The only parts required are an SPDT (Single-Pole Double-Throw) toggle switch and six inches of small 28 to 30 gauge wire (the kind used for wire wrapping is ideal). A low wattage, fine-tipped soldering iron and rosin core solder should be used for all connections.

Here is the exact procedure:

1. Cut the wire into three two-inch lengths and strip all ends. Connect one wire to each terminal of the SPDT switch.

2. Remove the 74LS20 chip at location A5 on the language card. Locate pin 5 of this chip and carefully bend it outward (see photo 3).

3. Connect the wire from the center (wiper) terminal of the switch to pin 5 of the chip.

4. Connect one of the other wires to pin 7. This must be done very carefully; just tack-solder the wire to the top of the pin where it goes into the chip. Do this as quickly as possible so as not to damage the IC. Also, avoid getting any solder on the lower two-thirds of the pin, since it must go back into the socket.

5. Carefully insert the remaining wire into the IC socket hole where pin 5 of the chip would normally go. For a good connection, the wire should go straight in and fit snuggly.

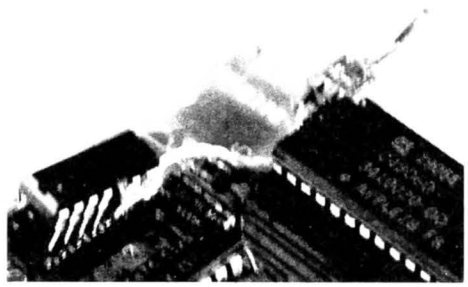


Photo 3

6. Continue by putting the IC back into its socket. Note that pin 5 no longer goes into the socket and indeed should be kept clear of the wire coming out of its hole.

7. Rotate the switch a few times to twist the leads together and then glue the switch to the board as shown in the photo. If needed, you can add a small object between the switch and the board to act as a standoff; this will allow the switch to be centered in the cutout of the Apple's case behind slot 0. Before mounting the switch you may also wish to check out the modification and verify that you've mounted the switch in such a way that it will indicate properly which ROM is active. With the switch up, the language card (autostart ROM) should be selected.

Although this modification will certainly void your warranty, you can restore the board to its original state by simply removing the switch and replacing the IC with a new 74LS20. Note that it's possible the computer may hang if you change the switch while it is running, but there's no danger of harming the computer, and most of the time you can make the switch without upsetting the system.

Monitor in RAM. The preceding modification takes care of selecting which Monitor ROM will be active when you're using the motherboard language. When you switch to the alternate Basic on the language card or other 16K RAM board, you'll normally find yourself with autostart operation, no matter which position the switch is in. This is because the switch has no effect when the language card is active. In fact, neither the F8

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MICROSOFT

Monitor ROM on the motherboard nor the one on the language card is enabled. Instead, the $F800-$FFFF space of the RAM on the language card is being used. This space is loaded with an image of the autostart Monitor at the same time that Basic is loaded by the DOS 3.3 *Hello* program. This image is contained within the files INTBASIC and FPBASIC.

Because the Monitor is stored in RAM, not ROM, it can be modified. This modification is accomplished by creating two new files that will also load Basic into the language card but with the nonautostart Monitor. Actually, you'll only have to create one file. Which one depends upon whether you have an Apple II or Apple II Plus.

Apple II. Throw the language card switch down to revert to nonautostart operation. If you have not made this modification, temporarily remove the language card. Boot the 3.3 System Master. You should be in Integer Basic. Type the following:

```
>BLOAD FPBASIC,A$2000 <cr>
>CALL -151 <CR>
*3D0G <cr>
```

Replace the System Master with another disk that has at least fifty free sectors, then type,

```
>BSAVE FPBASIC,A$2000,L$3000
```

and return. If this disk does not already have the language card loading program (called *Applesoft* on the System Master), transfer it now. Your disk will then load Applesoft with the old Monitor when booted (make sure the greeting program is in Applesoft or else type FP after booting). Don't forget to label the disk accordingly.

Apple II Plus. The first thing you must do is find a source for the nonautostart Monitor. Your source can be either an Integer ROM card or perhaps a friend who has an old Apple. Insert the Integer card or use a standard Apple to achieve nonautostart operation. Then repeat the steps above but substitute INTBASIC for FPBASIC. The language card loading program you'll need is the one called *Hello* on the System Master.

The Language Card and DOS 3.3. Another feature Apple added with DOS 3.3 was the automatic destruction of whatever is on the language card when a new disk is booted. Presumably this was done to ensure that any foreign program or data on the language card would not be mistaken for Basic. This means, however, that it takes an extra fifteen seconds every time you boot. If this delay annoys you, then this next modification is a must. It is a small software change to the DOS and is accomplished with the aid of the *Master Create* program on the System Master. It goes like this:

```
>BLOAD MASTER CREATE <cr>
>CALL -151 <cr>
*080D:4C <cr>
*800G <cr>
*1BCD:20 <cr>
*82DG <cr>
```

If you have a disk zap program, an alternate way to modify DOS is to change byte CD of track 0, sector 9 to a $20. This modification will cause the language card to be loaded when the computer is first turned on. Subsequent booting of any disk modified in this way will not reload the language card—unless the language that was on the language card has been wiped out by some other program.

The Final Touch. Another tool for more efficient operation is the language card quick-loader. This program is sold under various names and its purpose is to load Basic into the language card much faster than the normal DOS 3.3. *Hello* program does. That this is possible should not be a surprise; you see the same speed whenever you boot the Basics disk. With this utility you can shave about thirteen seconds off the normal nineteen seconds that it takes to boot a 3.3 disk and load Basic into the language card.

All the hardware and software modifications presented in this article are designed to make your Apple more flexible and efficient. None will make a profound change in your computer. But all are simple, low in cost, and easy to perform—making them well worth the time and money spent. ■



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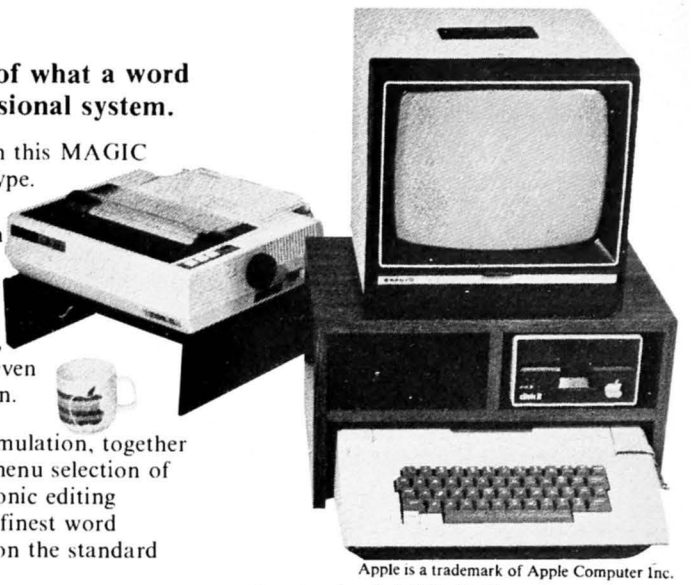
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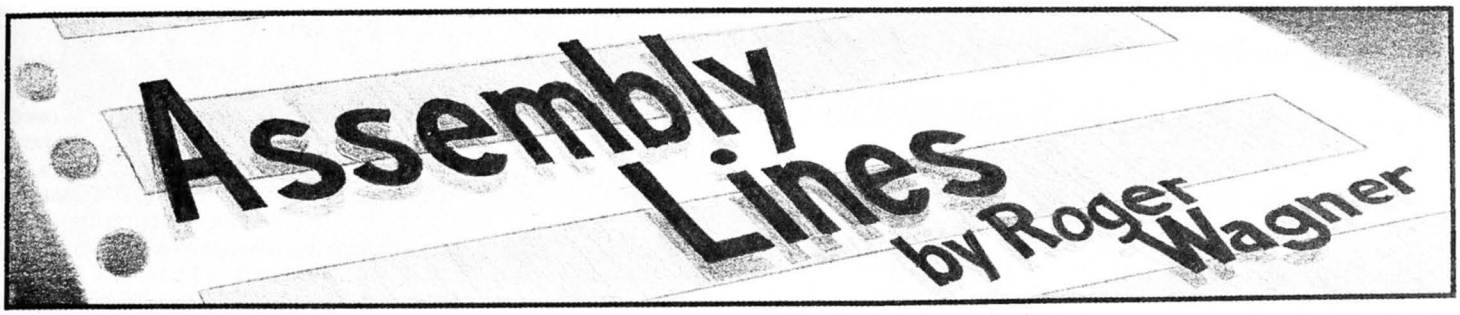
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Everyone's Guide to Assembly Language, Part 15

Commands Covered So Far:

JMP	LDA	LDX	LDY	TAX
JSR	STA	STX	STY	TAY
RTS	INC	INX	INY	TXA
NOP	DEC	DEX	DEY	TYA
—	CMP	CPX	CPY	PHA
BEQ	BNE	BCC	BCS	PLA
SEC	CLC	ADC	SBC	

It is not enough just to know an arbitrary selection of options or commands when using any tool, program, or programming language. Equally important are the techniques with which the options are combined to achieve results.

