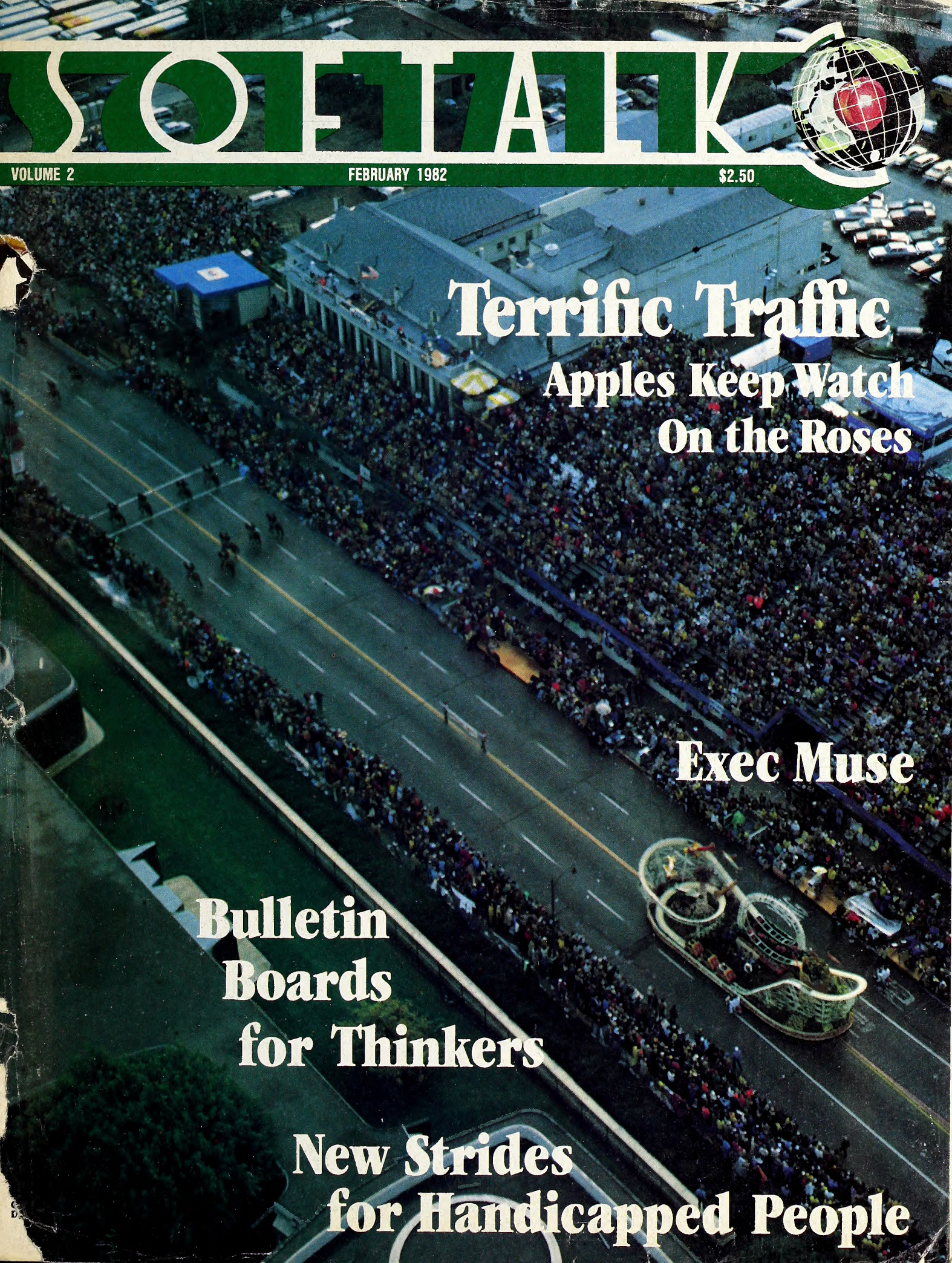
SOFTALK

VOLUME 2 FEBRUARY 1982 $2.50



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Apples Keep Watch On the Roses

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Sectors

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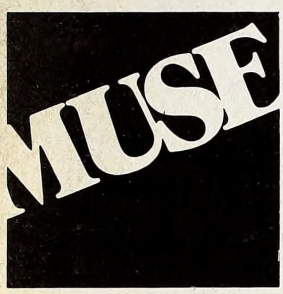

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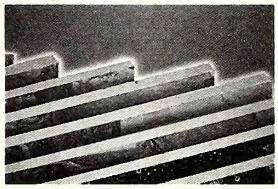

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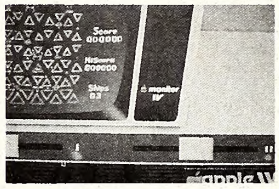

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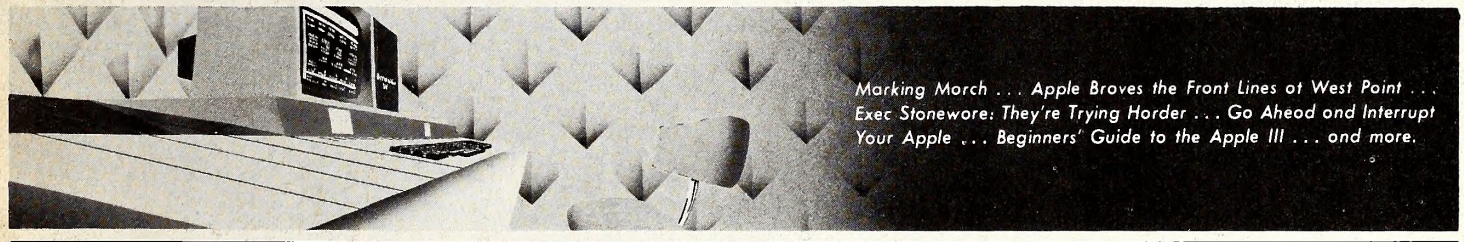

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Paid Subscription: After one free year, $24 per year without sponsor, $18 per year with sponsor. At the end of the free year, each subscriber will be notified; response is required only if you wish to continue receiving *Softalk*. Lack of response will be taken as your choice to discontinue the magazine. For multiple subscriptions, deduct $6 per subscription. Special rates for schools and libraries, $8; multiple subscriptions for schools and libraries, $5 each.

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

Problems? If you haven't received your *Softalk* by the fifteenth of the month, or if you have other problems with your subscription, Ron Rennells or Robert Mann can help out. Call (213) 980-5099.

Moving? Send new address and old to Softalk Circulation, 11021 Magnolia Boulevard, North Hollywood, CA 91601; telephone, (213) 980-5099.

Contest: ASCII RR

Alan Nayer was a close runnerup for first prize in the Contest Contest with his contest, ASCII Railroad. It's a word game and a number game and a computer game all rolled into one. And it's hard.

First prize in the contest will be $100 worth of the *Softalk* advertisers' products of your choice. Up to five runnersup will win an extra year's free subscription to *Softalk*. In case of ties, the Apple random number generator will determine the winner and the runnersup.

Beginning with this month, all sincere contest entrants who were not already eligible for the $18 subscription rate for *Softalk* will become so by virtue of their entry in a contest.

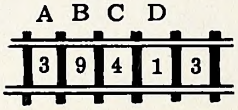
Deadline for the contest is March 15, 1982.

Here are the rules for ASCII Railroad, as Alan Nayer wrote them.

Fill each of the 27 "railroad cars" in the chart with a decimal digit. Each pair of digits forms the decimal representation of an ASCII code. Except for the first and last digit, each pair of digits overlaps with its neighbor; the second digit of a number is also the first digit of the next number.

Clues may relate to the meaning a character has in one of Apple's languages or operating systems, the character name (nul, soh, and so on), or the character itself. Sometimes, poetic license was used, or even abused. Remember: the digit pairs are the *decimal*, not hexadecimal representation, and the code 0 through 9, when used, should contain a leading zero.

Here is a brief example (with answers):



A. Some languages prefer this as the literal delimiter (the apostrophe character ' which is decimal 39)
B. Enticement to a horse (carrot. . . carat or 94)
C. Basic subscript delimiter (end parentheses, 41)
D. Its name is a holdover from the typewriter (CR, 13)

A. Alarm clock for DOS
B. Footnote
C. Underwater vessel (abbr)
D. Prompt character
E. Computerized eraser
F. Arithmetic operator
G. Realistic minimum number of drives for Pascal
H. Oops!
I. Golfers need this to boot up
J. Immediate AND opcode
K. New England state (abbr)
L. Down, but not back
M. Hara-kiri in Pascal
N. Hara-kiri in Basic
O. Pascal default exec delimiter
P. Innocent exclamation
Q. Spanish affirmative
R. Statement separator
S. Second person singular or plural
T. Default maxfiles
U. There's more than one way to go home
V. Half of our northern neighbor
W. Like F
X. String suffix
Y. It prints in Applesoft
Z. It's NOT in Integer; it's not in Applesoft

Send this entry form or a facsimile to Softalk Railroad, 11021 Magnolia Boulevard, North Hollywood, CA 91601, by March 15, 1982.

Name: _____

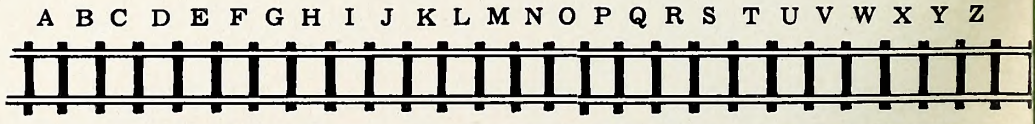
Address: _____

City/state/zip: _____

Phone: _____

Prize desired: _____

Dealer: _____



Jumbled Jumble Extends Deadline

Any of you who sailed through most of last month's Apple Jumble only to be stumped on Hector Plagbits can quit pulling out your hair. Yes, old Plagbits suffers from a typo. His name should read:

Hectar Plagbits

That's *Hectar* with an *a* instead of an o.

Because of our error and your torn fingernails, the deadline for Apple Jumble entries is extended to March 1, 1982.

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Contest Special

Somewhere in this issue appears a picture of Pascal Path author Jim Merritt. Can you identify it? The first readers from each continental U.S. time zone to specify correctly the exact location of Merritt's photograph will win a $25 gift certificate at their local retailers. In case of ties, the Apple random generator will determine the gift certificate winner. All who tie for winner will receive an extra year's free subscription to *Softalk*.

Entries from outside the continental U.S. will be counted with the Eastern time zone.

Send your answer to Merritt's Mug, Softalk, 11021 Magnolia Boulevard, North Hollywood, CA 91601. ◨

CONTEST WINNERS: 1981 Oracle Retires With New Disk][

Orocle '81 winner Jim Gonz (left) shown with AM Computer Products President Dove Alfono (right). Gonz, of West Hortford, Connecticut, took home o second disk drive for his prophetic onswers to our yeor-long contest.

Oracle '81. "When everybody around here first found out I won, we were all going crazy! Now I'm kind of nonchalant about the whole thing."

So said eighteen-year-old Jim Ganz of West Hartford, Connecticut, when he claimed his new disk drive last month at AM Computing in Southington, Connecticut. Ganz was the grand prize winner of *Softalk*'s year-long Oracle '81 contest. Ganz figured out the answers to the contest during breakfast the morning before the final postmark deadline date. He only spent about five minutes filling out the entry form and never expected he had a chance to win.

But as the months went by and Ganz's name was still in the running for the grand prize, he started paying attention to the contest with considerably more interest. Now, one extra disk drive richer, Ganz plans to spend a lot more time on Pascal.

When asked if he had entered Oracle '82, Ganz replied quickly and without hesitation, "No way!

"Not only because I don't need three disk drives or because this year's contest is really tough," he said. "But every month last year when my *Softalk* would arrive, I had to flip open the pages and check the Top Thirty list and the contest winners [the last part of the contest dealt with which company would appear most often on the Top Thirty]. I'll be glad when I get *Softalk* this year just to be able to sit back and relax with it."

City Hall. Lou Meiss, winner of the Bonus Contest that ran in last September's *Softalk*, chose a copy of the book *Apple Monitor Peeled* as his prize, which he picked up at Rainbow Computing in Northridge, California. Meiss correctly identified Los Angeles City Hall as the major city hall hidden in a photograph in the September issue.

Softalk Photo

Denby the Robot (left) wos on hond to congrotulote Lou Meiss (on the right), winner of the Bonus Contest published in the September issue of Softolk. Meiss received his prize, $25 worth of goods, ot Roinbow Computing in Northridge, Californio.

Winning this type of a contest wasn't hard, according to Meiss. He is a professional photographer and has an eye for fine detail. In addition, Meiss works in a building situated right across the street from the city hall he correctly identified. The lucky winner used his $25 gift certificate for the book, which he hopes will help him with programming. ◨

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Space Warrior by Marc Goodman

On the far outposts of the galaxy the Space Warrior waits — protecting the Empire from the attacks of the dreaded ram ships. Requires 32K Apple II Integer or Plus and will boot on either DOS 3.2 or 3.3. $24.95

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the penguin computer art competition

It's not surprising that Mark Pelczarski, author of the *Complete Graphics System* and *Special Effects*, is an art lover. Some of us might be a bit surprised, however, that he's willing to consider loving our art. Well, he'd like to see it anyway, and the guest contest he's sponsoring this month guarantees he'll get the chance.

The Penquin Computer Art Competition has three parts, any or all of which you can enter.

Contest 1: Computer Drawing. Prize will go to the best full screen picture created using any graphics program on the market or one written by the contestant. Drawings may be in color or black and white. Originality will weigh as heavily as execution in the judging.

Contest 2: Computer Calligraphy. Prize will recognize the best original type font (of text characters). Font must be compatible with either Penguin's *Character Generator* or Synergistic Software's *Higher Text*. A written statement accompanying the entry disk must specify which character generator the entry will work with and whether it is a small or large font.

In addition to the prize, the best fonts entered will be included in a fonts disk Penguin will provide to users of their graphics products, with full acknowledgment of the contributors. If you want to enter this contest but do not want your font included on this disk, simply specify this; it will in no way affect your chances of winning.

Contest 3: Computer Animation. Prize will go to the best moving screen picture, moving sculpture, or animated drawing that runs without any user interaction. Entries that require user input will be disqualified. Time limit for the entire program from start to finish is two minutes. Entry disks must be accompanied by written title of program and all files needed by the program must be loaded automatically by the program.

General Rules:

1. All entries must arrive at *Softalk* no later than March 31. (The gremlins are apt to get them if they arrive the following day. . . .)

2. All entries must be submitted on disk, but multiple entries are permitted on one disk as long as a written and clearly understandable catalog accompanies the disk. Penguin promises to return any disks that are accompanied by proper postage and proper packaging; disks not so accompanied will not be returned.

3. Any entrants wishing to be considered for *Softalk*'s Bonus (explanation follows) must put their entries to all three contests on the same disk.

4. Penguin will be the final judge. Entries will be judged on originality and creativity in the use of the Apple hi-res graphics capabilities. All decisions are final.

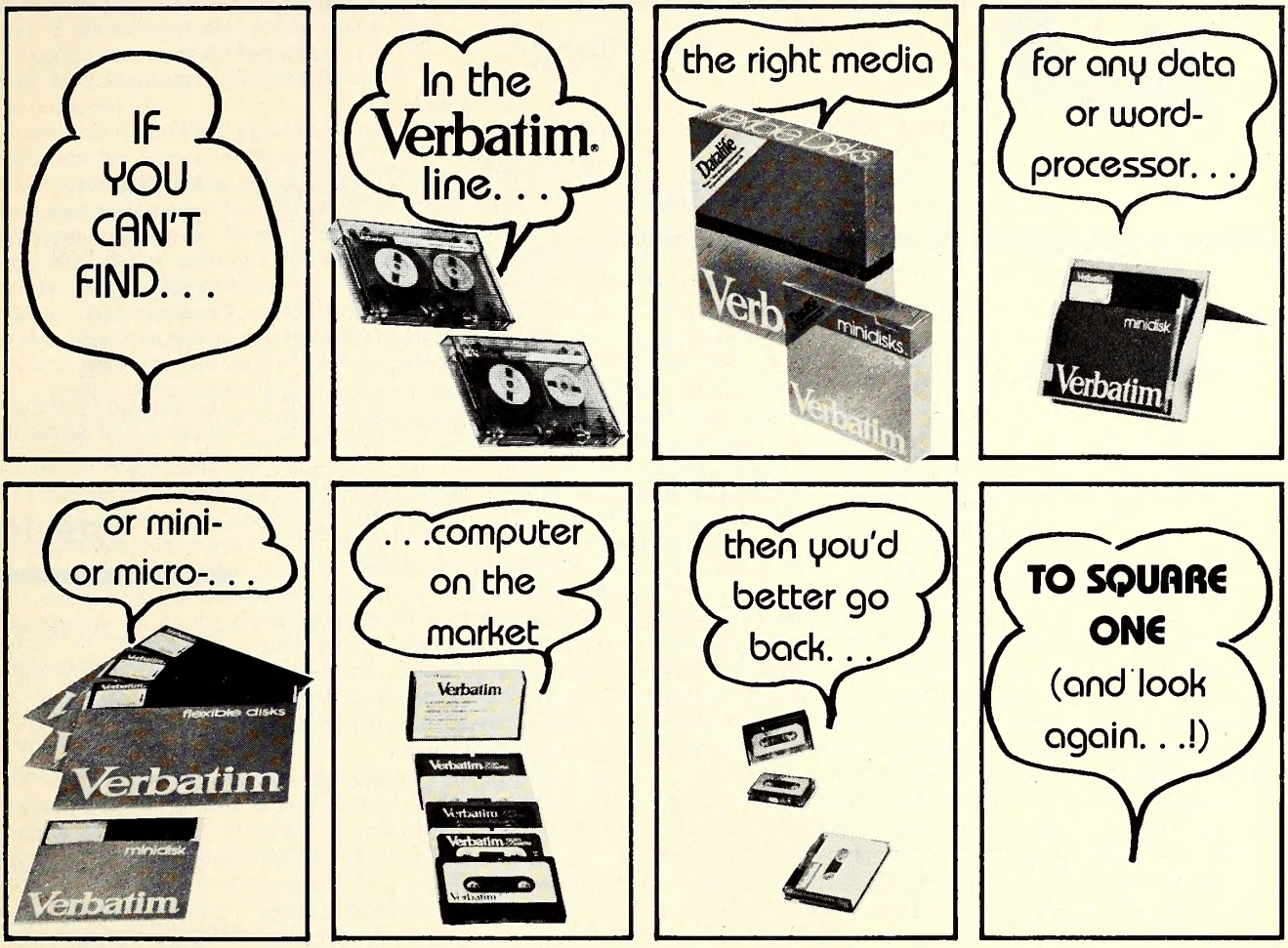
5. Entries must be accompanied by your name, address, and phone number, both in writing and on any submitted disk.

Prizes. First prize in each category will be $150 worth of any software advertised in *Softalk*. Second prize winners will receive copies of Penguin's package, *The Graphics Magician*; third place prizes are copies of Penguin's *Special Effects*. If a second or third place winner already owns the prize they've won, Penguin will substitute another Penguin product of the contestant's choice.

Mark Pelczarski and the Penguin wish you good luck and happy creating.

Softalk's Bonus. If any one individual should place first, second, or third in all three contests, *Softalk* will award that person $100 in prizes chosen from any of *Softalk*'s advertisers. In the event that more than one person achieves these lofty heights, the random number generator will be put to work again to choose the bonus winner. ■

THE FLOPPY UN-PUZZLE



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Sirius Tools

E-Z Draw

E-Z Draw is a graphics editing package for Apple II BASIC with simple one character commands so it can easily:

- Draw dots, lines, parallelograms, triangles, circles and ellipses on the screen,
- Move any area of the screen to any other area,
- Transform any area of the screen into its mirror image while expanding or compressing its width or height or rotating it 90 degrees,
- Draw text on the screen using any of 20 original and imaginative type styles using the Higher Text Character Generator by Ron & Darrell Aldrich,
- Save images and complete pictures to the disk for use within BASIC programs, and
- Draw using any of the Apple BASIC colors.

This program has been used by professional programmers to generate spectacular hi-res pictures for use with their games, professional packages and educational software. It can be used to create professional illustrations, graphs and slides in addition to adding hi-res graphics to BASIC programs. E-Z Draw requires a 48k Apple II or II+ and one disk drive.

Audex

Audex is a collection of utility programs that allow you to create sounds, shape them, edit them and play them back in your own Applesoft BASIC programs. The only tools required are an Apple II computer with Applesoft BASIC, 48K of memory, one or more disk drives with DOS 3.3 and an optional tape player. Included with this disk are:

- DRAW-A-SOUND, a program for creating and editing sound pulse patterns using the keyboard and hi-res screen. These sounds can be tones, squalks, thumps or anything you choose.
- EXCERPT-A-SOUND is a program for getting sounds from the cassette port and excerpting portions of this audio data for use as sound effects. Excerpting produces more uniform tones and uses less memory.
- BUILD-A-SOUND is a program to connect sounds and tones together into extended patterns to form or emulate speech.
- AUDIO OPCODES is a collection of relocatable machine language routines that allow you to easily reproduce in your own Applesoft programs any sound effects, music, speech, etc. created using the above utility programs.

A user manual is provided that includes many programming examples and complete instructions for using all the utility programs.

PGE

The Pascal Graphics Editor is a complete graphics editor with command and menu structures modeled after the Pascal text editor. It Features:

- Commands for drawing dots, lines, rectangles, parallelograms and circles
- A routine to fill any closed area with any of 720 color combinations
- Protective viewports which allow selective filling, erasing, or drawing without disturbance of other screen areas
- Easy moving, rotating, inverting (upside down and/or mirrored), crunching, expanding (horizontally or vertically), color separating and saving to disk any portion of the graphics screen
- A built in font generator which can be used to define fonts with cell sizes ranging from 1 x 1 to 16 x 16. Fonts can be drawn onto the screen in any of 16 different DRAWBLOCK display modes with optional proportional spacing.

Return of the included license agreement entitles you to a free back-up diskette and Pascal utilities package which includes two library units that expand TURTLEGRAPHICS:

- The GEOMETRIC UNIT simplifies the drawing and filling in of simple geometric shapes and aids in creating DRAWBLOCK arrays and saving pictures to disk with commands: PROCEDURE TRIANGLE, PARALLELOGRAM, ELLIPSE, PFILL, COPYBLOCK; FUNCTION PICREAD AND PICWRITE.
- The TEXTWRITER UNIT allows you to load and use multiple fonts including all fonts defined by PGE with commands: PROCEDURE WFCHAR, WFSTRING, FONTYPE, PROPORTION; FUNCTION FONTREAD.

The Pascal Graphics Editor requires a 64K Apple II or II+ and one disk drive.

The Joyport

The Joyport is the most significant new input device for the Apple computer since the keyboard. A wide variety of software is rapidly being developed to take advantage of the Joyport's features:

- Apple game paddle sockets that can use 4 game paddles
- 2 Sockets to accept Atari type joysticks
- Connections for Apple and Atari paddles and joysticks that are easily accessible without opening the Apple case (no more dissecting the Apple each time you want to change paddles)
- Complete compatibility with all existing BASIC, Pascal and machine language programs and games
- 2 Switches to select between Apple type paddles and Atari joysticks
- Custom designed enclosure that complements Apple case

A complete users' manual including installation and programming examples is provided with each Joyport. For a limited time only, included with the Joyport will be a free copy of Computer Foosball.

Sirius Software, Inc. 10364 Rockingham Drive Sacramento, California 95827 (916) 920-1195

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OPEN DISCUSSION

War . . .
I am an Apple owner, a university instructor, and an avid reader of your magazine. I feel that *Softalk* is one of the finest magazines available for the Apple computer. I wholeheartedly recommend it to all Apple owners, and I have learnt a great deal from reading your articles and software listings.

But I must tell you that I feel that the advertisement for *Street Life* that you allowed to run on page 175 of your December issue and which also ran in the November issue on page 107 is *not good*. In fact I feel that it is *really bad*. I neither care what consenting adults do, nor would I try to dictate my morality on anyone else. But I have two sons (ages 11 and 15) who are also readers of *Softalk* and as a conscientious parent it is my responsibility to concern myself with what they read, do, and what they expose themselves to in general. As publishers you must realize that a great deal of your reading audience and the personal computer constituency is made up of teenagers who are influenced by the things that you print and the software that is made available to them through your magazine.

The ad clearly shows a street walker and the text tells how this game "puts you in control of up to ten ladies of the night."

I can't believe that you are so desirous of advertisers that you would not realize that this kind of ad glamorizes pimps and sets a very bad example for minds in general and young minds in particular. It is not desirable to depict nor to use women as sexual objects that are to be used to earn money with. Even to encourage people to fantasize in this activity is a great misdirection of energy and values.

I realize that the ad is probably geared to adults (although nowhere does it so specify—nor can anyone control who mail-orders) but, none the less, children and teenagers will read the ad if it's in your magazine and will be tempted to buy and/or trade this program. I for one do not want to encourage my sons to play at "being pimps, avoiding police, and looking for eager 'johns,' " etc., as is advertised in this ad.

I guess that computer magazines will have to face the fact that a time of decision making is fast approaching, and that software will be becoming more and more sexual. Are you an adult magazine or a family magazine? Will you advertise for anyone who is willing to pay you money or will you insist on a certain level of truly useful, educational, and beneficial products to serve the real interest of your clientele?

I strongly recommend, therefore, that you and your staff take another look at this ad and really think about whether this is the type of material that you wish to make available to your readers.
Lawrence Galante, New York, NY

And Peace
I feel I must respond to two letters in the November 1981 "Open Discussion." They are "A Letter to On-Line" and "Vacuous Sex Symbol Misrepresents Women," both on page 22. Incidentally, I am not associated with On-Line Systems or with any other software publisher.

Richard Gillett objects to the *Softporn Adventure* ad turning *Softalk* into "cheesecake." This reminds me of a *Popular Science* article on color photography being criticized for using pictures of a girl in a modest two-piece bathing suit to demonstrate flesh tones. If the *Softporn* models were actually posed any lower in the hot tub, they would drown. You can see considerably more bare flesh at any public swimming pool.

As a recent *Softalk* recipient, I don't have any back issue with an ad on page 70 that Mary Miller Smith could find offensive. Her comment, "Women will never get out of the bedroom if this type of advertising is continued," suggests it was *Softporn, Street Life,* or, most likely, *Interlude.*

These two letters present variations on the theme that sex is essentially bad. Mr. Gillett feels *Softporn*, a "product which is as useless and unnecessary as its ad" is lowering the computer industry to the "gutter level." Ms. Smith finds a sex-related computer game a "put down."

It puzzles me that I have heard so many protests against sex in computers and other areas, and so few against violence. How socially desirable is it to glorify nuclear destruction. (*ABM* and *Missile Defense),* piracy *(Shadowhawk 1),* robbery and violence (*Zork*—my personal favorite), and warfare *(Sabotage, Bomber, Tank War,* and *Star Trek)*?

One of my feminist friends has a T-shirt that reads, "Woman's place is in the Bedroom and the Boardroom." Certainly, the time for women's social and economic equality is long overdue. But that doesn't mean that a woman is necessarily being exploited when she enjoys sex. One of the major advances of Women's Liberation has been the number of women now insisting on their right to a satisfying sex life. This assertion is shocking in a culture that raises its children with the myth that there is something wrong with a girl who desires sex, while a boy's "animal" lusts are normal and inescapable, although not something to be discussed in mixed company. I find it interesting that, according to *Time, Softporn* author Chuck Benton has been deluged with requests for a female version.

War games can be a harmless outlet for aggression. Surely it's better to come home after a rough day and blow away a few Klingons than to take it out on the family. Maybe the sex games will help people defuse some of the sexual/emotional time-bombs our culture has attempted to install in our psyches. If *Interlude* helps couples overcome a few of the sexual incompatibilities that are rending families in epidemic proportions, more power to it!

Sex is one of God's greatest gifts to humanity. It can be a physical expression of love. It can also be perverted. I feel the greatest perversion is to try to make it "dirty." As God said to Saint Peter, "What I have made clean, do not call 'unclean.' "
James K. Olinger, Austin, TX

Should Softalk Rate Adventures?
With the large interest in adventure-fantasy simulations, I feel that the time has come for some kind of standardization. In the old days, it wasn't too hard to choose what games to buy because only a handful existed. Today, there are numerous games to choose from. I myself am a fairly experienced adventurer and prefer to play those games that will offer me a challenge. On the other hand, many of my friends who are just starting out would prefer a game that is more forgiving to their beginning adventuring style.

I recently ran across *Birth of the Phoenix* by Phoenix Software and was very impressed by the program and by this company's attempt to indicate by a numerical rating system the relative difficulty of some of their adventures. I believe this is a step in the right direction. As all neophyte adventurers already know, it can be quite frustrating to play an adventure that may be far too difficult for their skill level. Many beginners, who would eventually become good adventurers, get scared off because they get in over their heads. Some of the adventures on the market today are very sophisticated and at anywhere from $15.00 to $100.00, buying the wrong program can be very costly indeed.

While Phoenix Software is moving in the right direction, the majority of adventure and fantasy producers are very vague as to the relative difficulty of their programs. What I propose is that an independent reviewing group such as *Softalk* come up with a numerical rating system and rate all adventure-fantasy games in this way. Please understand that this would not be a system to rate the quality of the programs, just the relative difficulty of play. A system such as this

would make it much easier for the beginning, average, and advanced adventurer to make a correct choice in what kind of skill level they want to play at.

Ideally, all companies would submit a final version of their program to the review board and this board would then assign the proper difficulty number. When the program was made available to the public, it would bear the difficulty rating on the package and in advertisements.

I would like to encourage *Softalk* or anyone else who may be interested in making adventure-fantasy simulations more enjoyable to feel free to contact me. I am anxious to hear the views of other adventurers as well as the views of the program authors themselves.
Joe Balsamo, San Diego, CA

Furthering Fortran

The Fortran review by Coats and Waldman in the December issue is one of the better articles on such a subject. Anyone considering the purchase of any of the products in the review will be well warned of the pitfalls.

The numbers shown in the benchmarks caught my attention. I couldn't understand how the Z80 could be ten times faster than the 6809 for benchmarks 2 and 3. Apparently, The Mill is interpreting the code while the SoftCard is executing the code directly.

Out of curiosity, I produced two 6809 assembly language versions of benchmark 3. The result from the first version, in which I emulated a very crude Fortran compiler (no sophisticated code and no optimization whatsoever), was a running time of ten seconds. The second version, in which redundant operations were removed and initialization of the FLAGS array was optimized, resulted in a running time of less than five seconds.

I also ran benchmark 3 on a Xerox/Honeywell Sigma 5 and got a running time of about five seconds. This test was in a time-sharing environment with no other active users.
E. M. Greene, Ridgecrest, CA

Pioneers Together

I often read letters submitted to this magazine from users of software who are very unhappy about the support they receive from the various software houses. I would like to take this opportunity to write a letter of praise for the support I have received from Continental Software in Culver City, California.

Recently I purchased Continental Software's *Home Money Minder* for $34.95. I found the software I purchased to have some marginal program loads and actually found a possible bug or two in the logic of the program. Needless to say, I was very unhappy! My first instinct was to return the software to the store and get my money back. Instead, I contacted Continental Software. I was immediately rushed a new diskette that eliminated the marginal program load problems and was put in contact with the programmer to resolve the "bugs." When one considers that the *Home Money Minder* has been essentially replaced by Continental Software's new money manager, *The Home Accountant*, the support I received was above and beyond the call of duty.

We are often quick to criticize. Instead, we should be trying to work out problems with the software houses. The home computer industry is a new frontier and we, the pioneers, must work together with the manufacturers (who are also pioneers) to produce working products.

In the future when we have problems with software, I feel we should attempt to contact the software house about the problem. If we do not receive support then let's write letters to this and other magazines about that software house. If however, we do receive support from the manufacturer, let's hear about these companies, too.

For now, thank you, Continental Software, for your support!
Joe Goebelt, Boulder Creek, CA

Making Learning Fun

I've just come across what I feel to be one of the best programs available for the

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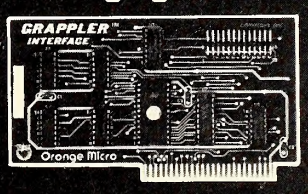


© 1981 Orange Micro, Inc

Apple. It's the *Word Scrambler and Super Speller* by Avant-Garde Creations. This program teaches spelling, but with the fun of a video game, and costs less than one too.

In the future I would like to see a best-sellers list devoted to educational software.

Also I would like to say that I think *Softalk* is a must for all Apple owners.
Gordon Lurie, Skokie, IL

Watch for The Schoolhouse Apple, a new column coming soon in Softalk.

The Oracle Flunks Arithmetic

After reading and rereading both the September and December 1981 issues of *Softalk*, I cannot understand the December standings in the Oracle '81 contest.

My understanding is that Part 5 was worth either 0, +10, +20, or +30 to any contestant. Unfortunately, adding any of these to all of the leader's totals as published in the September issue fails to yield a single match with the December issue. If, for example, Jim Ganz's total after Part 4 was −13, the most he can have after Part 5 is +17. This assumes that he guessed the Dodgers would triumph over the Yankees. However, in December you reported his score as +22. Similarly, Daniel Tobias's September score is repeated in that issue as −15⅝, implying that the only scores above zero he could have would be +4⅜ or +14⅜, not +9⅜ as shown in December.

Although both of the above examples seem to indicate that a constant error of +5 is present, my score is indeed above zero but less than +2 after Part 5 (+1⅝), as *Softalk* correctly indicated in December. Finally, it seems I was left out of the September issue even though my score after Part 4 was −18⅜, indicating I was third at that point.

Could you please help me to understand the published results?
Michael B. Preston, Culver City, CA

September's information was in error; the error was often in scores recorded as five less than they ought to have been, but some could have been ten or fifteen less as well. Inadvertently, in updating for part 2, scores had been increased by 0, +5, +10, and +15. Only the first figure is correct. Scoring entries should have been increased by +10, +20, and +30, respectively. We caught this only during the preparation of the December issue and updated all scores, contenders or not, accordingly. Incidentally, congratulations on a fine entry.

Circle the Day

I noticed that your magazine has grown to more than two hundred pages, and I congratulate you on the success of your excellent product. I was wondering, would it be possible to add one of those advertiser's reader service cards at the back of the issue similar to *Byte* magazine's, where readers could inquire about several products without writing to each advertiser individually?
Steve Brodsloy, Stanford, CA

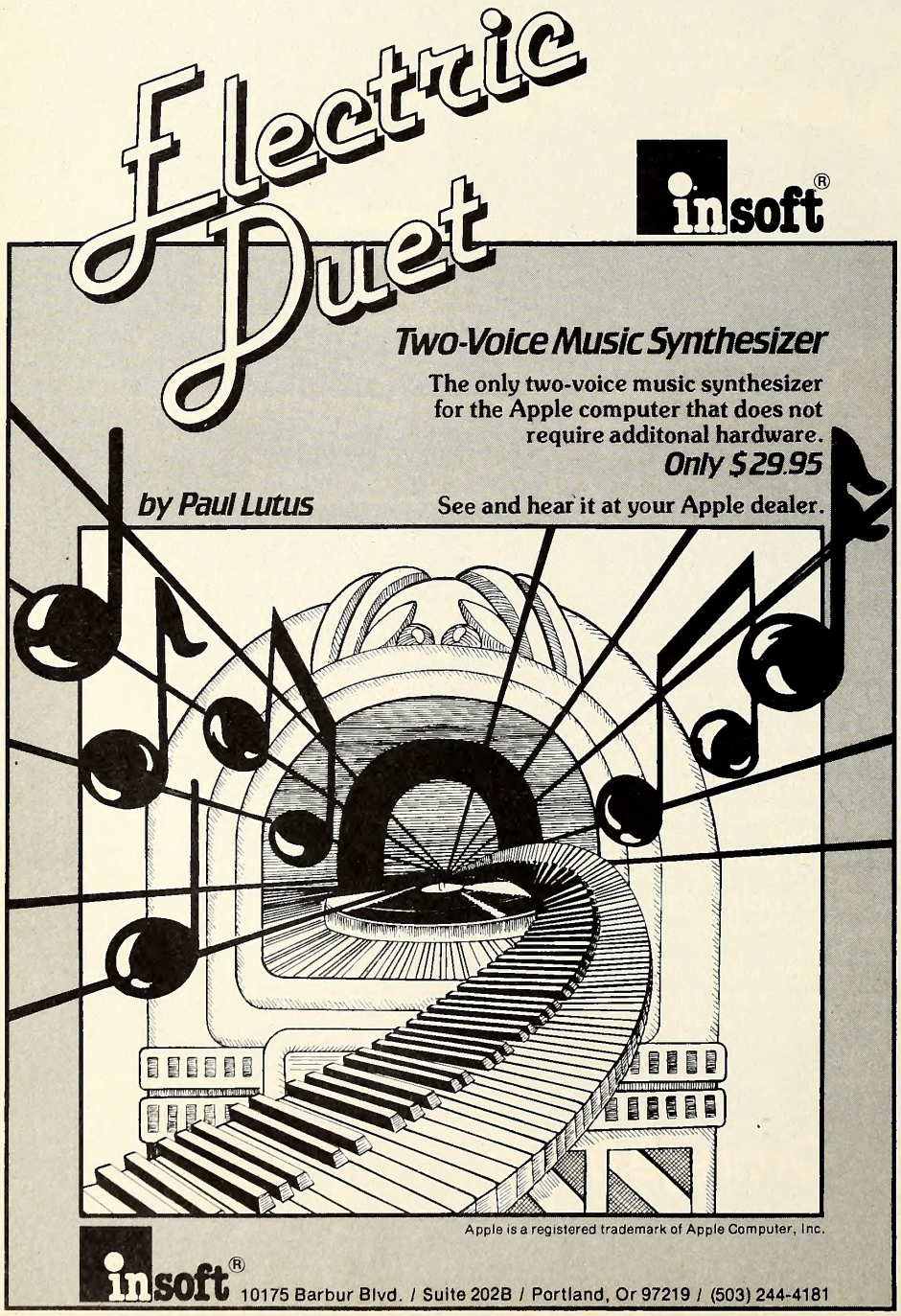
Where an action or policy might encourage or discourage Apple owners from supporting their local dealers, Softalk *has always opted for the course that favors the dealers. In this infant industry, most users benefit from the support and assistance of an expert they can contact personally; many local dealers are set up to give this aid, but the more time and effort they are willing to contribute this way, the more expensive it is for them. If, as soon as they are relatively familiar with their computers, such a dealer's customers begin dealing directly with publishers, manufacturers, or mail-order houses, service of this nature will no longer be feasible.*

More Apples Choose Engineering

I obtained a May 1981 issue of *Softalk* at the Toronto Apple Expo, November 1981.

In the Open Discussion section, page 8, I read with great interest J. W. Yee's letter entitled "An Engineering Apple." I am in the same position as J. W. Yee.

I would like to request, if possible, the address of Johnson W. Yee, in San Francisco, so that I might get in touch with him.



They have landed and are taking over the city. Steadily they are making their way across the city, destroying everything in their paths. The town has been evacuated and your regiment has retreated leaving you, alone in the city, at the mercy of the aliens.

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Also, I bought a 48K Apple II-Plus used, and this May 1981 issue is the first I've seen. Could you let me know the subscription rates?
V. Siciunas, Toronto, Ontario, Canada

We are presently exploring distribution arrangements for Canada, Australia, Sweden, and the Orient. As soon as these are firm, they'll be announced in Softalk *and inquirers will be individually notified. Meanwhile, an independent company, Bite-soft, has arranged a foreign subscription plan of their own for which they buy magazines from us. You can write to Bite-soft at Box 175, North Hollywood, CA 91603.*

Crystal-Clear Controversy

I read, with interest, the letter headed "Trust Is Best Protection" in your December issue of *Softalk*.

Strangely enough, I have suffered the same experience at the same hands with the same lack of success. I bought a copy of *Sands of Mars* from Crystal. It didn't work. Nor did the replacement. Nor did the replacement's replacement. Somewhat miffed, I sent a letter (copy enclosed) with the software to Crystal asking for a refund. The result? Five weeks later I got the whole lot back with a rather nasty letter sticker that said, in essence, "once you've bought it, we can't be responsible." Frankly, their attitude stinks. The trouble is, I really have no recourse, unless there are enough ticked Crystal software buyers out there to start a class action suit?!

I do think that it has to be, in part, your responsibility, *Softalk*, to screen your advertisers and protect your readers from these sort of unscrupulous get-rich-quick merchants. Maybe you need to set up a watchdog line to allow readers who have been gypped to complain.

At least demand a sample of the advertised software and make sure it runs. The *Sands of Mars* still crashes happily, and the graphics/animation are puerile!

Please, *Softalk*, see what can be done to protect us from these rip-off kings—at least get their programs and try them.
John Lillicrap, Eden Prairie, MN

In reference to the letter printed in your December issue, I would like to say a few words in the behalf of Crystalware Inc.

To the best of my knowledge, with the conversion of our game software for the Apple II to DOS 3.3, all of the troublesome bugs have been taken care of.

Although we've found the majority of software buyers to be honest and ethical, we still run into a great deal of "White Collar Crime" and software piracy.

I will only be too happy to speak to any of our unhappy purchasers out here if they will call (408) 788-3125.

It is much easier for our competitors to produce what we consider to be very primitive games and debug and test their products. The more complex a program the more difficult it is to totally debug.

We feel it ethical to provide a working, playable copy of our product. It seems at times there are individuals who are more interested in finding fault than appreciating our product and experiencing and enjoying them as is our intention they should.

We always are receptive to comments and useful suggestions but sometimes cannot process orders quickly and at the same time argue on matters of suggestive opinion and personal taste.

Again my lines are open for your encouragement and suggestions. Please say "Code Blue" when calling.
John Bell, President, Crystalware, Morgan Hills, CA

Several individuals, including some retailers, have offered us unsolicited comments on Crystal products. Two retailers sent us unopened packages of several of the Crystal games. Both sets of packages are 3.2 version. When John Bell of Crystal called Softalk *to ask for "equal time" to offset the negative letter in December's Open Discussion, we offered him more than equal time. Believing that the best argument for a negative comment is a good product and that a review of such a product would be far more influential than a letter stating unbacked opinions, we informed Bell of the software we had received and of our intent to review some of the products. Bell was distressed that we did not have the new, "bugfree" 3.3 versions, and we expressed full willingness to review those versions rather than the ones we had if he cared to send them to us. If the new versions were fully cleaned up, we would be most pleased to announce that; we far prefer publishing good news than bad.*

However, no 3.3 versions—in fact, no versions at all—arrived from Crystal; so we proceeded to testplay the 3.2 version of Crystalware's six-disk-side role-playing game, Fantasyland 2040 A.D., *which is, indeed, rife with bugs.*

Softalk *does not print responses that are highly negative to a company without first so informing that company; John Bell's response to that reading was to ship out a set of the 3.3* Fantasylands *by express mail, in the hope that we could include it in our review.*

In the interest of being absolutely fair, Softalk's *review of* Fantasyland, *including 3.3, will appear next month.*

We take issue with John Bell's implication that bugs are more acceptable in complex software than in simpler products. No program is worth the price, whatever that may be, if it doesn't run properly. If authors' programs are too complex to be debugged, those authors need to lower their expectations temporarily and work on less complex programs that they can produce perfectly.

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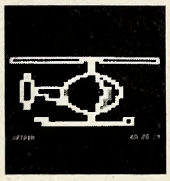

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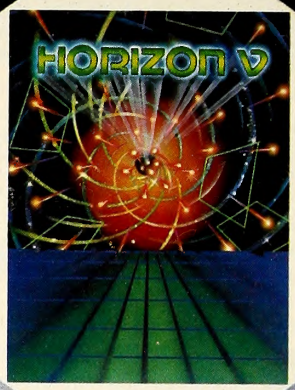

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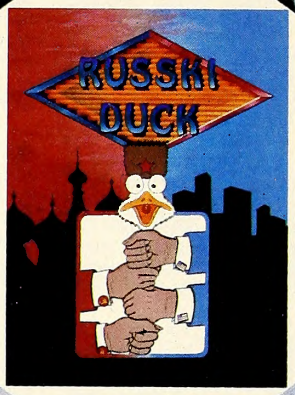

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HOLLYWOOD

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Gebelli Software Inc.,
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In addition, from all we have seen of Crystal's products, we believe that there is not one game publisher represented in the Softalk *Bestsellers whose products could be considered primitive compared with Crystal's. Some of Crystal's programs are sophisticated, but so are* Raster Blaster, Crossfire, Zork, Cyborg, Castle Wolfenstein, Ulysses and the Golden Fleece, Ultima, *and* Wizardry, *to name just a few; and all of these are essentially bugfree.*

Seek and Ye Shall Find

The writer of this letter is executive editor of The Living Light, *an interdisciplinary review of Christian education. Interested readers can contact him at the Catholic University of America, Washington, DC 20064.*

I was intrigued by an advertisement in the November 1981 issue of *Softalk* publicizing the wares of Cross Educational Software in Ruston, LA (page 182). I have placed an order with them for several of their Christian education programs. Although I suspected that such programs existed, these were the first I have seen advertised.

Some months ago we received an unsolicited manuscript from someone at Control Data ballyhooing some of the efforts made by churches to employ computers. The applications that he cited all dealt with data processing and management—which is not very different in churches than in business (I was going to say, other businesses). We rejected the manuscript because we didn't think it would interest our readers. It did set me to wondering, however, about what programs have been developed for religious education. It seems to me that if there is a market for educational software in general education, there is also a potential market in religious education.

Who might know what is being done along these lines? When I phoned Cross Educational Software to place my order, the lady who answered told me about GRAPE ("Group for Religious Apple Programming Exchange"). She promised to send me some material on it. To your knowledge, are there other private groups or commercial companies that are producing software that could be used in religious education?

The Living Light attempts to provide a forum for catechists and professional religious educators, designed to present developments and trends, to identify problems and issues, to report on research, to encourage critical thinking and to contribute to decision-making in the field of religious education.

There must be others like us who bought a computer for one purpose, only to realize that we have not begun to exploit its full range of possibilities. In our case we use our two Apples largely for word-processing, but we could obviously be experimenting with them for use in religious education. (I am also chairman of the graduate program in religion and religious education here at the Catholic University of America.)

Berard L. Marthaler, Washington, D.C.

Remember the Controller Even McGraw Could Make?

The article by Silas Warner in the October 1981 issue entitled "The Controller Even You Can Make" was a very interesting and useful article regarding applications of an I/O board with the Apple computer. However, Mr. Warner's flippant remark on page 134, "This principle can be expanded *easily* to cover eight column lines," is typical of many computer writers.

As suspected, it was not easy, in fact three of us have worked on this for two weeks. We are quite certain now that we do not have a hardware problem, but that the difficulty lies in the software.

Perhaps you might be able to prevail on Mr. Warner to furnish the necessary changes to the program to read and print correctly an eight-by-eight matrix of chess board squares. I know how to do the data, the problem is with the expected code changes we have made, we get stepping up the data table on a diagonal basis, not on a row basis.

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I have to assume there is a program error. That being the case, I am sure you have heard enough complaints from disgruntled readers of your great magazine that you don't need any more abuse on the subject, but really, until they come out with Apple IV with the "OGT" mnemonic button—"Ought To Run"—any help you can provide would be appreciated.
Ralph McGraw, Arlington Heights, IL

Maybe The Typos Were Trying To Tell Us Something
Referring to the Basic Solution in the December 1981 issue of *Softalk*, I regret to have to inform you that the *Catalog Hello* program submitted by Brad Stone is in all probability a plagiarism.

I have had this program for at least ten months. I do not know who wrote it originally, but I got it from a local Apple dealer as part of a free collection offered to regular customers. Since Mr. Stone says he developed it after reading the May issue, it certainly could not be his original program that I have.

The usual evidence is available: the program is *exactly* the same; the same line numbers, the same variable names, the same format. I'd send you a listing but it wouldn't prove anything since it is exactly the same as the one in your column.

I don't know what "the *basic* solution" might be to such a problem. It must take guts if not foolishness on Mr. Stone's part to take a chance to have this published where thousands of readers have the opportunity to recognize it!
Jerome I. Weintraub, El Cajon, CA

Being an avid reader of your magazine, I was very surprised to discover that the "Hello Program" in the Basic Solution column of the December 1981 issue was an exact copy, except for *many* errors, of a program that appeared in *Creative Computing*'s "Apple Cart" of September 1980. I'm sure the person given credit would be very embarrassed if Bob Sander-Cederlof, the real author, pointed this fact out to him.

I enjoy your magazine very much and hope you continue its many fine and interesting articles, but please be more careful!
Paul R. Mueller, Muskego, WI

The subroutine from the December 1981 Basic Solution, as corrected in the January 1982 column, was indeed the product of Bob Sander-Cederlof, a software publisher known for Assembler 4.0 and publisher of a newsletter on assembly language programming. With Sander-Cederlof's permission, the routine was published in Creative Computing. But it is a public domain program, as far as Sander-Cederlof is concerned, and he had no problem with its appearance in Softalk.

Brad Stone is a thirteen-year-old from Utah who attends university-level programming classes. He and a friend used to write and modify programs together up to sixteen months ago, when the friend moved. This program was primarily the friend's, and Brad thought it was original. Brad uses his programming knowledge mostly to help in his father's real estate business.

There appears to be no way to prevent the possibility of a similar problem occurring again, as long as we're willing to print the programs of our readers. While we regret greatly having presented you a program that was not original, and while we regret equally the failure to credit the proper author at the time, we believe your participation in Softalk *is important, and we're willing to take the chance. We have confidence that very few of our readers would consider sending us unoriginal programs as their own, especially with today's evidence that the rest of our readers won't let them get away with it.*

Printing Out Programs Has Its Ups and Downs
Like others, I have been frustrated by not being able to output both upper and lower case on my printer from Basic or Applesoft programs. After a short study of the assignment of the ASCII codes, I was able to come up with a very simple subroutine that allows me to output both upper and lower case on my printer with a minimum of complication and overhead.

To use the subroutine, one merely defines the string SENT$ as the phrase to be printed with the letters to be capitalized preceded by an @. Letters not preceded by an @ will be printed as lower case. Setting the variable ZN=10 is the same as HTAB (10) and starts the phrase in the tenth character position. GOSUB 9000 to the subroutine then causes the phrase to be printed as desired.

This works well for me and has been tested on an attached IBM Electronic 60 and an Epson MX-80. I'm sure that it will work for most printers hooked to an Apple, with lower case capability of course, with little or no modifications.

A copy of the subroutine with a sample program and phrase follows. I hope that this can be included in your Open Discussion section.

```
10  SENT$ = "@THE @UNITED @STATES OF
    @AMERICA"
20  ZN = 5
30    GOSUB 9000
40    END
8000  REM  ********************************
8010  REM
8020  REM  PRINTER UPPER AND LOWER CASE
8030  REM              SUBROUTINE
8040  REM
8050  REM              DIANE DURBECK
8060  REM
8070  REM            DECEMBER 26, 1981
8080  REM
8090  REM  ********************************
9000  REM
9010  REM  ***BEGINNING OF SUBROUTINE***
9020  REM
9030  REM  SENT$ IS THE PHRASE YOU WANT
      TYPED WITH UPPER AND LOWER CASE
      LETTERS
9040  REM  LETTERS WILL BE PRINTED ON THE
      PRINTER IN LOWER CASE UNLESS A LETTER IS
      PRECEDED BY @
9050  REM  ZN=5 IS EQUIVALENT TO HTAB 5
9060  REM  THE PHRASE MAY BE UP TO 255
      CHARACTERS LONG INCLUDING @ AND
      SPACES
9070  DIM ZWRD$ (255)
9080  DIM ZC (255)
9090 ZM = LEN (SENT$)
9100  FOR ZK = 1 TO ZM
9110 ZWRD$ (ZK) = MID$ (SENT$,ZK,1)
9120  NEXT ZK
9130 ZI = 0
9140 ZI = ZI + 1
9150  IF ZWRD$ (ZI) = "@" THEN GOTO 9190
9160  IF ASC (ZWRD$ (ZI)) > 64 THEN ZC(ZI) = ASC
      (ZWRD$(ZI)) + 32
9170  IF ASC (ZWRD$(ZI)) < 64 THEN ZC(ZI) = ASC
      (ZWRD$(ZI))
9180  GOTO 9240
9190  FOR ZK = ZI TO ZM
9200 ZWRD$(ZK) = ZWRD$ (ZK + 1)
9210  NEXT ZK
9220 ZM = ZM - 1
9230 ZC(ZI) = ASC (ZWRD$(ZI))
9240  IF ZI = ZM GOTO 9260
9250  GOTO 9140
9260  PR# 1
9270 ZR$ = " "
9280  FOR ZK = 1 TO ZM
9290 ZR$ = ZR$ + CHR$ (ZC(ZK))
9300  NEXT ZK
9310  HTAB ZN - 1: PRINT ZR$
9320  PR# 0
9330  RETURN
]RUN
     The United States of America
```

Diane E. Durbeck (age sixteen), San Jose, CA

Another Way To Chase the Blues
I refer to your October 1981 issue of *Softalk*, page 14, "The Ol' Reset Blues."

Reset blues have been experienced by most Apple owners. As medicine for the "Ol' Reset Blues," I have seen several articles describing solutions, but the best I have tried is as follows:

Start by purchasing, from your local hardware store, a 5/8 inch O-ring gasket. (5/8" is an approximate size.) Then remove the reset button by gently prying upward with a small screwdriver, place the O-ring gasket over the button shaft, and replace button cap.

This modification allows full use of reset button without the need of a special device, such as a pen. The modification requires a little extra pressure to actuate the reset, but accidental reset is near impossible, unless you are a gorilla of a typist.
Todd S. Douglas, San Jose, CA

Volume What and Print Where?
I have a question the answer to which is probably painfully obvious but which has escaped my notice utterly.

In Pascal, disk drives are referred to by "Vol 4" and "Vol 5"; the printer by

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Softalk's circulation is growing every month, with the January issue going to approximately 60,000 Apple owners and retail stores. No other magazine offers such a thorough penetration of the Apple marketplace.

Classified advertising space is available at the rate of $10 per line for the first ten lines, with a five line minimum. Each line over ten lines is $25 per line. Ad copy should be received no later than the 10th of the second month prior to the cover date of the issue you want the ad to appear. Payment must accompany ad copy.

The publisher reserves the right to reject any advertising that he feels is not in keeping with the publication's standards.

Softalk's classified ads will be set in Electra and Electra Bold type face. Body text for the ads is 8 point on 9 point leading. Italics are available for body text only; please underline the portions you would like italicized. Heads will be set in 10 point bold face, all capitals only.

The body text of the ad will hold roughly 53 characters per line. Spaces between words are counted as one character. Heads will hold roughly 25 characters per line, with spaces between words counted as one character. Please indicate if you would like the head centered or run into the text.

Please write or call for additional information.

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"Vol 6"; and so on.

In the transfer utility I can get listings by transferring to "printer:". Output goes to the screen with a "writeln"—but would somebody please tell me—How do I get output to go to the printer or disk file? Where do the volume numbers come into writing where I want to? Please be as specific as you can; I feel that the manuals dodged a straight explanation.

P.S. It is driving me nuts to figure I've just missed seeing it.

Jay Weston, Gainesville, FL

The Pains of Imperfection

Is the Apple Pascal IORESULT function really broken, or is this another one of those petty oversights on my part?

The most elementary concern for the user of a program would dictate that he/she not be punished with a fatal runtime error every time a mistake is made in entering a numerical value. Under program control, Apple Pascal does not allow a single error—an unacceptable situation for input intensive programs.

Taking the Apple Pascal *Language Reference Manual* at its word, the following function would make life a lot easier for the user:

```
function
ENTER(VNAME:string):real;
(*$I-*) (*turn off the fatal IO feature*)
var X:real;
begin
  write('THE VALUE OF',
  VNAME,? :');
  readln(X);
  while IORESULT<>0 do
    begin
      write(chr(7),VNAME,;? : ');
      readln(X)
    end;
  ENTER:=X
end;
(*$I+*) (*in case you want your
        program to go belly up for a
        simple error elsewhere*)
```

However, this procedure does not work. It will gladly accept the literal *A* as a "real number," returning an IORESULT value of 0. The same function without I- will give a "bad format" runtime error (IORESULT = 14).

A variant of this function for avoiding runtime errors due to the unavailability of a requested disk (IORESULT = 9) works fine.

Summarizing: The I- compiler option changes the behavior of the IORESULT function some of the time. Seems like nonsense. Does anyone know of a fix or a dodge?

E. Kurt TeKolste, Mililani, HI

Hello, Dolly?

I have a hobby that I feel may be of some interest to your readers. This hobby is more fun than any hobby I have ever had, and I seem now to know more people across the country than I ever dreamed of. I haven't met most of the people in person, I know them only from their typing. I know this will sound confusing, but I am the Matchmaker of "Dial-Your-Match." What I'm going to attempt to do is explain my hobby in more detail.

The excitement lies in a type of computer program commonly known as a CBBS. This stands for Computer Bulletin Board System. Anyone who has a computer can run a CBBS. A person can write a CBBS program or purchase a prewritten one at a computer store. This program turns the owner's computer into a type of phone answering machine. Once properly set up, people with "remote terminals" can call up the computer over the telephone and operate the computer from anywhere in the world they happen to be. Most CBBSes are run by private individuals as a club meeting place or just as a message system. As a caller, depending on the type of Computer Bulletin Board System, you can read messages or enter messages, and sometimes the system will even give you free computer programs.

A *sysop* [for *sys*tem *op*erator] is the term given to the person who runs the CBBS. Sometimes a CBBS will allow the caller to communicate with the sysop in "chat" mode. This allows the user to talk to the sysop by typing in the conversation over the terminal. The sysop can immediately respond by typing back. Of course, a better way to communicate with the sysop would be for both parties to pick up the telephone, but this is just not as much fun!

As I said before, I am a sysop. I run a CBBS known to people throughout the United States as Dial-Your-Match. I don't like the name "sysop," so I go by the name of "Matchmaker."

Dial-Your-Match, a CBBS, is a program that was not purchased. It is a computer program that took me two months to design and write. It runs on my Apple computer. Anybody, anywhere in the world, can call Dial-Your-Match. It's free, other than long-distance phone charges, and available to anyone with access to a "remote terminal."

Dial-Your-Match is not like most CBBS systems. The first thing my computer does when a person calls is have them answer a personal questionnaire. This questionnaire gets information such as your name, age, sex, sexual preference, height, values, hobbies, and so on. It also asks questions relating to the person's personality. When complete, this questionnaire is filed and is used to locate possible matches from the list of other people who have called Dial-Your-Match. Once the person has a list of matches, they can selectively "browse" any or all of those people's questionnaires. If a good prospect is located, the person may want to send private mail. The computer stores this mail internally and will list it out only when the addressed person calls the system again. People who are not satisfied with their matches can also advertise themselves on a "Public Bulletin Board." When persons are finished with the system, they are encouraged to leave comments to me, the Matchmaker.

[*Here followed a lengthy list of positive comments.*]

I'd like to share an interesting experience that occurred on my system a few weeks ago. On the public bulletin board was posted the following message (of course I've changed all the names): "Well, Matchmaker, the system has real people on it. Just thought I would let you know that you have brought people together. And across 3,000 miles. This afternoon, John from California flew to Florida. We met him at the airport and have been partying ever since."

A few days later, the bulletin board contained the following message from John: "I have to write and tell you that I am extremely pleased with your board and the fact you made me a good match. I just got back from a trip . . . I hope to go again soon. I am in Atlanta right now, but you made me a match that is 100 percent great!"

And a few days after that, I received the following comment from John: "Please erase this account. My match and I found each other. Don't need this service anymore. Thank you very much

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for being here."

I've operated Dial-Your-Match for six weeks now [*mid December*] and my computer has received more than 4,500 telephone calls. There is never more than a one-minute delay between the time one person hangs up and the next person calls. I turn off the ring on the telephone at night so I can sleep, but the matchmaking process goes on, twenty-four hours a day, seven days a week. You see, I am not required to do anything; the computer answers the phone, hangs it up, and keeps track of all calls.

If you have a modem for your Apple and want to find a match for yourself, the telephone number for Dial-Your-Match is (213) 842-3322.

I would be very happy to answer any question you may have in regard to computer bulletin boards, Dial-Your-Match, microcomputers, or anything you are curious about.

I would appreciate not having my name published without first contacting me; there are a lot of weirdos out there. Please just refer to me as the Matchmaker.

The Matchmaker, Burbank, CA

Hi-Res Help for Ace Teems In

Many letters have arrived to answer Ace Colter's letter in the December issue, including some as many as eleven pages long, and a fine one from a young man in Huntington, West Virginia, who forgot to include his name. Following are representative, and, while somewhat repetitive, offer unique approaches.

This is a response to Ace Colter's letter in the December '81 *Softalk*, asking for the locations of the Apple's hi-res routines. This is something that I feel Apple should have included in the *Reference Manual* along with the lo-res routines.

These are:

HGR HGR2	$F3E2 $F3D8	Both of these routines act just like the Applesoft commands of the same name, clearing the appropriate screen to black and switching to it. Simply do a JSR to the location.
HCLEAR	$F3F2	This will just clear the page to black if it is JSRed to.
HCLEAR2	$F3F6	This will clear the page to the last color plotted. To use it, *hplot* a dot somewhere, then JSR to here.
POSTN	$F411	This is the subroutine used to tell the Apple where it will *hplot* or where it will draw a shape. The X coordinate should be in the X and Y registers (most significant bite in Y) and the vertical coordinate in the accumulator. Then simply JSR to the address.
HPLOT	$F457	This does just what it says, using the coordinates given to *postn*, and the *hcolor* set.
HLINE	$F53A	This will draw a line from the last plotted point to the point sent to the subroutine. This point should have the X coordinate in the X register and the accumulator (most significant byte in X) and the vertical coordinate in the Y register. Note the difference here from *postn* setup.
DRAW XDRAW	$F601 $F65D	This will *draw* or *xdraw* a shape. Use *postn* to tell the Apple where to draw the shape, then place the address of the shape to be drawn in X and Y (most significant byte in Y). Note that this address is the address of the shape itself, *not* the shape table. The rotation value goes in the accumulator, and the scale should be placed in location $E7. Then simply JSR to the routine.
HCOLOR	$F6F0	To use this put the number of the color in the X register, then JSR.

Using these routines will speed up the *drawing/xdrawing* somewhat, but there is still the annoying flickering. Using hi-res images is much more satisfactory, but how to do that is even harder to find out than these locations.

I wish to concur with Ted Young's letter to Roger Wagner, asking for some hi-res instruction. The routines I mention here can of course be used, but they obviously do not rise to the challenge of wanting to program *Gorgon* or *Raster Blaster*.

I hope that these are still found useful by Ace Colter and other readers out there.

One other location which I failed to mention earlier:

If you want to draw on one page while displaying the other, location $E6 will do the trick. This is where the Apple tells itself which screen is to be drawn on. A $20 will force the Apple to draw on page 1 and a $40 will do page 2.

Also, the Apple decides its color from what is in location 28 (decimal). This location contains a value from 0 to 255. But there are only seven hi-res colors, you say. Sort of. Without going into a long, drawn-out discussion on how the Apple does its graphics, there are simply many different combinations possible. To see the possible things you can do, try poking anything into 28, and Call 62454, which is the fill screen routine mentioned above. Or try this program:

```
10 FOR X=0 TO 255
20 POKE 28,X:CALL 62454
30 NEXT X
```

The normal colors, as you will see, are as follows: 0=black 42=green 85=purple 127=white 128=black 170=orange 213=blue 255=white.

By *poking* a value into 28 and *hplotting*, you can achieve some very strange effects, some of which could be useful in games.

Mason Jones, Ann Arbor, MI

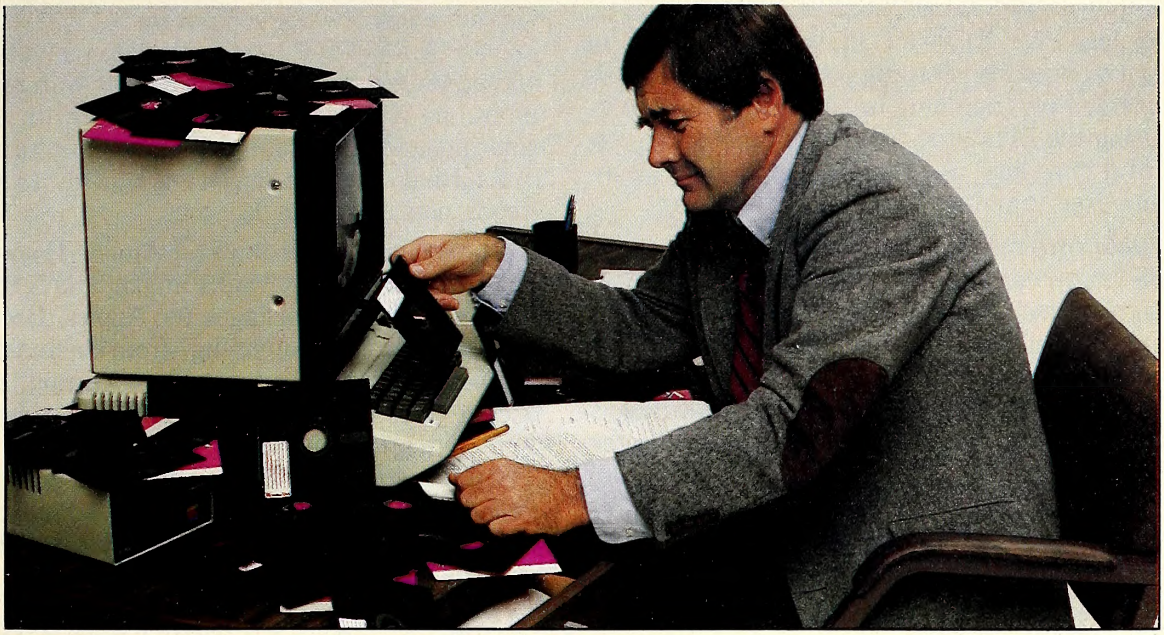
I have recently read many letters from people who are interested in the locations of the Applesoft ROM graphics routines. The only list I have found was in the March/April 1980 issue of *Apple Orchard*, but almost all of the entry points it listed were incorrect, so I spent several hours attempting to correct them. The correct routines are:

HGR	$F3E2	same as Applesoft command
HGR2	$F3D8	
HCLR	$F3EC	clear screen to black
BKGRND	$F3F6	clear screen to color in $1C
HPOSN	$F411	position the hi-res cursor without plotting. A = vertical, Y = high horizontal coordinate, X = low horizontal coordinate. A, X, and Y must be set on entry.
HPLOT	$F457	positions the cursor with *hposn*, and then plots a dot of color in $E4. A, X, Y registers same as in *hposn*.
HLINE	$F53A	draws a line from the last plotted or positioned point to: Y = vertical coordinate, X = hi horizontal, A = low horizontal.
SETHCOL	$F6EC	sets hi-res color to X (X is 0 to 7) Hex values of colors: 0 1 2 3 4 5 6 7 & 0 2A 55 7F 80 AA D5 FF
DRAW		has two entry points: $F601, and $F605. Use $F601 if the shape definition (not the start of the table!) you want to draw is pointed to by Y,X (Y is high, X is low). The conventional shape drawer (Applesoft *draw*) is first a JSR $F730 followed by the JSR $F605, where X is the shape number to be drawn, and the start of the table is pointed by $88.89. For both, the cursor must be *hposn*ed, and A = *the rotation factor*, $E4 = the color, and $E7 = scale.
XDRAW		identical procedure as *draw*, but exchange $F65D for $F601, and $F661 for $F605. The $F730 is the same.

The value of byte $E6 decides what hi-res page you plot on: $20 for page 1, or $40 for page 2. On the draw function, the rotation you just used is stored in $B5, and the last color plotted is $1C. The functions above are nearly identical to the ones described by the January 1978 *Apple II Reference Manual* on page 46.

In response to Ted Young's letter in *Softalk*'s December 1981 issue, which asked why Apple did not say where their

GOTO 82



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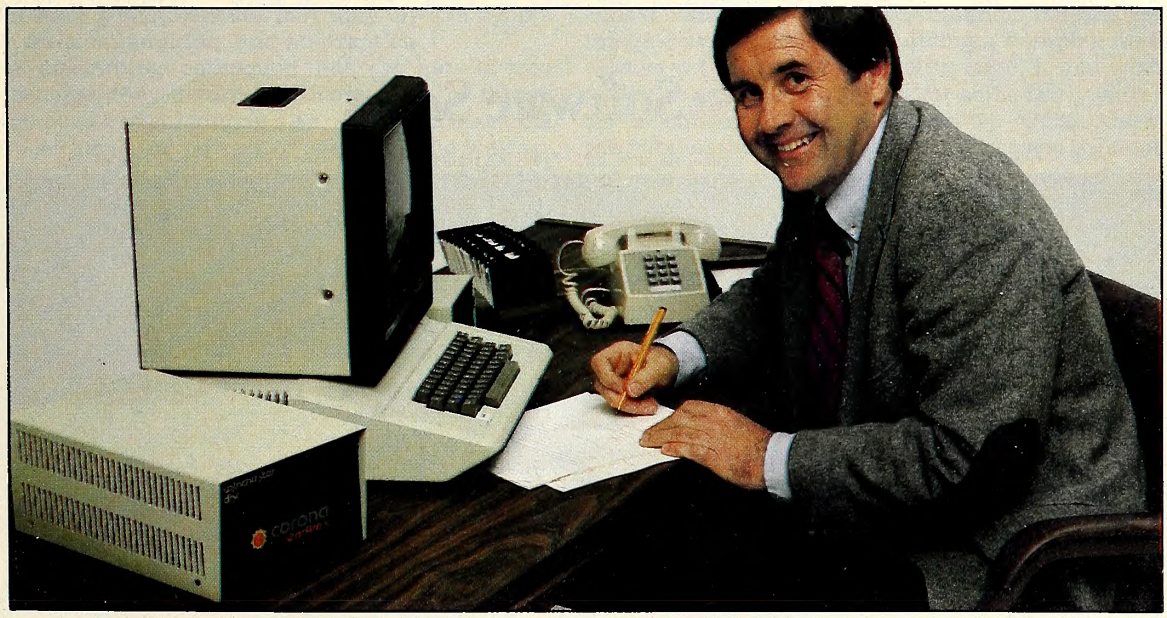

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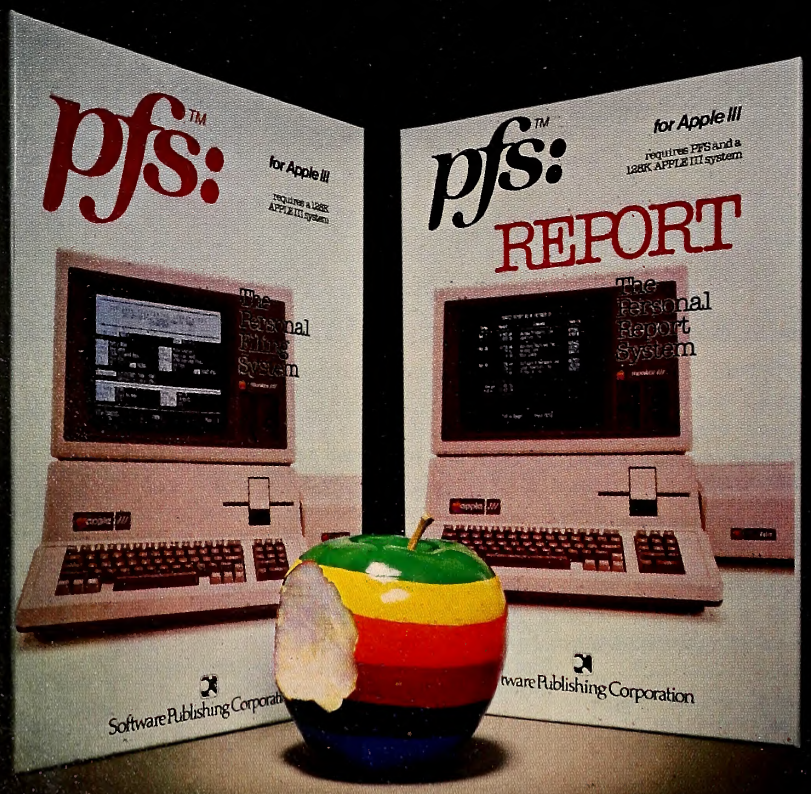

VENTURES WITH VISICALC

BY CRAIG STINSON

It's hard to do compound interest calculations in your head.

Probably that's because the arithmetic weight-training that we do early in our lives rarely gets beyond linear functions. That is to say, all of us—or at any rate those of us who grew up in precalculator days—developed at least some familiarity with multiplication tables. Hence it's not too hard for us to figure out in our heads that if Uncle Sam and his ilk are going to take away a third of a $27,000 income, we're going to be allowed to keep $18,000, and that if we double our income and have to give up half of it, we improve our position by only $9,000 or 50 percent.

Even if we have to assist ourselves with paper and pencil to do them exactly, we usually have a fairly good notion of where such calculations are going, because they only involve simple multiplication, division, addition, and subtraction.

Calculations concerning compound interest get us into deeper water because they involve exponentiation, or taking something to the power of something else. Few of us learn the powers of five—let alone the powers of one-fifth—the way we learn times tables. Most of us are content to leave that kind of figuring to accountants, or to our banks and their computers.

Yet a lot of us are paying 20 percent of more these days for credit, so the powers of one-fifth do indeed have some relevance to our lives; they have a lot to do, in fact, with those shocking numbers that appear on the MasterCard bill at the end of the year, under the heading, "Total interest paid in 1981."

One of the great virtues of *VisiCalc* is its ability to reveal the long-range consequences of financial decisions we make. The program is an especially valuable tool when applied to those problems, like compound interest, where our own intuition tends to be a little imprecise.

We're going to look at interest from a positive point of view this month, as we build a *VisiCalc* model to calculate the future value of an investment. The banks were busy touting Individual Retirement Accounts (IRAs) around the beginning of the new year, so we'll use our model to check out the long-range consequences of opening and maintaining an IRA.

First, the mathematics.

If you invest $1,000 and get a 10 percent annual return on your money, then at the end of a year, your investment will be worth the original $1,000 plus 10 percent more, or a total of $1,100. Calling the original investment P and the interest rate I, the value of your investment, V, after a year would be determined by this formula:

V = P * (1 + I)

At the end of a second year, the value of the investment would be 110 percent of what it was at the end of the first year. That value, call it V(2), could be found by this formula:

V(2) = P * (1 + I) * (1 + I)

But (1 + I) * (1 + I) can be written as (1 + I) ∧ 2, so, to state the case more generally, the value V(Y) of an investment P that earns interest I compounded annually for Y years after Y years is found by the formula:

V(Y) = P * (1 * I) ∧ Y

If the interest is compounded more often than annually, the picture becomes only slightly more complex. If our ten percent annual interest were compounded quarterly, we would plug a rate of 2.5 percent into the formula and multiply the exponent by four. If we let N represent the number of compounding periods per year, then the general formula for the future value of our investment becomes:

V(Y) = P * (1 + I/N) ∧ Y * N

This is the formula we'll use in our *VisiCalc* model.

Clear a worksheet and set recalculation to manual, with a /GRM. The automatic recalculation feature tends to slow things down when you're building a complex model. You can always set it back to automatic later, if you wish.

We're going to need space for some fairly wide numbers, so set the column width to twelve with a /GC12. And since most of the information on the sheet will represent amounts of money,

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you can do a /GF$. We'll override that format in a few locations.

A typical IRA account advertised in Los Angeles offers 14 percent interest compounded daily. The law permits a maximum annual investment for a single person of $2,000; working couples are allowed to invest $4,000 annually. We'll work with the former figure first.

Let's start by putting some labels in the area from A1 to A6. Type in the following:

```
>A1:PRINCIPAL
>A2:INTEREST
>A3:PERIODS
>A4:TERM
>A5:INT/PERIOD
>A6:FUTURE VALUE
```

You can either type that in literally, using the greater-than symbol and the colon to move your cursor to the appropriate coordinates, or just set cursor movement to vertical and hit the right arrow after each line.

We'll plug our data into the corresponding cells of column B. Let's assume that our hypothetical working depositor is now twenty-one years of age and that he or she is going to make a single deposit this year of $2,000 and let that money ride until retirement day, forty-four years from now. We'll also make the assumption, for the sake of simplicity, that the money will earn a full year's interest for 1982.

Plug in the values 2000, 14, 365, and 44 at locations B1, B2, B3, and B4, respectively. At B3 and B4, you'll probably want to override the dollar format with a /FR.

At location B5 we want to show the interest rate per compounding period, so type in the formula: +B2/B3/100. You need the division by 100 to convert the percentage rate into a decimal. When you hit return, you should get 3.835616E-4 for an answer, meaning that your money will earn about four hundredths of a percent interest per day.

Finally, at B6, plug in the formula that calculates the future value of the investment. That formula should read:

```
+B1*((1+B5) ^ (B4*B3))
```

Note that *VisiCalc*'s order-of-precedence rules are a little different from Applesoft's. In Basic you could state that formula as B1*(1+B5) ^ (B4*B3) and everything would come out fine. Basic would figure the terms within parentheses first, then do the exponentiation step, and then finally multiply by B1. *VisiCalc*, on the other hand, reverses the last two steps; it figures the parenthetical terms first, then does everything else from left to right. If you leave out those apparently redundant parentheses in your *VisiCalc* formula, the result you'll get will read error, not because your syntax is illegal but because you've overflowed the limits of the system.

You could avoid having to put in the extra parens by putting the B1 term on the right side of the formula, as +(1+B5) > (B4*B3) *B1, but you might just as well get accustomed to using a lot of parens. In *VisiCalc*, when in doubt—or when in error—check to see if you're assuming something other than a left-to-right order of precedence and add parens as necessary.

Now that you've got it right, B6 should be displaying a fairly impressive six-figure number, showing that $2,000 left in the bank for forty-four years, gathering interest at 14 percent compounded daily, will grow to $945,736.17.

To observe the effects of changing the compounding period, try putting in different values at B3. Hit an exclamation point after each new entry to calculate the results. Notice, for example, that if the money is compounded annaully instead of daily, the effect will be drastic. At the end of the forty-four year term, the difference in the value of the investment will be about $300,000.

Suppose now that we want this worksheet to reflect your situation and that you're no longer twenty-one. Set your cursor anywhere on row 4 and type /IR /IR. In the new blank positions at A4 and A5, type the labels AGE and RETIREMENT.

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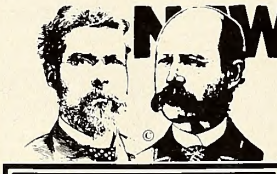

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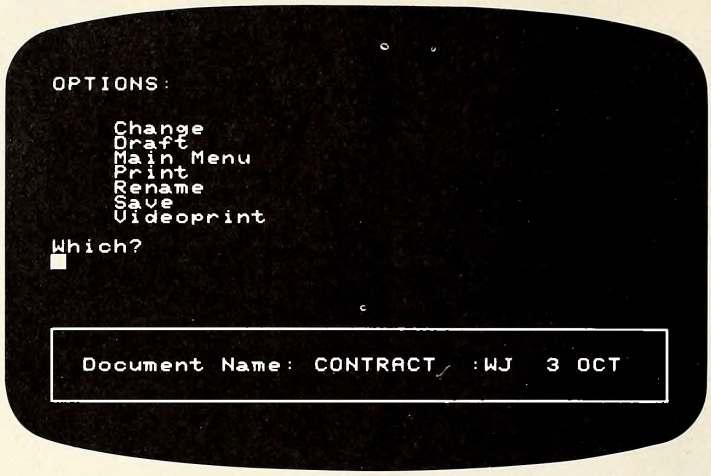

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Put in /FR at both B4 and B5 and plug in the appropriate values—your present age and the age at which you intend to hatch your nestegg. Now replace the value at B6 with the formula +B5−B4. Hit an exclamation point and the program will calculate with the new data. Notice that you don't have to do anything with the formulas that are now at B7 and B8; the insert-row command automatically adjusts the formulas to reflect the new locations of the cells involved.

So far what we've done is calculate the future value of a single, one-time investment. Suppose you put another two grand in the bank next year, two more the following, and so on until your retirement. Then how much will you have?

To answer that question, the first thing we'll do is construct a table showing the value of the original $2,000 investment at the end of each year.

Go down to A12 and enter /FL to override the current default dollar format. Replicate this formula down to A56 by typing /R:A12.A56 and hitting return. Now enter the value 0 at A12 and the formula +A12+1 at A13. Replicate the formula from A13 to A56 with /R:A14.A56:R. Now at location B12 enter the formula +B1. This is your initial investment, after zero years of growth.

Now at B13 through B56 we're going to want to calculate the value of the investment at the end of one-year intervals. The simplest way to do this, if you have *VisiCalc 3.3*, is to copy the formula at B8 into B13, make a small change in it, using /E, and then replicate. If you don't have the sixteen-sector *VisiCalc*, you won't be able to use /E, so you'll have to enter the formula at B13 by hand.

Assuming you've got /E, go first to B8 and copy the formula with /R:B13:NNNN. Do a /E, move the cursor with the right arrow until it sits just to the right of the B6, hit two escapes, enter A13, and hit return. If you're working with *VisiCalc 3.2*, go to B13 and type +B1*((1+B7) ^ (A13*B3)).

What we've done here is copy the formula for the future value of our investment but used the number at A13 for the term of the investment. With the cursor still at A13, type: /R:A14.A56:NNRN and you'll have a year-by-year table of the value of your account, assuming only the initial $2,000 deposit. The bottom line, at B56, should read 945736.17, that impressive six-digit number that we had originally at B6.

Position B14 shows us that at the end of a year, the $2,000 will have grown to $2,300.49. If you now invest another $2,000, obviously the value of your account will jump to $4,300.49. We can represent that new figure at D14 by entering the formula +B14+B13. At the end of the second year, if you make no more deposits, you'll have the $2,646.12 that represents your initial input, plus $2,300.49 from the second deposit. That total can be arrived at by adding B15 and B14.

To create a yearly table that represents two deposits, just replicate C14 down to C56, with /R:C15.C56:RR.

Clearly, you can repeat this process to show the effect of putting in $2,000 every year. Just go to D15, enter +C15+B13, replicate, go to E16, enter +D16+B13, and so on. On a 48K Apple you'll eventually run out of memory if you try to run the table out to forty-four years. With a RAM card you'll have enough memory with about 2K left over.

If you have the patience to build this table to completion, you'll discover that that bottom right-hand cell, the one that represents the total value of the account assuming a new $2,000 input for each of forty-four years, holds an astounding $7,227,140.66.

Unfortunately, there isn't any simple way in *VisiCalc* to replicate diagonally. The relative feature in the replicate command either increments columns, if you are replicating horizontally, or rows, if you're replicating vertically. It will not—to our knowledge—perform both operations at once. Anyone who has a simpler method to build this table (there probably is one) is invited to send it to Softalk Ventures, 11021 Magnolia Boulevard, North Hollywood, CA 91601; we'll be delighted to print it here—and if we do, you'll get an extra year's free subscription to *Softalk*. ■

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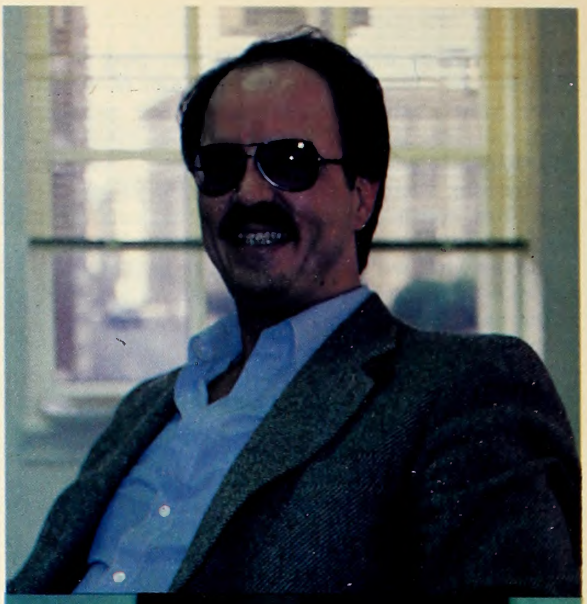


Spiralling clockwise, beginning above: Muse headquorters in Baltimore—retail store is the ground floor, software publishing the two floors above; founder Ed Zoron; cofounder and programmer Silos Warner; business monoger Maggie Block; development monoger Jim Block; store monoger Peggy Puente; and soles monoger Fred Poole.