With time and practice you will develop your own skills at creating efficient machine language routines, but that process can be assisted by examining the techniques that others have developed in previous programming efforts.

The intention of Assembly Lines has been, and will continue to be, to provide a reasonable mix of programming techniques along with the usual ration of new commands.

Relocatable versus Non-relocatable Code. There were, in an earlier issue, two print subroutines for the output of text to the screen or disk text file. The disadvantage of both routines was that they were not *relocatable*. To see what this means, consider the following program:

```
                          1  ****************************************
                          2  *      NONRELOCATABLE PRINT DEMO       *
                          3  ****************************************
                          4  *
                          5  *
                          6          OBJ     $300
                          7          ORG     $300
                          8  COUT    EQU     $FDED
                          9  *
                         10  *
0300:  20  0D  03        11  ENTRY   JSR     PRNT
                         12  *
0303:  4C  0C  03        13  DONE    JMP     EXIT
                         14  *
0306:  D4  C5  D3        15  DATA    ASC     "TEST"
030A:  8D  00            16          HEX     8D00
                         17  *
030C;  60                18  EXIT    RTS
                         19  *
030D:  A2  00            20  PRNT    LDX     #$00
030F:  BD  06  03        21  LOOP    LDA     DATA,X
0312:  F0  EF            22          BEQ     DONE
0314:  20  ED  FD        23          JSR     COUT
0317:  E8                24          INX
0318:  D0  F5            25          BNE     LOOP
031A:  60                26  FIN     RTS
```

This program, as written, can only be run at the location specified by the ORG statement, in this case $300. Thus it is called nonrelocatable code. Machine code becomes nonrelocatable through the use of any statements which involve absolute addressing. The most common examples are the JMP and JSR commands, and the use of data statements, usually in print routines.

The first statement of this type occurs on line 11. The JSR to PRNT ($30D) will only work so long as PRNT is at $30D. If the routine were to be loaded into memory at $400, instead of $300, the routine would take the JSR to a block of nonexistent code at $30D.

Likewise, the JMP on line 15 has the same difficulty as does the DATA,X statement on line 21. Any attempt to run the code at an address other than $300 will result in disaster.

It should be noted, however, that JSRs and JMPs are not universally troublesome. The JSR COUT ($FDED) will execute properly no matter where the object code is located, since the reference is to a location outside the object code block.

The general rule, then, is that any code which makes reference to absolute addresses within itself will not be relocatable, whereas code that does not suffer from this limitation can be run anywhere in memory.

The problem of relocatability may seem slight, since any given routine is usually designed to be put at a definite location—usually either at $300 or at the top of memory—and then protected via the Applesoft *himem:* statement. However, as the number of routines you use increases, you will encounter more and more conflicts between routines originally written to occupy the same memory ranges. In addition, it is also occasionally desirable to append machine code directly to the end of Applesoft programs, where they will float up and down in memory at the end of the Basic portion of the listing, being automatically moved as lines are added or deleted.

For these reasons, it is better in the long run to write code to run anywhere in memory when possible, thus avoiding future headaches about where to put everything.

The remainder of this article will discuss the various ways of avoiding the use of absolute addressing, thus creating code that can be used anywhere in memory, regardless of the ORG statement used at assembly time.

JMP Commands. This is an example of a common use of the JMP command to jump over a range of memory, here represented by the FILL section. At the destination, EXPT, the bell routine is called as a trivial example of where a subroutine might be executed.

```
                          1  ****************************************
                          2  *      NONRELOCATABLE PRINT DEMO       *
                          3  ****************************************
                          4  *
                          5  *
                          6          OBJ     $300
                          7          ORG     $300
                          8  BELL    EQU     $FF3A
                          9  *
                         10  *
0300:  4C  04  03        11  ENTRY   JMP     EXPT
                         12  *
0303:  EA                13  FILL    NOP
                         14  *
0304:  20  3A  FF        15  EXPT    JSR     BELL
                         16  *
0307:  60                17  DONE    RTS
```

An alternative to this is the use of a forced branch statement, as shown in this example:

```
                          1  ****************************************
                          2  *          RELOCATABLE JMP #1          *
                          3  ****************************************
```

```
                        4  *
                        5  *
                        6          OBJ     $300
                        7          ORG     $300
                        8  BELL    EQU     $FF3A
                        9  *
                       10  *
0300:  1B               11  ENTRY   CLC
0301:  90  01           12          BCC     EXPT
                       13  *
0303:  EA               14  FILL    NOP
                       15  *
0304:  20  3A  FF       16  EXPT    JSR     BELL
                       17  *
0307:  60               18  DONE    RTS
```

Notice that by clearing the carry, and then immediately executing the BCC, the same result is obtained as when the JMP command was used in the earlier listing.

The main caution to observe is that the jump is not made over a distance greater than 127 bytes, although most assemblers will give an error at assembly time if this is attempted. In addition, since the carry is cleared to force the branch, routines that set or clear the carry to indicate certain conditions may have compatability problems with this approach.

Both limitations can be overcome by slight modifications to this listing. The first is by using the overflow flag, often represented by a V. You should remember that the status register of the 6502 contains certain flags that are conditioned by various operations. These flags can be checked and appropriate response made, depending on their status. Examples of flags already covered are the carry and zero flags.

The overflow flag is another bit in the status register which is set either by the BIT command (the overflow flag is set to bit 6 of the memory location) or by an ADC command. The overflow will be set whenever there is a carry from bit 6 to bit 7 as a result of an ADC operation.

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These details are mentioned only in passing at this point, and you need not be concerned if it is not entirely clear. The main reason for bringing it up is that the overflow flag is used much more infrequently than the carry and thus is a slightly more desirable flag to use when creating a forced branch.

To make jumps over distances greater than 127 bytes, a stepping technique can be used. This is done by creating a series of branch commands throughout the code to facilitate the program flow from one part to another. It is generally not too difficult to find breaks between routines in which to insert the branch statements required for the stepping action.

Both techniques are illustrated here:

```
                        1  ****************************************
                        2  *            RELOCATABLE JMP #2        *
                        3  ****************************************
                        4  *
                        5  *
                        6          OBJ     $300
                        7          ORG     $300
                        8  BELL    EQU     $FF3A
                        9  *
                       10  *
0300:  B8               11  ENTRY   CLV
0301:  50  01           12          BVC     STEP
                       13  *
0303:  EA               14  FILL1   NOP
                       15  *
0304:  50  01           16  STEP    BVC     EXPT
                       17  *
0306:  EA               18  FILL2   NOP
                       19  *
0307:  20  3A  FF       20  EXPT    JSR     BELL
                       21  *
030A:  60               22  DONE    RTS
```

Although only one step is shown here, any number may be used, depending on what is required to span the distance.

Where Are We? Solving the JMP problem is only the beginning of the task. Very often it is important to know just where in memory the code is currently being run. One example of this is the code present on the disk controller cards. Since the card can be put in one of seven slots, and since each slot occupies a unique memory range, some technique is required to answer the question, Where are we?

```
                        1  ****************************************
                        2  *              LOCATOR #1              *
                        3  ****************************************
                        4  *
                        5          OBJ     $300
                        6          ORG     $300
                        7  *
                        8  PTR     EQU     $06
                        9  RTRN    EQU     $FF58
                       10  STCK    EQU     $100
                       11  *
0300:  20  58  FF       12  ENTRY   JSR     RTN
0303:  BA               13          TSX
0304:  BD  00  01       14          LDA     STCK,X
0307:  85  07           15          STA     PTR+1
0309:  CA               16          DEX
030A:  BD  00  01       17          LDA     STCK,X
030D:  85  06           18          STA     PTR
030F:  60               19  DONE    RTS
```

The success of this routine is based entirely on the predictable nature of the stack and its function whenever a **JSR** is executed.

The stack was briefly described in an earlier issue (June 1981). At this point a little greater detail is recommended. The stack is a reserved part of memory from $100 to $1FF. It is used as a temporary holding buffer for various kinds of information required by the 6502 microprocessor. Information put on the stack is always retrieved in the opposite order from which it was deposited. This is often called LIFO—last in, first

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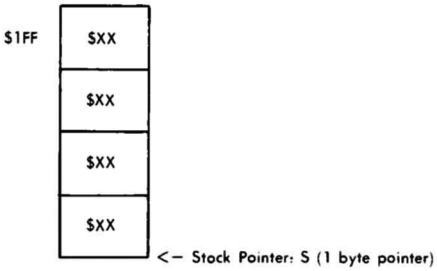
out. The analogy of a stack of plates was used earlier, but the time has come to examine what actually occurs.

Whenever a JSR is done, the stack is used to hold the address to which the return should be made when the RTS is encountered. The following diagrams illustrate this. Location $FF58 is a simple RTS in the Monitor ROM that will be used to set up a dummy return address. Before the JSR, the stack pointer is set to some arbitrary position in the stack. Upon executing the JSR, the return address of $302 is put on the stack, and the stack pointer is decremented two bytes. Note that the stack stores the data from the top down, advancing the pointer as new data is added. When the RTS is encountered (immediately in the case of $FF58), the stack pointer is returned to its original position and the return made.

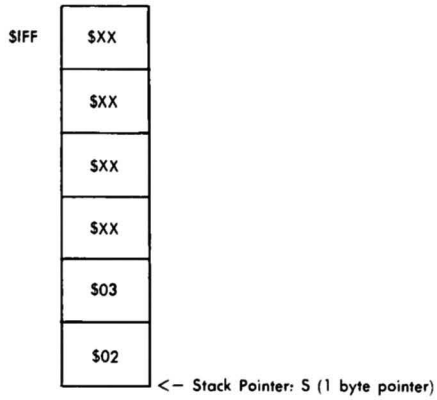
Note that the address stored $302 is the last byte of the JSR command—or, put another way, one byte less than the address of the next immediate command following the JSR.

Upon return from the JSR, the stack pointer is transferred to the X register with the TSX command on line 13. Because the stack pointer is at the next available byte on the stack, this will also point at the high-order byte of the return address still

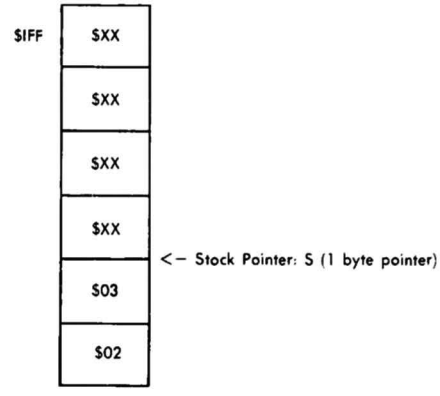
Before the JSR $FF58:



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After the JSR $FF58:





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left in memory there. This is retrieved with the LDA STCK,X on line 15 and put in a temporary pointer location PTR+1 ($07). The X register is then decremented and the low-order byte retrieved and put in PTR ($06).

The final RTS of the routine returns control to the caller, at which point $06,07 may be examined to verify the successful determination of the address $302. You may wish to run this routine at several different locations in memory to verify that in each case PTR is properly set to (ENTRY + 2).

What you have then is a short routine that can determine where in memory it is currently being run. The only disadvantage to this routine is that the high-order byte is retrieved first, thus complicating things if we want to add some offset value to the return address. The desirability of this will be shown shortly. In the meantime, consider this altered version of the Locator #1 routine:

```
                                1  ****************************************
                                2  *              LOCATOR #2              *
                                3  ****************************************
                                4  *
                                5          OBJ     $300
                                6          ORG     $300
                                7  *
                                8  PTR      EQU     $06
                                9  RTN      EQU     $FF58
                               10  STCK     EQU     $100
                               11  *
0300: 20  58  FF                12  ENTRY    JSR     RTRN
0303: BA                        13          TSX
0304: CA                        14          DEX
0305: DB  00  01                15          LDA     STCK,X
0308: 85  06                    16          STA     PTR
030A: E8                        17          INX
030B: BD  00  01                18          LDA     STCK,X
030E: 85  07                    19          STA     PTR+1
0310: 60                        20  DONE     RTS
```

What we've done here is decrement the X register (line 14) immediately after the TSX statement, so the low-order byte of the address can be retrieved first. The INX is then later used to go back and get the high-order byte. The advantage of this system is that it makes adding an offset much easier.

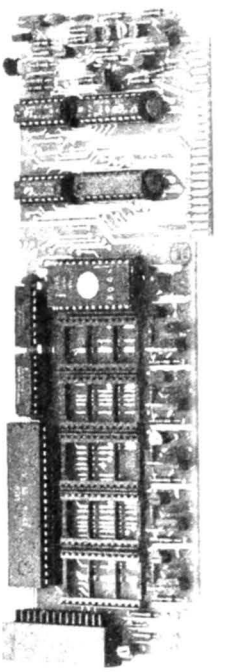
To show what we can now do, look at this revised print routine:

```
                                1  ****************************************
                                2  *         RELOCATABLE PRINT #1         *
                                3  ****************************************
                                4  *
                                5          OBJ     $300
                                6          ORG     $300
                                7  *
                                8  PTR      EQU     $06
                                9  COUT     EQU     $FDED
                               10  RTRN     EQU     $FF58
                               11  STCK     EQU     $100
                               12  *
                               13  *
0300: 20  58  FF                14  ENTRY    JSR     RTRN
0303: B8                        15          CLV
0304: 50  06                    16          BVC     CONT
                               17  *
0306: D4  C5  D3                18  DATA     ASC     "TEST"
030A: BD  00                    19          HEX     8D00
                               20  *
030C: BA                        21  CONT     TSX
030D: CA                        22          DEX
030E: 18                        23          CLC
030F: BD  00  01                24          LDA     STCK,X
0312: 69  04                    25          ADC     #$04
0314: 85  06                    26          STA     PTR
0316: E8                        27          INX
0317: BD  00  01                28          LDA     STCK,X
031A: 69  00                    29          ADC     #$00
031C: 85  07                    30          STA     PTR+1
```


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```
                        31          *
031E:  A0  00           32  PRNT    LDY   #$00
0320:  B1  06           33  LOOP    LDA   (PTR),Y
0322:  F0  06           34          BEQ   FIN
0324:  20  ED  FD       35          JSR   COUT
0327:  C8               36          INY
0328:  D0  F6           37          BNE   LOOP ; (ALWAYS TILL 255)
                        38          *
032A:  60               39  FIN     RTS
```

After calling the dummy return statement, a forced branch over the data section is done. This will have no effect on the address remaining on the stack. At CONT, we take the general procedure used in Locator #2, and add the CLC and ADC statements needed to add an offset to the address on the stack. What we need is the starting address of the ASCII data to be printed. Since the data starts at $306 and the address on the stack is $302 (see earlier examples) the offset needed is #$04.

This may seem arbitrary, but the value to add will always be #$04 if you always do the CLV, BVC $XXXX branch immediately after the return and follow that with the data to be printed.

Once the actual address of the ASCII data has been calculated, it is printed in the PRNT section by use of the indexed pointer at LOOP.

JSR Simulations. You might get the impression from the above example that a tremendous code expansion takes place to accomplish the relocatability of a program. This is somewhat true but depends on how you write the program. The use of CLV, BVC $XXXX only takes three bytes, whereas the JMP $XXXX it was replacing also used three bytes.

The stack operations just discussed take a small number of bytes to implement but could become rather large if used many times. What is needed is a way to put the stack operations in a subroutine. Unfortunately, the JSR is one of the nonrelocatable commands.

```
                        1   ****************************************
                        2   *       NONRELOCATABLE JSR DEMO        *
                        3   ****************************************
                        4   *
                        5           OBJ     $300
                        6           ORG     $300
                        7   *
                        8   BELL    EQU     $FF3A
                        9   *
                        10  *
0300:  20  04  03       11  ENTRY   JSR     TEST
                        12  *
0303:  60               13  DONE    RTS
                        14  *
0304:  EA               15  TEST    NOP
                        16  *
0305:  20  3A  FF       17  EXPT    JSR     BELL
                        18  *
0308:  60               19  FIN     RTS
                        20  *
                        21  * WILL RETURN TO DONE
                        22  *
```

This routine is very similar to the nonrelocatable JMP demo presented earlier, with the exception that the call to the BELL routine has itself been made a subroutine, headed by the label TEST. In this listing, TEST is followed by a dummy NOP statement, but we'll fill that in shortly.

This program, as written, can only be run at the address specified in the ORG statement. Here is an improved version, using a simulation of the JSR command:

```
                        1   ****************************************
                        2   *       RELOCATABLE JSR SIM            *
                        3   ****************************************
                        4   *
                        5           OBJ     $300
                        6           ORG     $300
                        7   *
```

Everybody's Guide to Assembly Language

by Roger Wagner

When Roger Wagner isn't writing utility programs for the Apple computer, planting corn in his backyard, publishing communications and utility software, or singing on the beaches near San Diego, he contributes a monthly column to Softalk.

Called Assembly Lines, it deals with assembly language programs at a basic level and has caused more comment and more mail than any other feature in the magazine. Because of the large number of requests, Softalk is now reprinting all Assembly Lines columns through December 1981 in a compact form, bound with spiral binding to make reference easy.

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```
                          8  PTR     EQU   $06
                          9  BELL    EQU   $FF3A
                         10  RTRN    EQU   $FF58
                         11  STCK    EQU   $100
                         12  *
                         13  *
0300: 20 58 FF           14  ENTRY   JSR   RTRN
0303: B8                 15          CLV
0304: 50 01              16          BVC   TEST
                         17  *
0306: 60                 18  DONE    RTS
                         19  *
0307: BA                 20  TEST    TSX
0308: CA                 21          DEX
0309: 18                 22          CLC
030A: BD 00 01           23          LDA   STCK,X
030D: 69 03              24          ADC   #$03
030F: 85 06              25          STA   PTR
0311: E8                 26          INX
0312: BD 00 01           27          LDA   STCK,X
0315: 69 00              28          ADC   #$00
0317: 85 07              29          STA   PTR+1
                         30  *
0319: 20 3A FF           31  EXPT    JSR   BELL
                         32  *
031C: A5 07              33  FIX     LDA   PTR+1
031E: 48                 34          PHA
031F: A5 06              35          LDA   PTR
0321: 48                 36          PHA
0322: 60                 37  FIN     RTS
                         38  *
                         39  * WILL RETURN TO DONE
                         40  *
```

This program is very similar to the Print #1 program, with two exceptions. First, #$03 is added instead of #$04 to the address on the stack. This is a subtle point worth mentioning, and you should review the listings until you feel comfortable with what is being done. Remember that the return address for a JSR/RTS is always *one less* than the address you want to return to. In the case of the DATA statement, we needed to know the exact address of the first character of the string to be printed. Hence the difference in the offset value used in each case.