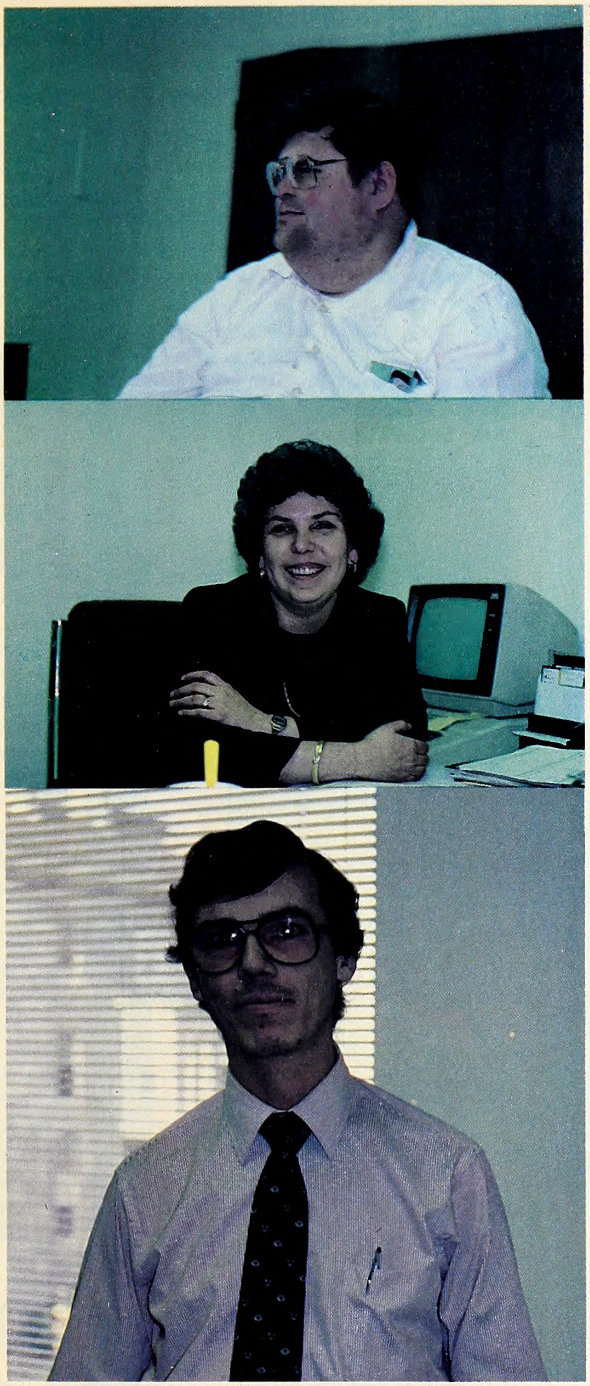
EXEC

BY CRAIG STINSON

MUSE From

Ed Zaron, founder and president of Muse Software, rubbed sleep from his eyes and poured a round of coffee. "I was up until four in the morning last night, thinking about this new database we're working on. I wasn't programming—just lying in bed trying to figure out how to make certain things work the way I want them to. I'm really excited about it."

Zaron has plenty of things to muse on these days. Apart from an exciting and consuming new software project—Muse's first major contribution to the art of database management—there is the company's recent expansion to ponder, along with the growing pains attendant thereto. Last July, Muse was a company of thirteen, crowded onto one floor of a



Softalk Photos

building on downtown Baltimore's Charles Street. Now the personnel list numbers thirty, an increase of about 230 percent, and the firm has its own three-story edifice down the street a block from its former lodging.

To be precise, Zaron and Muse are in the process of making the new building their own. "We've completely renovated it. You should have seen this place. It was the pig of Charles Street when we moved in," Zaron recalls. "The front was completely boarded up with plywood, with just a little opening where you could look in."

Now the front of the ground floor is a show window into a retail computer store run by Muse. The software publishing activities, for which the company is more widely known, go on behind a bright brick facade for two floors above the retail store. Below the store is a basement full of people busy with shipping, packing, inventory management, and other activities vital to the day-to-day sustenance of a software company.

The building is leased, but Muse is in the process of buying it; a second building, nearby on the same boulevard, has already been picked to catch the overflow from this one.

The Agonies of Growth. Growth has brought with it changes, both in corporate personality and in individual lifestyles. Muse is clearly in a state of transition, from being a small, closeknit alliance of friends to being an organization of considerable size. Zaron, who in the beginning was one of Muse's two principal programmers, has seen his role shift dramatically in recent months. His Apple now resides at his home, providing less distraction from the responsibility of overseeing the whole business operation.

Growth has brought personal conflicts as well. Besides the conflict between creativity and time that is often seen in software houses—the desire for endless refinement and improvement of product versus the need to put product on the market—Muse has also experienced some painful disagreement over purposes and methods. Jim Salmons, who had been the company's chief of marketing, advertising, and sales, left in July as a result of what Zaron describes simply as "a personality clash." His departure is still a matter of much regret to the company, both because Salmons had been a close and longstanding friend of Muse's principals and because his talents have proved difficult to replace.

When Salmons left the company, the decision was made to break up the marketing-advertising-sales function into two separate divisions on the same management level. Fred Poole has served admirably since midsummer as sales manager, but the marketing-advertising slot, which was temporarily filled, is unoccupied as of this writing.

Four Years Old Is Ancient. On the whole, nevertheless, Zaron has a lot to be pleased about in the progress of his company.

Muse is approaching a fourth birthday, making it one of the older Apple software houses. The company has distinguished itself, however, not merely by its longevity but also by the diversity of its product line and the broad, across-the-board impact it has made upon the Apple marketplace.

Its bread-and-butter products have been games and a word processor. But the company has also produced such varied materials as graphics utilities, plotting programs, a pseudo speech synthesizer that transported the user's voice under program control from tape recorder to the Apple speaker, mailing list utilities, and a version of the Pilot programming language, called *Appilot*.

Many of these programs were ground breakers of sorts. *U-Draw*, for example, was one of the first available graphics utilities, and the *Voice*, although less impressive now that true speech synthesis has been achieved on the Apple, was unique and advanced for its time. The two games from Muse that held dominant positions in the *Softalk* bestseller lists through the second half of 1981—*Robot War* and *Castle Wolfenstein*—are both fully original, one-of-a-kind creations.

Someone Bought an Apple. Like many other firms in this business, Muse was started by one individual's purchase of an Apple. In this instance the blessed event took place in February 1978, in the early days of the Apple II.

Zaron had spent the previous nine years in the employ of Commercial Credit Corporation, a subsidiary of Control Data.

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For about six of these years, he had done assembly language programming on a CDC 3300, "A nice machine," he says, "but not as powerful as my Apple."

A Big Surprise. On the evening of the day he made the step up to microcomputing, Zaron arrived home to find a fellow Commercial Credit employee, Silas Warner, waiting on his doorstep. "I don't even know how he found out where I lived," Zaron recalls, "but there he was, and he immediately started showing me how to use the thing."

In such a manner was a collaboration conceived.

"We picked the name Muse out of the dictionary. We were hoping to find something that sounded sort of like Rand, and I found *muse* and thought that looked pretty good. Silas said, 'Great. It can stand for Micro Users Software Exchange.' Silas is like that—very quick, always coming up with good ideas."

The partnership of Zaron and Warner worked out of Zaron's home for the next ten months. Warner's contribution to the fledgling company consisted of *Maze Game, Escape,* and *Side Shows,* while Zaron wrote *Tank War, U-Draw,* and *Music Box.* The programs were all on cassette, of course; Apple's Disk Operating System was not even available to the general public until about midsummer 1978.

The first ten months' output from Muse set a pattern that was to prevail throughout the company's development: Warner wrote unusual, interesting games, while Zaron concentrated more on utilities and so-called serious product. This was by no means an invariable division of talent; Zaron also wrote games, and Warner subsequently programmed *Dr. Memory,* one of the first text processors available for the Apple.

Nevertheless, Warner has made his biggest impact with game programs—especially with *Wolfenstein* and *Robot War*—and Zaron was to author the company's major entry in the word processing market, *SuperText.*

Zaron says Warner is the more creative of the two. Whether that is the case or not, the two men complement each other well, and the balance of their abilities and inclinations accounts in large measure for Muse's broad coverage of the market.

And Then Came Maggie. If that night in February marked the conception of Muse, its birth occurred the following November, when the firm took up residence in a for-real office—one room over a gun shop in the suburbs of Baltimore. Zaron also hired a person to manage all the company's nonprogramming affairs—inventory, packing, shipping, bookkeeping, and general tactical and moral support. All this burden was—and still is—entrusted to Maggie Black.

Freshly settled into their new country home, the small band of Muselings seemed unaware of what was in store for them. "We thought that one-room office was so big, we didn't know what to do with all the space." Such comfort was brief.

"In December of seventy-eight," Zaron remembers, "we sent out a Christmas special to dealers. It was just a little mimeographed flyer, but we got a ten-thousand-dollar response, and we were just blown away with excitement. We couldn't find enough tapes to fill the orders."

Things change rapidly in the Apple world, and the new year brought landmark changes for Muse as well. Early in 1979 the company issued *Dr. Memory,* which was noteworthy in two respects. It was one of the first Apple text processors, and it was also the first program by Muse to be released on disk.

Forgetting Dr. Memory. Some six months after the appearance of *Dr. Memory,* Zaron encountered a fellow at a trade show who had some rather disquieting things to say about the program. Zaron reacted to the criticism in a fashion characteristic of a prideful entrepreneur—he went home and commenced to revise it from scratch. The metamorphosed processor underwent half a year's trial as an in-house tool before coming out in public under the name *SuperText.*

Besides having become a popular piece of business software, *SuperText* claims the distinction of being the first copy-protected program written for the Apple. "With *Dr. Memory* we were getting many more trouble calls than we had had sales," Zaron says, "so we knew the time had come to start protecting our programs. The market was less professional then, and copying and trading were openly encouraged."

Around the beginning of 1980, Muse, tired of country living, migrated to downtown Baltimore, setting up shop on North Charles. They also opened their retail store.

Zaron says he has no plans to build the store into any kind of retail empire. It's intended to function as a single, independent profit center. "I've tried to take a hands-off attitude toward it," he asserts. "I want it to be a separate entity, and I don't want to get sidetracked by it, no matter what."

Warner adds that the store—essentially an Apple dealership with a large stock of software from the major Apple vendors—also provides a valuable link between the product development people at Muse and the end user, helping the former stay in touch with the needs and moods of the latter.

Credit for keeping the retail operation profitable goes to Peggy Puente, who has been minding the store since last October.

Then Along Came Jim. Other significant events of early 1980: Silas Warner finally came on board as full-time member of the staff; his massive contribution prior to that time had been done on a royalty basis while he continued to work for Commercial Credit. And Jim Black, husband of business manager Maggie and another colleague and friend from Commercial Credit, became the company's manager of product development. Black had initiated Zaron in the rites of CDC 3300 assembly language programming back in the early 1970s.

Aside from the splitting up of the sales-marketing-advertising function into two coequal management positions, Muse attained its present organizational shape when Black came aboard. The rest of its history has been consolidation and growth.

Since he joined the staff, Black has been concerned not only with the development of product, but with the development of producers as well. Although Muse has published and will continue to publish the work of outside authors, Black intends to grow a strong core of inhouse programming talent. Currently that staff includes Dave Fitzgerald, Dave Schwartz, Tom Davenport, Ralph Sanchez, and Scott Diegel.

Things To Come. The database program that keeps Zaron up nights is one of the current projects occupying this crew of programmers. Another is an eighty-column overhaul of *SuperText II* (scheduled to be released by the time this story goes to press).

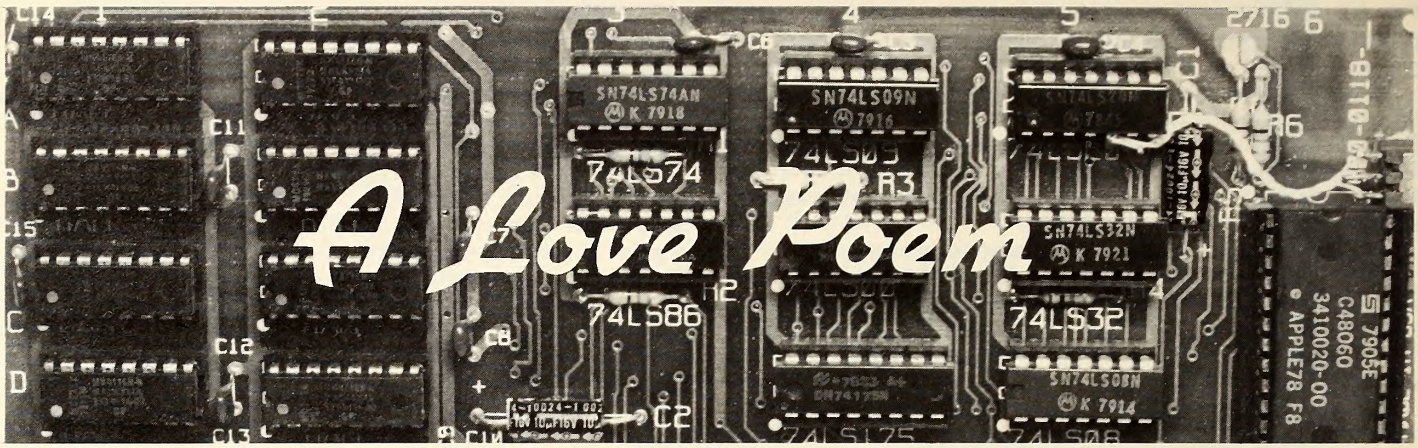
But what's really exciting people at Muse these days is the prospect of putting these two items together with some other software to form what they describe as an integrated electronic office program.

As they envision it, this office-of-the-near-future will be a massive turnkey system featuring database functions, word processing, interdesk communications, and "everything else you need to run a company." The key to the system will be a hard disk storage device into which each individual user will be cabled.

Muse intends to stay in the business of making games and utilities, as well. Warner is working on another adventure game, to be based on some of the concepts developed in *Castle Wolfenstein.* He's also in the process of writing an improved version of *Appilot.*

The latter, while still in development, is already being put to work. At least a couple of educational programs are in the offing, both of which will use *Appilot* as a development language. One of these is a four-disk tutorial for adults on the subject of writing; the programmer is Eric Kraft.

There's a stranger in the office now, a computer that's bigger than the Apple II. It's a loner, sitting off by itself in the corner of a conference room. Odds are it's going to get some attention one of these days. But, for the present, days at Muse—and sometimes nights as well—are consumed by the effort to create a database program and an integrated electronic office system for the Apple. ■



Main Frame/Mettle/Me (and Apple II)

I

To balance out your life
Would you take Main Frame for your lawful, wedded wife
Or husband, as the case may be?
To have and hold
Like taffeta or velum—
A touching tonic for your cerebellum,
Wrinkled more
For coping with the Terminal . . .
Or Monitor . . .
Or Slave . . .
(Auxiliaries frustrate me,
A member of the Bourgeoisee du Stand Alone variety.)
Than from tasting of the fatted calf
Of random wisdom binary,
Gargantuan and raw.

II

To test your mettle, then,
Go serve the Mastermind—
The Brain
Which up to now has held the key
To Sanity, Chastity, Veracity, Integrity—
The oceanic OM,
Precision-honed,
Dendritic and pervasive—
Not to rule, Oh, no!
But seeming to foretell
The fate of myriad others who
Are not equipped so well.

III

To find a random group:
Can they pass the tests/exams,
Complete the printed questionnaires
That programs in the Main Frame
Conjure up for them?
Can a linear regression gain them entrance
To the citadel of Eye Bee Em?
What lies therein, my friend?
Simply quantitative anas,
Measured brains and alchemy
No end.

IV

To turn the tide for me:
There is a special bed.
No maze of wires and circuits (at the head)
No place to plug a Dumbterm (at the stead)
No longer
Must I visit sterile, air-conditioned cubicles
(With operators running to and fro)
Befuddled by the revolution of each memory disk,
Where laves the giant Behemoth,
Numbered with her tandem sisters—
Unisexed, more or less—
But noting size, capacity, and dress.
To think, I ravish her/it . . . or did
Until the micro versions came along—
Family size, desk size, pocket size—
I have my pick.

V

And frequently at dusk
I tremble as the memory
Of musk and wires and ozone, plastic buttons, diode lights
Invades my senses
Longing for an old connection.
Then, weak but resolute
I tiptoe to my Apple II
Select a program (depending on the mood)
And let it digitate
Undulating freely
Till the problem finds solution
In one glorious burst
Of panoramic 30 resolution
(Charged seminal particles, if you will).

VI

So keep your giant golem Brain
Your mighty Main Frame,
Cold, electric paramour.
My Apple serves me well
Hooked up and in tune
To my arhythmical cadenza.

—Frank Malone

Frank Malone runs a Computerland store in Cedar Rapids, Iowa, and is an occasional contributor to Softalk*'s Ventures with VisiCalc.*

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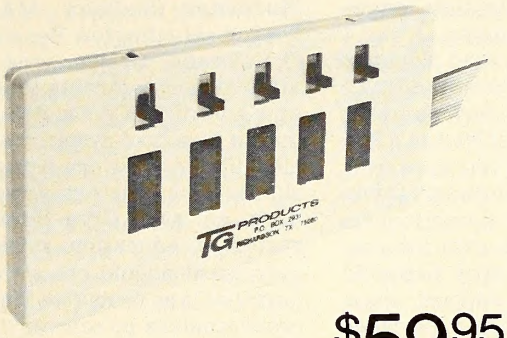

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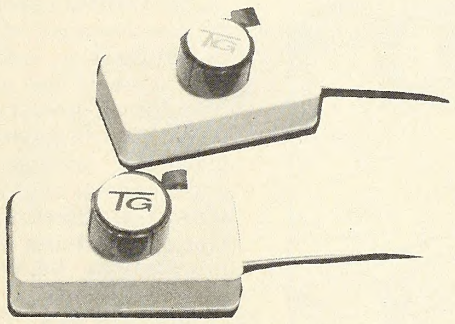

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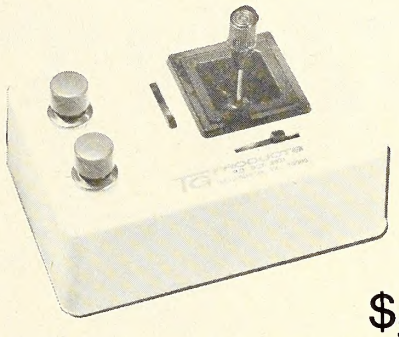

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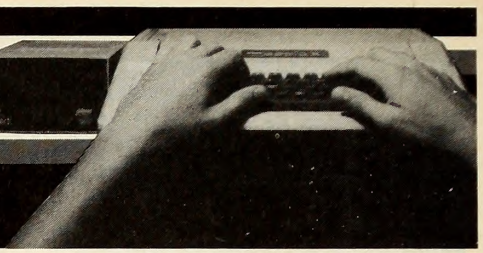


☐ **Morty M. Eisen,** a specialist in telecommunications consulting, has joined **Logica** (New York, NY), the multinational computer and communications systems design and implementation firm, as a consultant. He brings expertise in SNA architecture and IBM-oriented commercial applications to his consultation services for Logica's clients. Eisen was previously manager of systems integration and implementation for Network Analysis Corporation.

☐ **CompuServe** (Columbus, OH) has signed a five-year, $9.5 million resource management agreement with **Comp-U-Card of America** (Stamford, CT), calling for CompuServe to provide network communications and facilities management services for Comp-U-Card's applications—allowing its two million subscribers to buy household goods below list prices—at CompuServe's Columbus computer centers. Members can gain access to the shopping service via home computers and terminals, telephone, and cable television.

☐ The stockholders of **Wang Laboratories** have elected **Frederick A. Wang** a member of the board of directors. As senior vice-president of development for the company, Wang currently directs the efforts of two thousand scientists, engineers, and technical specialists.

☐ **Lewis R. Shomer** has joined **Novation** (Tarzana, CA) as vice-president of marketing. Shomer was formerly domestic marketing vice-president of Pertec's Systems Group, and has served as executive vice-president of Computer Investors Group International operations in London, and operated his own international consulting firm. **Larry Selznick,** Novation's new product support manager, brings his eight years experience as product line specialist with Anadex to the company.

Widening its market, Novation has added **Bauer and Stobin** (North Hollywood, CA) and **Software Knowledge Unlimited** (Berkeley, CA) to its network of California dealer representatives, part of a marketing thrust that has also added six new distributors nationwide: **Bohlig and Associates** (Minneapolis, MN), **Micro Distributors** (Fountain Valley, CA), **CPU** (Charlestown, MA), **W.A. Brown** (Orlando, FL), **Consumer Computer Marketing** (Sudbury, MA), and **Prime Source** (Huntington Beach, CA).

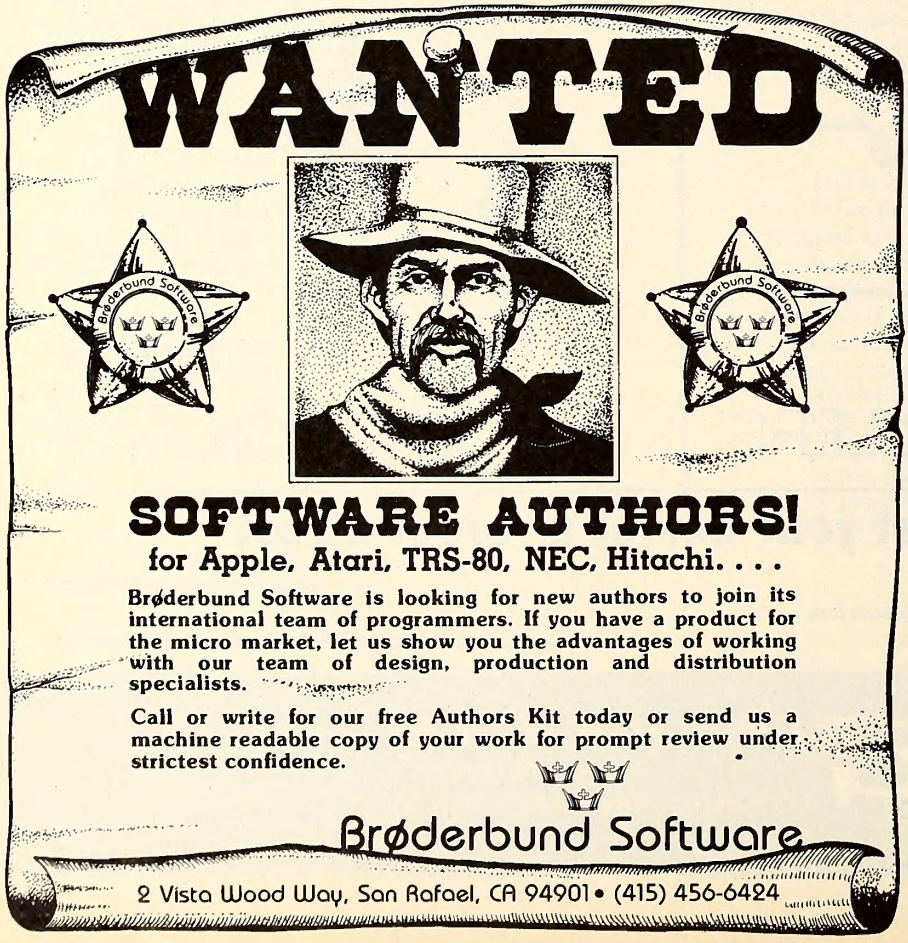
☐ Colorado, Oregon, and Florida have all awarded contracts to **Apple Computer** (Cupertino, CA) to deliver microcomputers to school systems and state agencies. The Apples are being installed and supported by the extensive Apple dealer base, as, says **Greg Smith,** Apple's director of education sales, "Dealer involvement should ensure that local support that is so crucial to the success of microcomputers in schools."

☐ In addition, Apple has joined with **South-western Publishing** (Cincinnati, OH), the nation's largest publisher of business educational materials, to develop business educational software packages. The partnership marks Southwestern's first entry into the personal computer education market; its Apple programs currently under development will be released in the spring.

☐ **Inmac** (Santa Clara, CA) has appointed **William Sousa** vice president and general manager of the company's Clear Signal Division. Sousa joins Inmac after four years as vice president and general manager of Memorex's Rigid Media Division. He will supervise the division's engineering, manufacturing, marketing, and financial activities in the manufacture of standard and special-order cables and switches for bidirectional communications between computers and peripheral devices.

☐ **Software Arts** (Cambridge, MA) has announced three new management appointments. **Eliot Tarlin,** former programmer/analyst with Wang Laboratories, has been named manager of quality assurance. He will oversee the design of testing systems and supervise the technicians. **Carole Hirsch** has been appointed manager of administrative services, responsible for all administrative activities including building and office management, purchasing, and inventory. She was formerly senior administrator for Technology + Economics. **Diane Curtis,** the new product manager, comes from her marketing analyst position with Polaroid. She will coordinate all activities concerning the development of a major new product to be announced later this year.

☐ **Micro Lab** (Highland Park, IL) is under semi-new management. **Stan Goldberg** is now sole owner, former co-owner



Rosalie Dixler having sold him her interest in the company in order to devote more of her time to doing volunteer work for the elderly. Goldberg's plans for his company are to "continue with our aggressive growth, reorganizing to accommodate the new responsibilities." Micro Lab increased its staff by four in January and plans seven new products for the first quarter of 1982, including a hard disk version of *Data Factory*.

☐ The second annual **Talmis** exhibition will be held February 18-19, 1982 at the Ambassador West Hotel in Chicago. The conference is designed to allow publishers, training industry executives, hardware manufacturers, software distributors and small developers in the technology-assisted learning industry to make contacts, display new products, and explore avenues for cooperative effort and development in computer- and video-based educational service ventures. Space is limited; exhibit registrations will be accepted on a first-come, first-served basis. Contact **Mary O'Keefe** at (312) 848-4000.

☐ Succeeding to the vacancy left by the promotion of **Paul Kurth** to vice-president of rigid disk manufacturing for **Shugart Associates** (Sunnyvale, CA), **Bob Russell** is now plant manager of Shugart's manufacturing facility in Roseville, California. Russell was formerly vice-president of manufacturing at Data Systems Design in San Jose, California. In his new position, he is responsible for manufacturing, product engineering, quality control, inventory.

☐ **Program Design, Incorporated** (Greenwich, CT) has announced the appointment of **Jenny Tesar** as vice president and **Laurie Hall** as director of marketing services. Tesar has worked with PDI as a consultant and program developer since the company's founding in 1978, authoring programs on reading comprehension, vocabulary development, and spelling skills. She will be responsible for product development and acquisitions. Hall will be responsible for contacts with domestic and international wholesale distributors and retail stores and Product Design's advertising.

☐ **Management Science America** (Atlanta, GA) will be holding three conventions this year:

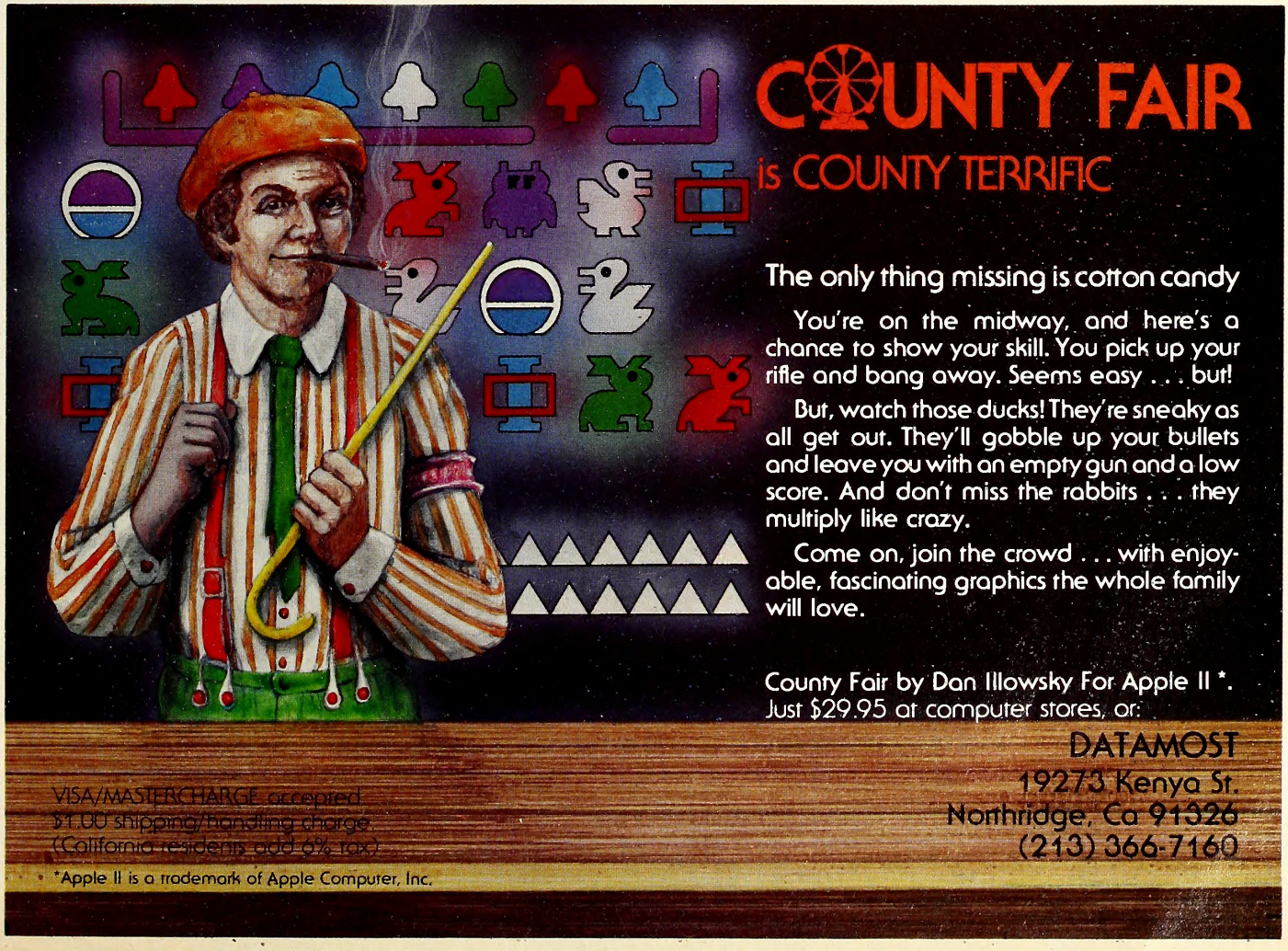
F.U.T.U.R.E., February 17-20, Hilton Hotel, San Francisco, the annual convention of the eleven hundred-member user group of MSA's **General Ledger/F.I.C.S. Software System**, will bring together fifteen hundred representatives of the computer software data processing industry with processing, banking, insurance, government, education, and health care professionals.

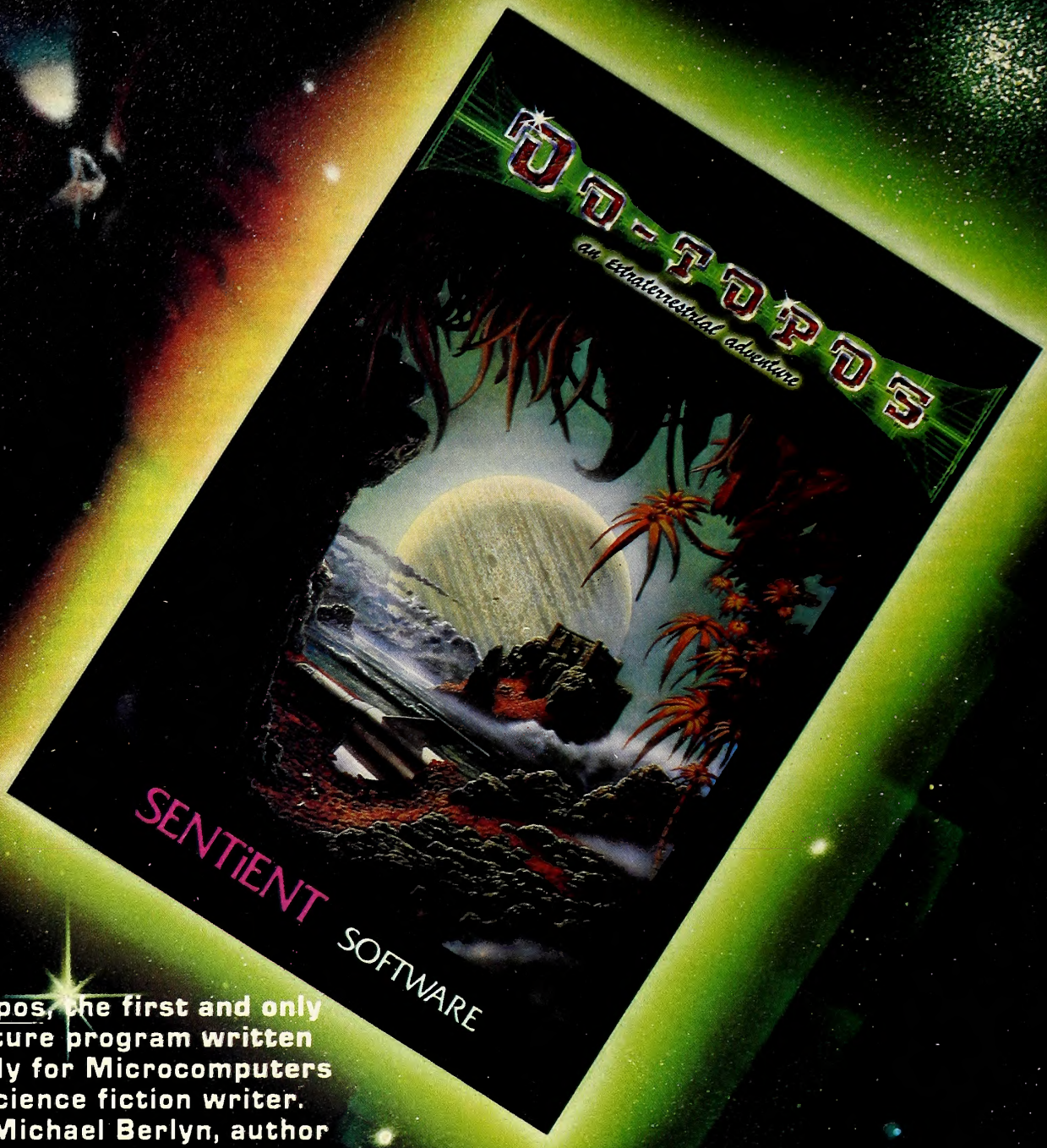
Interact I, September 7-10, Hyatt Regency Hotel, Atlanta, MSA's **Cash Management Systems** users convention, will let nine hundred data processors, accounting specialists, and credit managers hear addresses on various topics from accounting/financial experts.

Interact II, June 1-4, Hilton Hotel, Atlanta, hosted by MSA's international **Human Resource System** user group, will bring together twelve hundred payroll, personnel, and data processing professionals for workshops and sessions on system and industry topics.

☐ **Home Terminal Monitoring Service**, providing a variety of research products to subscribing organizations, will hold its first annual Subscriber Conference February 3rd in Clearwater Beach, Florida. The tentative agenda provides for three general sessions and two special interest sessions for representatives with management, marketing, or technical interests in home terminals. There will be visits to the HTMS laboratory in Clearwater where conference registrants may operate terminals, access data bases, and use the resource library.

☐ **Sirius Software** has moved. Their new location is 10364 Rockingham Drive, Sacramento, California 95827. Phone: (916) 366-1195. ◨■





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There's a Powerful Word Processor Hiding in Your Pascal Apple

BY ALLEN MUNRO

"You can't use the Pascal *Editor* for word processing," said the computer club newsletter editor.

"Why not?" asked the new owner of an Apple Language System. "It seems like a nice full-screen editor, and the *Filer* is convenient, and . . ."

"How can you stand it?" the newsletter editor interrupted. "Every time you hit return, the next line starts at the same margin as the one before. After you indent for a paragraph, you've got to backspace to get over to the left margin on the next line! And, if you backspace one keystroke too far, you wrap back to the previous line and have to hit return *and* all those backspaces again."

Worlds Unknown. The Pascal *Editor* has several modes that can be easily customized by the user. Like many casual users of the Apple Pascal system, the newsletter editor hasn't found the time to explore the full range of the *Editor*'s capabilities.

Because of its auto-indent feature, the default mode is the appropriate mode to use when writing Pascal programs. When the user inserts a new line in this mode, the *Editor* automatically indents the line to the same point as the previous line, making the default mode convenient for programming. Other modes are possible, however, including several that are more suitable for word processing.

To experiment with Pascal word processing yourself, begin by clearing the *workfile*. The workfile is a text file with special status to the Apple Pascal operating system; it's the file the system is ready to work on. The workfile can be a file with a name chosen by the user or it can be the default workfile. The default workfile is called *System.Wrk.Test*. It resides on the boot diskette (the diskette with System.Pascal and other system files), which is located in the boot drive (the disk drive attached to the drive 1 connector of the disk controller card in slot 6 of the Apple).

To start a new text file rather than modify an existing one, you must first clear the workfile. To do this, enter the *Filer* (by typing F at the command level) and type N for new. This tells the system it should expect to work on a new file. If no current workfile exists, or if the current workfile is not the default file, the *Filer* responds, "Workfile cleared."

If, on the other hand, the current file being worked on is the default file (*System.Wrk.Text*), the *Filer* asks whether you want to remove that file. If you don't, say N for no in response to the question, type S for save, specify a new name to save the file under, and then type N to "new the workfile." That sounds like a lot of hassle, but ordinarily the workfile is cleared with two keystrokes, F for *Filer* and N for new.

Once you've cleared the workfile, type W to quit the *Filer*. This restores the command level of the system. Next, type E to invoke the *Editor*. Since there's no current workfile, the *Editor* will ask for one. In this example, you are starting a new text file rather than modifying an existing one, so specify the default workfile by simply hitting return. The *Editor* will present the edit command line at the top of the screen, and you'll be ready to begin.

In the *Editor*, you have various options. If you simply type I for insert, you begin inserting text in the default mode, which, as you remember, is more appropriate for Pascal programs than for text. What you want to do instead is to specify an environment appropriate for word processing. In the Apple Pascal system, this is accomplished by setting the edit environment. From the edit command level, type S for set. The set prompt line asks whether you want to set a marker or the environment. Typing E for environment causes a half-screen menu to be displayed.

```
>Environment: [Options] <etx> or <sp> to leove
  A(uto indent    True
  F(illing        Folse
  L(eft Margin    0
  R(ight Margin   79
  P(oro Morgin    5
  C(ommand Ch
Token Def         True

  2 Bytes used, 17406 Avoiloble

  Date creoted: 12-29-81 Lost Used: 12-29-81
```

The environment options displayed are responsible for such features as automatic indenting in the defualt mode. To change to a mode more suitable for word processing, type A for auto indent and F for false, then F for filling and T for true. This turns off automatic indenting. New lines now start at the left margin, unless they start a new paragraph. Selecting the filling option means that when new text is being inserted the *Editor* will automatically wrap words around to the next line when the right margin is reached. You need not hit a return unless the current line must be cut off before the right margin, such as at the end of a paragraph.

Speaking of margins, you might like to select margins that differ from the 0 and 79 default values. If, for example, the finished text is to be printed out on an eighty-column, ten-character-per-inch printer such as the Epson MX-80, you might decide you want a 6½-inch long line of text, with a 1-inch left margin and a 1½-inch right margin. In this case, a left margin of 10 and a right margin of 75 are what you want. Type L for left margin, followed by 10 and return. Then type R for right margin, 75, and return. An appropriate paragraph indentation might be to the fifteenth column, five more than the left margin. Type P for para margin, 15, and return.

Through this process, you have selected a reasonable set of options for word processing with the Pascal *Editor*. You can change any option by typing the first letter of its name, followed by an appropriate value. Since you've just selected some good options, type control-C (called *etx* by the system) or hit the space bar or return to exit the Set Environment mode. You'll be returned to the top level of the *Editor*, labeled *Edit*: at the beginning of the command line.

To see the effect of these environment settings, type in a few paragraphs. From the top *Editor* level, type I to invoke the insert mode. Use the backspace key to erase errors. To erase whole lines, use control-x for greater speed, and don't forget the repeat key when you want to hurry things up.

Now write something. When you reach the end of a paragraph, hit return twice. This will result in two line feeds on the screen, the second of which will be indented to the paragraph margin automatically. When auto indent is false, two returns in a row are interpreted as the signal for a new paragraph. When typing control-C. Now exit the *Editor* by typing Q to quit the Editor and U to update the default file, *System.Wrk.Text*.

System.Wrk.Text is not a very descriptive name for whatever you've written. To give your file a new name, enter the *Filer* by typing F from the command level, then type S for save-the-workfile. The system will ask for the new name of the file. File names must begin with an alphabetic character, be less than sixteen letters long, and not have any spaces in them. Type in "Wordproc" (or any other name that appeals to you), followed by return. You have now renamed the default workfile *Wordproc.Text*.

To print out your file, you don't even have to leave the *Filer*. If your printer interface is in the Apple's slot 1, the system software will recognize references to it as *Printer:*. Simply type T for transfer and when the system asks, "Transfer what file?" simply type in wordproc.text, followed by return. In response to "To where?", answer *Printer:*." You have just instructed the *Filer* to transfer wordproc to the printer. If the printer is on, it should begin to print the file immediately. The screen will remain black until the transfer has been completed.

This is how easy it is to edit natural

language text with the Apple Pascal *Editor* and to dump out the text files to the printer using the *Filer*'s transfer command. Although the description of the process is a bit long-winded, only a few keystrokes are required to set the editing environment for a file, and printing the file requires only a few more. With a little practice, these short sequences of one-key commands will become automatic and natural to you.

To make effective use of the Pascal system for editing, a user must learn to use a number of Apple Pascal *Filer* functions (see the table). With these commands, you can make backup files and disks and maintain disk volumes and files.

Since a number of system files aren't required when only word processing is to be done, some Pascal users choose to create a special boot disk to use just in Pascal editing. Such a simplified disk would include only the files *System.Apple, System.Pascal, System.Miscinfo, System.Editor,* and *System.Filer*. This boot disk configuration provides 125 blocks for text files. Of course, you're likely to have other boot disks, complete with other system files, for compiling and executing other programs.

On to Higher Things. This simple approach to word processing is likely to be sufficient for accomplishing many undemanding word processing applications, such as writing letters of less than one page.

Many additional editing options and functions are useful in word processing. For instance, you can copy material from an existing file into the file you're currently working on. You can replace every instance of a particular word or phrase with some other word or phrase—an especially useful feature when you discover you've misspelled a word consistently in a long text. You can use the *find* command to search for a particular word or phrase, including both capitalized and uncapitalized versions of the word.

In addition, the margins can be altered via the set environment commands, then the *margin* command can be used to reformat the text. *Margin* is one of many available commands not listed in the *Editor*'s one-line menu; it pays to read the documentation. To take full advantage of the *Editor*'s potential, study chapter 4 of the Apple Pascal *Operating System Reference Manual* and experiment with the use of each of the described commands.

For word processing tasks more complex than simple one-page documents, the procedure described here for printing leaves something to be desired. If you use the "Transfer to *Printer*:" technique, you must format carefully for the number of lines of text you want to appear on a page. If you allow the text simply to go on and on, it will print right over page boundaries (unless you use a printer that automatically skips page boundaries). It's nice to have page numbers, too, when printing out longer texts.