Once the offset has been added and the proper return address calculated, the FIX section uses the PHA commands to put these on the stack. Thus when the RTS is encountered, the program returns to DONE. Notice that we have seemingly violated two general rules of machine language programming. The first is using the PHA commands without corresponding PLA statements, and the second is the use of an RTS without a calling JSR.

Upon further thought, however, it should become apparent that the two counteracted each other and that an RTS is really equivalent to two PLAs.

The converse of this is to use two PLAs within a routine called by a JSR, to avoid returning to the calling address. This is equivalent to using a *pop* command in an Applesoft subroutine called by a *gosub*—but all this will be discussed in a later issue.

Having thus simulated the JSR command, let's put it all together into a rewrite of the Print #1 routine that uses calls to subroutines to minimize the extra code required to make the routine relocatable:

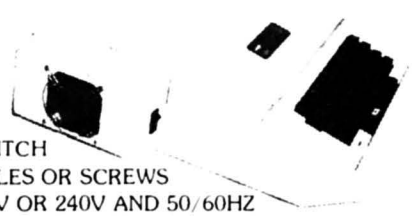
```
                          1  ****************************************
                          2  *          RELOCATABLE PRINT #2        *
                          3  ****************************************
                          4  *
                          5          OBJ   $300
                          6          ORG   $300
                          7  *
                          8  PTR     EQU   $06
                          9  COUT    EQU   $FDED
                         10  RTRN    EQU   $FF58
                         11  STCK    EQU   $100
                         12  *
                         13  *
0300: 20 58 FF           14  ENTRY   JSR   RTRN
0303: B8                 15          CLV
0304: 50 15              16          BVC   PRINT
                         17
0306: D4 C5 D3           18  DATA1   ASC   "TEST1"
030B: 8D 00              19          HEX   8D00
                         20  *
030D: 20 58 FF           21  L2      JSR   RTRN
0310: B8                 22          CLV
0311: 50 08              23          BVC   PRINT
                         24  *
0313: D4 C5 D3           25  DATA2   ASC   "TEST2"
0318: 8D 00              26          HEX   8D00
                         27  *
031A: 60                 28  DONE    RTS
                         29  *
031B BA                  30  PRINT   TSX
031C: CA                 31          DEX
031D: 18                 32          CLC
031E: BD 00 01           33          LDA   STCK,X
0321: 69 04              34          ADC   #$04
0323: 85 06              35          STA   PTR
0325: E8                 36          INX
0326: BD 00 01           37          LDA   STCK,X
0329: 69 00              38          ADC   #$00
032B: 85 07              39          STA   PTR+1
                         40  *
032D: A0 00              41  PRNT    LDY   #$00
032F: B1 06              42  LOOP    LDA   (PTR),Y
0331: F0 06              43          BEQ   FIX
0333: 20 ED FD           44          JSR   COUT
0336: C8                 45          INY
0337: D0 F6              46          BNE   LOOP ; (ALWAYS TILL 255)
                         47  *
0339: 18                 48  FIX     CLC
033A: 98                 49          TYA
033B: 65 06              50          ADC   PTR
033D: 85 06              51          STA   PTR
033F: A5 07              52          LDA   PTR+1
0341: 69 00              53          ADC   #$00
```




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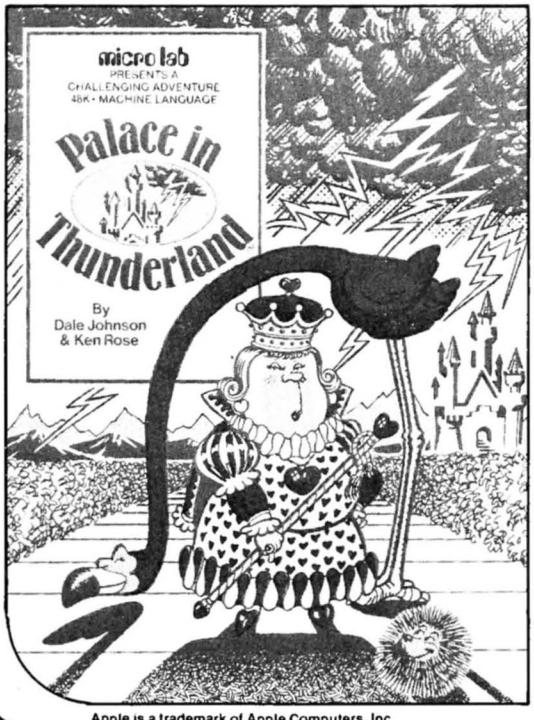
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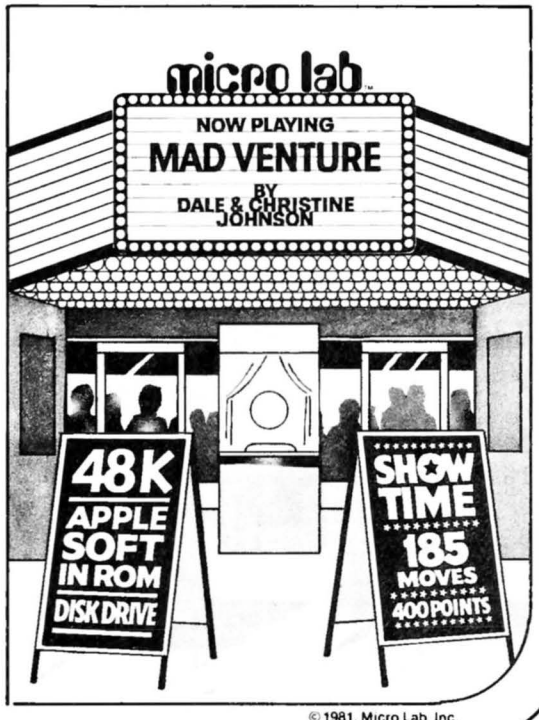
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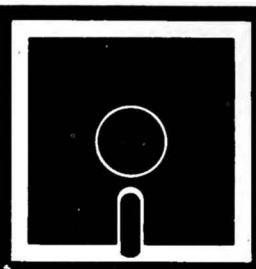
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```
0343:  48          54  PHA
0344:  A5 06       55      LDA   PTR
0346:  48          56      PHA
0347:  60          57  FIN RTS
                   58  *
                   59  *   WILL  RTS TO L2/DONE
                   60  *
```

This routine has the advantage of allowing the print statements to be used very much like they were in the nonrelocatable version given in the October issue. The extra bytes required for the stack calculations are confined to one place, and there are only three extra bytes per line to be printed, compared to the October routine.

The return to the end of each printed string is accomplished by using the Y register in FIX. At entry to FIX, the Y register will hold the length of the string printed, which is then added to PTR to calculate the proper address to return to. Again we use the two PHAs followed by an RTS to accomplish the return.

Self-Modifying Code. Ah, here is an area to make the strongest heart quiver—the idea that a program rewrite itself to accomplish its given task! The possibilities are endless, but for now, we'll just look at a way of coping with statements like LDA $ADDR,X. It was this type of statement in the first program of this article that contributed to its nonrelocatability.

Here's the new mystery program:

```
                    1  ****************************************
                    2  *          RELOCATABLE PRINT #3        *
                    3  ****************************************
                    4  *
                    5       OBJ   $300
                    6       ORG   $300
                    7  *
                    8  PTR  EQU   $06
                    9  COUT EQU   $FDED
                   10  RTRN EQU   $FF58
                   11  STCK EQU   $100
                   12  *
                   13  *
0300:  20 58 FF    14  ENTRY JSR   RTRN
0303:  B8          15      CLV
0304:  50 15       16      BVC   PRINT
                   17
0306:  D4 C5 D3    18  DATA  ASC   "TEST"
030A:  8D 00       19      HEX   8D00
                   20  *
030C:  A0 00       21  PRNT  LDY   #$00
030E:  B1 06       22  LOOP  LDA   (PTR),Y
0311:  F0 06       23      BEQ   FIX
0313:  20 ED FD    24      JSR   COUT
0316:  C8          25      INY
0317:  D0 F6       26      BNE   LOOP ;(ALWAYS TILL 255)
                   27  *
0319:  60          28  DONE  RTS
                   29  *
031A:  BA          30  PRINT TSX
031B:  CA          31      DEX
031C:  18          32      CLC
031D:  BD 00 01    33      LDA   STCK,X
0320:  69 04       34      ADC   #$04
0322:  85 06       35      STA   PTR
0324:  F8          36      INX
0325:  BD 00 01    37      LDA   STCK,X
0328:  69 00       38      ADC   #$00
032A:  85 07       39      STA   PTR+1
                   40  *
                   41  *
032C:  18          42  FIX   LDY   #$09 ; LEN OF $ + 5
032E:  98          43      LDA   PTR
0330:  65 06       44      STA   (PTR),Y
0332:  85 06       45      INY
0333:  A5 07       46      LDA   PTR+1
0335:  69 00       47      STA   (PTR),Y ; REWRITE DATA ADDR
0337:  48          48      CLV
0338:  A5 06       49      BVC   PRNT
                   50  *
```

This program will actually rewrite the address present on line 22 for the LDA DATA,X statement. The method is to use the address on the stack to calculate the address for the beginning of the ASCII string to be printed. It is this address that we will eventually want to put into the code at $30F,$310 to rewrite the data statement.

After calculating the address in lines 30–39, the program stores the result in PTR. The FIX section then adds the length of the printed string plus 5 and uses this as the Y register offset to point finally to $30F. The low and high order bytes are then written to the code and a return done to the actual PRNT routine.

The example comes with many cautions. The value on line 42 must be appropriate to the length of the string being printed. Also the order of the ENTRY, DATA, and PRNT routines was deliberately chosen to make the rewrite as easy as possible. Extreme care must be taken whenever constructing a program that alters itself, but the results can be very powerful.

If you are inclined to pursue this, study this example well until you are very sure why each step was done. To verify its versatility, you should assemble the code for this example and then run it at several different memory locations. After each run, list the code from the Monitor and see how the statement on line 22 has been rewritten. It's really quite fascinating!

Indirect Jumps. To round out this article, one more technique will be discussed. Although the stepping method using the forced branching can be used to span large distances, it can get rather inconvenient to have to keep inserting the stepping points throughout your code. An alternate technique is to use the indirect JMP command.

In the indirect jump, a two-byte pointer is created that indicates where the jump should be made to. The added advantage of this command is that the pointer need not be created on the zero page, which already is in high demand for numerous other uses. The basic syntax for the indirect jump is:

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```
                    .
                    .
                    .
0300: 6C FF FF  99  J1    JMP   ($FFFF)
                    .
                    .
                    .
```

Here is a sample program showing how this approach can be combined with the stack operation to create a relocatable jump command:

```
                        1  ****************************************
                        2  *        RELOCATABLE JUMP SIM          *
                        3  ****************************************
                        4  *
                        5        OBJ   $300
                        5        ORG   $300
                        7  *
                        8  PTR   EQU   $06
                        9  BELL  EQU   $FF3A
                       10  RTRN  EQU   $FF58
                       11  STCK  EQU   $100
                       12  *
                       13  *
0300: 20 58 FF         14  ENTRY JSR   RTRN
                       15  *
0303: BA               16  CALC  TSX
0304: CA               17       DEX
0305: 18               18       CLC
0306: BD 00 01         19       LDA   STCK,X
0309: 69 17            20       ADC   #$17
030B: 85 06            21       STA   PTR
030D: E8               22       INX
030E: BD 00 01         23       LDA   STCK,X
0311: 69 00            24       ADC   #$00
0313: 85 07            25       STA   PTR+1
0315: 6C 06 00         26       JMP   (PTR) ; TO 'EXPT'
                       27  *
0318: EA               28  FILL  NOP
                       29  *
0319: 20 3A FF         30  EXPT  JSR   BELL
                       31  *
031C: 60               32  DONE  RTS
```

The system is fairly simple, basically just using the stack to get a base address, and then adding whatever the distance is between the end of the JSR RTRN statement and the destination of the JMP(). As with some of the other systems, though, this distance will change as code is added or deleted between the two points. Consequently you may have to change the values on lines 20 and 24 rather frequently to keep up with your code changes.

It does, however, avoid the problems associated with many stepping points sprinkled throughout your code, as would be necessary using the other alternative.

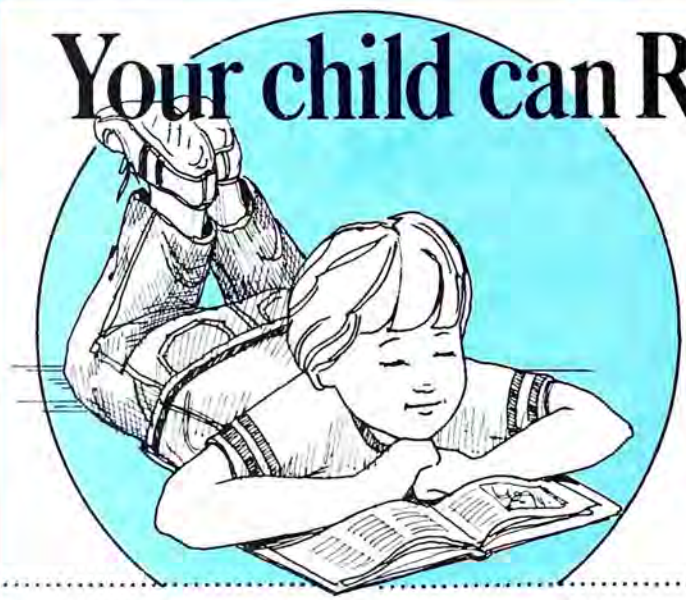
There is one bug in the use of the indirect jump that should be mentioned. It is present in the 6502 microprocessor itself and occurs whenever the indirect pointer straddles a page boundary. For example, if you used the statement JMP ($06), the destination would be retrieved from locations $06 and $07. However, if you were to use JMP ($3FF), the destination would be retrieved from $3FF and $300. The high-order byte is not properly incremented by the 6502. This is usually not a concern, though, since there are generally many alternate locations for the destination pointer.

In conclusion, then, certain techniques can be used to produce code which is not restricted to running at a particular address in memory. Although a bit harder to construct initially, and slightly larger in terms of final memory requirements, the final product is much more versatile in its applications.

If, in the course of your experimentation, you come up with more compact or more easily implemented approaches to this problem, please send your ideas to Assembly Lines, 11021 Magnolia Blvd., North Hollywood, CA 91601, so that they can be shared with the other readers of this column.

See you next month! ■

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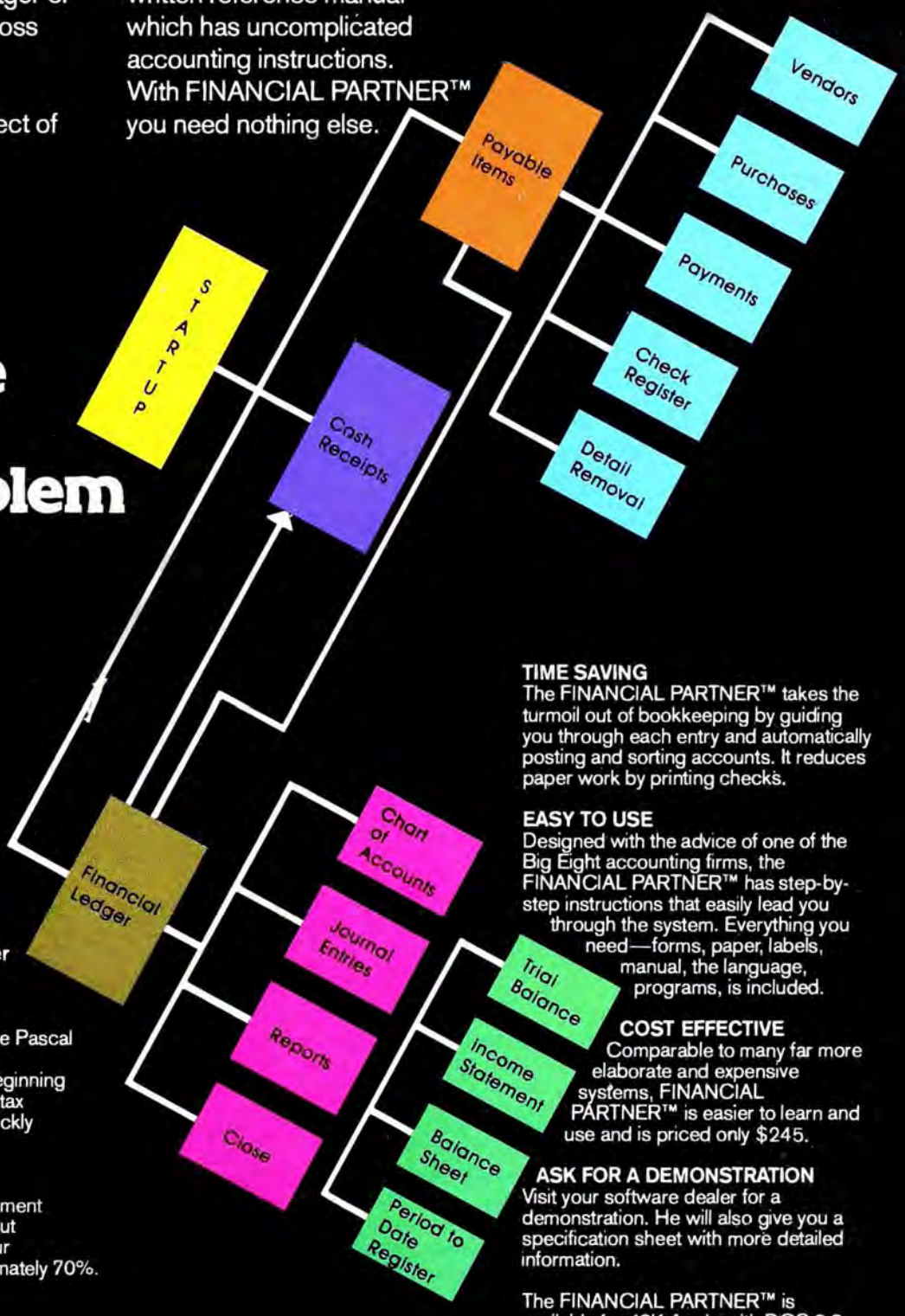
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A Different Kind of Atmosphere. The programmers whose ambience Mihm has found so delightful are Hatlak and Rostenbach, the in-house technical gurus and the authors of *Language Plus.* The pair have known each other for some time, and in fact both worked for the Milwaukee Railroad in separate divisions.