Of course, if you like, you can carefully count lines of text, insert a number of returns after the appropriate number of lines for a page has been entered, and then type a page number and a few more returns to start the next page. But such an approach defeats one of the major aims of word processing—namely, easy alteration of the text. If you add two lines of text to the page, then all the carefully inserted page boundaries for the rest of the text are no longer in the right places.

Clearly, it's a much better approach to use a formatting printout program. Such a program performs mundane tasks like printing a specified number of lines per page, keeping track of page numbers, and altering margins. Many printout programs offer other features such as underlining, overstriking for special character creation, and chained text file printout. Listing 1 is a very simple version of such a program, capable only of the mundane tasks of keeping track of page boundaries and margins.

More elaborate programs suitable for a wide range of word processing applications are available. For example, Intelligent Computer Systems advertises *Qtext* which works with *Ms.Speller*, a spelling checker program for Apple Pascal texts. Datamed Research offers a formatting printer called *The Incredible Text Printer*, with approximately one hundred commands available. The *Moonshadow* formatter (by Jim Merritt) from Merrimac Systems is yet another text formatting utility for users of the Pascal *Editor*.

A number of public domain formatting printers are available from Pascal user groups, and many Apple computer clubs have club libraries of such programs. Also, the Apple Avocation Alliance (AAA) of Cheyenne, Wyoming, distributes many such programs on its nominally priced Pascal disk. The twelve disks with Pascal programs from AAA include many printout programs, some with special features designed for use with particular printers such as the IDS Paper Tiger, the Diablo 1620, and the Epson MX-80. The public domain printout programs are not supported by any commercial distributor and cannot be guaranteed.

Hardware Modifications. There's no question that use of the Apple as a word processing system with Pascal can be more pleasant with certain hardware augmentations to the system. Foremost among these are keyboard enhancers and eighty-column cards. Keyboard enhancers permit the display of both upper and lower-case characters on the Apple II monitor (see "Apple in Small Letters," by Jeff Mazur, October, 1981). These enhancers also provide for optional normal shift key operation. That is, there is a mode in which depressing the shift key causes upper-case characters to be print-

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ed, and lower-case characters are printed on the screen otherwise. This approach to text entry is more natural than the use of the control-E, control-W, and, for those used to typewriters, escape key features available for lower-case entry without the hardware modification.

Text editing becomes even more straightforward through the use of a Pascal-compatible eighty-column card (see "The New Look with Character," by Jeff Mazur, March 1981, and Vision 80, Marketalk Reviews, June 1981). Eighty-column cards typically provide options for normal shift key operation as well, either through a connection to the Apple game I/O port or through a separate keyboard enhancer. Having the full eighty columns of text available on the screen makes a great difference in the ease of use of the Pascal word processing system. You see what you'll get without having to toggle back and forth horizontally between the two sides of the screen.

Both the keyboard enhancers and the eighty-column cards usually require minor modifications to the Apple Pascal operating system for all normal functions to work properly. Without the modification, some eighty-column cards may distort the keypress function and disable the typeahead buffer. The keyboard and display enhancers, used without eighty-column boards, require operating system modifications to display lower-case characters in Pascal. Product manufacturers can usually provide the text of the brief Pascal BIOS modification programs. Such programs only need be compiled and run once. Once the system boot disk is modified, it will provide the full Pascal functions thereafter.

The only other procedure you must follow is to execute *Setup* on *Apple3*: to change the screen width to eighty columns. This change will result in full prompt lines in such system components as the *Filer*.

The use of an eighty-column board presents special opportunities and special problems for text editing. For example, because of the limited number of keys on the Apple keyboard, characters such as square and curly brackets and the underscore must be entered with a series of keystrokes.

Rather than entering this series each time you need such a character, you can use the Pascal *Editor*'s universal replace option.

Type a simple symbol you're not using otherwise every time one of these characters occurs; after completing the file, jump to the beginning of the text and do a universal replace of every occurrence of the symbol with the complex character. Simple tricks like this enable you to use the *Editor*'s features to overcome the limitations of the Apple keyboard.

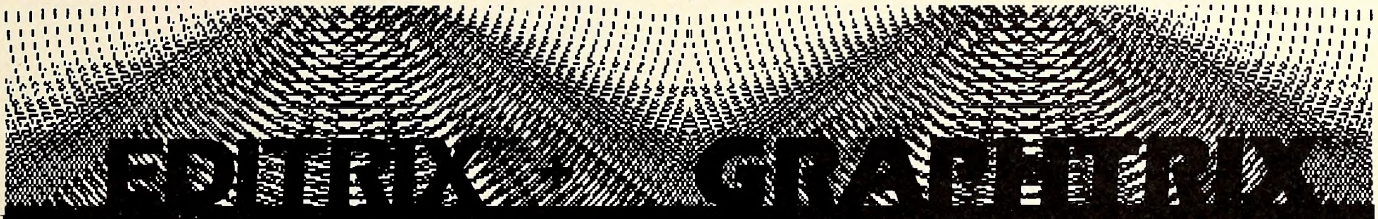
Other hardware enhancements can soup up word processing in Apple Pascal even more. One user, for example, uses a separate terminal, an Ampex Dialogue-80, in place of an eighty-column card. The terminal interfaces to the Apple with a CCS 7710A asynchronous serial card in slot 3. The terminal and computer communicate at 19,500 baud, a good deal faster than the speed provided by the eighty-column cards.

This Apple has the *Pascal Speed-up Kit* as well. This is a hardware/software combination consisting of the Stellation Two 6809 coprocessor board for the Apple II and Pascal *P-Code Interpreter* designed for the 6809.

The many hardware and software enhancements available to the Pascal word processing user provide a range of levels of sophistication for word processing systems. At the simplest level, you can merely set an appropriate word processing environment in the *Editor*, enter the text, and then use the *Filer*'s transfer option to print it out.

The next level of sophistication is to use a formatting printer program or a preformatter. Many professional writing tasks work very well this way, particularly if you have an eighty-column card and keyboard enhancer.

Finally, for those who demand the utmost from their word processing tools, a variety of hardware enhancements and special Pascal word processing programs provide high-complexity performance. The flexibility of the Pascal operating system permits a natural progression through these stages as your needs evolve.



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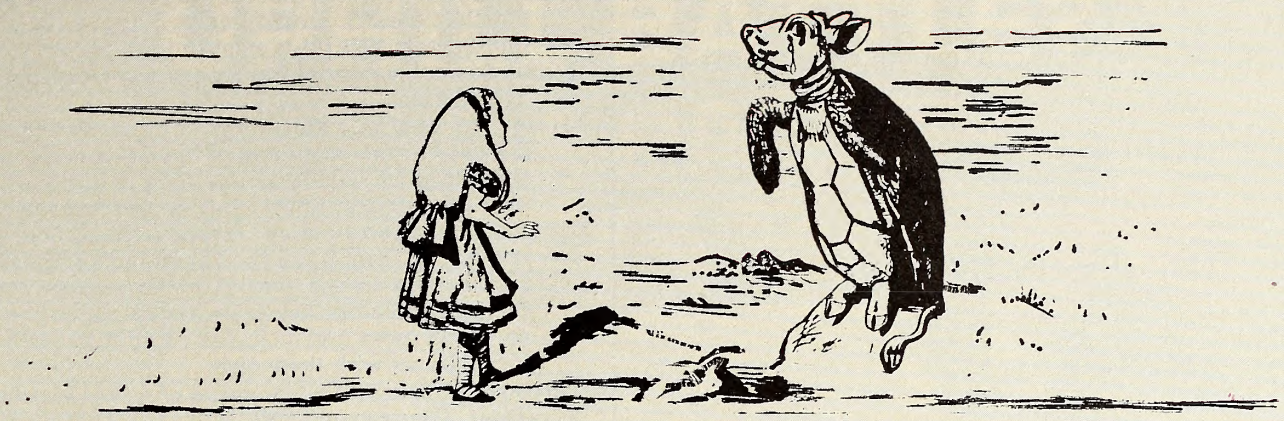
```
PROGRAM SIMPLEPRINT;
  (*by Allen Munra IIIIIIII December 10, 1981*)
  (* A very simple printaut pragrom far printing text files created with the Apple
     Poscal Editar. *)

  USES APPLESTUFF;              (* Keypress functian used to interrupt *)

    CONST ESCORD = 27;
          DEFLMARG = 8;  (* Left margin *)
          DEFRMARG = 80; (* Right margin, hence 72-calumn line *)
          DEFLPP = 58;       (* Default lines per poge *)
          DEFPGNO = 1;       (* Default starting poge number *)
          GOODIO = 0;        (* IORESULT value for gaod file apening *)
          FOREVER = FALSE;

    VAR LMARG,
        RMARG,
        LPP,
        PGNO,
        IORES
          : INTEGER;

        OUT,
        THETEXT: TEXT;

        FILENAME: STRING;

        KEY: CHAR;

    PROCEDURE READCH (AKEY: CHAR);
    (* Convert charocters ta upper cose *)
    BEGIN
      READ (KEYBOARD, KEY);
      IF ORD (KEY) > 95
      THEN KEY := CHR (ORD(KEY) - 32)
    END;

    PROCEDURE INITSTUFF;
    BEGIN
      REWRITE (OUT, 'PRINTER:');
      LMARG := DEFLMARG:
      RMARG := DEFRMARG;
      LPP := DEFLPP;
      FILENAME := 'SYSTEM.WRK.TEXT';
    END;

    PROCEDURE GETFILE;
      CONST SPACEORD = 32;

      VAR NEWNAME: STRING;

    BEGIN
      REPEAT
        WRITELN (CHR (12), 'F(ile nome:');
        WRITELN ('Current file is ',FILENAME);
        WRITELN;
        WRITELN ('New File name? (or <RETURN>) ');
        READLN (NEWNAME);
        IF LENGTH (NEWNAME) = 0
        THEN BEGIN END
        ELSE FILENAME := NEWNAME;
        IF (POS ('TEXT', FILENAME) = 0) AND (POS ('text', FILENAME) = 0)
        THEN FILENAME := CONCAT (FILENAME, '.TEXT');
  (*$I-*)
        reset )thetext, filename);
  (*$I+*)
        IORES := IORESULT;
        IF IORES <> GOODIO
        THEN
          BEGIN
            WRITELN ('Na luck. Try onother nome.');
            REPEAT
              WRITELN ('Press <spoce> ta continue. ');
              READ (KEY);
            UNTIL KEY = CHR(SPACEORD);
          END
        ELSE
          BEGIN
            WRITELN;
            WRITELN ('File ', FILENAME, ' OK.');
            CLOSE (THETEXT)
          END;
      UNTIL IORES = GOODIO
    END;

    PROCEDURE GETMARGIN;
      CONST LX = 7;
            LY = 1;
            RX = 8;
            RY = 2;

    BEGIN
      REPEAT
        WRITELN (CHR(12),'Margins: Q(uit, L(eft, R(ight');
        WRITELN (' Left ', LMARG);
        WRITELN (' Right ', RMARG);
        REPEAT
          READCH (KEY)
        UNTIL KEY IN ['Q', 'L', 'R'];
        CASE KEY OF
          'Q': EXIT (GETMARGIN);
          'L': BEGIN
                 GOTOXY (LX, LY);
                 WRITE ('      ');
                 GOTOXY (LX, LY);
                 READLN (LMARG)
               END;
          'R': BEGIN
                 GOTOXY (RX, RY);
                 WRITE ('      ');
                 GOTOXY (RX, RY);
                 READLN (RMARG)
               END
        END;    (* CASE *)
      UNTIL FOREVER
    END;

    PROCEDURE PRINTFILE

      CONST MAXLINES = 66;
      VAR ACHAR:CHAR;
          NUMLINES,
          NUMCHRS,
          I: INTEGER;

      PROCEDURE PAGENO(VAR APGNO: INTEGER);
        VAR I: INTEGER;
      BEGIN
        FOR I := 1 TO (RMARG - 3) DO
          WRITE (OUT, ' ');
        WRITE (OUT, APGNO);
        APGNO := APGNO + 1
      END;

    BEGIN           (* PRINTFILE *)
  (*$I-*)
      RESET (THETEXT, FILENAME);
  (*$I+*)
      IF IORESULT <> GOODIO
      THEN
        BEGIN
          WRITELN (' Na file ', FILENAME,'.');
          WRITELN (' Type <spoce>, then F(ile.');
          REPEAT
            READ (KEY)
          UNTIL KEY = ' ';
          EXIT (PRINTFILE)
        END;
      WRITELN (CHR(12), 'Print in pragress. (<esc> to exit Print)');
      PGNO := DEFPGNO;
      PAGENO (PGNO);
      FOR I := 1 TO (MAXLINES - LPP) DIV 2 DO
        WRITELN (OUT);
      NUMLINES := 0;
      WHILE NOT (EOF (THETEXT)) DO
        BEGIN
          NUMCHRS := 0;
          READ (THETEXT, ACHAR);
          FOR I := 1 TO LMARG DO WRITE (OUT,' ');
          WHILE NOT (EOLN (THETEXT)) DO
            BEGIN
              NUMCHRS := SUCC(NUMCHRS);
              IF NUMCHRS <= RMARG - LMARG
              THEN
```

Listing 1.

Mock Turtle



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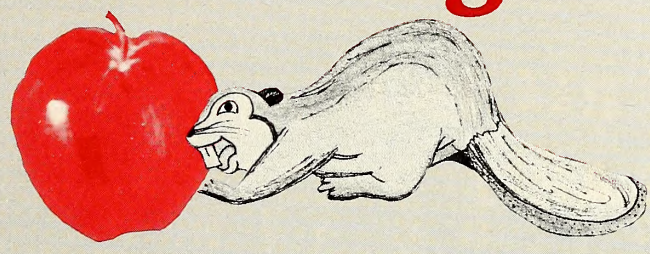

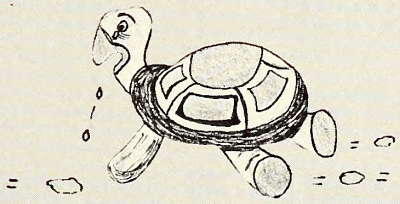

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```
            WRITE (OUT, ACHAR);
          IF KEYPRESS
          THEN
            BEGIN
                READ (KEYBOARD, KEY);
                IF KEY = CHR(ESCORD)
                THEN BEGIN CLOSE (THETEXT); EXIT (PRINTFILE) END
            END;
          READ (THETEXT, ACHAR);
        END;
      WRITELN (OUT, ACHAR);
      NUMLINES := SUCC(NUMLINES);
      IF NUMLINES >= LPP
      THEN
        BEGIN
          WRITE (OUT, CHR(12));      (* Farmfeed *)
          PAGENO (PGNO);
          FOR I := 1 TO (MAXLINES - LPP) DIV 2 DO
            WRITELN (OUT);
          NUMLINES := 0
        END;
    END;
  CLOSE (THETEXT)
END; (* PRINTFILE *)

BEGIN

  INITSTUFF;
  REPEAT
    WRITE (CHR(12), 'Simprnt: Q(uit, F(ile, M(argins, P(rint');
    REPEAT
      READCH (KEY)
    UNTIL KEY IN ['Q', 'F', 'M', 'P'];

    CASE KEY OF
      'Q': EXIT (SIMPLEPRINT);
      'F': GETFILE;
      'M': GETMARGIN;
      'P': PRINTFILE
    END;              (* CASE *)
  UNTIL FOREVER
END.
```

Apple Filer Functions for Word Processing

G(et. Used to get an old text file for further editing.

N(ew. Tells the system that the user wants to work on a file that doesn't already exist. Purges the default file, *System.Wrk*, if it exists.

S(ave. Saves the default file with a new name specified by the user.

D(ate. The user who adopts the habit of always setting the date at the beginning of the day's work has the advantage of having all his files marked with the date of their last update in the disk directory.

E(xtended directory listing. Presents the directory of a disk to the user. When the volume (disk) to be listed in specified in the format *Volumename:,Printer:* then the directory listing is printed out on the printer. Many users find it convenient to store such directory listings with their disk.

C(hange. Lets user change name of a file or volume.

T(ransfer. Used to copy files. Wildcard feature makes it easy to transfer many files with a single command.

R(emove. Used to get rid of unwanted files.

K(runch. Moves files up on a volume, consolidating unused disk space.

A careful study of these commands in the Apple Pascal *Operating System Manual* will pay off for the serious Pascal word processing user.

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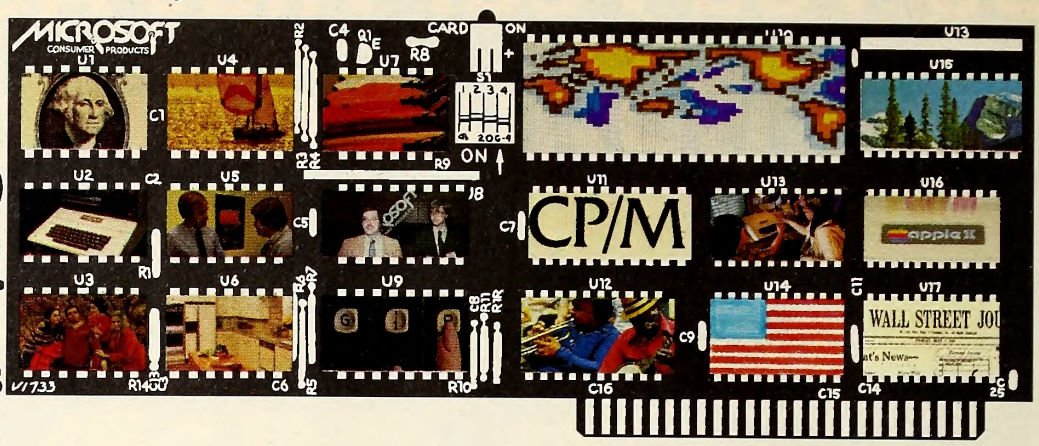
SOFTCARD Symposium

by Greg Tibbetts



Following the lead we established at the beginning of the new year, this month's column will continue to examine the CP/M utilities by reporting on STAT.COM. STAT stands for either *status* or *statistical*, depending on your preference. It's officially used for both.

Generally speaking, STAT.COM is a utility that allows you to display information about the current system configuration and to change that configuration when desired. Like PIP.COM, STAT.COM is a transient command; that is, typing its name causes it to load and execute, performing a function in the same way that typing one of the built in commands, such as DIR, performs a function.

STAT may be initiated by typing one of the following forms of command:

```
STAT[RETURN]
STAT "command line"[RETURN]
```

As in PIP.COM, the command line can take a variety of forms; we will examine these as appropriate.

Typically, the new CP/M user will seldom have discovered uses for STAT beyond its simplest form, which is to determine the amount of free space left on a particular diskette in a particular system disk drive. Typing STAT in the first form above will perform that function for the disk in the currently logged drive. The response will be in the following form:

```
A: R/W, SPACE: xxxK
```

If other system drives have been accessed recently, they will also be shown. If not, adding a command line that consists only of a drive specifier followed by a colon, for example, B:, will perform the same function for drive B:.

In the example, the SPACE: xxxK (where xxx is the amount of free space in kilobytes remaining on the disk) was expected. "But," you may be asking, "what is the R/W in that response?" STAT has just informed you that the disk is currently in Read/Write mode, and therefore can be written to by saving files, writing files from Basic, and so on. The existence of R/W implies an R/O mode for Read/Only as well, which does, of course, exist. We will talk about these, and about the methods of setting them, later in the column. For now we'll continue to examine the ways STAT reports on diskette status.

In addition to determining the free space and Read/Write status of the diskette, STAT can also tell us something about the files that reside on the diskette. Entering STAT with a command line that consists of a file specifier will cause STAT to display the status of and statistics on the file requested *before* reporting the total diskette status it gave us before. Both unambiguous and ambiguous file specifiers may be used, so *.*, *.BAS, and ?BASIC.COM are all valid forms. For a sample diskette with three files, the command and response would look like this:

```
STAT B:*.*[RETURN]

 Recs  Bytes  Ext  Acc
    8     1K    1  R/O (B:COPY.COM)
   52     7K    1  R/O B:ED.COM
  214    27K    2  R/W B:SORT.BAS
Bytes remaining on B: 91K
```

In this example, the first three colums relating to the files shown all display statistics about the file named in column five, while the fourth column reports whether that particular file can be written to or not. Now we'll examine each column to see what exactly it tells us about the files in question.

You'll recall from our column on file structure that the minimum amount of disk space Apple CP/M can allocate to a given file is one kilobyte. The bytes column, therefore, will never show a number containing only part of a kilobyte, even though the actual file may not be as large as the number shown. In effect, then, this column represents the number of kilobytes allocated to the file rather than the number of kilobytes the file occupies. For the files shown, one, seven, and twenty-seven kilobytes respectively have been allocated on the diskette. Since a standard Apple CP/M diskette contains 126K of usable space, we can see that the 35K allocated to the files, along with the 91K shown in the last line as free space, together equal the entire usable space on the disk.

In our discussion of file structure we also talked about the concept of extents and the fact that files are allocated not only in numbers of kilobytes but in numbers of 16K blocks as well. Each of these 16K blocks is called an *extent*. The ext column displays the number of extents allocated to the file and will correspond to the number of times sixteen can be divided into the bytes figure (plus one if there is a remainder).

This figure can be used in at least one way. Since each extent a file occupies uses up one entry in the space allocated for the director on the disk, and since there are only forty-eight such entires allowed, knowing if you're getting close to filling the directory area is important. Remember, even small random access files can occupy many extents depending on the record numbers in use.

Finally, the recs column displays the number of 128-byte records actually in use by the file. This figure will give you a true length of file (with all but random access files of other than 128-byte record size). This is so because with the exception of random access files, CP/M handles all files in records of 128 bytes. Therefore, when a file is first saved on disk, whether by using PIP.COM, LOAD.COM, SAVE, or whatever, CP/M keeps track of the number of records occupied in the last (non-full) extent used and writes the number in the directory entry for that extent.

But since random access file records may be other than 128 bytes in length, a file may have, for example, one six-byte random record in each of ten extents. In such a case, the true length of the file is sixty bytes, although STAT will show it as having ten 128-byte records in ten extents. The addition of another random record with a record number only one greater than the number of an existing record in the file would probably produce no change in the information reported by STAT, since the new record would just alter six bytes of information in what STAT thinks is an existing 128-byte record. With STAT

there is no way to get a true length of file in bytes for random files of other than 128-byte records.

A fourth statistics column can be obtained with STAT if a dollar sign followed by an S, ($S), is typed at the end of the file specifier. The $S must be separated from the file specifier by a space. The new column printed will be "size", and will display the virtual file size in records. All this means is that the number shown under the size heading is the record number of the last record existing in the file. This assumes, of course, record sizes of 128 bytes and that all records are in use.

For all files except random access data files, the size and recs columns will be the same, since records in these files are 128 bytes long and the file is full. With random access files, STAT will take the sum of all used 128-byte records existing in all the extents of the file and display it under the recs column, just as in our previous example, not counting the "holes" where records have not yet been written. For the size column however, STAT will find the end-of-file, and calculate the number of 128-byte records in use as if all previous records had actually been written. By some definitions, this is considered the true size of the file. As you can see, the size entry for a random file changes only if a new and higher last record is written, while the recs entry changes nearly every time a new record is added. Our earlier comments concerning records of other than 128 bytes apply here also.

Finally, you will notice that in our example COPY.COM was displayed in column five between parentheses, indicating that this file has been given the $SYS or system attribute. This is best understood by thinking back to our comments on R/W and R/O status. Both of these are considered to be attributes of the specific file.

In the same way, $SYS and $DIR are file attributes as well. A file with the DIR attribute will be shown in the director listing when the DIR command is used, and also may be copied freely using PIP in its standard form. On the other hand, files with the SYS attribute can be considered as hidden from both the DIR command and from PIP as well unless the [R] parameter, (described last month), is used with PIP. The SYS attribute is often used to hide files from other users of a diskette and is usually combined with the R/O attribute to prevent accidental erasure or copy-over with PIP.

Now that we've discussed attributes, we should talk about how to set them. Setting is also done with STAT in the form:

```
STAT filename.typ $attribute
```

where $attribute is the attribute you wish the file to have, either R/W or R/O, or DIR or SYS. The system will respond with:

```
filenome.typ Set To attribute
```

Either unambiguous file specifiers as were shown earlier or ambiguous file specifiers may be used with this command.

In addition to setting a file's write attribute, you can also set entire diskettes to R/O by the command form:

```
STAT d:=R/O
```

where d: is the drive you wish set. A drive can't be set to R/W with STAT, but a simple control-C resets an R/O status set with STAT. Also, hitting any key after getting the R/O error message when trying to write to a disk set with R/O will clear it. There is no analogous attribute to SYS and DIR for entire diskettes, although using the *.* ambiguous file reference will have that effect by setting all existing files to SYS or DIR as desired.

Besides displaying statistics and setting attributes for files, STAT also can be used to report the characteristics of the disk drives themselves. This is done using the form:

```
STAT d:DSK:     (where d is the drive identifier)
```

Stat will respond with:

```
   d: Drive Charocteristics
1024: 128 Byte Record Copocity
 128: Kilobyte Drive Capocity
  48: 32 Byte Directory Entries
  48: Checked Directory Entries
 128: Records/ Extent
   8: Records/ Block
  32: Sectors/ Trock
   3: Reserved Trocks
```

Admittedly, this information will be of limited use to the average user; however, it may come in handy when other than Apple disk drives are placed on a system. My system, for example, has a five-megabyte 5¼-inch hard disk, a double-sided, double-density, eighty track 5¼-inch floppy disk drive, two standard Apple disk drives and two double-sided, double-density 8-inch disk drives.

Each of these non-Apple drives has a different set of drive characteristics that are important to consider when doing disk to disk routines. This is especially true of the 8-inch drives, which can be set to single or double-sided, or to single or double-density. STAT provides a quick way of determining the drive configurations at any given time. This hardware, which comes from Lobo Drives International, is part of a growing number of drive options for Apple CP/M. We'll try to address the question of comparative performance of these peripherals in a future column.

The next use of STAT concerns the CP/M 2.2 USER function. As we discussed briefly in a previous column, the concept of USER areas is implemented by simply identifying each file entry with the USER number that was in effect when the file was saved. While DIR and other commands, (STAT included), will only report the files associated with the current USER, STAT can also report what the current USER number is and the number of other USER areas that have active files. To obtain this information, enter the following:

```
STAT USR:
```

Assuming of course that you are logged on as USER 0 and have files in USER areas 0, 1, 2 and 5, STAT will respond with:

```
Active User : 0
Active Files: 012 5
```

The final use for the STAT command is to report on and establish device assignments within the system. Of necessity, we're going to get rather technical here, but if you hang in there and refer to the *Softcard* manuals or other CP/M documentation for clarification, your understanding of general I/O in the Apple CP/M environment will be increased.

As we've touched on before, devices to the CP/M system are simply a conceptual part of the system that performs some specific function, such as the printer, paper-tape reader, disk, and so on. For CP/M 2.2, five functions the system performs require interfacing to the physical world. These are:

```
CON: - The user's console input and output.
RDR: - A reoder device of some sort, (cords, tope, etc.)
RUN: - A punch or output device, (os above)
LST: - The user's printer or listing device.
d:DSK: - The user's disk drives, (d: is identifier)
```

These are all logical devices since, with the exception of the disk drives, they correspond to a function rather than to a specific physical device. The disk drives can be thought of as both physical and logical devices. The other four must somehow be linked to a physical device that performs their specific function. The system's links to these physical devices are routines called *drivers* that are located in the BIOS. Consequently, when the system wishes to perform the logical LST: function, for example, the output it generates must somehow be directed to that driver in the BIOS which directs the operation of the actual physical device that you've selected to perform that function (probably the system line printer).

In like manner, the other three functions must be linked to the devices you've set up to perform those functions. Obviously, the system itself has no need for the names CON:, LST:, RDR:, and so on. Such names just make it easier for us humans to see what we're manipulating, and so STAT, (just like PIP last month), deals with these devices by their names. In

reality, the names correspond to vector addresses in the BIOS to which output is directed or from which input is obtained.

Typically, there is one actual driver for each function that comes built into a CP/M system and resides in the BIOS itself. Other physical devices may be linked in by having their driving routines placed elsewhere in protected memory, and then altering their vector addresses to point to those routines. These link vectors are also named as physical devices for use with STAT, PIP, and other commands.

The twelve physical devices and the logical devices they can be linked to are displayed by typing the command:

```
STAT VAL:
```

This command will produce a summary of the various STAT command forms we discussed earlier, plus a table under the heading·

```
Iobyte Assign:
CON: - TTY: CRT: BAT: UC1:
RDR: - TTY: PTR: UR1: UR2:
PUN: - TTY: PTP: UP1: UP2:
LST: - TTY: CRT: LPT: UL1:
```

In an earlier time, these names actually had some basis in fact. PTR and PTP actually stood for paper tape reader and paper tape punch respectively, TTY was the common teletype typewriter style keyboard, and so on. Now, however, these names are commonly used to stand for just about anything that is consistent with the basic function, i.e. input or output. You can't, for example, output to a PTR or UR1 device, and likewise can't input from an LPT or UP1 device. So long as the basic input and output functions are consistent, though, nearly any physical device can be assigned to any logical device.

We can find out what our current device assignments are by typing the following command:

```
STAT DEV:
```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If your CP/M is unaltered, it will produce the following list:

```
CON: is CRT:
RDR: is PTR:
PUN: is PTP:
LST: is LPT:
```

This list tells us that the logical device CON:, meaning console, is linked to the physical device CRT:; the logical RDR: to the physical PTR:, and so on. Remember that these physical devices are nothing more than vectors that point to a specific driver routine in memory that is itself designed to control *drive*, the physical device. Each of the twelve physical devices is associated with a particular vector. CP/M keeps track of the assignment of logical to physical devices by means of a single byte of memory called the *Iobyte*. The Iobyte is found at memory location 0003, and its eight bits are assigned, two to each of the logical devices, as shown here:

IOBYTE at 0003	LST:	PUN:	RDR:	CON:
bit number	7 6	5 4	3 2	1 0
standard value	1 0	0 1	0 1	0 1

Since four values—0, 1, 2, and 3—can all be represented in just two binary bits (00, 01, 10, and 11 respectively), each section of the Iobyte can be set to four values that correspond to the four possible physical devices that can be assigned to that logical device. The possible values for each logical device are:

```
CON: (bits 0 & 1); 0-TTY:, 1-CRT:, 2-BAT:, 3-UC1:
RDR: (bits 2 & 3); 0-TTY:, 1-PTR:, 2-JR:, 3-UR2:
PUN: (bits 4 & 5); 0-TTY:, 1-PTP:, 2-JP:, 3-UP2:
LST: (bits 6 & 7); 0-TTY:, 1-CRT:, 2-LPT:, 3-UL1:
```

So, by altering the bits in the Iobyte, we are able to change the physical device (remember these are only vectors to a driver for the physical device) that is assigned to the system's logical device or function. In this way, by knowing which physical devices (vectors and drivers) correspond to which hardware peripheral cards in your system, you can have maximum flexibility in the assignment of functions to specific peripherals. When you type [CTRL]-[P] from CP/M or LPRINT from BASIC, for instance, depending on your current device assignments, the hard copy output will be directed to the proper peripheral device no matter how many printers you have in your system. The same holds true for all the other logical and physical devices. Changing the Iobyte by hand for each system configuration, however, would be asking a bit much, and that's where the device assignment function of STAT comes in. By typing:

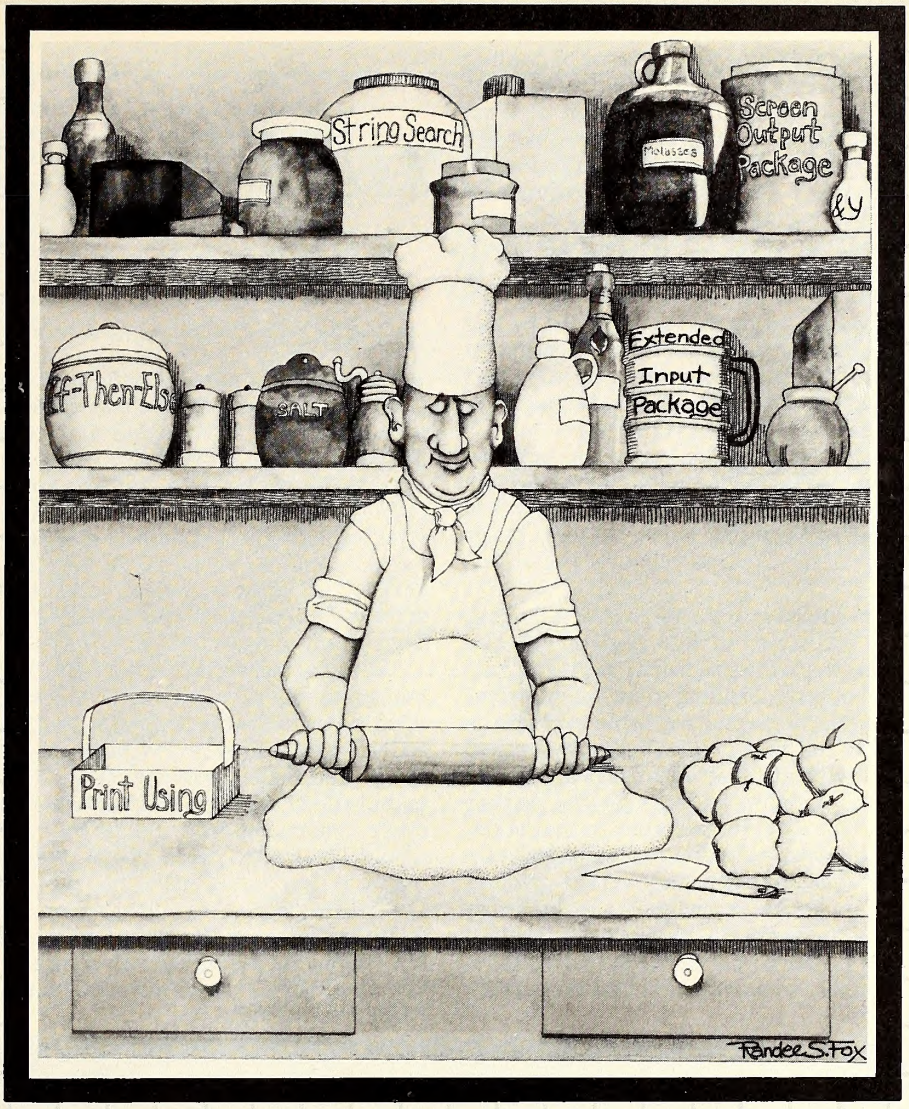
```
STAT logical device:=physical device:
```

we cause STAT to alter the Iobyte to the new configuration. STAT will respond with:

```
logical device: is physical device:
```

Apple CP/M does contain some limitations that must be considered in device assignments. Unlike the normal hardware that CP/M runs on, the Apple is set up to interface to the outside world through something called *memory mapped I/O*. Under this system, each peripheral slot is assigned a certain segment of memory addresses that, in reality, are not RAM at all, but are space that can be used for routines contained in ROM on the peripheral card in question. To the Apple, these ROM routines look like any other ROM or RAM routines in its memory range. Consequently, most Apple peripherals are built with such structure in mind and contain ROM routines that drive the peripheral—outputting characters, inputting characters, and so on—in a semi-standardized manner.

Because of this, when Microsoft designed the BIOS for Softcard, they had to establish a system of physical devices (vectors, remember?) that took into account the fact that this would possibly mean calling a 6502 subroutine in ROM located on a peripheral card in one of the six Apple slots. Where possible, to save time switching back and forth from 6502 mode to Z-



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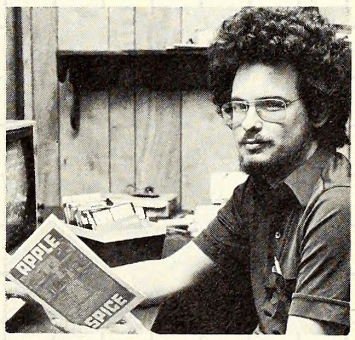

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80, calling such ROM routines was rejected in favor of dealing directly with the I/O circuitry on the card. In either case, however, allowing complete freedom in the placement of such cards among the six slots would have meant requiring the user to rewrite portions of the BIOS each time such reconfiguration took place. While this might have been acceptable to some sophisticated users, most users would not have been able to perform such configuration alone. For that reason, Microsoft made the decision that lead to the current configuration, in which the physical devices are confined to specific slots. The LPT: (line printer), device, for example, is confined to slot one; the PTR: and PTP: (reader and punch) devices to slot two and so on. General purpose drivers for these devices that would take care of most standard Apple peripherals placed in the corresponding slots were installed in the BIOS.

The inherent structure of the Apple II hardware dictated that all twelve physical devices be implemented using just ten vectors. These vectors are two bytes in memory that contain an address of one of the general purpose driver routines in the BIOS. A simplified example of the process will help you understand how it works.

If the system wishes to output a character to the logical LST: device, it places the character in Z-80 register [C] and then examines the Iobyte to see which physical device is currently assigned to do that output. Finding that the physical LPT: device is the proper one, it consults a table and learns that the vector used by LPT: is List Output Vector #1, located at F392 and F393. The two bytes at these addresses are themselves an address that is the starting address for the printer driver located in the BIOS. The system now goes to that starting address and executes the driver routine controlling the interface card in slot 1, and a character is printed on the printer.

Simply stated, each logical device is assigned (by you), to a specific physical device, each physical device is assigned to a specific vector, each vector points to a specific driver routine, and each driver routine controls a specific slot. The table summarizes these assignments.

vector name		memory location		assigned physical devices
Console Output Vector #1	-	F382 & F383	-	TTY:, CRT:
Console Input Vector #2	-	F384 & F385	-	UC1:
Console Output Vector #1	-	F386 & F387	-	TTY:, CRT:
Console Output Vector #2	-	F388 & F389	-	UC1:
Reader Input Vector #1	-	F38A & F38B	-	PTR:
Reader Input Vector #2	-	F38C & F38D	-	UR1:, UR2:
Punch Output Vector #1	-	F38E & F38F	-	PTP:
Punch Output Vector #2	-	F390 & F391	-	UP1:, UP2:
List Output Vector #1	-	F392 & F393	-	LPT:
List Output Vector #2	-	F394 & F395	-	UL1:

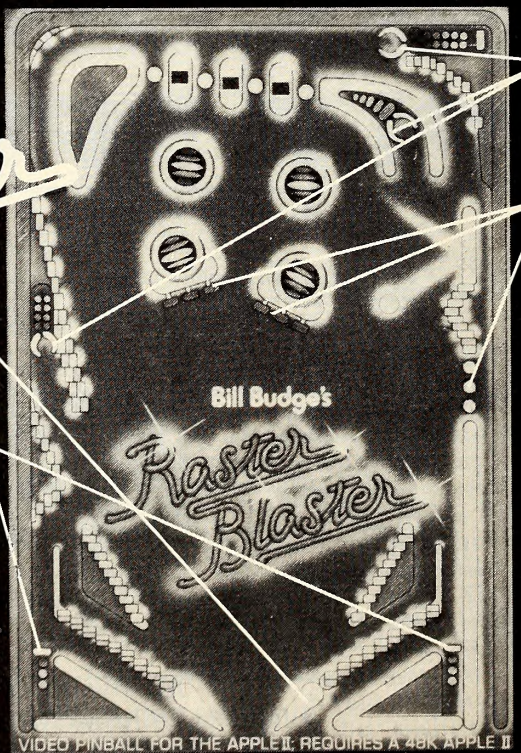
Apple CP/M comes configured with drivers in the BIOS for a printer interface in slot one, general purpose I/O in slot two, general console I/O, (either an 80-column card or an I/O card connected to a terminal), in slot three, and disk controller cards in slots four, five, and six. Slot seven is undefined, as are slots four and five if they contain no disk controllers. If the peripheral card in a specified slot is one that CP/M recognizes (which includes most cards distributed by Apple Inc., plus a variety of printer, serial, and eighty-column cards), the drivers in the BIOS will initialize the card and direct input from it and output to it in a way the card expects.

With the exception of the LST: logical device, these drivers can generally recover well if accessed with no card in the slot. With no card installed in slot two, for example, output to the PUN: logical device will have no noticeable effect; likewise, attempted input from the RDR: device will always return an end-of-file character. Since it was foreseen that there would be other non-recognized cards for which the standard driver would not work, patch areas were set aside in the BIOS in which a user could place his own driver for such a card.

This brings us to our subject for next month; the CONFIGIO utility, which, coincidentally, has as one of its functions the ability to install driver routines for unrecognized cards, and to enhance the driver routines already in the BIOS. Until next month. . . .

Bill Budge's

Raster Blaster



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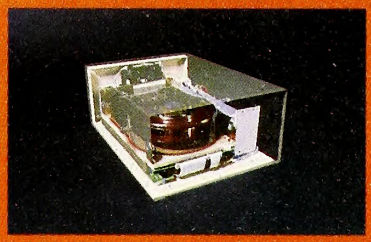

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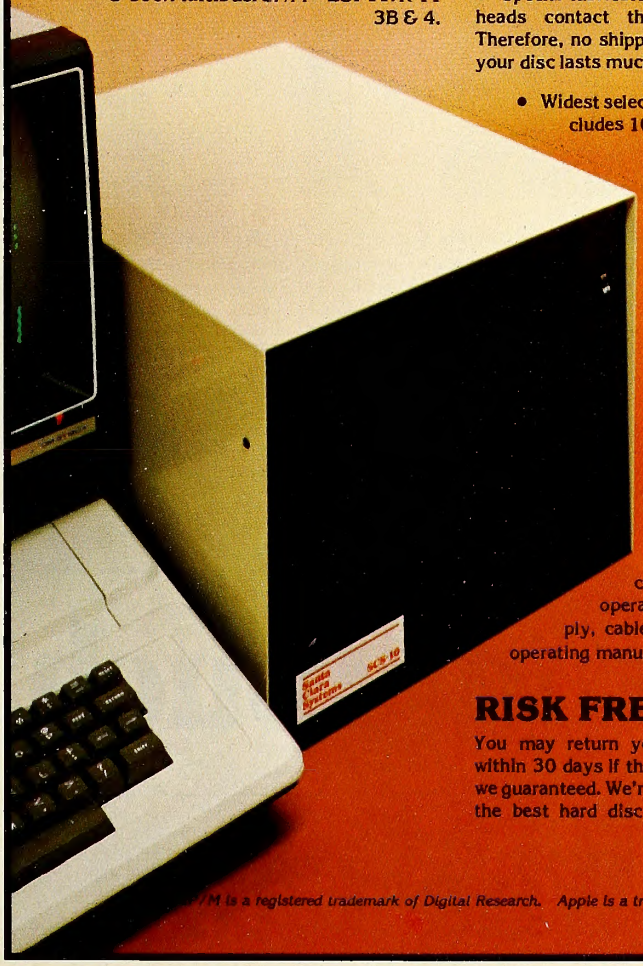

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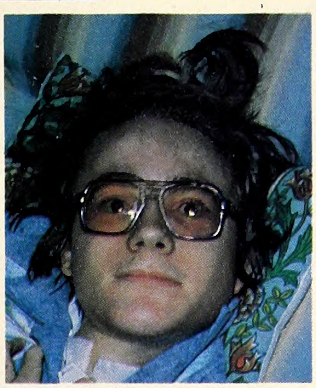
An Apple with synthesizer haaked up ta a speciol platfarm enobles Chorlene Brown, who is totolly deof, to "hear" the music through the vibratians in her feet. Brown is shown doncing ta music being ployed an the Apple by Harald Martindale, wha's legally blind, and fram the laak af the picture, they're bath getting inta the beot. Opposite poge, from the tap: Jeon Miller, Jock's dad, says his son and Dole Washlake act as a catalyst for eoch ather. Washlake wrate o program that enables Jack to work at his Apple for long periods of time.

Apples That See, Hear, and Touch For People Who Can't



BY MELISSA MILICH

Roy Bonnell and his colleagues at Florida State University in Tallahassee have given music to twenty-nine-year-old Charlene Brown who has been deaf since birth. A vibrating platform hooked to a musically programmed microcomputer enables Brown, who loves disco dancing, to feel the music and dance to the beat she "hears" through her feet. Bonnell plans to expand his vibrating platform into an entire studio that would enable deaf students to major in dance at Florida State if they chose.

Thanks to computer software developed by Gary Kelly and David Ross of Georgia Tech in Atlanta, blind people can now learn to read using a tonal alphabet that substitutes musical tones for letters and numbers. Kelly, who is himself visually impaired, says those who learn his musical language will be able to read the musical version of English at approximately three hundred words a minute—a reading speed three times as fast as the average braille reader and a speed nearly equal to the average sighted reader.

In Rancho Palos Verdes, California, Jack Miller, a high school senior suffering from muscular dystrophy, lacked the strength and agility in his fingers to use his Apple keyboard to learn programming. Fortunately, Miller had an innovative computer teacher, Dale Washlake, who wrote a program allowing his young student to control the keyboard by turning the knob on a game paddle.

The computer software that gets the most press attention these days does not usually include programs that are developed for the handicapped. There's always a lot of hoopla that goes along with each new arcade or adventure game release. But there is also a large amount of excitement brewing among a more quiet group of people who are just as actively developing computer applications that will make life easier for those without fully functional bodies.

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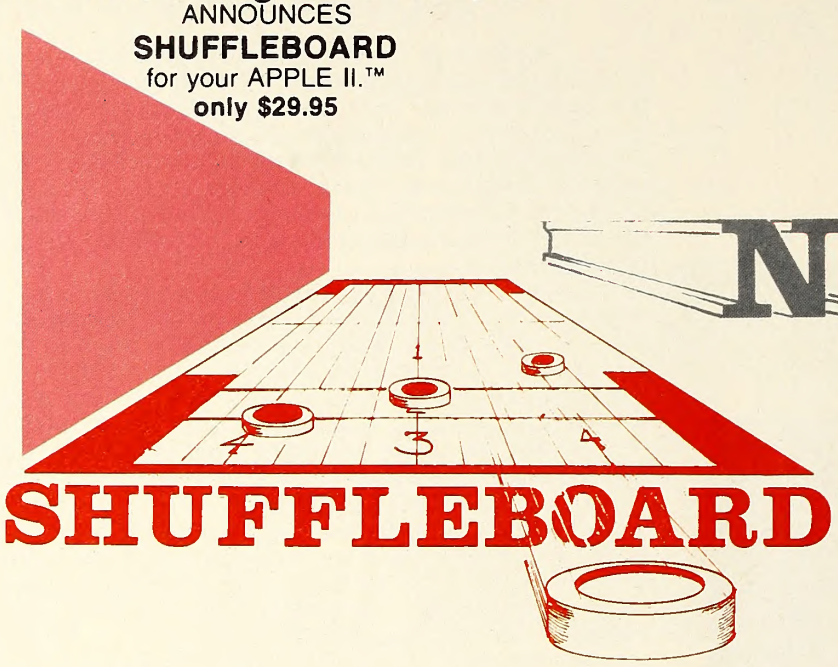

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This is not to shortchange the value of computer games. Their value has already been proven in several aspects of therapy, from helping stroke victims develop coordination to teaching children with behavioral problems how to concentrate. And, as Jack Miller will attest, it was the skill he developed manipulating the game paddles playing *Raster Blaster* over and over that enabled him to adapt so successfully to Washlake's alternative to the keyboard.

The programmers, Roy Bonnell, Gary Kelly, and Dale Washlake, are not getting rich off their software programs or computer applications, but they are getting different kinds of rewards. The look on Charlene Brown's face the first time she hopped on the vibrating platform to "hear" the music through her feet was worth a million dollars to those who built the contraption at Florida State.

Brown, who loves dancing, always went to discos regularly, but since she is totally deaf, she had to keep time to the flashing lights and by the movements of the other dancers. Brown was one of the first to test the invention that was created jointly by Bonnell, a career counselor, and Barry McConnell, a computer programmer.

The vibrating platform that allows Brown to dance to a beat she can feel is actually an artificial floor that contains sound transducers. The transducers, which are manufactured by a private company, weigh only about two pounds and can fit into the palm of an average-sized hand. A voice coil and a large magnet inside turn sounds into physical vibrations.

Bonnell installed several of these sound transducers into a platform that's connected to an Apple computer with a music synthesizer inside. The result was the vibrating platform.

Brown's eyes radiated excitement with her first steps as she felt the music coming through the floor.

"Oh, if you could have seen her, it was so great," recalls Bonnell. "There's a feeling component to music that's very important. The only time people usually experience this is if they are sitting in the front row before a huge orchestra.

"Even if they're not deaf, it's fun to watch people get up on this platform. A lot of people just like to sit on it."

Bonnell, who is systems coordinator for the university's career development services, also installed near the platform variably colored strobe lights that change with the rhythms of the music. Eventually, he would like to open an entire dance theatre built on a vibrating floor with rhythmically changing lights that could accommodate deaf students who want to major in dance.

"We are searching for ways to provide to the handicapped things that most fully functional people take for granted," Bonnell said. "We try to do this by finding things that are already available and putting them together in unique ways."

Gary Kelly, a graduate student at Georgia Tech University, shares that philosophy. On an Apple, he has developed a unique reading system for the visually impaired in which musical sounds have been assigned to normal English text. His language is reminiscent of the sounds of R2D2 of *Star Wars*. The software was written in machine language with all the tones corresponding to the ASCII characters. The carriage return, control assignment, and space bar all have tones assigned to them.

That's kind of unique all by itself, but what makes Kelly's innovation even more unusual is that his musical translation from English was so carefully engineered that proper English typed on a keyboard will come out of the computer via the synthesizer as a melody—sometimes even a recognizable one. Garbled spelling or garbled typing will come out as garbled music.

For example, the phrase *this is* is a very common expression in conversational computer language (this is an Apple II, and so on). The six letters in the phrase *this is* correspond to the first six notes in Scott Joplin's melody, "The Entertainer." Kelly, who has a background in psychology and human fac-

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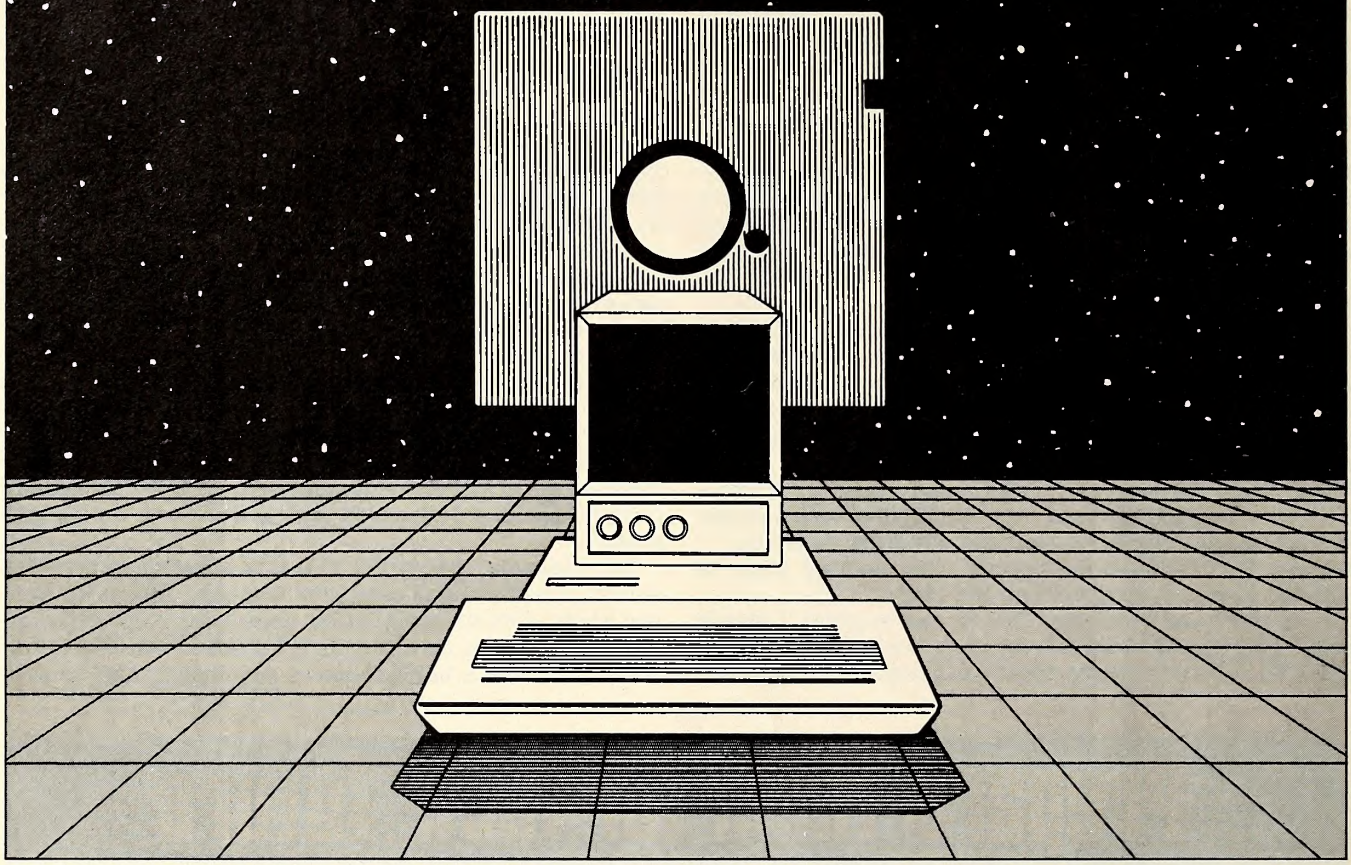

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The Apple Speller requires an Apple II/Apple II+ equipped with 48K, DOS 3.3, and 1 or 2 disk drives. Two disk drives are required to delete or add words to the dictionary.

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tors engineering, and not in music, says he paired the letters of the alphabet to the musical notes by way of a mathematical formula. The research, which was funded by the Veteran's Administration, first required Kelly to compile a list of the most frequently used letter sequences in the English language.

To do this, he used the same types of technical literature the FBI, CIA, and other special agencies use to crack codes. Kelly says the English language is very redundant, and his final list numbered only about three hundred combinations.

"The letters QU occur quite often," he explained. "You never find QB in this language. TH also occurs a tremendous amount, but TJ almost never."

The list of letters was ranked according to the frequency with which they occur in our language. Then, by coincidence, a visually impaired musician joined the project. He was able to compile a similar list—this time of the most commonly occurring musical sequences in Western culture.

Kelly found that musical sequences in the Western culture are almost as redundant as our language letter combinations. For example, the jumps in musical notes C to D to E occurs fairly often in popular songs, whereas the sequence of jumps from notes A to B-flat to C-sharp isn't a very logical musical sequence to most Americans, although that combination of sounds might sound just fine in a different culture.

Kelly says he tried to mesh the two lists together as logically as possible, but he naturally found some words that didn't come across as very musical. Words with a foreign spelling or an odd combination of letters that doesn't occur very often in English are slightly out of tune with the rest of the sentence in Kelly's musical language.

Kelly is now modifying *Apple Writer* to his tonal alphabet to provide a word processing system that the blind can use that he believes is more foolproof than the braille system. Typing mistakes will come across as a clash of sounds with the tonal alphabet.

Although still in the testing stages with only a small number of people using the system, Kelly believes the tonal alphabet is easier to learn than braille. After twenty hours of study, one user was able to translate or read one hundred words a minute. Eventually, the more well-versed users should be able to decipher about three hundred words a minute.

For added simplicity, punctuation marks were given completely different sounds—tritones or chords—to make a distinct sound from the alphabet and number tones. "The exclamation mark is a high-pitched shriek—it sounds like an exclamation mark. The period is a very low clump, and that sounds like it should be at the end of a sentence."

In addition, Kelly says his musical alphabet is also much more interesting and far less expensive than a braille system. Braille readers need a special machine to type and print, as well as special paper. Not many employers, Kelly believes, are willing to go to this extra expense to employ a blind person.

But, if the employer has an Apple computer, the only other thing that's required to use the tonal alphabet system is a music card. The software Kelly will supply free in exchange for a floppy disk on which to copy the program.

The only question people keep asking Kelly is, why should a person put so much energy into learning the tonal alphabet if there are computer-controlled tape recorded voice output devices now available for handicapped use?

"There are about two million visually impaired people in this country and their biggest problem is illiteracy. There are too many voice devices that free people way too much from ever having to use the language.

"They're gradually forgetting grammar, spelling, punctuation, and sentence structure. But these basic communication skills are needed by everybody whether they're employed by a company that needs a report prepared or they just want to write a letter to a friend."

Kelly sees the possibility of some fluent listeners of his lan-

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guage being able to translate an already existing piece of music such as Beethoven's Fifth and possibly discovering an interpretation new to music scholars. In the meantime he is satisfied for having developed something that is, in effect, an art form, which he describes as "musical poetry."

Both the tonal alphabet and the vibrating platform were created using standard pieces of hardware and inexpensive parts that were already on the market. Imagination also came in handy. Dale Washlake got the idea for an alternative to the computer keyboard while driving down the freeway, and all he needed after that was a game paddle and a little perseverance.

Washlake, who lives in southern California, is a private teacher of computer programming to eighteen-year-old Jack Miller, a victim of muscular dystrophy. Not only did Jack have problems pressing the keyboard, but he was also having trouble sitting up straight in a chair for long periods of time to work at his Apple.

An attachable RCA heat sensitive keyboard that hooks to the Apple was first brought in to solve the problem. Although no pressure is required to use the keyboard, agility was still a problem for Jack, especially when he had to press two keys at the same time in order to give control commands. So one night, after struggling with the Los Angeles freeways, Washlake went home and struggled with a program to eliminate the problem by giving a game paddle the control of a keyboard.

Washlake wrote a program in machine language that would scroll the letters, numbers, and characters of the entire computer keyboard across the top of the video screen. When it reaches the end of the sequence, the line backs up and runs by again. Turning the game paddle knob in any direction adjusts the speed at which the letters and symbols scroll by. To stop the scroll of letters at the chosen character, Jack simply twists the knob slightly toward the center.

To print the character on the screen, Jack presses the button on the paddle, which is large enough for him to work easily. The paddle also allows Jack to program from a reclining position. Washlake was careful to design the paddle programming so that its mechanics did not interfere with the program already created on the screen that the paddle program is formatting.

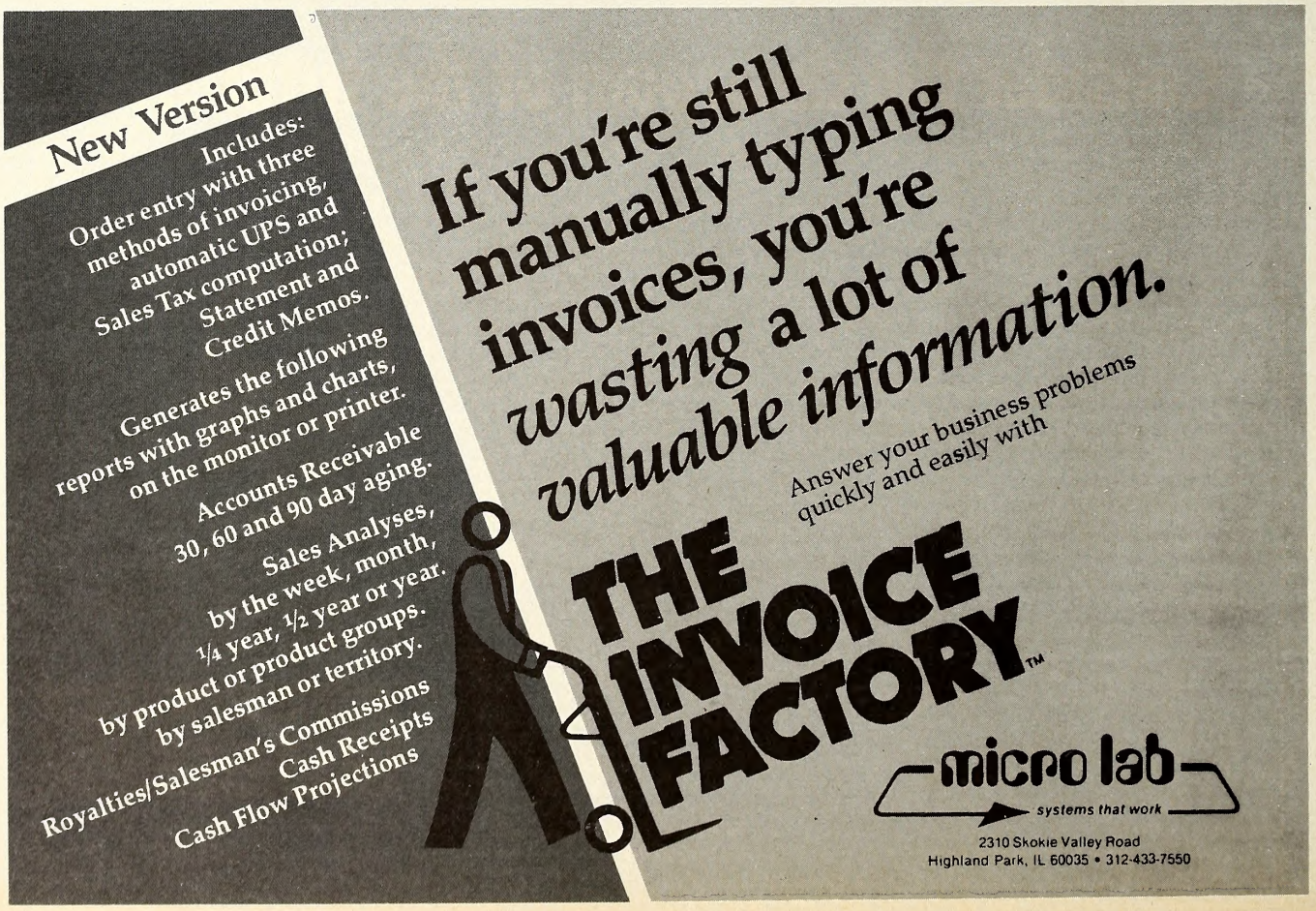
Washlake says when he figured out exactly what Jack needed, he contacted people all over the country to try to find an already-existing program that would utilize the game paddles in this way. But although Washlake thought it a very obvious solution, he couldn't find anybody who had already written the sort of program he had in mind.

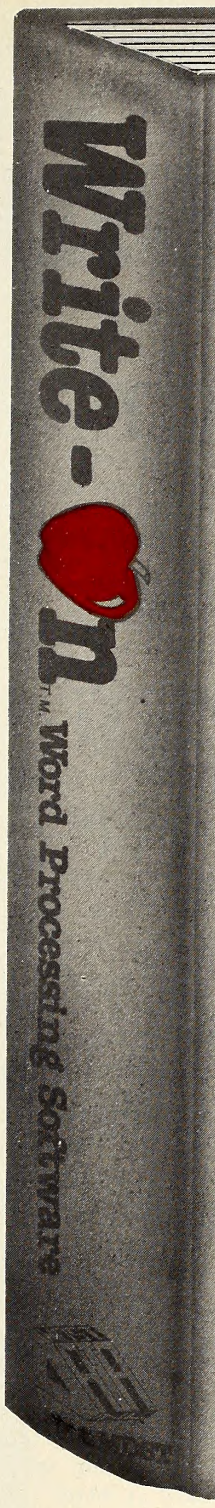
The program, which he calls *Paddle Keyboard II*, was written on *Lisa* and several days were spent revising it. Washlake calls it the II because the first version, in which every position on the paddle knob corresponded to a letter, was just too hard for Jack, or any user, to work. The new version, which takes just minutes to learn, is extremely adaptable to the average user. It takes less time to learn if you've had a lot of arcade game practice with paddles.

Although Washlake doesn't have a publisher for his program, he wants to make it commercially available to as many people as possible.

"The only way for Jack to learn programming was for him to do it. I wanted to provide a way to encourage him to do it as long as possible."

Washlake, Kelly, and Bonnell. Three Apple users in three different parts of the country, all who turn their ideas into something that will help somebody in some way. And they keep going. At Florida State, Bonnell is also helping to develop software and other applications for the visually impaired, including a braille printer they can produce at a fraction of the cost of the standard model. Georgia Tech's Kelly has his hands in at least ten other projects he promises are as intriguing as the tonal alphabet, and, in California, Washlake, with the help of Jack Miller, is developing a computer game. A few good ideas and the right people and life for the handicapped advances along with the rest of society. ■





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Beginning in Vancouver, British Columbia, the Saftalk cruise will visit the parts af Juneau, Skogway, ond Ketchikan. It will alsa explare the wanders of Glacier Bay and Misty Fjard, returning ta Vancouver ot the end af o week. During the cruise there will be several seminars affering Apple awners and their camputers the appartunity to learn fram the masters.

Ken Williams, creatar af hi-res adventures and other mischiefs, will illustrate sophisticated grophics techniques. Rager Wagner, bestselling outhar of Saftalk's Assembly Lines column and a craaner of some renawn in the San Diego area, will investigate advanced assembly longuoge pragramming. Dennis Gaadraw, ca-authar af Expediter II, the bestselling Applesoft campiler, will enlighten Basic pragrammers an the uses and abuses of compilers.

The latest additian ta this list of all-stors is Mark Pelczarski, outhar af the papular Camplete Graphics System and Special Effects. He'll delve inta the mysteries af basic and instruct those present on haw ta pragram their awn database.

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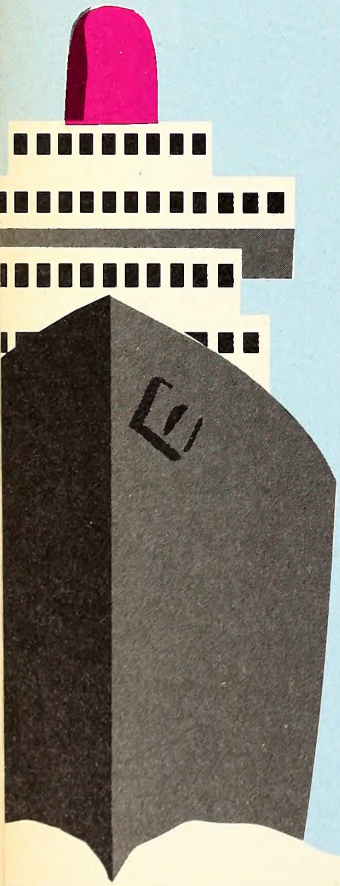


This tour is exclusively arranged far *Softalk* readers by Valencia Plaza Travel Agency af Newhall, California. Rager Wagner, Ken Williams, Dennis Goodrow, and Mark Pelczarski are committed ta giving seminars an this cruise unless extraordinary business cantingencies arise.

MARKETALK

Reviews

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.

Empire I: World Builders. By David Mullich. Not enough people seem to know that good science fiction has very little to do with gorgeous unclad women and fierce snarling monsters. Thankfully, David Mullich is a man who knows science fiction and this makes *Empire I* an interesting, thinking person's adventure game.

The game requires a lot of time and patience. In it, you create characters and watch them die with great rapidity. But you are always the master of your own fate, and you survive if you are smart.

The game begins at the New York Rocket Field where you are given the choice of playing an old character or creating a new one. The computer helps you randomly select the sex and characteristics of your player, which determine how she or he will fare in the trials and tribulations to come. You're given the choice of three career paths to follow: homesteader, miner, or missionary.

Once you've got your character, you board a spaceship which leaves earth for an interstellar voyage. Soon you find yourself orbiting a planet that has specific characteristics. Some planets are better than others, depending on what career you have chosen. Homesteaders have to find a planet with an earthlike atmosphere and some kind of government or chances are they won't survive for long. Missionaries need a planet with a population of some kind, since their primary purpose in life is to preach to someone. Miners are best served on planets that have a high density, since they are in search of mineral wealth.

This is definitely a game in which you must use your head. For instance, leaving a spaceship without your vacsuit on a planet that has an unbreathable atmosphere will cause your character to die painfully. Missionaries have to gauge the effect of their preaching on the masses or risk being stoned to death. Miners must be aware of their equipment (which could fail at any time) and of the local environment.

Homesteaders have perhaps the toughest time of all. They have to monitor crops, rainfall, and herds of heffelumps; they even have to get married and raise a family to keep from getting lonely. One of the highpoints in the game occurs when the homesteader mates with her or his spouse (accomplished by typing in "mate"). The computer determines if you had enough will power and whether any offspring resulted.

Empire I strives for reality whenever possible. You have to eat and drink when you are on a planet's surface. The longer you play the game with one character, the older you get. Eventually, a character will die of old age or be so worn out as to be useless. If you choose to quit before your character dies, he or she is saved on the disk for the next player.

Mullich has fashioned an elaborate history to explain the background of *Empire I* and to lay the groundwork for the two games to follow in this Interactive Fantasies series. Although it is not essential to read this history for purposes of playing the game, it is worthwhile and good science fiction.

Empire I is played, like any good adventure, using an elaborate vocabulary, including *fix, repair, undress, steal, bribe, stab, chop, fling,* and *preach*. You start with an inventory of possessions and you're given ample opportunities to buy needed goods in the course of the game.

You also interact with other characters in the course of the game, some friendly and some not. One nod to the less than serious aspects of science fiction is the Bandersnatches, ferocious, bipedal carnivores that invariably tear your character limb from limb.

On the whole, though, this is an adventure that goes out of its way to be interesting and evocative of the future potential for man's colonizing of the galaxy. DH

Empire I: World Builders, by David Mullich. Interactive Fantasies, Edu-Ware Services (Box 22222, Agoura, CA 91301; 213-346-6783). Either DOS. $32.95.

Zoom Grafix. By Dav Holle. If your printer can tap out graphics, *Zoom Grafix* may be for you. It will operate on any of the following machines: All IDS and Epson printers, the MPI 88G, NEC 8023A, Xerox, Pro-Writer, Spinwriter, Qume, Anadex, Diablo, Silentype, and Starwriter.

Zoom Grafix will show you a picture on the screen to let you decide if that is indeed the one you want printed out. You can also swap hi-res screens. If neither of the screens in memory is the one you want, you can ask for a file from the disk (getting a catalog by hitting return).

Once you've selected your file, you can print either a positive or negative image, vertically or horizontally.

You can change the size by changing proportions. Normally, you would print one dot high by one dot wide; to double the size, you'd select two by two, or triple it by selecting three by three, and so on. For special effects, you could choose one high by two wide, or vice versa.

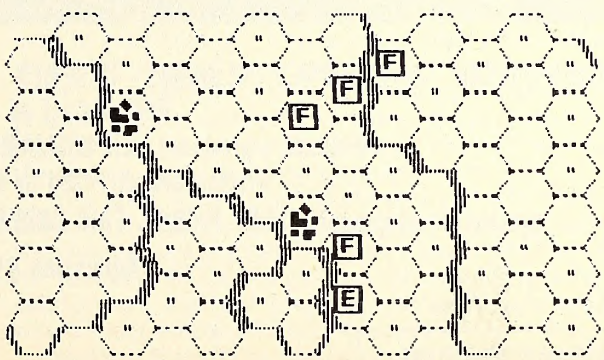
The zoom feature of *Zoom Grafix* lets you select any part of the picture by its outside row and column coordinates, then print it out to any size. Once you've set the dimensions at top and bottom, left and right, a frame will show around the chosen section. (If it isn't correct, you can change your dimensions.)

Note: you have to pay attention to the delay settings when you do this. If you have large areas of black to print out, you could damage your printer unless you let it cool periodically. Choosing number 7 on the menu lets you change the delay figure at the end of each row.

You can also set your left margin, change print width (automatically set according to your printer), and send a form or line feed command.

The error-trapping features on the program work quite well. You always seem to have an option to change your mind, as well, and that's very helpful. DA

Zoom Grafix by Dav Holle, Phoenix Software (64 Lake Zurich Drive, Lake Zurich, IL 60047). $39.95.



Screen from Napoleon's Campaigns, printed using Zoom Grafix.

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Napoleon's Campaigns: 1813 & 1815. By Paul Murray (design and programming), Joel Billings and Larry Duffield (game development). Strategy games on the Apple have always been much of a sameness. You enter all your orders, your opponent enters all of his or her orders, and the computer carries all the orders out at the same time. This is well and good, if you're playing something as precise as a game.

But real life is different. Things don't happen that way at all. Consider Benjamin Franklin's "For want of a nail" maxim, in which the lack of a nail results in horseshoe, horse, and rider all being lost.

In a real battle, orders can be delayed or lost. They can be misinterpreted. They can be followed timidly. In some cases, they may even be disobeyed. And the person in charge of the battle, no matter how competent, can't be everywhere at all times.

Until a few years ago, communication was accomplished via messenger. Even today in modern warfare, much of communication is handled the same way. After all, codes can be broken, radio transmissions can be jammed, electronic gear can be damaged. The fog of war that veils events from a commander's view is in effect just as much now as it was millennia ago.

Strategic Simulations places these factors in the forefront of its *Napoleon's Campaigns*. In this game, the player or players command corps of troops at either Waterloo or Leipzig. To avoid delays, the line of communication (LOC) must be kept open. The farther away a corps is from the headquarters, the longer it takes to respond to orders.

To replace subordinates' misinterpretation, the game counters with leadership ratings, with the tactical ability of corps commanders ranging from one to nine. Timidity is reflected by the aggressiveness rating of a commander, with negative and positive ratings possible. A corps may become so fatigued it's demoralized, giving it such low morale that it won't obey the army commander.

Corps are numbered according to their marching priority. Since the Allies (English, Prussians, and so on) are unwieldy, these corps are designated arbitrarily. Starting urgency and starting contact are also set at the beginning of the game.

Urgency determines how effective a corps will be. Starting contact modes range from initiative, withdraw, stand, and attack, to hasty attack. This lets you determine what a corps will do when it enters an enemy zone of control.

The sequence of play begins with a reconnaissance, as corps check the hexes they occupy and those immediately around them. Those in patrol mode check two hexes around them.

You next receive activity reports—some of which may be false, others which may reflect movement of your own troops.

Then come battle reports, with time, friendly units involved, battle location information, and so on. These are followed by reconnaissance reports. Units show the time sent, from where, which corps is sending the report, and an estimate of enemy strength (which can be inflated or minimized).

Last to arrive are location reports, in which each corps able to report tells when its report was sent, from what hex, and sometimes what combat action is planned.

After all reports are in, the commander can issue orders. These can be from three menus: strategic orders, orders to corps, and orders to a group of corps operating as a force under the immediate command of the primary army commander.

Strategic orders don't go to the corps; instead they show you what's happening. You look at an attractive map (coinciding with the maps and cardboard counters supplied with the game) and at status reports. As army commander you can also designate a secondary army commander, reset LOC, save the game, reread the earlier dispatches, or order a corps or force.

The second menu lets you designate hexes to withdraw or attack to, reinforce a hex containing friendly units, and examine the status of the corps (good only within one turn dispatch distance from the army commander).

Both the second and third menus allow setting urgency, contact mode, orders to move, patrol, change deployment from road to deployed (or vice versa), and exiting the menu.

In effect, the player or players fight their battles by dispatches, seldom knowing the immediate effects of their orders. Changes in the tides of fortune may make a poor earlier move seem brilliant or a good one disastrous. Some orders will conflict, leaving a unit marching in place. Orders should be given in bunches, rather than every time it's the player's turn.

Waterloo takes five days of turns, Leipzig six. Day turns use four hours, night turns eight. In addition, there are rain turns, march modes, ferocity, echelon attacks . . . all are involved in *Napoleon's Campaigns: 1813 & 1815.*

This is a highly complicated game, one that will take some time to learn, despite its well done and detailed instruction book, prompt card, color maps, and cardboard counters.

One minor problem when playing against an opponent is the difficulty of keeping your map secret. The map's slippery, so you may dislodge your counters if you cover it when you leave the room for your opponent's move.

Another drawback is that, in the solitaire Waterloo scenario, you can't play the French side, while in Leipzig you can't play the Allies. The sound of battle is supposed to be evoked by intermittent popping from the speaker. Why not a few trumpets and some cannonfire?

These complaints aside, this is such a realistic interpretation that any serious wargamer will be entranced. DA

Napoleon's Campaigns: 1813 & 1815, by Paul Murray, Strategic Simulations Inc. (465 Fairchild Drive, Suite 108, Mountain View, CA 94043). $59.95.

Ceiling Zero. By Stephen Warady. This new arcade game comes as a pleasant surprise. Although it seems there are just too many shoot em' up games, *Ceiling Zero* proves that there's always room for one more, especially when it's fast, smooth, and challenging.

After the title has been displayed, hitting the button on your paddle starts the game, placing you at the bottom of the screen. At the top of the screen is the mother ship of the aliens, which spews out a stream of smaller ships while moving back and forth the length of the screen. The smaller ships pass through a micro-deflection beam at various angles, with the beam set at ceiling fifteen at the beginning of the game.

When you have destroyed all the smaller ships at the first level, the beam comes down a little and you have a new set of terrors to contend with. The first three levels introduce you to the three different kinds of alien ships. The first two are fairly slow; after a few times of playing the game, they're easily done away with. The third level is much harder going; the ships become smaller and more difficult to destroy while moving considerably faster than the earlier ships.

Once you hit ceiling twelve, all three kinds of ships are let loose on you at once. This is when things get tough. Then, to make life even more difficult, there's the landing vessel that is sent by the mother ship, intent on violating your territory. It moves slowly in a straight line from the top of the screen to the bottom and is a real sitting duck. That doesn't mean it's easy to get it, though. You have to dodge all the other ships, sit under the landing ship, and blast away. If you miss and the vessel manages to land on the bottom of the screen, you are promptly killed and sent to a starry grave. Later in the game, past ceiling twelve, the landing ship wobbles as it moves down the screen, making it even harder to hit.

You start with three laser-bases and get more at certain points in the game. This adds greatly to the game's difficulty. You really have to earn those extra bases and they are few and far between. But if you get good at it and somehow make it to ceiling zero and survive, the mother ship crashes and the whole thing starts all over, but faster.

Stephen Warady's animation and graphics are smooth and consistent. As they leave the mother ship, the smaller ships careen off the sides, bottom, and top of the screen like in a pong

game. The hi-res color and sound effects are secondary to the action, but they are first-rate and give the game brightness and class.

Played with a game paddle, *Ceiling Zero* demands a calloused thumb, but any experienced arcade game player should find that no problem. All in all, this is a thoroughly enjoyable game that offers hours of fast action and fun. DH

Ceiling Zero, by Stephen Warady, Turnkey Software (13078 Mindanao Way, Suite 314, Marina del Rey, CA 90291). $29.95.

The Soul of a New Machine. By Tracy Kidder. (*Book Review.*) The majority of people who use computers probably have little understanding of what a monumental task it is to make one. *The Soul of a New Machine* concerns the building of a supermini computer, the Eclipse MV/8000, or Eagle as it was known during its building at Data General in Massachusetts.

Written at times like a novel, this is the true story of big companies and intercompany politics, design teams and visionary managers, moments of despair and moments of triumph. It is the story of people working very hard for something more than money and prestige. There is a phenomenon in the computer industry known as the all-nighter and it gets its reputation from the likes of the Eclipse group, the talented team responsible for designing and building the Eagle.

Thousands of people worked on the Eagle, and Kidder does a good job of concentrating on the main characters. At the same time as you are reading about the incredible sacrifices that went into the making of the computer, you also learn something about the individuals and why they are doing it. Toward the end of the book, Kidder turns to John Ruskin and his theories of Gothic architecture. In much of modern industry, tasks become so fragmented and simple that it requires an army of slaves to put out a product. But, in something like a cathedral, the individual craftsman is allowed to pursue his talents to the utmost.

This is how it was with the Eagle. The style of management at Data General allowed for a looser than usual atmosphere, where practically anything was possible and any problem could be solved. Engineers and programmers soared and tried to do the impossible whenever they got the chance. Not everything worked, but it was the kind of experience not easily forgotten.

Kidder has done his homework and made this an extremely engaging book. For those interested in the history of computers and particularly the making of them, this nontechnical book can offer considerable food for thought. DH

The Soul of a New Machine. Atlantic Monthly Press (Boston, MA).

Hi-Res Computer Golf. By Stuart Aronoff. *Hi-Res Golf* makes us consider a new distinction in computer game genres: computer sports. Only this and one other program would fit this category thus far. No, not *Computer Quarterback* or ditto *Baseball* or ditto *Soccer* and the like; they are computer games about sports. But *Hi-Res Computer Golf* follows the lead of *Olympic Decathlon* in requiring a form of athletic dexterity in its play.

In *Decathlon*, you had to get your fingers in good running shape or you were sunk. Now, for golf, you'll have to fine hone those fingers for timing finesse in order to swing your clubs. Like the pole vault and the shot put in *Decathlon*, swinging the club in *Hi-Res Golf* is hard—so hard that some people won't consider the practice necessary to master it worth the effort.

For those willing to put in the effort, or those willing to risk the brand of duffer, *Hi-Res Computer Golf* is a masterpiece game of judgment, strategy, visual keenness, and skill.

You'll find that the game provides facsimiles of several eighteen-hole golf courses of varying difficulty. Start modestly. Holes may be completely shown on one screen or may require two or three screens. Since your judgment of distances is important in real golf, all fairways on all courses in the game are to the same scale, one hi-res dot equalling one yard; this is why a long hole can't simply be represented as smaller on one screen.

All the accoutrements of a real golf course are there to hinder you: sand traps, roughs, pretty and game-deadly lakes and ponds, and groves of shady trees. The verisimilitude of the game is such that each grove of trees is calculated for the heights of its trees. If your drive is a very high one, it may pass over smaller trees; a couple of pixels one direction or the other, however, and you've collided with a big oak and lost your ball among the fallen leaves.

As you begin a hole, you see your ball on the tee and all or part of the fairway; the toggle to see the rest of a multiscreen fairway is quick and simple. For the rest of the review, we'll describe a single screen hole.

With a paddle, you set the direction in which you'll aim the ball. You'll have to take into consideration the direction and velocity of the wind, which is given at all times, and which may change even while you are setting up a shot.

Now you choose a club. You can toggle to your golf bag, a text table showing the range of each club at each of several strengths. Having determined how far you want the ball to travel in the direction you've set, it's easy to choose the correct club and the proper strength from the table. You return to the fairway and input these values. All this done, you're ready to drive.

Every good golfer knows that you look at only one thing when you drive: the ball. And that's what happens here. The fairway fades away and you're presented with a simulated golfclub swinger. You must guide your clubhead through the appropriate arc to hit your ball straight on. If you top it or undercut it, you'll hook or slice or lob it only a few feet. You'll find it all too easy to miss it altogether. This is really hard and will require a lot of practice from anyone.

As soon as your clubhead makes contact with the ball, the screen switches back to the fairway and you watch your ball move through the air (you hope). If you didn't hit it head on, you'll helplessly watch it curve toward that sandtrap or begin descending before it even reaches a grove of trees. Sound effects are occasional, and one of the occasions is the landing of your ball: thud in the sand, splash in the water, bonk on the treetrunk, maybe even swish on the fairway.

Assume—we hope realistically—that you eventually make it to the green. Now the screen becomes a closeup of that area, and the scale changes. You won't forget because your ball itself is clearly much bigger. Several things are different here. That you'll use your putter is assumed, but you must still input the strength with which you'll hit it. The wind is no longer a factor, but the green is geometrically divided by direction of incline, and this must be taken into account when you choose your strength and also the direction in which you'll aim the ball. Once you've set these and hit return, the computer takes over and you'll see your ball go the way you directed it, which may or may not be the way you intended it to. There is no swing required (hallelujah) in putting.

You can play golf alone or with a foursome or any combination in between. So it is with *Hi-Res Golf*. The (printable) scorecard provides for all these.

Besides the excellence of the graphics within the context of the game requirements, besides the apparent simplicity with which they have handled amazingly complex details of simulation in the physics of ball motion and interaction with the club and the elements, besides the remarkable integration of outside elements with player input, and in spite of the difficulty of the game, the authors seem to have thought of every possible detail to make playing the game simple and pleasing to the gamester. MCT

Hi-Res Computer Golf, by Stuart Aronoff, Avant-Garde Creations (Box 30160, Eugene, OR 97403). Either DOS. $29.95.

Utopia Graphic Tablet Software. By Todd Rundgren. The Apple Graphics Tablet is a device that very precisely senses the position of a special stylus held near its surface. Physically, the Apple Graphics Tablet system consists of an interface card, the stylus, the 15½ by 15½-inch tablet itself, and connecting cables.

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Tablet owner a comprehensive tool for the creation of hi-res displays using the graphics tablet. It provides all of the functions of the original Apple software supplied with the Tablet, although in modified forms. It also provides a great many new options for making and modifying images. The strength of this package is the wealth of effective options for making hi-res graphic displays. Its weakness is that it is quite complex and difficult to learn to use, and its documentation fails to make the learning process easy.

A comparison of the features of the *Utopia* software and the original Apple Graphics Tablet software shows the relative strengths of each. Both systems make minimal use of the keyboard, permitting the user to rely almost exclusively on the graphics tablet stylus to interact with the program. Both use menus to present user choices. In the original Apple software, the menu is printed on a transparent mylar sheet affixed to the Tablet. In *Utopia*, there are a number of separate menus that fill the screen with choices (up to twenty-two at a time). The main menu appears when the program is first booted. From this program level, one can select other menus that permit the selection of a new hi-res screen image (with a user-chosen background color), the selection of an old image from disk, a choice of pen characteristics, a "tour" through stored images on disk, the creation of graphs, and a number of more exotic functions.

Utopia offers a much wider selection of drawing modes than does the original software. The user can select paintbrushes of a wider variety of colors, widths, shapes, and consistencies than are possible from the original software. One can choose brushes that draw two, three, or ten parallel lines. In addition, one can develop custom paintbrushes and store the brush shapes on disk for use in constructing pictures. Very important: *Utopia* offers a fill option that permits the user to fill an enclosed area of the screen quickly with a chosen color from a palette of sixty-four colors constructed by weaving together the different Apple hi-res colors. *Utopia* has also provided a number of functions for softening edges and otherwise adding an element of randomness that enhances the realism of representational art on the Apple II hi-res screen.

The *Utopia* graphing options, provided on one of the main submenus, permit the user easily to construct bar graphs, Cartesian coordinate graphs, and pie charts. Values for the graphs can be input either through the graphics tablet or from the keyboard. A variety of graph labeling modes are provided, including a character-paint option in which a selected character is painted on the image in response to stylus inputs. A software keyboard filter permits the use of escape as a shift and shift-lock key, so that graphs may be labeled in both upper and lower case.

Utopia is difficult to learn to use. While a six-year-old child using the original Apple Graphics Tablet software can learn in ten minutes how to clear the screen, sketch a picture, and save it to disk, an intelligent adult may require an hour or more of experimentation and flipping through the user's manual to learn how to do the same thing with *Utopia*. In part, the problem is the twenty-four page *Utopia* manual, which is more of a reference book than a tutorial. The confusing (to the novice user) structure of the *Utopia* document stands in sharp contrast to the carefully designed Chapter 2 of the *Apple Graphics Tablet Operation and Reference Manual.*

Utopia offers the Apple Graphics Tablet owner a greatly expanded set of graphics production tools. The structure of the system and its documentation do not facilitate learning how to use these tools. Nonetheless, the serious graphics tablet user may want to purchase this package and take the time necessary to learn to make use of its many functions. AM

Utopia Graphics Tablet Software, by Todd Rundgren, Apple Computer Inc./Special Delivery Software (10260 Bandley Drive, Cupertino, CA 95014). Apple Graphics Tablet required. $75.

The Battle of Shiloh. By David A. Landry and Charles T. Kroegel, Jr. This entry from Strategic Simulations is a simple, rapid game for a solitary player or two opponents. You can play either side in the battle, and adjust the ratings of the armies to reflect the players' ability levels.

The battle is Shiloh, April 6 and 7, 1862. A.S. Johnston's Confederates, fifty thousand strong, surprised U.S. Grant's Army of the Tennessee (forty thousand troops) in an attempt to destroy it before it was joined by Don Carlos Buell's fifty thousand-man Army of the Ohio.

The attack almost succeeded, but the Union rallied, and fell back toward Pittsburg Landing on the Tennessee River. Johnston fell in battle, leaving P. Beauregard in charge. Beauregard withdrew to campsites in the rear to rest for the next day's assault. But that night, Buell's troops and the Third Tennessee Division reinforced Grant; the strengthened Union drove the Confederates back.

Unlike most of the SSI sames, the *Battle of Shiloh* is set up so you can see the entire map of the battlefield. You can decide to attack or not, even when you're adjacent to an enemy unit. You move your pieces from hexagonal position to hexagonal position by selecting a number from one to six. Numbers two and five are horizontal; the others are at thirty-degree angles.

The units have historically accurate combat points, leadership, and morale. They're each named for the actual commander, as for example, Jackson's Third Brigade of the Confederate Army of the Mississippi.

One interesting new feature of this game is the use of attacker's and defender's levels of risk . . . and strategy. Level of risk ranges from daring through bold to conservative and finally cautious. In terms of strategy, the attacker can decide on all-out attack, medium, probe, or reconnaissance. The defender may respond with a counterattack, hold, withdrawal, or full retreat.

Each of these choices has some impact on losses. In fact, the riskier a unit's choice, the more likely that orders will be disobeyed and the message "leader acted on his own initiative: new strategies" will appear. Other messages that could occur include "leader killed; unit cannot attack due to low leadership/morale; units did not receive attack orders," and so on. Units don't necessarily have to retreat if given the option, but, if they don't, they'll suffer additional losses.

Artillery fire can be called down on troops; reinforcements and replacements will occur; the Union gunboats can trigger artillery on adjacent Confederate troops; morale and leadership affect what risks a unit will accept.

Although it's simple (for an SSI game), there's enough complexity in *Battle of Shiloh* to make it a good beer and pretzels tactical wargame. It has a save option. DA

The Battle of Shiloh, by David A. Landry and Charles T. Kroegel, Jr., Strategic Simulations Inc. (465 Fairchild Drive, Suite 108, Mountain View, CA). Either DOS. $39.95.

Cropduster. By Uriah R. Stukk. The bean moths are coming. The state legislature is vacationing in the Badlands and can't be reached—their last official act was to ban your one-man cropdusting operation. The only thing standing between two thousand acres of prime Dakota beanland and agricultural disaster is your Fokker triplane (in need of repair) and five hundred gallons of impounded DDT.

Thus begins *Cropduster,* the new fantasy role-playing home-arcade game from Slipshod Software (Bad Nation, SD). The game is extremely involved and time-consuming; not recommended for beginning adventurers. Before you can even get to the government warehouse and devise a strategy to liberate your illegal insecticide, you must get out of your house without arousing the suspicions of your wife/husband/significant other, an ecological activist. (Alienation of affections is fifty points off your score before you even get started.)

After bribing the right officials or stealing a sufficient quantity of the DDT, you must then find a good airplane mechanic. The airfield has been closed in observance of Fort Midge Heritage Day, so you must taxi your Fokker down to Main Street for use as your runway, at which point the time for secrecy is obviously past. When and if you come down again, you will either be a hero for saving South Dakota's economy, or you will be delivered into the hands of the federal marshals—or both. (At which point you must go to disk three, *Plea*

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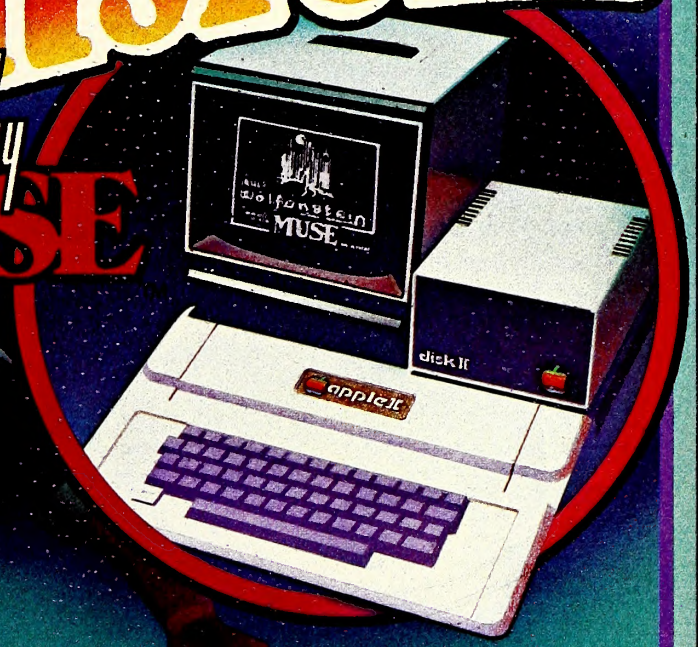

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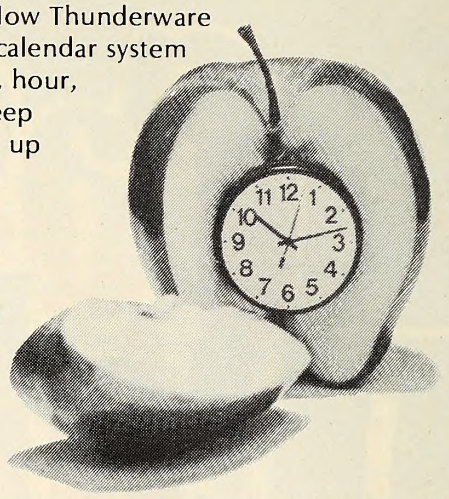

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DISK VOLUME 254

*A 006 HELLO                07/07 16:37
*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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Bargain, and possibly disk four, *Escape from Dannemora.*)

Once airborne, life gets even harder. The Fort Midge Historical Society is holding its annual picnic in the middle of the beanfield. You can attempt pinpoint spraying—risking noneradication of the bean moth menace and a subsequently dimmer view of your actions in the public eye—or blanket spraying, probably killing all the moths but risking several strangulated historians and even dimmer public opinion. Your spouse keeps breaking in on the CB to tell you he/she wants a divorce.

There are several other frustrations, most of them apparently programmed into the game, but others apparently not. The third time you run into a power line at an altitude of three thousand feet may cause annoyance. The twelve-disk business simulation version keeps you apprised of stock market behavior and fluctuations in bean futures as affected by your ongoing efforts, allowing considerable investment potential, but it has its own unfortunate tendency to load its *VisiCalc* interface if you try to spray and bank left at the same time. If your plane crashes, the disk will do the same—part of Slipshod's well-known emphasis on authenticity and meaningful consequences. This is not for everyone.

Intelligent spraying can require considerable entomological background (some provided in the exhaustive documentation), as there are beneficial insects and even natural enemies of the bean moth concealed in the two thousand acres of bean rows. One must fly perilously low to identify them by their markings and coloration (hitting a cow is minus twenty-five).

You may find you require additional documentation to explore the game's potential fully. Unhappily, Slipshod is currently embroiled in legal difficulties with a large arcade game manufacturer claiming *Cropduster* to be a copy of one of its games. George Spelvin, Slipshod president as well as chairman of the board for the South Dakota Bell System, denies the charge, but, while the arcade company tries to serve the injunction, Slipshod has effectively gone underground. For the duration of the suit, no Bell System operator in the state will give any information on Spelvin, or his company, or even acknowledge the existence of the entire town of Bad Nation.

While the lack of support is a problem for the time being, *Cropduster* is, all in all, a satisfying and engrossing foray into the realm of rural adventuring, much in the tradition of Slipshod's previous *Cattle Drive* and *Migrant Farm Worker.* AC

Cropduster, by U. R. Stukk, Slipshod Software, General Delivery, Bad Nation, SD. Cobol-13. $129.95 or best offer.

David's Midnight Magic. By David Snider. Perhaps it's the venerable age of the pinball machine concept that makes it apparently impervious to copyright questions. After all, with all the differences in colors and shapes between games, the basic idea is the same: shoot pinballs into a field of chutes and lights and bells—a slanted field that encourages the balls to escape; then give the player outside-controlled flippers to catch the coasting balls and knock them back into the field of play, tripping as many traps and lighting as many lights as possible. Are any two pinball machines more different than *Gobbler* and *Snack Attack* are different among home-arcades? Are they nearly as different as *Snoggle* and *Bezman*?

But pinballs are accepted as a genre and anyone so inclined can create variations on the theme. The pinball genre is enjoyable, but it would fade quickly if only one permutation were permitted to exist. Perhaps that's where we're coming to a greater acceptance of the concept of variations on a theme in arcade and home-arcade games. Not a lot of gamesters play *Hyper-Headon* anymore, the game that first used the expenditure of dots through a maze form. But the genre is still a great favorite; people just like variations.

David's Midnight Magic is a pinball machine on your Apple. As such, it bears many similarities to Bill Budge's multi-best-selling pinball, *Raster Blaster.* Only the details have changed, and that makes it a whole new ball game.

Instead of one set of flippers, you get two, one guarding the bottom exit chute and the other keeping you scooting around the high-bonus-prone top half of the screen. You're after immediate points and bonus points, extra balls that let you keep going, and multipliers. There's a spot at the very top in which you can deposit balls and get additional ones for them; the third ball entering sets them all free at once. There's a loop at the top of the lower area that multiplies whatever bonuses you accumulated by the end of that ball—two times bonus for once through, three times for twice through, and so on up to five times bonus. After five, you get an extra ball to shoot for each subsequent trip through the loop. Sounds simple but it ain't easy.

In graphics, animation, smoothness, speed, and general excellence of execution, *David's Midnight Magic* is right up there with *Raster Blaster.* It's another step toward the ultimate micro pinball. The next step, it appears, will be pinballs with themes built in, causing great variation in looks and feeling. For instance, picture a Vegas pinball, where one area of lights or traps sets off slot machines; another, blackjack; another, craps; and perhaps each game has a random set of keno numbers to try to match by hitting all the right lights and only the right lights . . . or a cops and robbers pinball, or basketball pinball—you get the picture.

If you loved *Raster Blaster,* you'll love *David's Midnight Magic.* David Snider may not be an old revered name in the infant micro world, but he's been doing his homework just as well. He's a software author to watch. MCT

David's Midnight Magic, by David Snider, Broderbund Software (2 Vista Wood Way, San Rafael, CA 94901). Paddle or joystick. $34.95.

Castles of Darkness. By Michael Cashen. Michael Cashen has added a new element to hi-res adventuring: he has given reality to the computer/person/self the adventurer commands to move, look, get, and all. When you hit the key to begin this adventure, a full-color screen of the lawns outside a moated castle appears; as soon as it's settled, a little red-headed, white-togaed person walks into the scene, stopping midscreen. Only then are you asked for your command. Once you've given it, your animated representative turns in the direction you re-

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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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quested and walks off; the screen changes (somewhat slowly, going to the disk every time), and your friend enters, moves centerstage, and awaits your next command.

The animation is not complete, but it's a good step in the right direction. Animated sequences besides walking on and off screen are going up and down stairs and fighting, the latter varying in the animation with the weapon being wielded by the adversary.

As an adventure, *Castles of Darkness* seems nearly impossible when you start; once you cross the first barrier, it seems unusually simple for a while. But don't let this discourage you. Once you make it to the second castle (What? There's a second castle?), things perk up and the riddles are an enjoyable challenge for the best adventurer.

Let it not be said that sight is everything. *Castles of Darkness* occasionally speaks as well. It doesn't happen often, but, when it does, you'd do well to heed what it says.

This is an excellent first adventure from a new entrant into the realm of adventure publishers. Its only significant fault is the delay caused by frequent return to disk, and this is not to discourage you from enjoying the game, but to encourage the company to seek methods to speed up the process in the adventures we look forward to their producing in the future.

One side feature is excellent. Saving of seven games simultaneously is possible, a feature essential for families and offered by only one other company we know of (although this can be done with games that will save to ordinary disks by using a different disk each save). MCT

Castles of Darkness, by Michael Cashen, The Logical Choice (Pomona Square, 1700 Reisterstown Road, Pikesville, MD 21208). $34.95.

Impressions

☐ **Milestones,** by Ken Franklin, Creative Computing (39 East Hanover Avenue, Morristown, NJ 07960; 201-540-0445). Card games translated to the computer are generally pretty much a washout in competing with the real thing, except that the computer provides an opponent when no human is available. Perhaps the most likely to benefit from this genre of software then are only children. *Milestones* is a case in point.

Designed to simulate a card game designed to simulate an automobile trip, *Milestones* is a good card game for kids, in the tradition of *Touring* and *Water Works.* All are games parents can enjoy too—once in a while, in relatively small doses.

Milestones, done in brightly colored, cartoony graphics, provides a playing companion of infinite patience for the child alone. The game requires planning and strategy to win and thus is a worthwhile learning game. The idea is to travel seven hundred miles before the computer does. You rack up the miles by playing various denomination mileage cards, but you can only play them after you have played a "Roll 'em" card. Meanwhile, you try to thwart the computer by playing on its stack cards representing flat tires, accidents, red lights, running out of gas, and speed limit, and the computer is doing the same to you. These delays must be countered by appropriate solution cards or by one-of-a-kind preventative cards, such as "Extra Fuel Tank," which renders out-of-gas cards useless against you. The first player to get to seven hundred miles wins the hand, but both players score their mileage and can score various bonuses.

The game is well executed, plays swiftly and smartly, and will provide youngsters some good quiet fun when they're arcaded out. $19.95.

☐ **Robot Tank.** By Jay Crafferty, Amber Software, distributed by Micro-ware Distributing (P.O. Box 113, Pompton Plains, NJ 07444). Out for a Sunday roll, your tank is not having an easy time of it. Although versatile and well armed, it must contend with other robot tanks programmed to destroy it. If enemy tanks are too easy for you, there are also flying saucers that come winging down from the sky and attempt to cook your goose.

Requiring a set of paddles, *Robot Tank* is strictly a shoot-'em-up affair. One paddle moves you right and left and fires the gun. The other paddle moves you forward and back. When an opposing tank is firing at you, a triangle forms on the screen warning you to get out of the way.

Colorful graphics and arcade sounds make the game all that more palatable. You get three tanks and three chances to reach 500, which means you have killed all the enemy tanks and saucers. When you destroy an enemy tank, its turret rises up and falls on the ground, making a nice graphic effect. In turn, when you are killed, the windshield of your turret breaks. $34.95.

☐ **Picture Puzzles,** by Jim Neville, Creative Computing (39 East Hanover Avenue, Morristown, NJ 07960; 201-540-0445). What's the least likely pastime you can think of to program for computer play? If you didn't say jigsaw puzzles, it was only because you didn't think of it, right?

Jim Neville disagreed, and he has produced a program that makes a jigsaw puzzle of any hi-res picture you want to feed it and lets you play it on the screen.

What you see on the screen is the interlocking outline of all the pieces in the puzzle, only they're blank. You can then riffle through the pieces themselves, using the paddles, to pick one you want to insert. You paddle a marker to the spot where you want to put the piece and, if it will fit the shape, it is inserted. It may not be the right spot, though.

Neville gives you several options for play. You can see the picture ahead of time and toggle to it while solving or you can work a puzzle without access to the picture; you can play with the traditional interlocking pieces or with squares—which is hard.

Quite a few hi-res pictures come with the program, varying from the traditional covered bridge to a modern all-squares abstraction. The program runs fast and smoothly and the pictures are well done. If you really love jigsaws, you may find this a fun addition to your software library, and though the sixty-piece puzzles won't challenge you much, the computerized method will probably make up for it. $19.95. ◨

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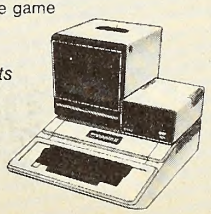

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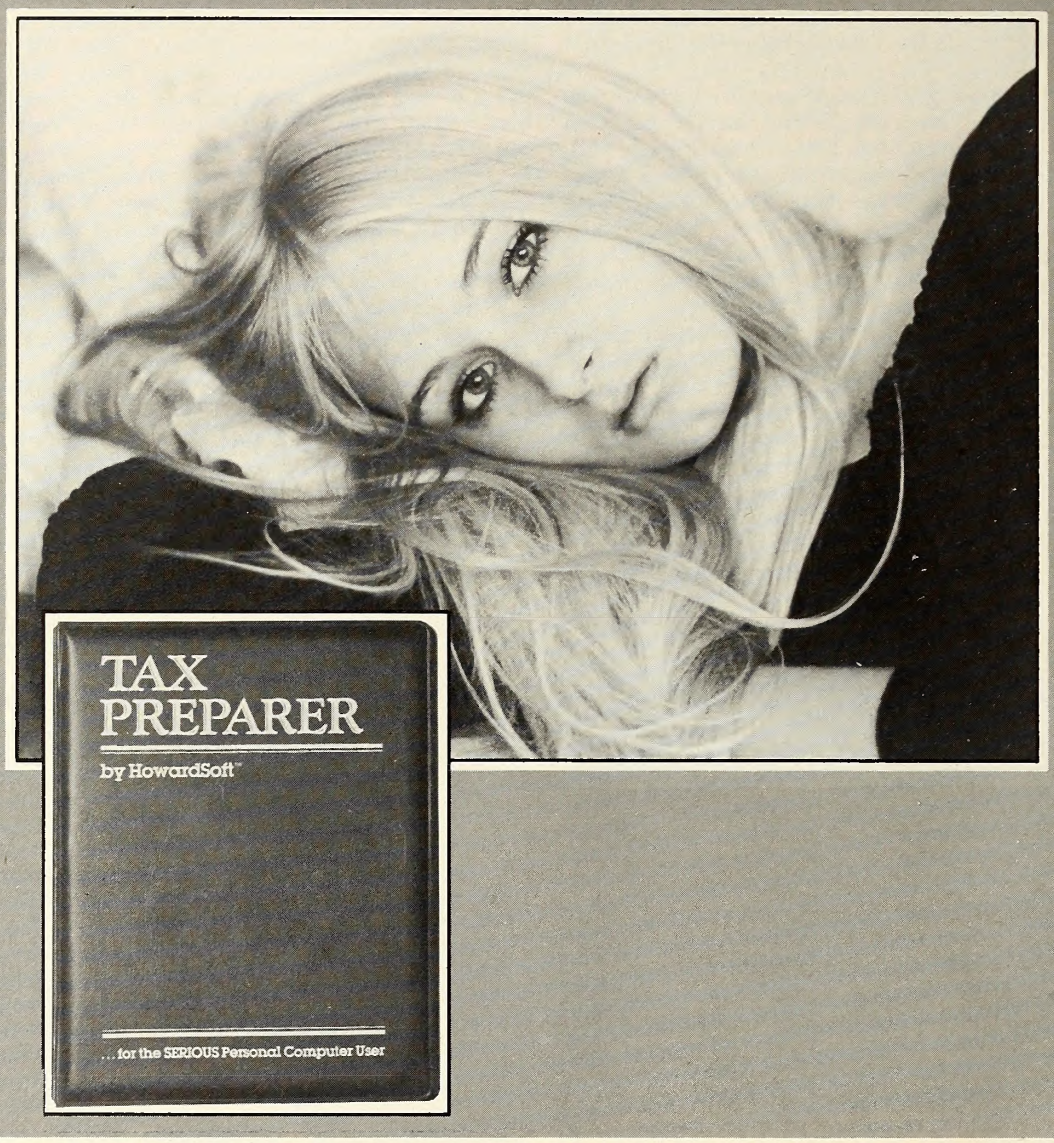

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Mind Your Business

BY PETER OLIVIERI

Data Base Corrections. All of you who have been keeping up with our comments on data bases will want to look at the Open Discussion section of the December issue (page 15), where you'll find additional comments about and corrections to our reviews of both *DB Master* (Stoneware) and *The Data Factory* (Micro Lab). Our thanks to the authors of these programs for helping us keep the record straight.

Computers at Tax Time. While we are all obligated to pay our taxes, we are also duty-bound to take advantage of any tax savings available to us as taxpayers. There's nothing wrong about taking advantage of legal tax deductions. Doing so, however, requires investing some time in understanding what these deductions might be.

Before we discuss some of the things you should consider at tax time, it might be useful to outline briefly certain aspects of taxes. While many of the business men and women among our readers are already familiar with these, the new home computer user may not be.

If you itemize your tax deductions each year, you are already aware of the value of deductions. Each deduction you can claim reduces your gross income by the dollar amount of the deduction. When you finish taking all of your deductions, what remains is the amount of income that will be taxed. Certainly, claiming all of the deductions available to you will work to your advantage, since it will lower the amount of your taxable income.

Depreciation. The cost of certain (usually expensive) items cannot be deducted in full in the year of purchase. Instead, an item of this sort must be depreciated over its useful life. For example, a computer for which you paid ten thousand dollars might be depreciated over a period of ten years, with deductions of $1,000 being claimed each year. As you can see, depreciating an item is actually like taking a deduction. It too reduces your gross income and therefore reduces the amount of tax you are required to pay.

While there are several methods of depreciating an item, the new tax laws specify clearly what method should be applied to computer equipment. We will look at this shortly.

Tax Credits. Tax credits, like deductions, have the effect of reducing the amount of tax you must pay. Tax credits differ from deductions, however, in that they are subtracted directly from your tax liability, not from your gross income. (Tax liability is the figure that's obtained after you've subtracted all of your deductions from your income and then referred to the tax tables that are appropriate to your adjusted gross income range.)

Clearly, tax credits are nice. Because they act directly on your tax liability, they return even more money to your pocket or savings account than deductions do. One significant tax credit to be aware of is the Investment Tax Credit. A tax credit of up to 10 percent may be claimed on certain property you may have purchased during the year in connection with your professional responsibilities. The investment tax credit is in addition to any depreciation deductions that you may have taken.

Do You Qualify? You're probably already aware that you can deduct the expenses you incur in running a business. If you also wish to deduct related expenses, take advantage of the depreciation features, and claim an investment tax credit, you must be able to demonstrate that you have used the equipment for business purposes.

A side business you run from home may make you eligible to take advantage of some of the features we've been describing. For example, you may be using a word processing package to write articles, maintaining mailing lists for local businesses, writing programs as a consultant, or learning about mathematics packages for your use as a teacher. The IRS will be interested in how frequently you use the computer. If you use it only once a year to balance your accounts, it's likely the IRS will be reluctant to consider your computer a business resource. The key to qualifying for this deduction is that the computer must be used in your occupation as a tool. (Using your Apple at home to play *Space Invaders* and *Olympic Decathlon* isn't sufficient to demonstrate that you qualify!)

If you're able to demonstrate that your computer is a business tool or resource, chances are that a variety of other deductions may also be available to you. In particular, you may be able to deduct the cost of maintaining a home office. The rules for verifying that you have a home office are stringent, but if you feel that you may be eligible, by all means take the time to investigate the possibility. Furthermore, if you do qualify for deducting your home office, you may then also add a deduction for depreciating the portion of your home that's used as an office. This could be a fairly substantial sum. Don't

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forget other possible deductions including supplies, books, diskettes, paper, electricity, insurance, and the sales tax on your computer.

As mentioned earlier, the new tax laws provide a new method of depreciating your computer. It is called the Accelerated Cost Recovery Systems (ACRS). Under this system, computers are depreciated over a five year period (over a three year period if they are used in research and development). The depreciation schedule is as follows: 15 percent in year one, 22 percent in year two, and 21 percent in each of the last three years. Thus, if you had bought a $5,000 personal computer that you used for business purposes, you could claim a 15 percent ($750) deduction in the first year.

In addition, you may claim an investment tax credit for equipment with a five-year life which is being depreciated over those five years. This 10 percent tax credit is one of the better savings available to the taxpayer and should be looked into.

What Next? You may be beginning to feel burdened by the complexity of all this. Indeed, tax requirements and regulations do require you to do your homework, but as you can see, substantial savings may be the result of your effort.

Next month, we'll look at some programs you can purchase for your Apple that will help you find your way through much of the maze. Although these programs can't make the decisions for you and can't determine your eligibility for certain deductions, they can help you with some of the mathematics. You and your tax advisor will have to tackle the other sorts of questions.

Many books are available that can help you along the way, among them J. K. Lasser's *Your Income Tax* (Simon & Schuster, $5.95). If you're a teacher, don't be without the *Tax Guide for College Teachers* (Academic Information Services, $13.95). If you buy a book, be sure it includes the latest tax changes and the new 1981 tax forms. In particular, you'll want to look at Form 3468 (Investment Tax Credits), Form 2106 (Use of Equipment in Your Occupation), Schedule C (if self-employed), and Schedule A (for itemizing deductions).

A Final Warning. Please be advised that I am not a tax expert or specialist. I want to point out to you some areas for consideration, but telling the IRS that "Olivieri said it was so" won't reduce your prison term by any substantial amount. Do purchase a tax book (it's deductible). Then if it seems appropriate, see a tax specialist. It can save you money.

The Learning System. Micro Lab has introduced a package called *The Learning System.* This method of teaching requires a 48K Apple with Applesoft in ROM or a language card, as well as one or two disk drives with DOS 3.3. As is the case with many packages, a printer provides enhanced capability.

As we survey some of the features of this package, its utility to both teachers and students will be quite apparent. The reason we are reviewing this package here is that it also has some rather useful applications in the business/office environment.

Essentially, *The Learning System* allows the user to create a variety of tests. These tests can then be administered to students, and the performance of the test takers can be monitored. Provided with the system is an original master diskette (with backup), as well as two player disks. Questions, answers, and student records are stored on the master diskette.

The master menu presents the following list of options: testing, creating tests, creating compositions, reviewing of student scores, status of tests, deleting tests, and initializing user diskettes.

The creating tests option allows the user to create three types of tests: fill-in, column matching, and multiple choice. There is a lot of flexibility within each of the categories. For example, when creating a fill-in test, you can specify a preferred answer, an alternate answer, and a hint. And for column

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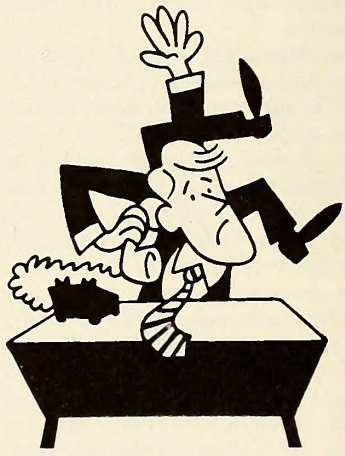

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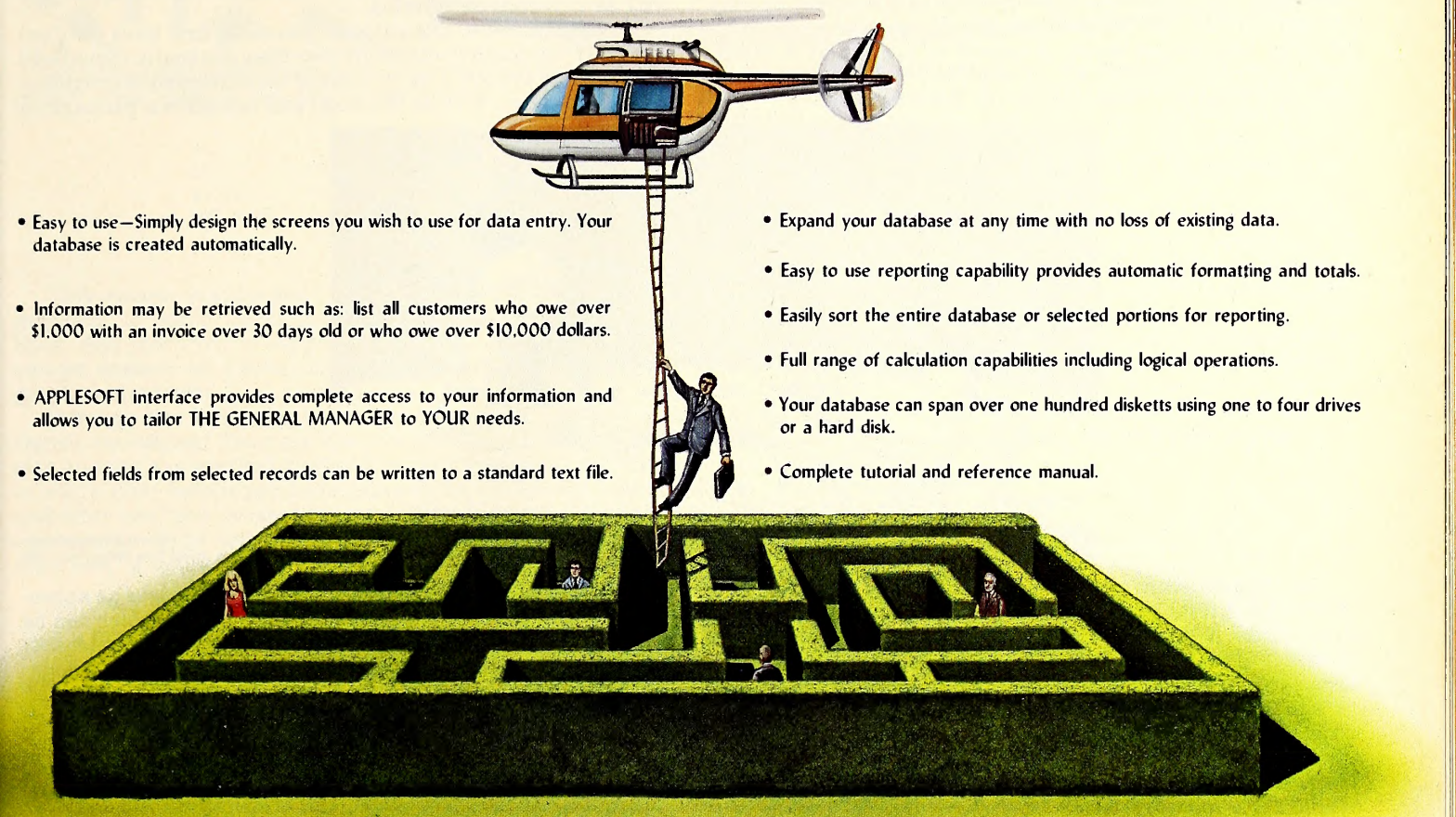

- Easy to use—Simply design the screens you wish to use for data entry. Your database is created automatically.
- Information may be retrieved such as: list all customers who owe over $1,000 with an invoice over 30 days old or who owe over $10,000 dollars.
- APPLESOFT interface provides complete access to your information and allows you to tailor THE GENERAL MANAGER to YOUR needs.
- Selected fields from selected records can be written to a standard text file.
- Expand your database at any time with no loss of existing data.
- Easy to use reporting capability provides automatic formatting and totals.
- Easily sort the entire database or selected portions for reporting.
- Full range of calculation capabilities including logical operations.
- Your database can span over one hundred disketts using one to four drives or a hard disk.
- Complete tutorial and reference manual.

Some database programs let you perform calculations so you can easily handle economic projections, sales forecasting, and cost accounting. Other database programs give you a wide range of search and selection options so you can find the information you need to make daily decisions. Still others format the screen for easy data entry so anyone can use the database. But now, one database program PUTS IT ALL TOGETHER.

THE GENERAL MANAGER is designed after large mainframe database management programs. The hierarchial structure allows up to sixteen unique record formats which interrelate to form the total database. You design the screens the way you want them and then fill them in. It's just like working with a set of blank forms. Information from one screen can be automatically used in other screens. Any fields can be used in complex calculations to figure costs, interest, payment terms, discount rates, recipe proportions, and many more applications. The data built on one screen may easily be used to make comparisons or build totals on another screen.

THE GENERAL MANAGER provides easy-to-use APPLESOFT interface using the ampersand command which allows user programs to read, write, update and delete database records. Uses for this interface are limited only by your imagination. In addition, using your selection criteria, THE GENERAL MANAGER can write selected fields of selected records to a standard DOS text file to be used by word processors or other existing programs.

With THE GENERAL MANAGER you are never stuck with your original database format. You may change the length and type of fields, add and delete fields and add entirely new screens at any time with no loss of existing data. As your needs change The GENERAL MANAGER will change with you. The unique access method of The GENERAL MANAGER allows your database to span over 100 diskettes using from one to four disk drives or a hard disk while at the same time using the minimum amount of disk storage to store your data. The GENERAL MANAGER has the flexibility to handle a recipe file or an entire business system.

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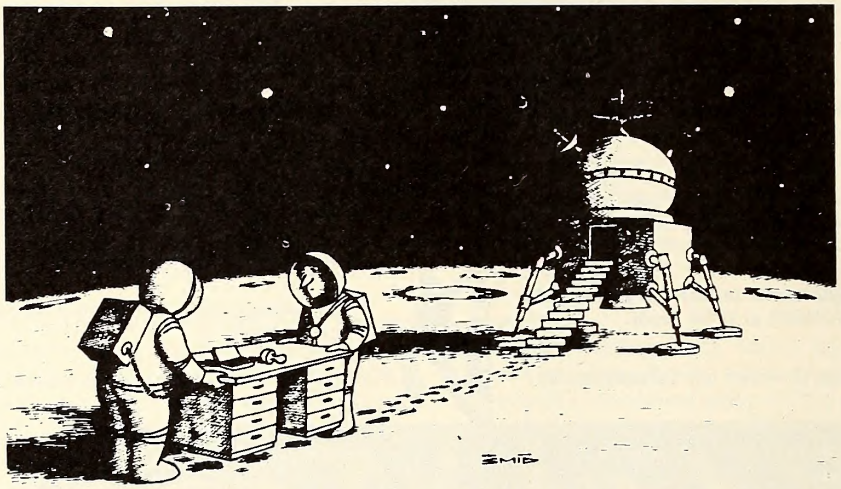
matching tests, extra choices can be listed if you like. You can, of course, modify tests once you've created them.

The creating compositions option allows the user to compose material that can be used as a pretest learning aid. Material in these compositions can be matched directly to test questions, and can even be designed to work with several versions of your tests. It can be displayed before the student takes a test.

Testing is, of course, the main task of the system. When you select this option, you are asked to choose which test you'd like to administer. Students may elect to be given instructions (in which case, the appropriate composition is displayed) or may proceed directly with the practice drill. Questions answered incorrectly will automatically reappear at the end as a retest. Once they've completed the practice session, students may take the actual test. Test scores are stored on disk.



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Reprinted from World Press Review/May 1981

The student score review option allows the test creator to look at what tests students have taken and at their scores on those tests. A detailed display of students' performance is provided. If you have a printer, you can print copies of tests, compositions, student scores, and test analyses.

The application of this particular package in an educational setting are easy to see. But there are many equally good applications in business that may not be immediately obvious. *The Learning System* could be used, for instance, when you're evaluating applicants' skills for a particular position in your organization. A variety of office procedures could be taught, using the computer as a teaching tool. In this way, employees may become familiar with certain company policies, procedures, or rules, or even with how to operate a computer. Because of the compositions option and the feedback that the system provides, employees can learn in a very positive way at their own pace. *The Learning System*'s applications are limited only by the imagination of the user.

The Learning System is a useful package—certainly a valuable addition to both the personal and professional software library. The user's manual is well written and provides a variety of examples that guide the user through all phases of test construction and administration.

The Analyzer. A few issues back we discussed *The Controller,* an accounting package from Dakin5. Now a companion product, *The Analyzer,* is available to accompany it. The *Analyzer* is designed to assemble, evaluate, and distribute monthly information in reorganized forms that are produced by the *Controller*. For example, a budget master option allows you to display projected budget figures, the true figures, and the differences. A profit and loss analysis compares dollar amounts for this year with those of last year on a monthly, quarterly, or year-to-date basis.

For those who wish to perform some financial analysis, the *Analyzer* provides a report of the sources and uses of funds and displays the changes in the balance sheet from last year to this year. In addition, some seventeen financial ratios can be computed, including liquidity ratios (the ability to meet short-term obligations), leverage ratios (the extent to which the company has been financed by debt), activity ratios (how effectively resources are used), and profitability ratios (the overall effectiveness of management).

The cash flow program provides a cash flow projection for the month following the current month twice a month through three future months. Knowledge of your cash flow will enable you to meet expenses and plan for other asset acquisitions.

The *Analyzer* includes sections on balance sheet analysis, interfacing with the general ledger, customizing the *Analyzer* for your organization, and end-of-month closing procedures, as well as a variety of utilities.

Obviously, to use this package you must first have the *Controller*. If you do have the *Controller* then you really should add this package to your library. Dakin5 is committed to providing the business user with as thorough and complete a package as possible and intends to release companion packages as appropriate. A new product, the *Depreciation Planner*, which can be linked to the *Controller* or used alone, has just been released. The documentation is complete and the user guide is well done.

The Readers Speak. "I currently have a single Apple in my business. It is clear that we could use several of them (perhaps one on each manager's desk). Is it possible for several Apples to share data on a disk? Can the Apples 'talk to each other'? How do I find out more information about these possibilities?" K. S., Houston, TX.

Yes, it is possible for several Apples to share the same disk, and it is also possible for them to talk to one another. The feature you are describing is more formally called *networking*; that is, using a network of microcomputers. This is not a new concept, and in fact, several organizations now have Apple networks in operation. Under this arrangement, each user has his or her own computer to work with, can access a common data base, and can communicate with other users. In addition, each user can share any peripheral equipment (such as a high-speed, letter-quality printer).

A network of this sort would require (in addition to the Apples you'd add): a large storage capacity hard disk (don't forget to consider backup), interface cards for each Apple, and connecting wires, as well as a printer.

At present, we're aware of four manufacturers that provide network capability to an organization. These are Corvus Systems, Nestar Systems, Santa Clara Systems, and Micromation. In a future issue, we will discuss networking in depth. Perhaps we might even profile a particular business user.

Take care until next month. Let me know if there's something in particular you'd like to see covered in the future. ◨

Micro Lab, 2310 Skokie Valley Road, Highland Park, IL 60035 (312) 433-7550. Dakin5, Box 21187, Denver, CO 80221 (303) 426-6090. Corvus Systems, 2029 O'Toole Avenue, San Jose, CA 95131 (408) 946-7700. Nestar Systems, 2585 East Bayshore Road, Palo Alto, CA 94303 (415) 493-2223. Santa Clara Systems, 560 Division Street, Campbell, CA 95008 (408) 374-6972. Micromation, 1620 Montgomery, San Francisco, CA 94111 (415) 398-0289.

All About Applesoft

by Doug Carlston

Greetings and welcome back to the wonderful world of Applesoft. This month's vocabulary list follows:

<--	-->	ESC-I
ESC-J	ESC-K	ESC-M
ESC-@	ESC-F	CTRL-S
LIST 10-50	LIST 10,	PEEK (33)
	POKE 33,33	

This episode is supposed to cover editing and introductory graphics. It won't. There just isn't space to cover both this time. And since you're supposed to finish the spinach before you get dessert, we'd better begin with the editing and save the graphics for later.

Editing. The Apple keyboard has three keys that are designed for editing. They are the two arrow keys on the right side and the key marked ESC on the left. There are two times to edit a line: before you have pressed the return key (easy) and after you have pressed return (a little harder). Let's take an example. Type *new* and then *home* (pressing return after each one, of course). Now type this:

```
10  PRINT "THIM IS OUR FINEST HOUR."
```

Don't press return. The flashing cursor should be blinking right next to the final quotation mark. As you may have noticed, the word *this* has been misspelled. To remedy the situation, use the left arrow key to back the cursor up until it is positioned directly over the mistake. Then type S and use the right arrow key to advance the cursor to the end of the line. Then (and only then) press return.

What has happened is this. As you type on the computer, each character you type (up to a maximum of 255 characters) gets stuck into an area of memory called the keyboard buffer. This information is ignored by the computer until you press return, at which point the computer examines the buffer to see if you said anything of value.

The left arrow is a signal to move the cursor one space to the left and to remove the last character thrown into the keyboard buffer. It does not relate directly to what is on the screen. This may not make much sense until we talk about the ESC (escape) key in a couple of minutes, so just file it in your pending buffer.

The right arrow is a signal to copy whatever character the cursor is sitting on top of into the keyboard buffer and then to move the cursor one space to the right. Generally, it saves the effort of retyping a line. Don't ever fall into the trap of using the left arrow to back up to an error, fixing it, and then pressing return. Everything backed out of the keyboard buffer by use of the left arrow has to be replaced there, either by retyping or by using the right arrow.

So much for the easy part. But what if the fatal return key has been pressed? How do you get up to that blemish in the code? (Some of the more observant may already have noticed the absence of an up arrow key on the keyboard.) This is where the escape key comes in.

The escape key can be used to position the cursor on the screen. There is a diamond on the right part of the keyboard made up of the I-J-K-M keys. These keys can be used in escape mode to move the cursor up, left, right, and down. To get into escape mode, just press the key marked ESC once. Now press the I key and watch the cursor move up one line. If you accidentally press any key other than these four (with a few exceptions that we aren't going to get into right now), you will exit escape mode and will have to press the escape key again to get back into it.

When you are in escape mode, nothing that you type gets put into the keyboard buffer. You can travel from one corner of the screen to the other, passing over words, line numbers, and whatever assorted trivia you have on your screen, and your buffer will still be as clean as a whistle. The *only* way to put anything in that buffer is to leave escape mode and then either type a character or use the right arrow key to copy something from the screen.

Now that we know what we are doing, let's try some practical examples. Type *new* and enter the following listing:

```
10  HOME
20  VTAB 10: HTBB 14
30  PRINT "THE STORY OF":HTAB 14
40  PRINT "MY LIFE";
50  HTAB 14: PRINNT "----------":HTAB 14
60  PRNT "BY PEACHIE KHAMA"
```

Make sure to include all the mistakes. Try to *run* it if you like. Bingo. "Syntax error in 20." It won't be the last time.

Now to edit out the mistakes. Type *list.* Then press the escape key and use the control diamond of I-J-K-M to position the cursor over the 2 at the beginning of line 20. Using the right arrow, copy over the line until the cursor is on top of the error. Correct the error and then continue to copy the rest of the line with the right arrow key.

Finally, press return, and the new corrected line 20 will replace the old one in the Apple's memory. Type *home* and then *list* to check this.

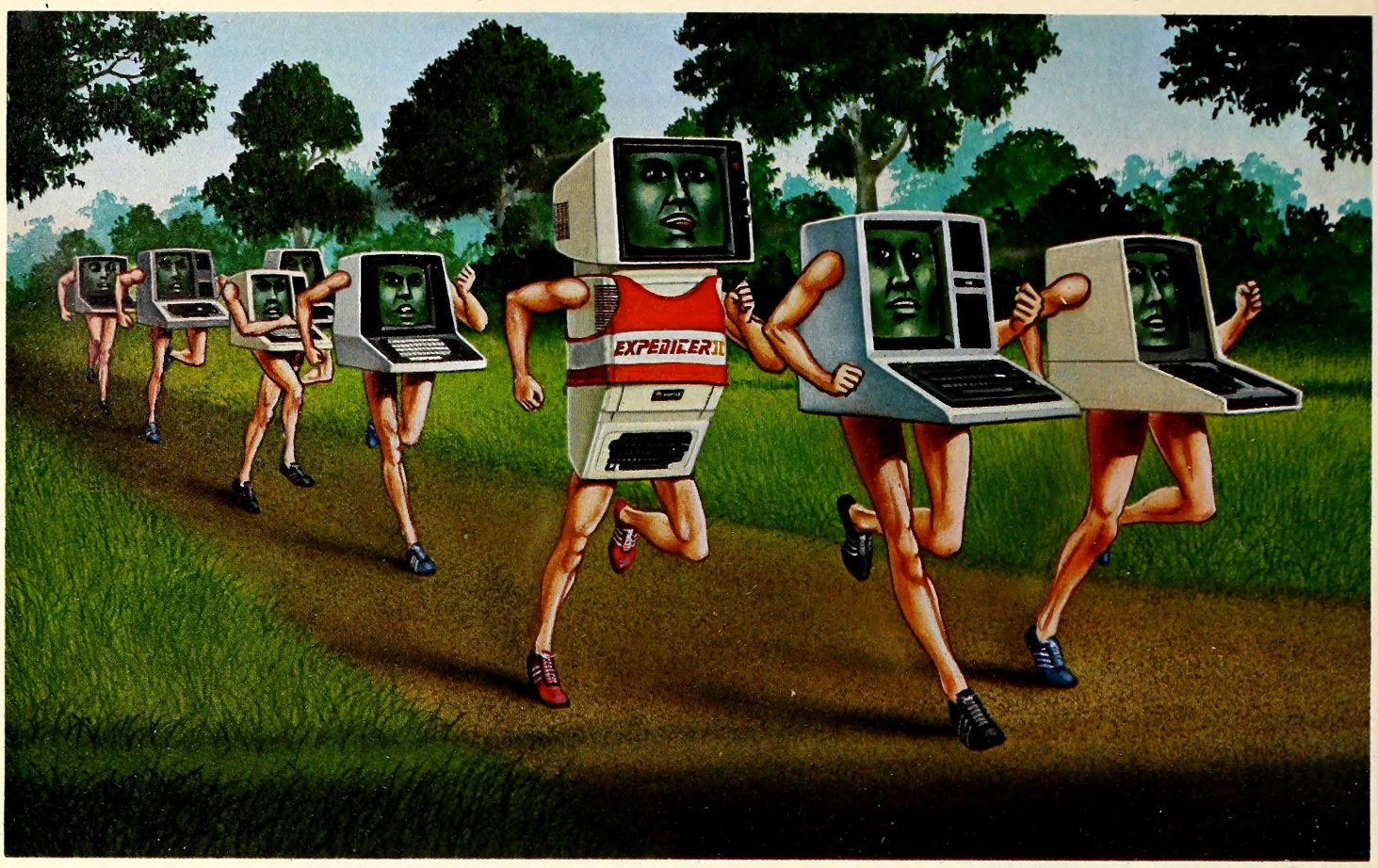
Next, let's remove the semicolon at the end of line 40. It shouldn't be there anyhow. Escape up to the beginning of the line. Then hold the right arrow down and press the REPT (repeat) key on the right side of the keyboard until the cursor arrives at the semicolon. With the cursor on top of the semicolon, press return. No more semicolon.

When you bounce around a lot on the screen, it may start to get a little cluttered with bits and pieces of old lines. There are a couple of quick commands for cleaning up the screen that you might want to make note of before continuing. Both are entered from escape mode. Escape-@ (the escape key followed by shift-P) will clear the entire screen, just like the command *home.* Escape-F will clear the screen from the cursor on down, a very handy command to remember if you have to do a lot of editing.

Deleting and inserting are perfectly possible using the editing commands. Let's try a deletion first, since it is a little simpler. LIST the program and look at line 50. The PRINT command has an extra N in it, so enter escape mode, cursor up to the 5 in 50 and then use the right arrow key to copy over until you reach the first N in PRINNT. Now reenter escape mode by pressing escape and press K to skip over the first N. Then continue with the right arrow key across the rest of the statement and press return. Type escape-F *list 50* to see the results of your handiwork.

You may have noticed that the first time you pressed the

WE'RE BUILDING UP SPEED



The race has just begun

A recent article in "INTERFACE AGE" tested 45 of the most used BASICs on 48 different microcomputers. That article judged that if you are an APPLE owner writing programs in APPLESOFT, you have the nineteenth fastest BASIC/computer combination tested.*

–THAT WAS BEFORE EXPEDITER II.–

If you're an APPLE owner *with EXPEDITER II* writing programs in APPLESOFT, you can now have your BASIC program judged second in the same comparison - with a minimum of effort. You need only LOAD your program, BRUN EXPEDITER, then save your program.

EXPEDITER II is a new programming utility which translates your APPLESOFT programs into machine language, usually on the first try. Problem spots in the code are flagged during compilation. The new compiled code supports all the features of APPLESOFT including HI-RES graphics, shape tables, LO-RES graphics, defined functions and DOS commands. EXPEDITER II is the only compiler to support global string variables easily. There is no additional BASIC syntax to learn. The only real difference you'll notice with the new program is that it's faster - *usually two to twenty times faster.*

Other APPLESOFT compilers are available for the APPLE, but none have all the features of EXPEDITER II. EXPEDITER II, with its new MEMORY COMPRESSION OPTION can reduce your compiled program size by up to 50 percent. (Remember: a machine language program is normally bigger than a BASIC program that does the same thing). It's also compatible with MMS II** to help you solve any memory problems you might encounter.

We make your compilation process easier by providing a symbol table and address listings for each line of your BASIC program. EXPEDITER II even allows you to reserve areas for machine language subprograms or graphics. Debugging is facilitated by EXPEDITER IIs support of the Applesoft TRACE command.

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The Optimizing Applesoft* Compiler

By Shmuel Einstein and Dennis Goodrow EXPEDITER II is a trademark of Einstein/Goodrow

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right arrow after using the escape commands, your Apple failed to respond. This is because the Apple takes the first non-edit character as a signal to leave escape mode rather than as an actual character. Not to worry. If you use the repeat key and the right arrow together, you may not even notice it.

Insertion is a little more difficult, but only a little. We happen to have a candidate for insertion in line 60. Escape up to the 6 in 60. Then use the right arrow to cursor over until the cursor sits atop the N in PRNT. At this point everything up to the N has been entered into the keyboard buffer. Now reenter escape mode and press J to backspace one space (do *not* use the left arrow—the left arrow will delete the letter R from the keyboard buffer, and that would never do). Then press the space bar (or any other key) to exit escape mode and type the missing I. You should then be able to cursor over the rest of the line without any problem and press return.

As you have doubtless noted, the line now looks something like this:

```
60  PINT "BY PEACHIE KHAMA"
```

However, list the program again and look at line 60 as it appears on the screen. It should look correct now.

Run the program now. You may want to go back and edit it some more to spruce it up. Or then again you may not.

Long Programs and Long Lines. If you have gone off on any tangents before now and tried to write some longer programs on your own, you may have run into a couple of problems that we haven't discussed yet. If you write a program that is more than twenty-four lines long you will find that it doesn't all fit on the screen at one time when you *list* it. In fact, the part of your program that interests you may have scrolled completely off the screen before you can examine it.

You can stop the screen listing in midstream by pressing control-S, and if you are quick enough you may get just the part you want in front of you. Pressing any key will then cause the listing to resume. If you want to break into the listing or call the whole thing off, use control-C.

If you want to list only a part of your program, you can qualify the *list* command: *list 100-200* works, as does *list 200-*. You can substitute a comma for the hyphen if the spirit moves you—the Apple shows some rare flexibility in this instance.

Now on to the problem of long lines. As we mentioned, the Apple takes whatever you write and formats it by adding spaces between commands and by indenting certain lines to make it all more readable on the screen. There is one flaw in this scheme of things. If a line needs editing, automatic formatting can be a real nuisance. Suppose you want to edit the following line in your program:

```
10  PRINT "THIS IS THE WAY THE WO
    RLD EMDS."
```

As you can see, this line wraps around onto two rows, and the part that needs editing is on the second row. To edit this you must enter escape mode as usual and then use the edit diamond to position the cursor over the 1 at the beginning of the line. If you then use the right arrow and repeat keys to push the cursor along until you reach the error (remember, of course, to cursor to the end of the whole program line once the correction has been made), you will get something like this when you run the program:

```
THIS IS THE WAY THE WO      RLD ENDS.
```

Look familiar? Join the club. You can avoid this in any of several ways. First, when you are copying the line by using the right arrow key, you should stop as soon as you have reached the space after the O in *world*. Press escape at this point, cursor to the right with the K key until the cursor is positioned over the R, and then continue with the right arrow key to the end of the line. There are better ways, however.

The best way is to go down to your local computer store and purchase Neil Konzen's *Program Line Editor* (Synergistic Software), the most valuable programmers' utility an Applesoft programmer can possess, and one of the least expensive.

Alternatively, you can annihilate the Apple's formatting propensities. As we mentioned earlier, the Apple's screen has forty columns; that is, up to forty characters can be printed on a single row. If the screen width is narrowed to less than thirty-four characters, the Apple automatically turns off its screen formatter.

The Apple keeps track of the number of characters it is supposed to print on each line in an area of its memory called the zero page. Without getting into the details of where things actually are under the hood, this is an area used internally by the Apple and not ordinarily visible to us. However, it is possible to peek into this area and even to modify it if we know what we are doing. Try typing the following direct command:

```
PRINT PEEK (33)
```

Location 33 is the area in memory where the screen width is stored. If we haven't messed with it, it will always return a value of 40. Now let's mess with it.

Go ahead and type in the line 10 above, including the misspelling at the end. Then type escape-@ to clear the screen. Now let's change the screen width. Type: *poke 33,33*. The command *poke a,b* means put the value B in the address A. If you now type *print peek (33)*, you should see the new value.

Now *list* the program:

```
10 PRINT "THIS IS THE WAY THE WO
RLD EMDS."
```

Use the escape mode to position the cursor over the 1 as before and then push the cursor along with the right arrow. When you get to the O in *world*, don't stop. You'll see the cursor jump directly down to the R at the beginning of the next row. When you've finished copying the line after you've made the correction, press return. Then type *poke 33,40* and press return again. When you run your program, everything should be hunky-dory.

Now you are a full-fledged editor. Next time, it's on to better and bigger things. No more spinach. ❑■

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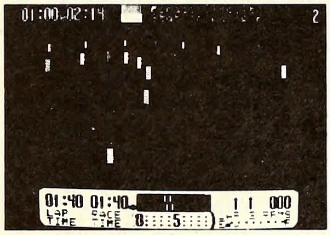

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OPEN DISCUSSION

from page 22

routines were in memory, Apple has not been trying to hide them from us, but they are simply unable to state their location because of their agreement with Microsoft, who wrote the language Applesoft for them. (This is also why they haven't given us a disassembled version like they have with the system monitor.)

I believe the routines in this letter are correct, and I will be happy to answer any questions I can.
Steve Brodsky, Stanford, CA

My guess is that a number of readers have already responded to your request for the machine language addresses of Applesoft's hi-res graphics subroutines. This information is not too difficult to find, if you know where to look. Having been in the same situation before (I wrote a hi-res air combat program in Applesoft that I wanted to convert to machine language), I quickly discovered (as I'm sure you have) that the Apple and Applesoft reference manuals were of little value on the subject. Below is a list of Applesoft's hi-res graphics routines that you (or anyone else) may find useful:

Name	Hex	Decimal
HGR	F3E2	62434
HGR2	F3D8	62424
HCLR	F3F2	62450
BKGRND	F3F6	62454
HPOSN	F411	62481
HPLOT	F457	62551
HLIN	F534	62772
HFIND	F5CF	62927
DRAW	F601	62977
XDRAW	F650	63070
HCOLOR	F6F0	63217

As I stated earlier, these addresses have appeared many times in various club newsletters and Apple publications. One such place is page 83 of *Nibble*, Volume 2/Number 3, 1981. I recommend that you look this over, as it gives the registers that you need to load with certain values (X and Y coordinates, for example) before calling some of these subroutines. For a more complete reference of all Applesoft's subroutines, see the excellent publication of *Apple Orchard*, Volume 1/Number 1, March/April, 1980, pages 12 through 18. Please note that some of the values given here for the hi-res routines are incorrect; corrections appear on page 34 of the fall 1980 *Apple Orchard*.

If you're really serious about converting a number of Applesoft programs to machine language, you might want to consider an Applesoft compiler. However, if you want your program to be completely independent from the language in ROM (or don't have megabucks to spend), you might be better off to assemble the program yourself and write your own set of graphics subroutines. (This brings up the subject of hi-res graphics in Assembly Lines, which appeared in December's Open Discussion in a letter by Ted Young. I feel Mr. Wagner eventually plans to present this information to interested readers; however, being a very complicated subject [graphics animation *without* the use of Applesoft's subroutines], I think it is still quite a ways away. Besides, what would there be left to cover after that?)

I hope this information can be helpful to you, Ace, and anyone else interested in using Applesoft's hi-res commands from machine language.
James Baker, age 16, Alexandria, VA

In response to Ace Colter's letter from the December issue of *Softalk*, I'm fourteen also, and in this letter I will give you the addresses for the routines you wished. I suggest that you also obtain a book that I just recently purchased that maps out the entire RAM memory plus ROM subroutines and special addresses for the Apple II and II Plus. This book gives the special uses, if any, for all locations in the Apple, which is invaluable to any Apple 6502 programmer. Its name is *What's Where in the Apple*, by Professor William Luebbert. The book is published by Micro Ink, 34 Chelmsford Street, Chelmsford, MA 01824.

Getting back to your routines, here are the entry points for several routines and addresses. *Hposn, xdraw,* and *draw* use the Y register for the horizontal MSB, the X register for the horizontal LSB, and the accumulator for the rotational factor. (Use the hi-res map in the *Apple II Reference Manual* to find positions.)

Draw $F601 (−2559)
Hplot $F453 (−2989): plots point after *hposn* is called
Hposn $F40D (−3059): uses A register for vertical position
Scale $00E7 (231)
Hcolor $0324 (804)
Xdraw $F65D (−2467)

Only *hposn* has a horizontal MSB and LSB; *draw* and *xdraw* use the MSB and LSB for origins.

If you have Integer Basic and the Programmer's Aid #1, then you can use the addresses found in the ROM listings at the back of the that manual.
Myles D. Greenberg, Andover, MA

I am writing in response to Ace Colter's letter in the December issue. The Applesoft hi-res routines are listed in *Call-A.P.P.L.E In Depth: All About Applesoft*, pages 55 and 56. If you have Integer Basic, the same routines are on the Programmer's Aid #1. Descriptions of these are in the *Programmer's Aid #1 Manual*, complete with source listings! Good Luck, and happy plotting!
Joe Schwartz, Andover, NJ

Here are a few goodies about using hi-res graphics from machine language in response to several of the letters in Open Discussion. I, too, hope Roger Wagner will soon treat the subject more authoritatively and in depth, but, until then, here are some things to get you started.

The following information comes from *All About Applesoft*, a *Call-A.P.P.L.E. In Depth* magazine, available to members of the Apple Puget Sound Program Library Exchange (A.P.P.L.E.) for $6.50. One may join A.P.P.L.E. by sending a $25, one-time application fee and $15 for one year's dues to A.P.P.L.E, 304 Main Avenue South, Renton, WA 98055.

In an article entitled "Applesoft Intervals," Jim Crossley lays bare many of the entry points for Applesoft, including floating point functions and utilities, initialization routines, miscellaneous Basic commands, and of course, entry points for the hi-res graphics routines. In "Notes on Hi-res Graphics in Applesoft," C. K. Mesztenyi expounds more fully on the Applesoft hi-res graphics routines and here are a few of the secrets revealed:

HGR = JSR $F3E2 —will initialize hi-res graphics page 1.

HGR2 = JSR $F3D8 —will initialize hi-res page 2.

HCOLOR= JSR $F6F0 —will set plotting color to a number from 0 to 7, which must be passed in the X register.

HPOSN = JSR $F411 —position (but doesn't plot) a point on the hi-res screen. The A register must contain the Y coordinate of the point, the X register the low order byte of the X coordinate, and the Y register the high order byte of the X coordinate.

HPLOT = JSR $F457 —similar to *hposn*, but plots the point on the screen. X,Y coordinate passed identically to *hposn*.

HLINE = JSR $F53A —draws a line from last point *hposned* or *hplotted* to the point passed in the registers as follows: Register Y contains the Y coordinate, register A contains low order byte of X coordinate, and X register contains high order byte of X coordinate.

Hope this will help get a few people started. Would like to also congratulate *Softalk* for a great magazine, but also plead for a magazine shipping wrapper of some kind in order to thwart the efforts of the U.S. Post Office. The last issue of *Softalk* had its cover completely separated from the magazine, and the two issues of *Softline* I got looked like wrappers from yesterday's lunch. I would gladly pay a couple of bucks to have it shipped to me in a manila envelope. After all, *Softalk* is one of the best Apple magazines around, and you can't beat the price!
Randi Rost, Davis, CA

The unbeatable price has fallen victim to a year's time limit, but note the way your Softalk *arrived this month—a baggie, yet.*

Chefs Might Feel Left Out
Besides being extraordinarily stupid, the [C&H Video] ad [October 1981, page 141] is an extremely good example of blatant sexism. I wonder if it has ever occurred to to the C&H Video Company that males can also cook, and that perhaps a "wife" might be running the computer, not the male of the household. If the leaders of this company, presumably males, really want to do something nice for their wives, perhaps they could stop running ads which portray women in this light. There is enough software junk on the market already. One hopes C&H Video will quietly fade away.
Michael Schuyler, Kingston, WA

Tongue-in-Cheek Paul Strikes Again
Thanks to your readers I have solved my recent problem with my eighteen-inch disk containing my favorite programs.

I am working on a new program entitled "How Not To Pay Income Tax at All," which will include subroutines such as:

How to have more cash in your pocket each month.
How you can benefit from inflation.
How to buy income property with $10.00 down.
How to double your money each year.
How to invest your money to make more money than you will ever be able to spend.
How to do this without leaving your home.

Because of my limited skills in programming, any help your readers can offer to get this program going would be appreciated.

I have an Apple II, a TRS-80 Model I, an Underwood manual typewriter, and an Atari pong game all in good condition.
Paul Raymer, Las Vegas, NV

Knocking at the Right Door
I am a sixteen-year-old High School Senior and a reader of *Softalk* for the last two years. I wrote a College Entrance Essay which may be of interest for your Open Discussion section.

Jossy and the Apple
Two years ago a new addition to our family changed my life. This offspring was born in Silicon Valley, California. Its name was Apple II Plus.

Apple has become an important member of our household. We try to share it equally; sometimes it is hard!

When I first used it, I thought it was the most clever electronic game I had ever seen. One word of command would display a whole world of fantasy and fun on the monitor. Then I became curious about the programming that made that entertainment possible. I started to learn Basic. I liked this language. It reminded me of an endless puzzle where each piece had its own place in the proper sequence. It also often frustrated me with the display "syntax error." Then, with work and patience, I would find the "bugs," do my "debugging" and . . . I had working programs!

Now I want to learn the different languages that make the computer work for humans. Today Fortran, Cobol, Pascal, and others are just names to me. Tomorrow I want these names to become my tools. I want to acquire that knowledge and create with it. I am also fascinated by the inner works of the microprocessor and the technology that is changing the way we live.

When I first saw the Apple sitting in our family room, I did not know I was looking at my future. Now I do know.
Jossy Fogelson, Wilmette, IL

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THE BASIC Solution

By Wm. V. R. Smith

Welcome back to the Basic Solution. It is really gratifying to see the favorable response that many of you have for the Basic Solution. The majority of the questions will be answered in upcoming issues.

Lawrence Grabinski of Burbank, IL, has written a very interesting letter in which he explains a way to improve and speed up the *Knight's Tour* program presented in the November issue. Lawrence used Hayden's *Applesoft Compiler* to speed up the execution of the Basic code. For those of you who did not believe the *Knight's Tour* was possible, a printout is supplied for your review.

KNIGHT'S TOUR

10	33	20	17	60	35	56	51
19	16	11	34	21	50	61	36
32	9	18	59	30	57	52	55
15	12	31	22	49	54	37	62
8	5	14	29	58	63	48	53
13	26	23	6	41	38	45	64
4	7	28	25	2	43	40	47
27	24	3	42	39	46	1	44

WORKING ON NUMBER 64

If any of you are interested in receiving a copy of this program, please send a self-addressed envelope, to Knight, in care of *Softalk*, for a photocopy of the routine sent in by Grabinski.

This month's Basic Solution deals with one of the most irritating aspects of the Basic input statement. How many times have you written a program that requests a number of some type, then found yourself running all over the house for a pocket calculator to multiply or divide or add some numbers together to answer the computer's request? There you are with $2,000 worth of computing equipment and you're searching for a $10 calculator to do a simple mathematical problem.

Wouldn't it be wonderful if Basic would interpret your input and do any mathematical functions requested by the user? The enclosed subroutine will analyze a string for the occurrence of any mathematical character, perform the functions requested, and return in a string the proper value.

This same routine will check for the occurrence of string data and not perform any mathematical functions, thereby allowing the routine to be used for any general input.

Those users familiar with the input structure of *VisiCalc* will immediately appreciate the structure and power of this subroutine in Basic.

The Basic Solution is anxious to hear from *Softalk* readers who have created original programs that they would like to have included in the Basic Solution. A $10.00 credit at your local computer store will be awarded to any author whose subroutine is published or mailed out to *Softalk* readers. If any of you have questions about this month's subroutine, please write in as soon as possible so we can include your comments in our upcoming issue. Please direct all correspondence to Softalk Basic Solution, 11021 Magnolia Boulevard, North Hollywood, CA 91601.