Micro Lab has ensconced them in their own facility, away from the hue and cry of more mundane commerce, so they can concentrate on the programmers' art. This facility does not go unappreciated. Hatlak commutes an hour each way to take advantage of the tools, not the least of which is seclusion, provided in what they affectionately term the skunk works.

Hatlak is also more likely to be the one found there during the normal business hours, Rostenbach having the tendency to work asynchronously to the normal population.

But the pair work closely as a team, with their strengths complementing each other. Hatlak is more the short-term project programmer, being able to zap out volumes of runnable code in a short period. Rostenbach, by his own admission, is likely to anguish for as much as two weeks over the code that he took an afternoon to write.

Rostenbach is content with his method, feeling that his code when finished will meet his minimum criteria for acceptable programming, and his criteria are higher than most. In addition, he believes he makes back some of that time because his code requires substantially less debugging than that written in speedier fashion.

He Had the Time. The way Hatlak describes the team, Rostenbach is the theoretician and Hatlak is the pragmatist. In fact, Hatlak serves as an anchor for the team, handling most of the coordination of projects.

Hatlak came to the Apple by way of 8080 home kits and the TRS-80. He pursued his programming hobby while operating a crane for the Milwaukee Railroad. His ability to make the Apple hum the desired tune caused his programming services to be in demand in the Chicago area for consulting work on special applications programs, the biggest projects being in conjunction with audio-visual graphics.

Eventually, Goldberg approached him about doing some consulting work for Micro Lab. Hatlak had three weeks of vacation due and took them the first three weeks of this year. For him it was the best of both worlds, being paid by one company not to work while being paid by another for working at his hobby. During that three-week stint at Micro Lab, Goldberg approached him about staying on full-time.

For the most part, Hatlak has been involved in the polishing of software developed outside the company and submitted for publishing. Those kinds of activities have provided him with insight as to which pitfalls to avoid in his own programs, but they've also kept him too busy to apply much of that new-gained knowledge.

However, Hatlak had primary responsibility for writing the code for *Invoice Factory,* a program conceived and designed by Goldberg.

Compile Not, Said He. It was Hatlak who discouraged Goldberg from entering the compiler fray. Supported by Rostenbach, he presented a scenario that predicted that the performance gains from compiled Applesoft would not be as significant as expected. In this view, the amount of RAM, the overhead required, and the very machine layout militated against an optimal compiler that would do preparsing and interpreting before delivering compiled code.

Rostenbach pointed out that the expansion of code required to compile a tokenized language like Applesoft would limit the advantages of the compilers.

This analysis paved the way for *Language Plus,* written as a joint effort by Rostenbach and Hatlak. A compilation of machine language routines that can be integrated into Basic programs, *Language Plus* offers the tailored coding of assembly language for specialized functions as opposed to the more general-purpose, and therefore more voluminous and ponderous, coding of a Basic language.

In contrast to Hatlak's fidelity to the Milwaukee Railroad for nine years, Rostenbach followed a more circuitous route to Micro Lab. He took several computer classes in high school, learning on a PDP-8. From there, he took a computer operator's position at the University of Iowa, where he was able to observe the hardware while monitoring some computer courses and taking others for credit. His assignment was the physics department, where Dr. James Van Allen presided.

The Creativity-Clock Conflict. From the university, he went to work on the Milwaukee Railroad as a clerk but was transferred to corporate headquarters data processing when his skills in that area were discovered. The constraints placed by big companies on creative individuals began to stifle him—particularly the requirement to work regular hours. Like many programmers, Rostenbach likes to continue writing code when it's flowing; breaking off an effort because it was quitting time was alien to his nature.

Because he had no friends when he moved to Chicago, he began hanging around his local computer store—Data Domain in Schaumburg. Eventually, owner John Clark offered him a job and he jumped at the chance. Rostenbach had fallen in love with the Apple at first sight. It was more powerful and more friendly than the mini he had learned on, and working at Data Domain would give him a chance to get intimately acquainted with the machine.

After a year during which he handled mostly sales, he began developing some software in anticipation that Data Domain would venture into the publishing business. When that eventuality didn't come to pass, Rostenbach looked for greener pastures.

In association with Harlan Felt he developed the Emergency Medical System Mobile Intensive Care data base management system for Loyola University. If you read ads in the papers carefully, you may have heard of it. It was one of the programs featured in Apple's campaign a while back.

Subsequent to completing that project, he tackled a biorhythm program for the Bally home arcade machine. His goal was to get an assignment writing for the coin-operated arcade machines. When that wasn't forthcoming, he was amenable to Micro Lab's offer.

Micro Lab's commitment to user-friendly software and to customer support was what won Rostenbach over. He's firmly against locking software, but felt that the policies of providing a backup with the package and providing liberal updating procedures were in concert with his general philosophy.

Enter the Closet Youth. Like Hatlak, much of his effort has been expended in polishing other authors' efforts, but he's looking forward to the day when their presence will be more noticeable in the Micro Lab output.

Micro Lab actually has a third programmer, David Sousson, who's attending the University of Illinois as a freshman on a Micro Lab scholarship. Both Hatlak and Rostenbach have high praise for Sousson; they described a scene wherein they were explaining the intricacies of data base management systems to the youngster. By the time they were halfway through their explanation, it was clear that Sousson had intuitively grasped the information and could anticipate what they would say next.

As their warranty procedures and their treatment of Sousson indicate, Micro Lab is a company that considers their impact on the persons with whom they come in touch. Of course, the other indication is the number of new products they've got for your Christmas stocking this season. ■

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Softalk Presents The Bestsellers

VisiCalc showed its heels to the field again in October, dominating software sales throughout the country and outselling the second strongest program, *DB Master*, by roughly a two-to-one ratio.

The continuing strength of *VisiCalc* in the Apple market is a story so often told that it tends to become ho-hum. It should not be so. *VisiCalc* has validated the personal computer as a useful business tool, and it's the business user who's now flocking into the computer stores everywhere and queuing up for the product.

The number of personal computers outstanding is not yet so great that they make a truly significant impact in any segment of our society. So it would be hyperbole of the basest sort to declare *VisiCalc* the universal tool. But within that segment of industry that has taken to the desktop computer, *VisiCalc* comes near to fulfilling that claim.

As interesting in the month of October was the ascendancy of *DB Master* to the runner-up position. This marks the first time in the fifteen months of the *Softalk* Top Thirty listing that business products have been both first and second on the list. With the Christmas buying season for entertainment software approaching, it's far too early to herald this result as proving that the Apple marketplace has matured into one of business rather than hobby users. But the conclusion is inescapable that all signs point in that direction.

DB Master's strong showing indicates in a different manner the widespread use of the Apple for more serious endeavors. Its sales have not come at the expense of other data base competitors at all. *Personal Filing System* is showing consistent strength in the marketplace and *Data Factory* continues to hold its own. In addition, *VisiFile* from Personal Software and *Data Reporter* from Synergistic are making headway.

Similarly, the widespread sales of word processors indicates that there's more cooking in the Apple market than arcade games. *Apple Writer*, the hobbyist's friend, continues to pace the field. But there's practically no difference in sales be-

Strategy 5

This Month	Last Month	
1.	1.	**Castle Wolfenstein,** Silas Warner, Muse
2.	2.	**Flight Simulator,** Bruce Artwick, SubLogic
3.	3.	**Robot War,** Silas Warner, Muse
4.	4.	**Sargon II,** Dan and Kathe Spracklen, Hayden
5.	—	**The Battle of Shiloh,** David A. Landry and Charles T. Kroegel, Jr., Strategic Simulations

Adventure 5

This Month	Last Month	
1.	1.	**Hi-Res Adventure #3: Cranston Manor,** Harold DeWitz and Ken Williams, On-Line Systems
2.	5.	**Hi-Res Adventure #2: Wizard and the Princess,** Roberta and Ken Williams, On-Line Systems
3.	2.	**Softporn,** Chuck Benton/Blue Sky Software, On-Line Systems
4.	—	**Adventure in Time,** Phoenix Software
	—	**Goblins,** Antonson Labs, Highlands Computer Services

Fantasy 5

This Month	Last Month	
1.	1.	**Ultima,** Lord British, California Pacific
2.	3.	**Wizardry,** Andrew Greenberg and Robert Woodhead, Sirtech
3.	2.	**Kaves of Karkhan,** Rodney Nelsen, Level-10
4.	—	**Alkemstone,** Level-10
5.	—	**Upper Reaches of Apshai,** Automated Simulations

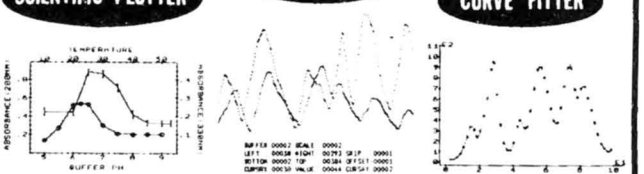
Business 10

This Month	Last Month	
1.	1.	**VisiCalc,** Software Arts/Dan Bricklin and Robert Frankston, Personal Software
2.	2.	**DB Master,** Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
3.	4.	**VisiTrend/VisiPlot,** Micro Finance Systems/Mitch Kapor, Personal Software
4.	3.	**Personal Filing System,** John Page, Software Publishing Corporation
5.	6.	**VisiDex,** Peter Jennings, Personal Software
6.	7.	**PFS: Report,** John Page, Software Publishing Corporation
7.	8.	**Apple Plot,** Apple Computer
8.	—	**VisiFile,** Creative Computer Applications/Richard Ewing and John Unger Zussman, Personal Software
9.	5.	**BPI General Ledger,** John Moss and Ken Debower, Apple Computer
10.	10.	**Data Factory,** Bill Passauer, Micro Lab

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tween *Magic Window, Easy Writer, Superscribe II, Supertext II,* and *Word Star.* All are doing well.

In addition, *Letter Perfect, Executive Secretary,* and *Word Handler* are all making significant inroads into the marketplace.

In the Home Ten listing, a battle royal is shaping up between the home finance packages as well. Continental's *Home Money Minder* has been the leader here for the past few months. But *Personal Finance Manager,* a Special Delivery Software entry from Apple Computer, and *Financial Management System II* from D. R. Jarvis are closing ground fast.

Home 10

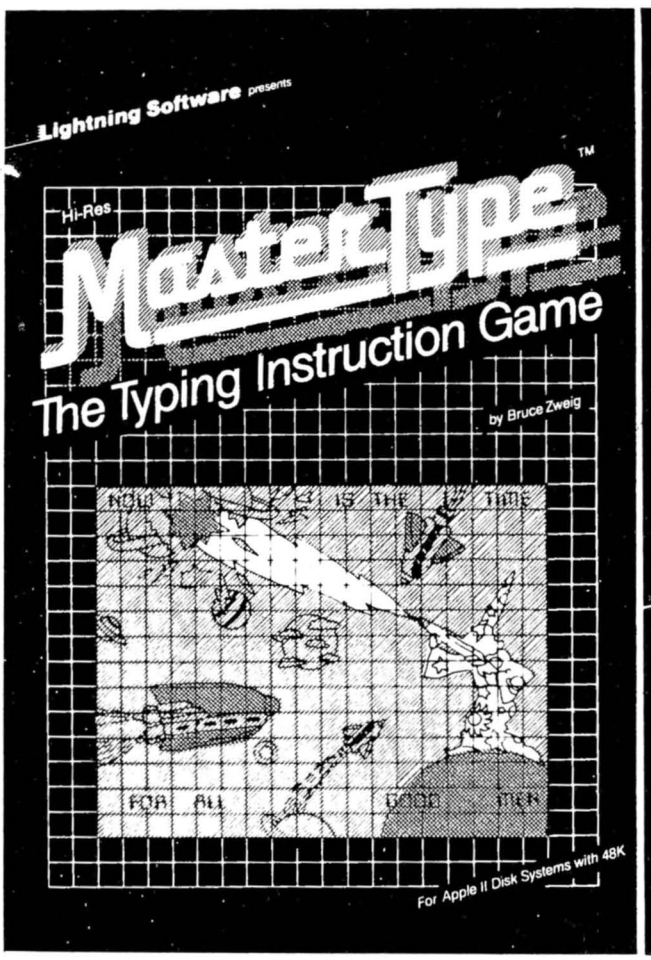
This Month	Last Month	
1.	2.	**Typing Tutor,** Image Producers, Microsoft
2.	3.	**Graphtrix,** Steve Boker, Data Transforms
3.	1.	**Home Money Minder,** Bob Schoenburg and Steve Pollack, Continental Software
4.	6.	**Personal Finance Manager,** Jeffrey Gold, Special Delivery Software, Apple Computer
5.	5.	**The World's Greatest Blackjack Program,** Warren Irwin, Carl Cooper, and Lance Humble, Special Delivery Software, Apple Computer
6.	—	**Data Capture 4.0,** David Hughes and George McClelland, Southeastern Software
7.	7.	**ASCII Express,** Bill Blue, Southwestern Data Systems
8.	8.	**VisiTerm,** Tom Keith, Personal Software
9.	—	**Financial Management System II,** D. R. Jarvis, D. R. Jarvis Computing
10.	9.	**Tax Preparer,** James Howard, Howard Software
	4.	**Goodspell,** Henry G. Baker, Special Delivery Software, Apple Computer

Hobby 10

This Month	Last Month	
1.	2.	**DOS Tool Kit,** Apple Computer
2.	1.	**DOS 3.3,** Apple Computer
3.	8.	**Enhanced MX-80 Graphics,** David Hudson, Computer Station
4.	—	**TASC,** James M. Peak and Michael T. Howard, Microsoft
5.	7.	**Super Disk Copy III,** Charles Hartley, Sensible Software
6.	5.	**Complete Graphics System,** Mark Pelczarski, Penguin Software
	9.	**Multi-Disk Catalog,** Charles Hartley, Sensible Software
8.	6.	**The Inspector,** Bill Sefton, Omega Microware
	—	**DOS Plus,** Mike McLaren, Sensible Software
10.	—	**Program Line Editor,** Neil Konzen, Synergistic Software

Word Processors 5

This Month	Last Month	
1.	1.	**Apple Writer,** Apple Computer
2.	3.	**Magic Window,** Gary Shannon and Bill Depew, Artsci
3.	2.	**Easy Writer,** John Draper, Information Unlimited Software
4.	—	**Superscribe II,** David Kidwell, On-Line Systems
5.	4.	**Supertext II,** Ed Zaron, Muse
	5.	**Word Star,** Micro Pro



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The success of *Personal Finance Manager* in the retail outlets after Apple's abortive attempt to market Special Delivery Software only by mail is another ratification of the importance of the conscientious retailer to the thoughtful software buyer.

There were few changes of any magnitude in the special lists that accompany the Top Thirty.

The Word Processor Five expanded to six when *Superscribe II* edged in front of *Word Star* and *Supertext II*. In the Business Ten, *VisiFile* replaced *BPI Accounts Receivable*.

In the Home Ten, *Data Capture 4.0* and *Financial Management System II* rejoined the list after brief absences.

A change of some significance occurred in the Hobby Ten, when *TASC*, Microsoft's Applesoft compiler, took over the market from Hayden's compiler and *Expediter* from On-Line Systems. The folks at Sensible Software, while not often placing a program in the Top Thirty, continue to make the Hobby Ten their personal domain. This month three Sensible entries made the list.

No new programs grabbed high positions in the entertainment breakouts, although new entries dot the lower rungs of each of the three lists.

In the Top Thirty itself, only four programs were new to the list. *Wizardry*, in its first full month of release, came in eleventh. Apple's *Personal Finance Manager* was also a newcomer to the Top Thirty.

Two new arcade games nudging into the lower ranks of the Top Thirty were *Falcons* from Piccadilly and *Space Quarks* from Broderbund.

Poised just outside the Top Thirty and apparently ready to make a strong run through the Christmas season are *Bug Attack* from Cavalier, *Snack Attack* from Data Most, and *Firebird* from Gebelli.

Business was mixed throughout the country in October. Some retailers found the market slow, with users waiting to get a full look at all the Christmas goodies before plunging. Other dealers noticed a continuing momentum building that promises a record-breaking holiday selling season. Even in the face of the country's economic difficulties, the Apple market continues to hold its own and expand. ■

Apple-franchised retail stores representing approximately 8.1 percent of all sales of Apples and Apple-related products volunteered to participate in the poll.

Respondents were contacted early in November to ascertain their sales leaders for the month of October.

The only criterion for inclusion on the list was number of sales made—such other criteria as quality of product, profitability to the computer retailer, and personal preference of the individual respondents were not considered.

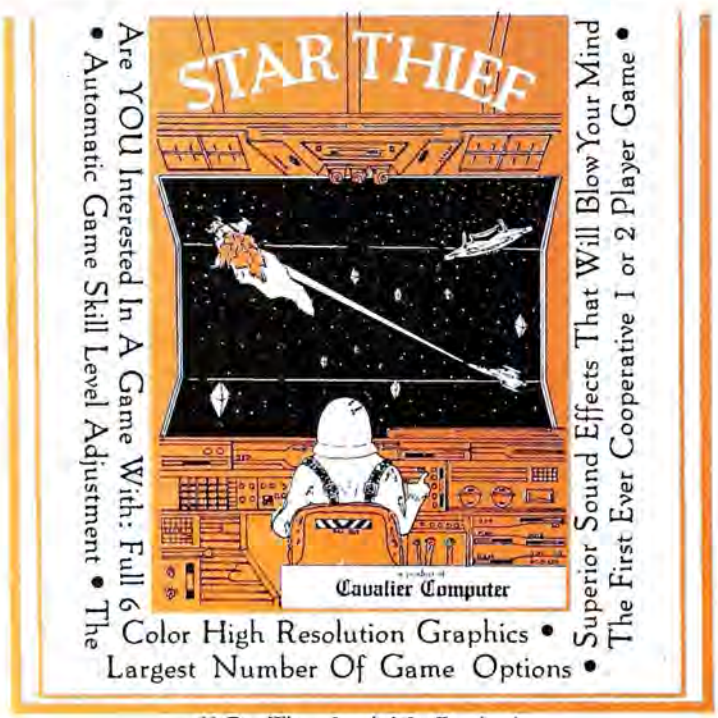
Respondents in November represented every geographical area of the continental United States.

Results of the responses were tabulated using a formula that resulted in the index number to the left of the program name in the Top Thirty listing. The index number is an arbitrary measure of relative strength of the programs listed. Index numbers are correlative only for the month in which they are printed; readers cannot assume that an index rating of 50 in one month represents equivalent sales to an index number of 50 in another month.

Probability of statistical error is plus-or-minus 5.2 percent, which translates roughly into the theoretical possibility of a change of 3.62 points, plus or minus, in any index number.

The Top Thirty

This Month	Last Month	Index Number	
1.	1.	99.97	**VisiCalc,** Software Arts/Dan Bricklin and Robert Frankston, Personal Software
2.	4.	45.34	**DB Master,** Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
3.	2.	33.78	**Raster Blaster,** Bill Budge, BudgeCo
4.	10.	29.02	**Epoch,** Larry Miller, Sirius Software
5.	3.	27.66	**Apple Panic,** Ben Serki, Broderbund Software
	7.	27.66	**Sneakers,** Mark Turmell, Sirius Software
7.	12.	26.98	**Snoggle,** Jun Wada, Broderbund Software
8.	9.	26.07	**Apple Writer,** Apple Computer
9.	12.	24.94	**Ultima,** Lord British, California Pacific
10.	15.	23.80	**DOS Tool Kit,** Apple Computer
11.	—	23.35	**Wizardry,** Andrew Greenberg and Robert Woodhead, Sirtech
12.	18.	22.90	**VisiTrend/VisiPlot,** Micro Finance Systems/Mitch Kapor, Personal Software
13.	5.	22.22	**Personal Filing System,** John Page, Software Publishing Corporation
14.	18.	21.54	**Castle Wolfenstein,** Silas Warner, Muse
15.	21.	19.27	**Gobbler,** Olaf Lubeck, On-Line Systems
16.	10.	18.82	**Hi-Res Adventure #3: Cranston Manor,** Harold DeWitz and Ken Williams, On-Line Systems
17.	6.	17.00	**Gorgon,** Nasir, Sirius Software
18.	8.	16.55	**DOS 3.3,** Apple Computer
19.	26.	16.32	**Flight Simulator,** Bruce Artwick, SubLogic
	16.	16.32	**Pegasus II,** Olaf Lubeck, On-Line Systems
21.	25.	14.74	**VisiDex,** Peter Jennings, Personal Software
22.	28.	14.51	**Typing Tutor,** Image Producers, Microsoft
23.	29.	14.06	**Graphtrix,** Steve Boker, Data Transforms
24.	17.	13.15	**Home Money Minder,** Bob Schoenburg and Steve Pollack, Continental Software
25.	—	12.92	**Personal Finance Manager,** Jeffrey Gold, Special Delivery Software, Apple Computer
26.	27.	12.69	**Robot War,** Silas Warner, Muse
27.	14.	12.47	**Olympic Decathlon,** Tim Smith, Microsoft
28.	—	12.24	**Falcons,** Eric Varsanyi and Thomas Ball, Piccadilly Software
29.	—	12.02	**Space Quarks,** Chris Jochumson, Broderbund Software
30.	23.	11.11	**Magic Window,** Gary Shannon and Bill Depew, Artsci



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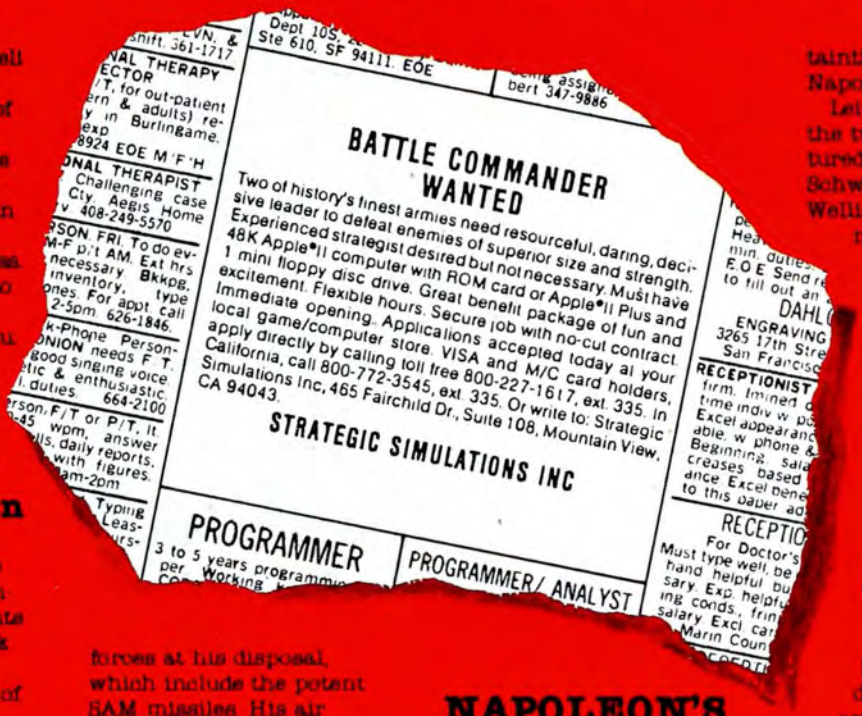
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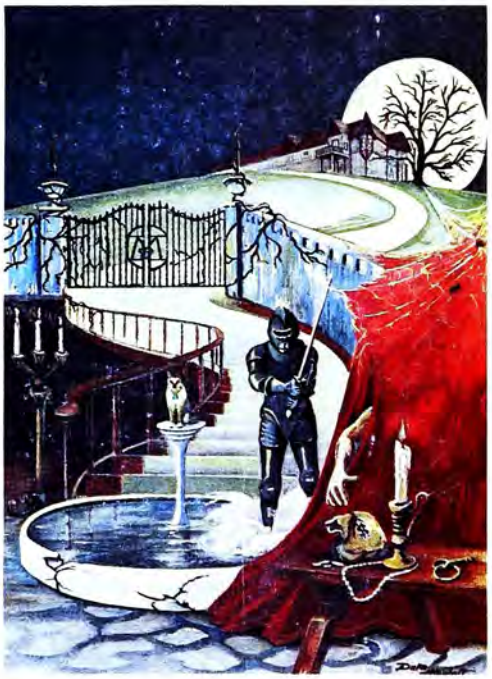
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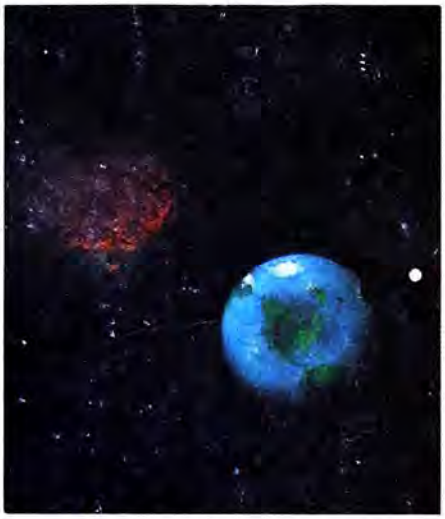
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