```
10  REM *
11  REM *                                  *
12  REM *          INPUT CALCULATOR        *
13  REM *                                  *
14  REM *          COPYRIGHT (C) 1982      *
15  REM *          WILLIAM V R SMITH       *
16  REM *                                  *
17  REM  ************************************
18  REM
20  INPUT "PLEASE INPUT A MATH PROBLEM";A$
30  GOSUB 100
40  PRINT A$
50  END
100  REM  ************************************
101  REM *          VARIABLE PARSER         *
102  REM  ************************************
103 L = LEN (A$):F = 2:A1 = 0:A2 = 0:P = 1:H$ = ""
105  IF L = 0 THEN RETURN
110 C = ASC ( MID$ (A$,P,1)):P = P + 1
130  IF C > 64 THEN RETURN
135  IF C = 46 THEN 170
140  IF C > 41 AND C < 48 THEN GOSUB 200:F = C
     - 41: GOTO 110
160  IF C < 48 OR C > 57 THEN 200
170 H$ = H$ + CHR$ (C): IF P > L THEN GOSUB 200:
     GOTO 600
180  GOTO 110
200 A2 = VAL (H$):H$ = "": GOSUB 300: RETURN
300  REM  ************************************
301  REM *
302  REM * PERFORM MATH FUNCTION
303  REM *
304  REM  ************************************
305 F1 = F:F = 2
310  ON F1 GOSUB 330,340,320,350,320,370
320  RETURN
330 A1 = A1 * A2: RETURN
340 A1 = A1 + A2: RETURN
350 A1 = A1 - A2: RETURN
370 A1 = A1 / A2: RETURN
399  END
600 A$ = STR$ (A1)
610  RETURN
```

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Clockwise fram upper left: Paul Dina enters traffic infarmatian on the Apple, Steve Waadburn makes a live traffic repart, drive times generated by Apple, underside af cansale with upside down Apple and disk drive.

HEAVY TRAFFIC:
Apples and Metro Traffic Take the Drag out of Rush Hour

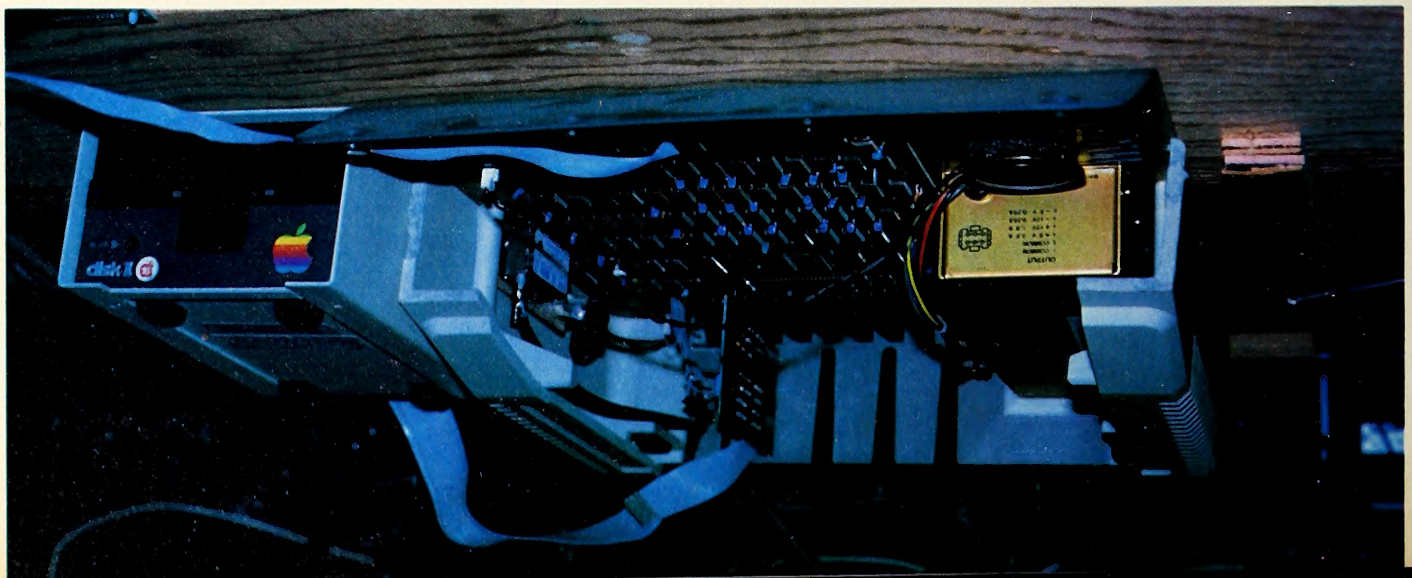
BY DAVID HUNTER

It's a wet and cold New Year's Day and the clouds are hanging low in the sky. It has just stopped raining and you're swooping through the skies of Los Angeles en route to Pasadena.

You've been up since before dawn and the noise in the three-seat helicopter is shaking you up, but you'll survive. Your job is to report the traffic conditions on the freeways into Pasadena. They should be jammed for the Rose Parade and again for the Rose Bowl football game.

Arriving in Pasadena, it is about how you expected it—a mess. You make your reports and you do your job with zeal. It is a beautiful morning and you are glad to be in the air. The pilot swings over the Rose Parade for a moment and you gaze down on the throng. They are a million strong and they are only barely aware of your existence.

And yet you are a part of much of their lives. Not necessarily this particular day, but every working day. They expect you to be up there every day, making their freeway driving



Softalk Photos

easier. Little do they suspect what a great time you have while you're doing it.

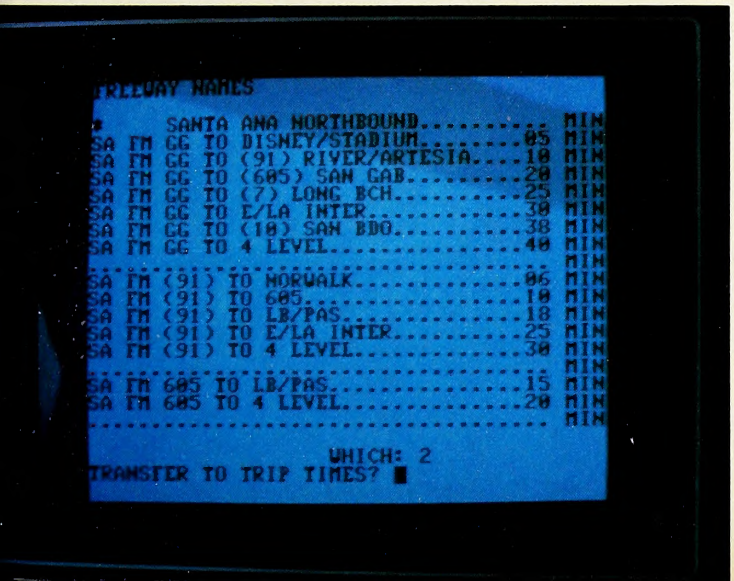
Flying Blind. One of the greatest banes of modern living is the daily commute. It comes in many forms: subways, trains, buses and cars. Any way you look at it, time is wasted and spirits are dampened.

Short of working at home or working the graveyard shift, there is no way to escape the mental frustration and physical discomfort of traffic, congestion, and crowds.

One solution is to redesign cities, making the movement of individuals fast and comfortable, at an affordable cost. In Larry Niven and Jerry Pournelle's latest novel, *Oath of Fealty*, a cubic structure two miles on each side is erected in the city of Los Angeles. The gigantic structure, Todos Santos, is a city within a city where the inhabitants travel short distances by subways, escalators, and elevators. They never have very far to go.

The future may see the elimination of the daily commute in one way or another. Telecommunications will free certain people to work from their homes. Building huge structures is one way to control the movement of people; elaborate people-mover systems and monorails are other ways.

But this is cold comfort for today's commuters stuck on the Dan Ryan Expressway or in the Lincoln Tunnel in bumper-to-bumper traffic. They're looking for something to make their lives easier today.



How do you make the undeviating sameliness of commuting less so? You read a book, listen to the radio, smoke, or look at members of the opposite sex. It also helps to know just what's holding you up and how long it will take to get where you're going.

All forms of commuting have their less than charming aspects (freezing on a train platform in the dead of winter makes for a jolly time), but the car seems the least tormenting of all. In a car you can smoke, drink coffee, listen to the radio, and, most important, be the master of your own destiny on the roads. Unlike a case of entrapment within a train or bus, you can change routes in mid-commute should the need and opportunity arise.

Millions of people begin each day the same way. They get into their cars, turn on the radio, and drive to work.

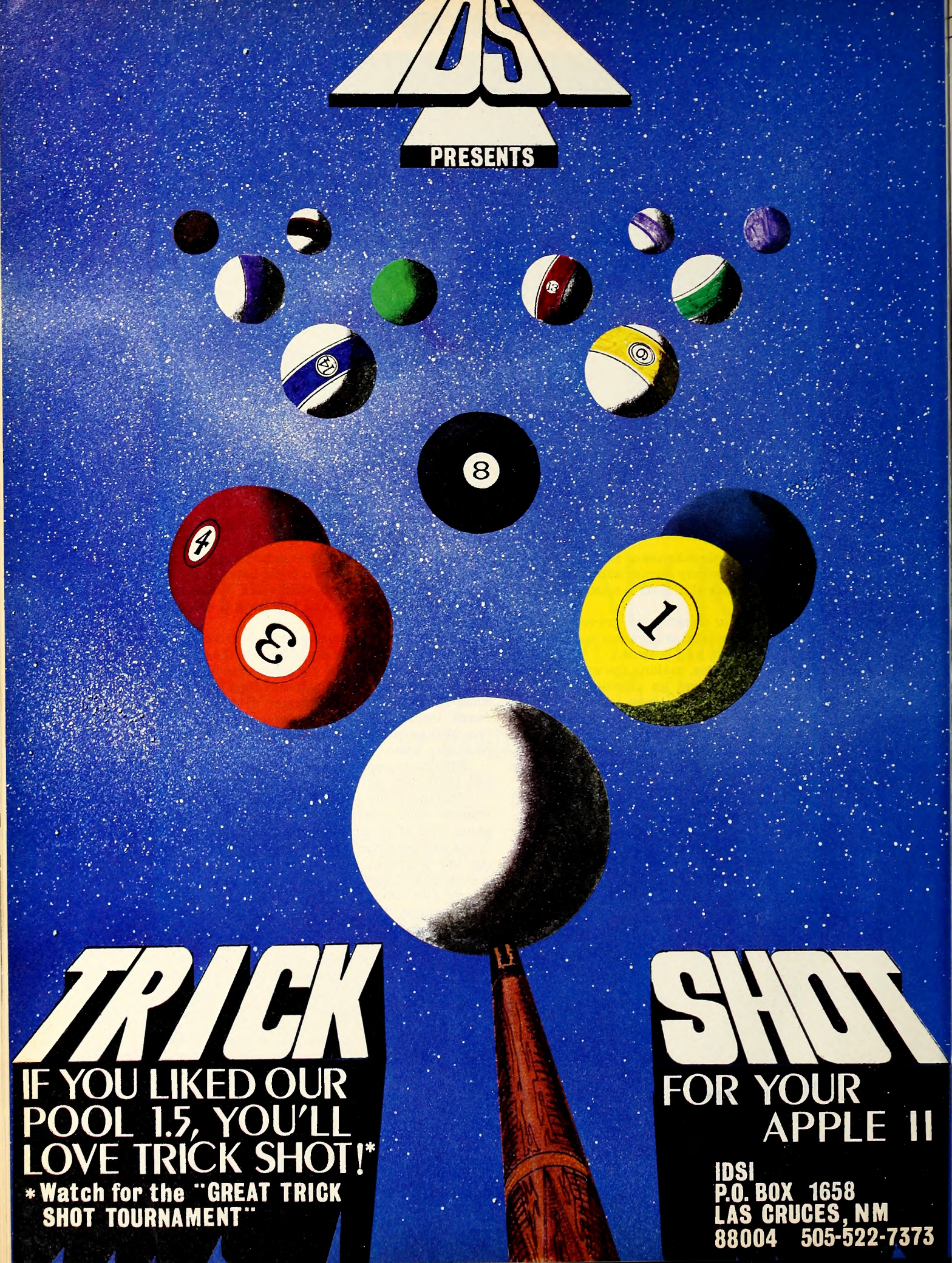
Morning radio stations with a heart have a friendly announcer with a deep voice who makes a few jokes and plays some kind of waking-up music or engages in harmless talk. News and weather reports are universally accepted subjects for the morning, as well as the usual deluge of advertisements. Sometimes it is soothing and sometimes it provides for a rude awakening.

Something that's popped up in recent years is the phenomenon of periodic traffic, informing the listener where accidents and other problems are occurring. The traffic reporters offer alternate routes or at least projected travel times.

Birth of an Idea. It took a Baltimore snowstorm, a traffic jam, and a sharp individual like David Saperstein to put two and two together. Sitting in his car one wintry day three years ago, Saperstein was fascinated by the traffic reporter he was listening to on the radio. The announcer was in a car, reporting from the road, providing up-to-the-minute information.

Many radio stations across the country use their own in-house traffic reporting services. But the cost of quality reporting from the air and on the ground is often beyond the budget of a single radio station. Partial or inaccurate reporting can frustrate and alienate an audience fast. There is nothing worse than hearing that the George Washington Bridge has light traffic when you're inching along the Long Island Expressway.

Today, David Saperstein is the president of Metro Traffic Control, which provides traffic information to more than twenty-four million commuters in twelve cities across the United States.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Every weekday and most holidays a small army of pilots, announcers, and technicians awake before dawn and arrive for work at five in the morning. The battalion of Apple computers that assists the employees of Metro Traffic Control are not spared the early wake-up call.

In three years, Metro has grown from a two-city service to one that includes Boston, Houston, Atlanta, Denver, Minneapolis, Dallas/Fort Worth, Detroit, and the latest addition, Los Angeles. Metro has succeeded incredibly since Saperstein first envisioned a traffic reporting service for the Baltimore and Washington DC areas. Saperstein had no inkling when he started that the idea would take off so fast.

By the end of 1983, Saperstein hopes to have conquered twenty-five of the top thirty nationwide markets. There are even more ambitious plans afoot for the coming years, which should help solidify Metro's position as the foremost traffic reporting institution in the country.

The key to all this success has been what Saperstein calls the credibility factor. It has been proven that people will trust on the spot reporting more than studio reporting. Actually, the reports gathered by the mobile and remote units could be sent to the studio and read over the air with no substantial delay in communicating the information. But it is much more effective to have an announcer in the plane or truck making the report from the scene.

Saperstein didn't stop there. Fixed positions from high vantage points over freeways can be just as good as planes and trucks. Metro invades the top of the Washington Monument at certain times each day, as well as a host of other high spots overlooking freeways across the nation.

Apple at the Core. With all of these various means of gathering information scattered all over a metropolis at a given time, a central location was needed to coordinate the activity and process the information.

At the typical Metro studio there is an announcer, a couple of technicians, broadcasting equipment, two-way radios, and the Apple. The computer operator and the person who takes the incoming traffic information sit on one side of a console with an amputated Apple keyboard embedded in one end, while the announcers and an engineer sit on the other side. The Apple, its keyboard and top removed, is bolted upside down underneath the top of the console with the disk drive attached rightside up next to it.

Portions of the traffic information are stored on the Apple and teleprompted to the announcer. In preparing a report for broadcast, the announcer in the studio reads the items off the Apple and then includes one or more reports from the mobile units; drivers usually double as announcers in the ground units.

The final effect is of having a main announcer who reports major problems and the general conditions of traffic, complemented by on the spot updates from the road or the air. Among other things, this format allows Metro to use existing announcers from participating stations.

A case in point is the new Los Angeles operation. Rhonda Kramer had been reporting traffic at KHJ radio for five years when Metro Traffic approached that station with its offer. KHJ was interested but didn't want to lose Kramer, who had become a familiar voice to the listeners. Metro simply incorporated her into the format and everybody was happy.

Saperstein's grand scheme is to utilize the proper mix of local people familiar with the area and experienced national people to keep things running smoothly. This spirit of moving into an area and using local resources has another practical application. Metro always approaches established aviation companies for the renting of planes and helicopters. Trucks are cheaper than planes so Metro owns and operates its own fleet of ground vehicles.

Tim Kenney is the experienced national figure who came from Denver to be the general manager of the Los Angeles operation. Rhonda and Tim get along extremely well and make for a dynamic duo. It's essential that people get along together in this business. The hours are long and the work can get positively frantic at times.

Rhonda Kramer is a good example of how much people enjoy this line of work. She liked flying so much while doing the traffic that she took it up as a hobby and now is a pilot. Knowing that you are up there, free, while all those other people are stuck on the ground in traffic must be slightly intoxicating.

Glen Ivey works out of Dallas and is the brains behind Metro's computer system that utilizes Apple computers. He is a self-avowed self-taught programmer who spent a great deal of time hopping computer stores looking for the right machine.

Ivey decided on the Apple for several reasons. The most important was mobility. Metro uses Apples in many exotic locations and even has them in trucks in some cities. Another factor for choosing the Apple was reliability. It is unthinkable to have the computer down in the middle of rush-hour traffic. Ivey tested an Apple for months to make sure it would stand the strain of being in use sixteen hours a day.

All the programs that Metro employs are the work of Glen Ivey. Working at first only in Applesoft, Ivey eventually found that certain subroutines would have to be written in machine language.

Basically, the Apple has two functions in the day to day reporting of the traffic. Its primary function is to list traffic information that can be scrolled through by the announcers as they broadcast on the air. Its second function is to compute driving times for a myriad of routes, taking into account delays or the lack of delays, as the case may be.

This second function is accomplished by feeding into the computer a group of previously compiled times for specific routes in various situations. In the course of a normal day, the driver of a mobile unit will radio in the speed he is traveling and his time will be compared against the data in the Apple. A driver may actually be going slower than normal and not realize it, but the computer will. The driver is then informed by the studio that something is up ahead and to continue on and investigate it.

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Ivey describes the program like this: it is like the night of an election, where the news services can predict a winner with only a fraction of the results.

The first function is really more than just putting up information on a screen. Ivey wrote a program for a split screen format where the lower portion of the screen displays information already gathered and the top portion of the screen is reserved for any information that may come in at the last minute. An announcer can change in the middle of a broadcast and add the newest update.

Ivey likens it to a messenger coming up to Walter Cronkite in the middle of his news broadcast and handing him a piece of paper with an up-to-the-minute development.

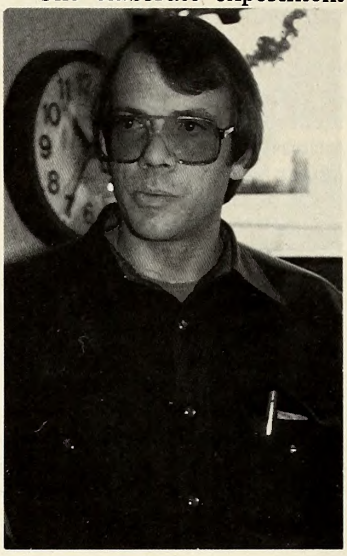
Ivey has tried all kinds of things on the Apple and many ideas have been discarded in the process. Ivey admits to having asked things of the computer that shouldn't have been asked, although some worked out in the long run. The final programs have been very successful and Ivey is pleased with the results. Apparently, the biggest problem with the drive time program is that some people don't drive at the same speed as the mobile unit (they always try to stay with the flow of traffic), which will throw the projected time off.

One effect of Metro's spectacular growth is that they have need of more Apples. As a matter of fact, they are in the process of purchasing approximately twice as many as they now have, close to $100,000 worth of Apples. This will bring all the offices nationwide up to the same standard. For the more than two hundred Metro employees, more Apples will be a welcome addition to the staff.

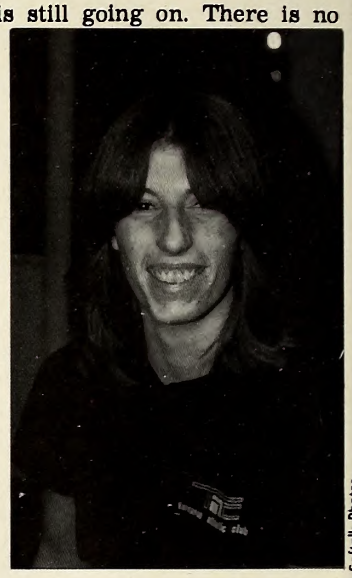
Writing an in-house program is not a unique achievement, but it is one that makes programming satisfying in a different way than producing a software package or game. Ivey is very proud of the system he has put together, but has no plans to sell it at this time or in the foreseeable future. All Metro's programs have been copyrighted as they have emerged.

The Growth of Empire. The Metro uses of the Apple don't end here. Many of the payroll and accounting tasks of the company are processed on the Apple. Saperstein and Ivey hope to hook up all the computers in the company in a nationwide network, making the passing of intercompany memos and information cheaper and faster.

One elaborate experiment is still going on. There is no reason why traffic reporting should be limited to radio, and Metro has been investigating television and its potential for imparting this kind of information. Ideally, an accurate road map, updated on the Apple, will be sent to a television station, with color codes and markings indicating the traffic conditions. The announcer in the studio can then refer to the map in the course of his or her report.



Tim Kenney



Rhonda Kramer

Softalk Photos

Another experiment that Metro has been trying is putting Apples into the mobile ground units. The always inventive engineering department has custom built compartments for holding the Apple, after it has had its keyboard and outer shell removed. Through the use of two-way radios, the driver can produce a report on the spot and send it to the studio in the form of hard copy coming off a printer. This is accomplished by using a 1,200 or 600 baud modem with a normal interface to the Apple, which is interfaced to a two-way radio. The radio frequency is generally as reliable as telephone frequencies.

Saperstein envisions this system having many uses other than reporting traffic. Ultimately, Metro may go into straight news reporting. With the Apple in the truck, a news story could be sent to a studio as quickly as a telephone call but in its final form, ready to be read on the air in a very short time. Soon there may be a lot of disgruntled rewrite men who find themselves being challenged by the Apple.

Metro Traffic Control is concerned with more than just daily commuter traffic, though that is the lion's portion of their work. Holidays are notoriously crowded on the roadways.

This year's Rose Parade crowd was huge and jammed things up greatly. Fortunately, the rain early New Year's Day kept some people off the road. A million people showed up for the parade, but a million and a half had been anticipated. In any event, everything went fairly smoothly and Metro's first Rose Parade was a success.

Other aspects of Metro's operation allow for sending up a plane in an emergency situation in ten minutes. Metro often gets information of stranded cars and accidents from its mobile units before the police or highway patrol. They pass on any information they think will be useful.

Although the Metro mobile ground units are normally not allowed to stop, sometimes it just can't be helped. One poor driver stopped once because a big dog was loose on a freeway in Baltimore. Trying to be helpful, the driver got out of his van

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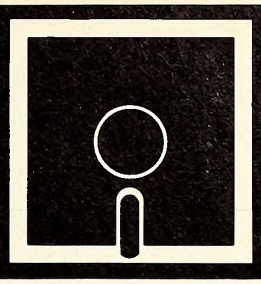

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and attempted to get the dog and hold it until it could be transported safely off the freeway. He got bitten for his efforts.

In another incident, a Metro driver was caught in the middle of a police shootout on a surface street in Denver. They closed off the street, but he was already caught in the middle. Proving his journalistic mettle, he crawled under the truck and reported the shootout as it was taking place.

When the freeways are traffic-free or there are no major difficulties, Metro often turns to problems on surface streets, going out of their way to provide a good product. The barometer for judging whether they are doing a good job is listener response in the form of letters and telephone calls.

Saperstein attributes much of Metro's success to the strong group of people working in the company. "I'm the weakest one. I just take people to lunch and dinner." While Saperstein is wining and dining potential new customers, a typical mobile ground unit may rack up two thousand miles a week.

Saperstein is no slouch, though. He may rack up fifteen thousand air miles a week, supervising various operations and meeting with potential customers.

At this point it costs approximately a quarter of a million dollars to set up a Metro traffic studio, including the cost of mobile ground units, but excluding the cost of airplane and helicopter rentals. The cost is worth it to Metro and the stations that use it. Saperstein boasts that the stations who use Metro almost always see a rise in their ratings, while stations who choose not to use Metro watch ratings go down or stay the same.

Metro has no competition at this point and Saperstein hopes the head start they have gotten will keep them in the lead indefinitely. There may be imitators, but that's a compliment and Saperstein can live with that.

The bottom line with Metro is the working atmosphere. At certain hours of the day, things pile up and it gets hectic in the studio. But that's nothing new in the radio industry and most people seem to enjoy it. You never know what will happen next.

This is also true with the mobile ground units. No day is the same as the one before or the one to come. It seems like a paradox, but it appears that being stuck in traffic can be less than frustrating. If it's your business to be there and you aren't racing to get home or to a football game, then why not make the best of it.

The pilots and announcers in the air are perhaps the luckiest of all. There is something about flying in a small plane or helicopter that makes you want to do it again and again. The Metro corps is like a modern-day dawn patrol that also doubles as a late afternoon patrol. They are a hearty, reliable bunch and they enjoy their work immensely.

Never at a loss when it comes to emphasizing the reasons for Metro's successes, Saperstein has a painting above his desk that explains a lot of it. The painting is of Babe Ruth walking away from home plate dragging his bat. The caption reads: "Babe Ruth struck out 13,080 times." People don't remember you for your strikeouts, but for the home runs you hit.

Carrying the baseball analogy further, Saperstein believes that life itself is like the national pastime. Everybody has a chance to bat and it is up the individual to swing or not. In business, and in life, you have to take chances. Of course, many people try to steal second base with their foot still on first.

In the great baseball game that is life, Saperstein is having a grand time. "It's like working in Disney World." Meeting people and providing a much appreciated product have made this dashing Baltimore used-car salesman a star in the big leagues. There are many innings left and many more at bats.

Commuting and crowded freeways will be with us at least until the end of the decade. By that time, maybe we'll have found an easier way to move people or have redesigned our cities and style of working. This is a task for scientists, engineers, and visionary leaders.

For the moment, we have to live with what we've got and make the best of it. Metro Traffic Control and its battalion of Apple computers is going a long way toward making traveling our highways safer and easier. ■

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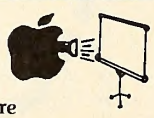

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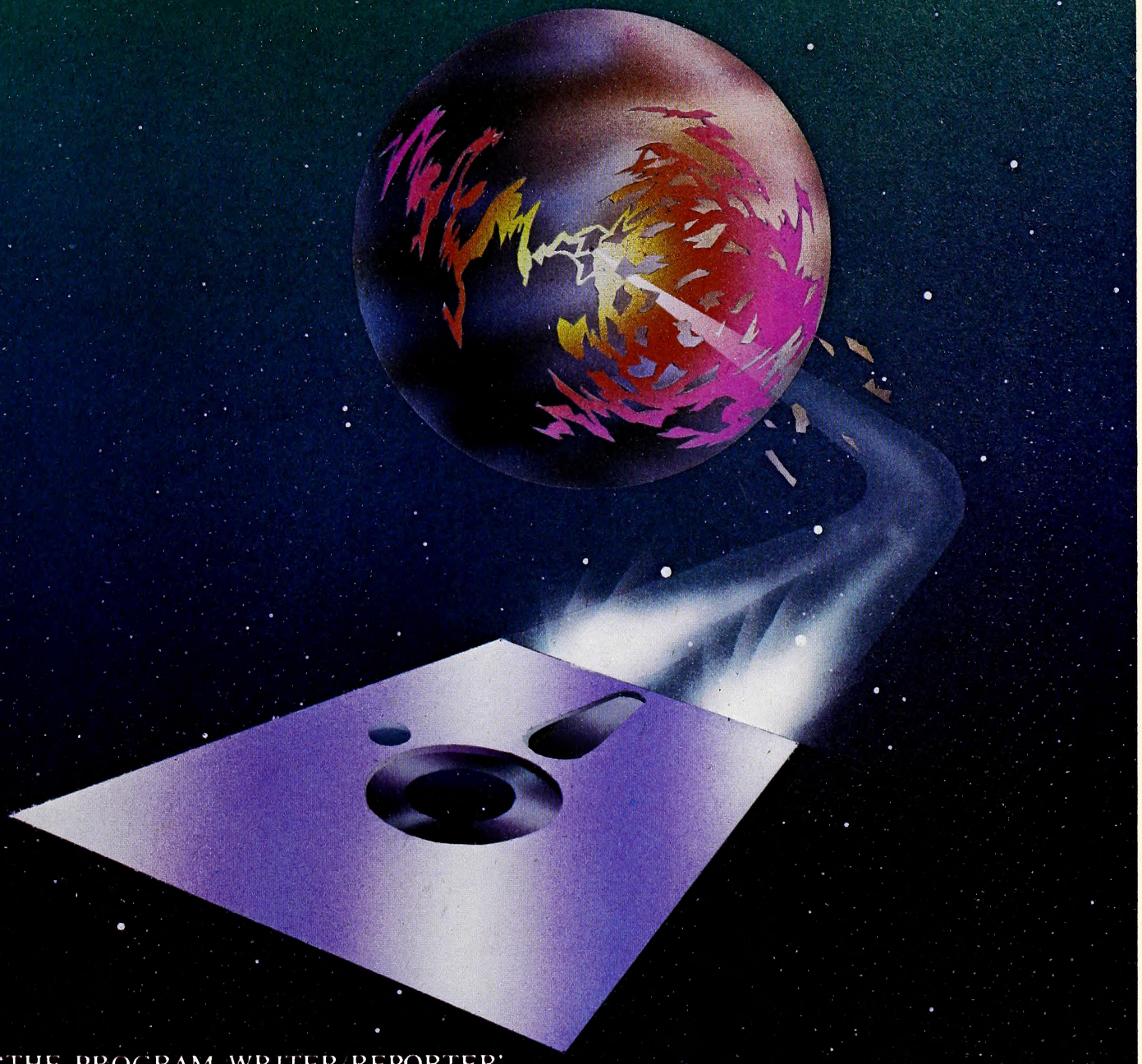

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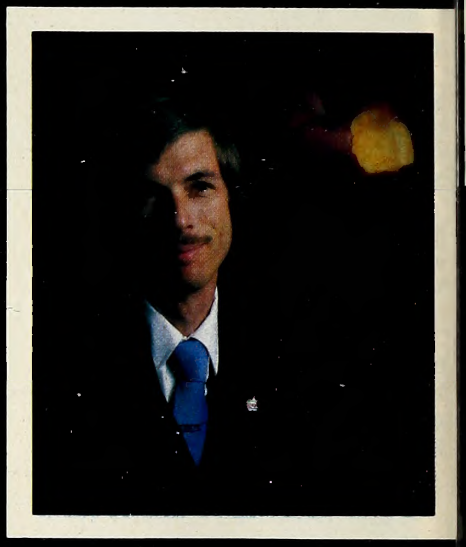

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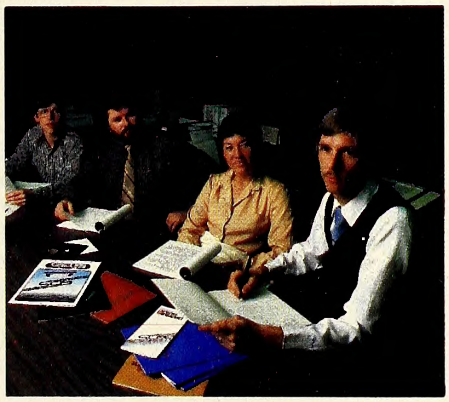

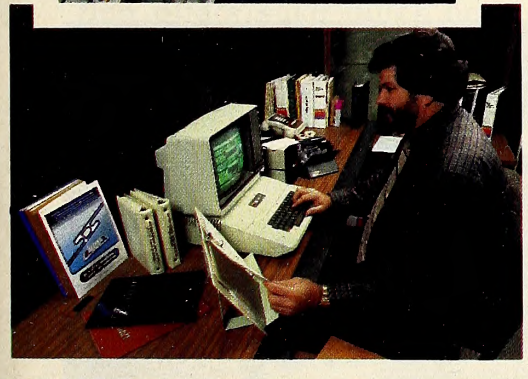

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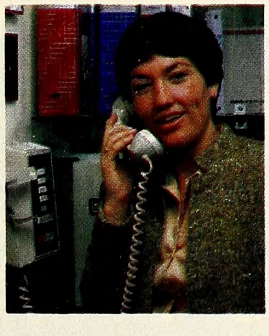

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Buttonwood Apples

BY KEN LANDIS

If you decide to use any of the electronic database services to gather information for your portfolio, you can use a packaged software program to retrieve the data for you and thus avoid having to enter it manually. There are several packages available designed to do just this. As with any other multibrand product, you'll need to identify your needs and then consider several factors to select the best one for you. Some criteria you should determine are: In what form can the data be stored? Is the file structure acceptable to other programs I am considering? What is the vendor's backup policy? How well supported is the package by the vendor?

This month, we'll review three packages. Two are dedicated to the Dow Jones News Retrieval Service and one to Compuserve's Microquote.

Dow Jones News and Quotes Reporter, by Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA 95014; (408) 996-1010. $95.

Backup policy: Master and backup disks supplied with purchase. Replacements made through Apple dealers.

Vendor Support: Varies from dealer to dealer; overall is adequate.

Hardware compatibility: Acoustic or direct connect-dial modems; Apple II or Apple II Plus with 48K RAM.

The *Dow Jones News and Quotes Reporter* includes a contract to subscribe to The Dow Jones System. The contract is executed with the dealer, and all arrangements are made at the time of purchase to receive the local Dow Jones access number and a password. The cost of the package includes a one-hour leisure time usage prepayment on the Dow Jones System. If buyers have previously purchased any of the other packages in the Dow Jones series from Apple, they'll receive a $25 credit to their account. The first time the package is used, it's necessary to customize the package. You're required to enter the local Dow Jones access number, your password, and the printer line width (for making hard copy).

After this housekeeping has been taken care of, you're ready to log-on to the Dow Jones System. If you are using an autodial modem (such as the Hayes Micromodem II) the software will dial the local access number, make connection with Dow Jones, and log-on using your password. If you are using an acoustic modem, the package will display the access number to dial manually. After you have dialed this number, and hear the carrier signal (the high pitched whine), you are instructed to place the receiver in the coupler and press the return key. The software will then connect you to Dow Jones and log-on in the same fashion described earlier.

The package does not allow you to access any of the other services available on the Dow Jones System. If you try to access other Dow Jones services, you will be disconnected from the Dow Jones System. You will then have to dial back manually and log-on to the Dow Jones System. You can request the desired service using the Dow Jones Commands. Dow Jones supplies the necessary instructions, which are easily mastered.

The documentation supplied with the software is well written and clear. There is a glossary of stock market terminology

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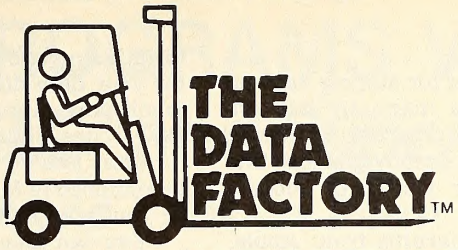

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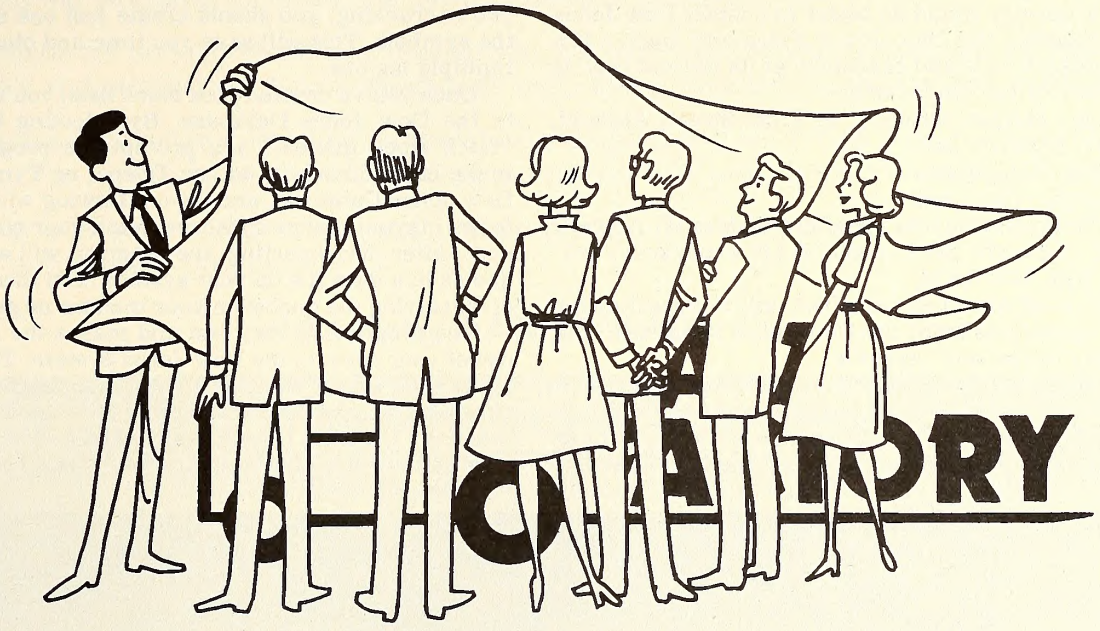

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in the back of the booklet, which is useful.

The package does not have a provision for storing data on disk, thus the user must enter the data manually into another program that will store it. Also, the program requires a modem to be in slot 2 of the Apple, an inconvenience. The package would better allow users their choice of modem placement.

This package is one of the earlier programs from Apple. Given the current state of the art, it is nothing more than a Dow Jones System utility. It would be an ideal package to be given as a bonus to anyone who subscribes to that service.

Consequently, an investor planning to use the Dow Jones News/Retrieval service would do better to contact Dow Jones directly to subscribe; the *Dow Jones News and Quotes Reporter,* in its present state and especially at its present cost, is not an effective tool for the investor.

Dowlog, Stock Market Software, 44 Front Street, Ashland, MA 01721; (617) 881-5190. $80

Backup policy: Copyable.

Vendor support: Excellent.

Hardware compatibility: Hayes Micromodem II; Apple II with Applesoft firmware card or 16K RAM expansion card; Apple II Plus with 48K RAM.

The *Dowlog* program is an excellent utility program for fetching stock quotations from the Dow Jones Database. The program is easy to use and versatile.

The first time the program is used, it must be configured; it requires you to enter a set of fixed parameters that it will use to fetch and print your data. The program allows you to have your modem and printer in any slots, and it has the capability for utilizing two disk drives—one for the program disk and one for your data disk. This feature means that you won't have to touch your Apple until after you've been disconnected from Dow Jones, thus saving log-on time and expense.

After you've configured, or initialized, your system, you'll be required to format a data disk. The program expunges DOS so you have additional storage on the disk.

You can then create a list of stocks (using ticker symbols) that you wish quotes for. You can add or delete stocks from this list at any time. This editing capability allows the stock list to save the fetched quotes in a different data file. However, if you wish to have daily information for your portfolio on the stocks you're tracking, you should create just one stock file with all the symbols. This will save you time and obviate the need for multiple log-ons.

Once you've created your stock lists, you're ready to log-on to the Dow Jones Database. By selecting the menu option "fetch stock quotes," you prompt the program to dial and make connection with either Telenet or Tymnet, request the Dow Jones Database, and log-on. Dowlog will then go directly to the current quotes database, fetch your quotes, and disconnect. After disconnecting, the program will save your fetched quotes in a data file on your system. You then have the option of displaying the quotes on your monitor or getting hard copy.

The program is very fast and makes the most economical use of your time on the Dow Jones System. The speed of Dowlog is such that it will literally pay for itself through the time charges you save over attempting to retrieve this information manually from the Dow Jones Database. The program also allows you to enter quotes manually (from a newspaper or other

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source such as Barron's Market Laboratory).

Another part of the package, the *Dow Jones Terminal Program*, logs you onto Dow Jones and places your Apple in terminal mode. Thus, you'll have access to all the other features of the Dow Jones System without the drudgery of logging on manually.

Dowlog has an edit feature that allows you to change the file headers, should you wish to use these files for other commercial programs or your own. *Dowlog* also allows you to edit manually the price information you have saved in the files. This feature can be used for correcting inaccurate manual entries, changing fractional information to decimal format, or translating prices into foreign currencies.

There are three utility programs included with *Dowlog*.

Change date allows you to change the date of your data file. You may want to do this if you update your data files after midnight, and the date shows the next day. Thus, December 12, 1981 closing prices will be available as current quotes until the opening of the market on December 13, 1981.

Read shows you how to read your data files. It is designed to be used by the investor who wishes to do some custom programming and use the data stored by Dowlog in his or her own program or to convert the data files to a structure required by other programs.

Fraction changes the fractional values in your quotes to decimal form. Some of the commercially available stock analysis packages require decimal information.

Dowlog is a well executed package; any investor who plans on using the Dow Jones Database to collect stock price information will find it well worth the price.

Microquote, by Stock Market Software, 44 Front Street, Ashland, MA 01721; (617) 881-5190; $75.

Vendor support: Excellent.

Backup policy: Copyable.

Hardware compatibility: Hayes Micromodem II; Apple II with Applesoft firmware card or 16K RAM expansion card; Apple II Plus with 48K RAM.

The *Microquote* quote program is a retrieval package that uses the Compuserve database as its source of data. It is similar to the *Dowlog* program; however, the Microquote package is designed to take advantage of the historical stock prices available on Compuserve.

Microquote will retrieve both current and historical data. The program has a feature called "vacation update," which will update your stock files for thirty days or thirty weeks, depending on whether you're using daily or weekly information. The advantage of this feature is that the investor need not log-on every day to get data. The historical fetch will retrieve price information for up to 30 stocks for as many as three-hundred days or weeks, depending on the information the investor is using.

All the other features of the program are identical to those described for *Dowlog*. The program disk has a *Read* program, like the one in *Dowlog*, for daily, historical, and vacation data files.

This program is strongly recommended for any investor who retrieves stock price information from Compuserve. The program is fast, thus saving time charges, and it is a convenient way not only to gather but to store price information.

The next article in the series will begin to explore software packages that manipulate investment data. These packages fall into three general categories: analysis packages, portfolio management packages, and decision generators.

See you then. ■

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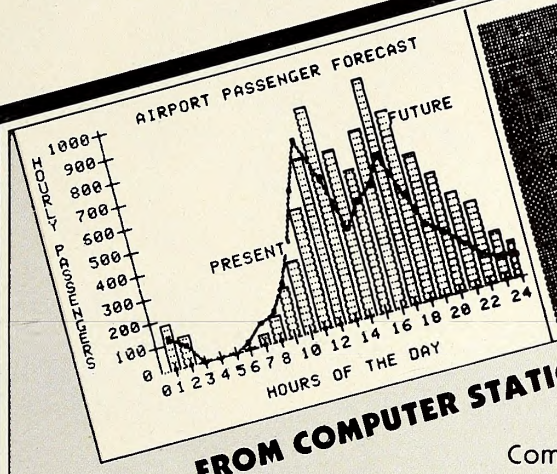

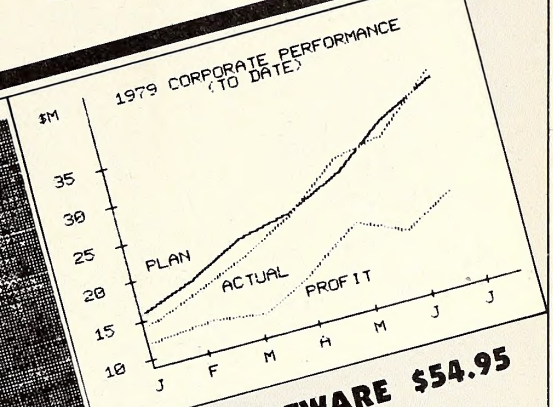

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Conferences Grow

on Trees

BY JEAN VARVEN

Picture, if you will, being able to bring together and confer with some of the most creative minds of the century about subjects that concern you, puzzle you, intrigue you, or make you curious. And, while you're at it, imagine not being constrained by such mundane, yet pivotal considerations as time of day, place of meeting, and schedules of participants. Your meeting can take place whenever the mood strikes you, even in the middle of the night, and it can go on for days, weeks, even months at a time.

Imagine, too, that although your discussion has a feeling of immediacy that's characteristic of conversation, you're also free to take time out to digest the issues and to formulate your responses to the questions raised.

Daydream Come to Life? The mental image you've just generated may not differ markedly from reality. Your picture may, in fact, resemble CommuniTree, an innovative teleconferencing system for the Apple that began operation in March of last year. The conferences it makes possible via computer need not be simultaneous in either time or place; they can occur with a minimum of delay and a maximum of user convenience.

Although it was established less than a year ago, CommuniTree has been a regional winner in a contest sponsored by Johns Hopkins University for new microcomputer applications for the handicapped; the award honored a flagship tree (renamed Knowhere) set up especially to disseminate health information for the disabled. This tree, incidentally, represents the fruition of the dream put forth by Joe Villareal in "Apples and the Handicapped" (October 1980). Villareal spearheads this tree.

Illustration by Michael Hedge

Based in San Francisco, California, the CommuniTree group consists of John James, a premier Forth programmer whose past experience includes programming on an IBM 360; Dean Gengle, writer and conceptual cofounder, who often speaks for the project; and Stephen S. Smith, whose degree is in psychology. Each one brings the benefit of specialized knowledge and unique perspective to the group.

The CommuniTree system consists of two main facets. The first is comprised of conference tree installations located in various parts of the country. Personal computer users who dial in to these trees via modem can connect with others about common interests and concerns. The unique treelike structure of the conferences facilitates both discussion of issues and dissemination of information. People find it easy to make contact with others and to organize from scratch around particular interests.

The second major element is what makes the conference trees possible: it's the CommuniTree software. Created by John James, its availability permits individuals in any community to plant and nurture their own trees. Requirements for setting up an Apple CommuniTree system are a 48K Apple II or II Plus equipped with monitor and disk drive and a Hayes Micromodem II.

You don't need to own the software or a 48K Apple to make use of the various conference trees. All you need is a microcomputer or terminal, telephone, and modem.

Communicating with other Apple owners via modem is neat, all right, but if you own a modem and have used some of the more than two hundred bulletin boards across the country, conference trees may not sound like anything remarkably new. But the name *CommuniTree* and the descriptive term *conference tree* were not arrived at without deliberation; they were chosen with care to describe a concept and communications system profoundly different from the bulletin boards you may be accustomed to. Dean Gengle calls the conference tree "a new communication game with its own rules." The more

Peter O'Halligan/Softalk Photo

The CommuniTree Group: Dean Gengle, Steven S. Smith, and John James.

one learns about CommuniTree, the more meaning this remark has.

Linear Arrangement Makes for Long Way Around. Messages on conventional bulletin boards are stored in linear fashion. They are linked together sequentially by date of entry. Gaining access and responding to messages that intrigue you is often a time-consuming process that involves wading through lots of messages that don't interest you at all. In addition, users who might want to read your bulletin board message are likely to have trouble finding it in the first place. And bringing together the threads of a multientry information exchange that's taken place over a period of time is even harder to do.

Consequently, few in-depth discussions occur directly on electronic bulletin boards. You'll probably see many more one-shot messages—announcements, hardware swaps, and the like, than you will sharing of views and information on an ongoing basis.

Branching Out. Here's where the CommuniTree begins to look less and less like the familiar bulletin board. John James describes his creation as a "tree-structured database of messages, with categories and subcategories determined by the users."

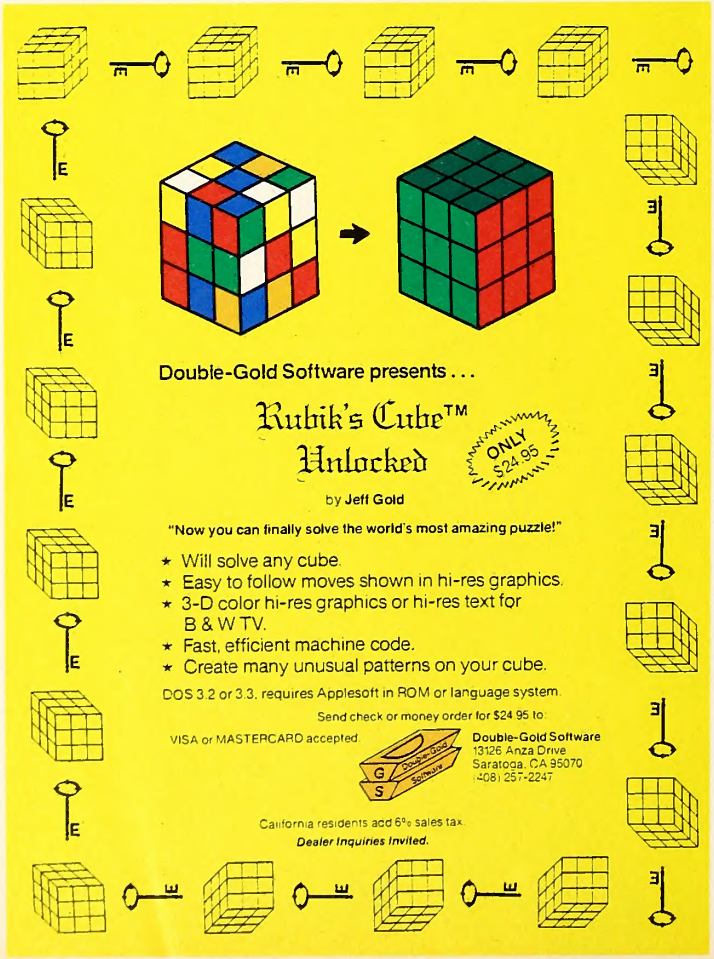
Conference tree messages are arranged hierarchically by subject; that is, they're attached to other messages that have to do with the same topic and are stored by related groups. This branching structure, as opposed to the linear one of bulletin boards, makes information access easy and organized. It also enables a user to follow a discussion from its origin or root outward through its various branchings and buds to its full foliage.

CommuniTree has only nine basic commands, and four of these—*read, browse, index,* and *add-to*—serve most users' needs quite handily at the beginning. When users first dial into a system, they're given an explanation of the setup and command structure and encouraged to "read help any time." The help files are extensive and make the system self-instructing.

Typing in the command read conferences is the easiest way to find out some of the discussions that are underway on a particular tree. Unless a discussion takes place on a private branch of the tree (in which case it won't show up in the conference listing) interested users can tune in on any topic they choose, listen in on the discussion that's taken place so far, and respond if they want to.

From the Inside Out. According to Gengle, some deep and powerful sharing takes place on the conference trees. The feeling of privacy and the absence of social role barriers are part of what makes this kind of sharing possible.

Many of us have had the experience of becoming acquainted with someone over the telephone or through letters. Even though we've never met, we become friends. If we do meet this person later on, after our friendship has already



been cemented, we may be surprised—our friend doesn't look anything like we pictured. Had we met in person first, perhaps we would not have become so close after all.

People who connect via CommuniTree often have a similar experience. While the system does require maintenance at regular intervals from an operator, users are ordinarily free to interact with a minimum of intrusion. The medium seems to be conducive to people's talking about ideas and questions that really matter to them, and, in the process of such interaction, people sometimes come to feel that even though they may never meet in person, they know one another on the inside.

Most conference trees also have what is known as a *private* branch. This is a section of the tree on which people can have confidential conversations. Private is a message name that stops the *read, browse,* and *index* commands from showing any of the message names attached to private. You must know in advance the specific name of the private branch you want in order to read it.

Would You Care To Leave a Message? A user entry by which a discussion topic is initiated or responded to is known as a *message*. The message name the user chooses can be up to twenty characters long and usually is an attempt to convey to other users the subject of the entry. Sometimes, a message title is designed to pique the curiosity of other users, motivating them to read the message and perhaps to participate in the discussion. Messages themselves can consist of up to fifty eighty-character lines (equivalent to approximately one single-spaced page of typewriter copy).

The message index is stored in RAM. This makes message indexing and access speedy and uncomplicated, but it also means that only 321 messages (no matter what their length) can be handled at any one time on a 48K Apple. (The addition of 12K of RAM allows space for 321 more messages.) So, when certain branches of a discussion become particularly active, the system operator can divide the original topic from which they sprang into subtopics and transplant these onto another computer, while messages that are judged to have outlived their usefulness may be pruned from the branch to allow space for new ones.

Responding to a conference tree message is done by means of *add-to*. This command puts the user into an on-line edit mode. The main emphasis here is on spontaneity, rather than on the physical appearance of the finished product. In this sense, the conference tree can be thought of as a sort of interactive word processor.

The on-line editor is easy to use. The text of the message you create is displayed on screen in eighty-character lines—broken into two forty-character lines—as you enter it. You can make changes as you go along by backspacing, and you can read your completed message and rework it as desired on a line-by-line basis. Once you've polished your message to your satisfaction, you can ask the system to do a *savepermanent*, which will save your message to disk. Until you do this, you can alter the text of your message or change your mind altogether about sending it.

A New Form of the Family Tree. The message that kicks off discussion of a particular topic is known as the *root* and as the *parent* of following messages on the same topic. Users who respond to this original message create *children* of the parent;

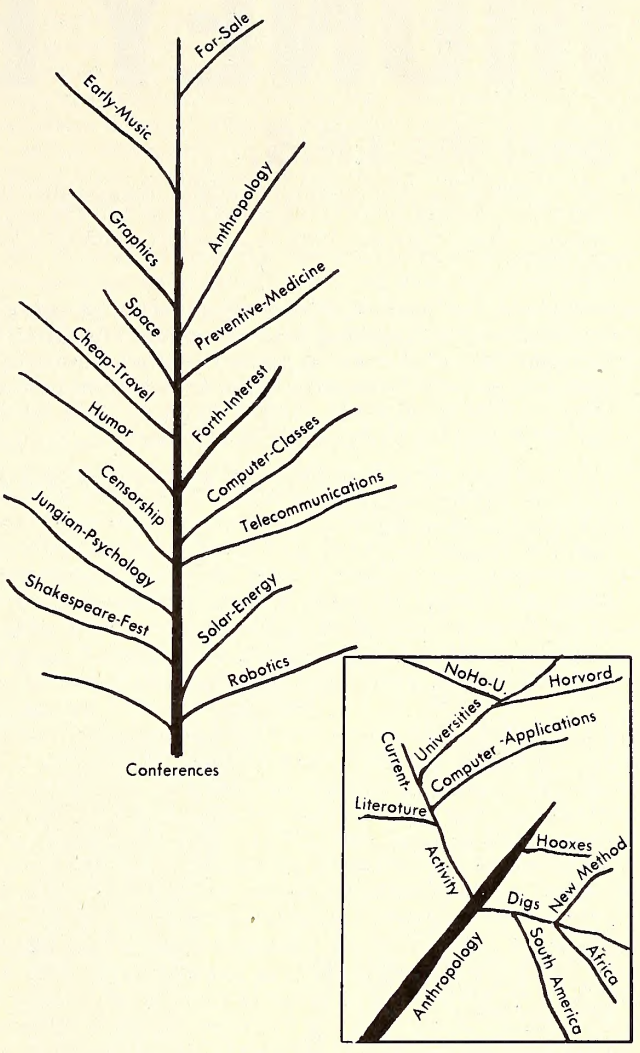


Diagram 1.

A simplified diagram of a conference tree. Inset is closeup of one branch.

related messages in response to the same parent are *siblings* of one another, while submessages of submessages are *grandchildren* of the original parent. This family tree can go on for generations. The branching effect shown in diagram 1 illustrates this process.

Its hierarchical structure and user friendliness make CommuniTree a facilitator of dialogue. People become involved, and their ongoing contributions to discussions build on one another and cover a lot of ground. Organizers of CommuniTree suggest that the engaged interaction between concerned people may have a synergistic effect that results in creative solutions to modern problems.

Teleconferencing capabilities have been available on mainframes since the late sixties. Teleconferencing of this sort is usually a rather deliberate process in which experts who think

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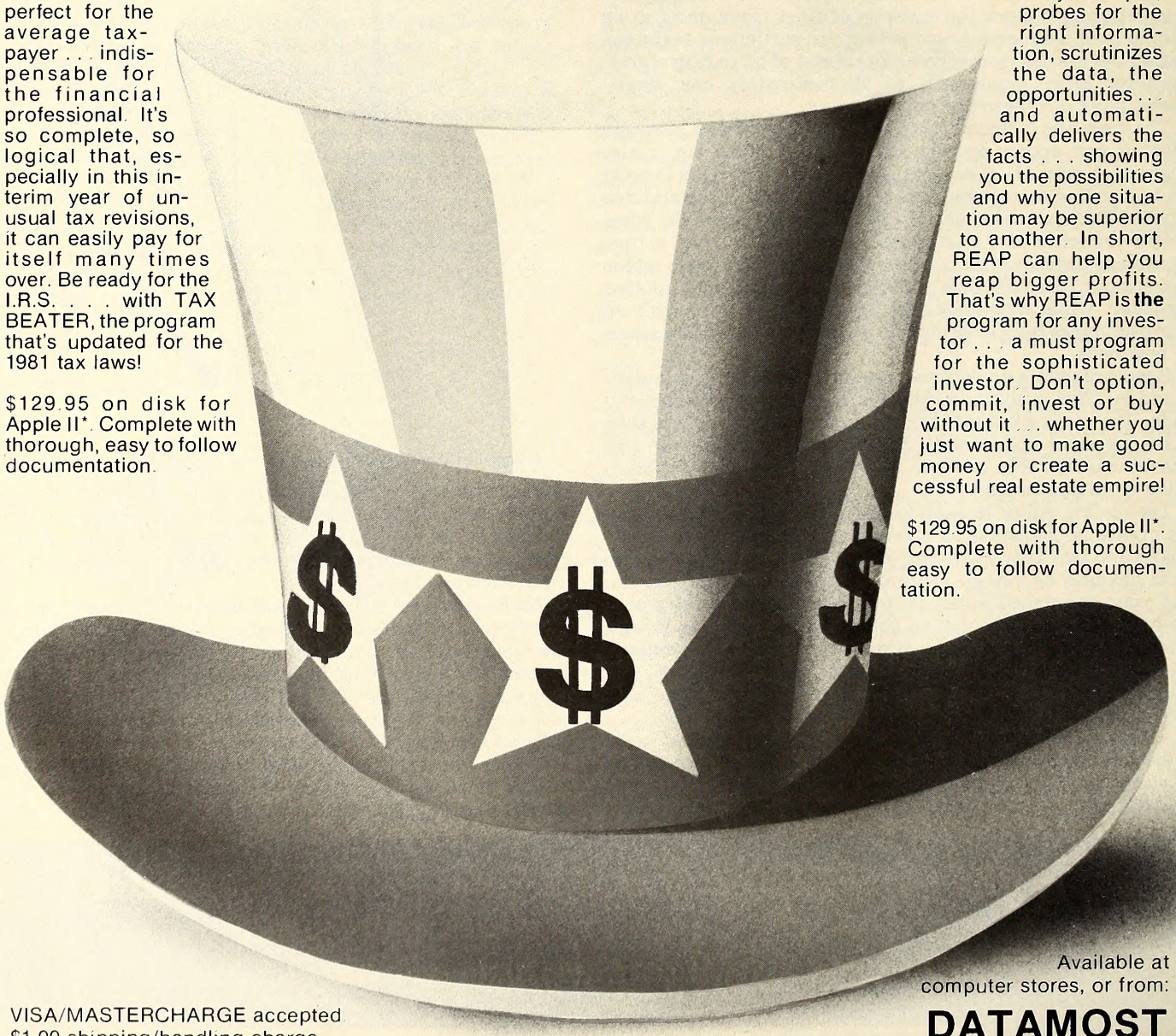

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of themselves as experts communicate with one another about prespecified topics.

James's goal in creating the CommuniTree software was, on the contrary, to come up with a versatile, low-cost medium that could be used by ordinary, thinking citizens who have access to microcomputers, not just by heads of corporations or computer sophisticates. He has succeeded admirably. CommuniTree conferences bring together in anonymity people who might never have known that such a connection was desirable. And this is done without expensive hardware. In addition, the same software can be used in a variety of ways, depending upon the needs and imaginations of users. An on-line technical meeting or journal, complete with immediate feedback, a multicontributor movie or restaurant guide, or a way for retired executives to keep in touch with their fields and with each other—all are possible.

James himself is responsible for an imaginative and forward-looking application of the CommuniTree software. The Berkeley tree he operates currently includes a forum for structured discussion of "all aspects of nuclear war and how to prevent it."

As system operator, James has suggested some ground rules for the discussion. He asks that users focus on supplying information, not argument, and that they make an effort to support their opinions with references to the material they have read or seen that leads them to hold a particular view. He has also "primed the pump" by starting subconferences on current events, organizations, books, government reports, articles, films, packets, and periodicals related to nuclear war. There's also a category called personal overview in which people can talk more generally or subjectively about their feelings and opinions. Users' contributions to this conference include book and movies reviews, events listings, and so on.

Idea Bears Fruit. The original idea of linking messages together in a nonlinear way came to John James two years ago when he was trying to devise a logical, organized way of answering the many questions people were asking him via modem about the Forth programming language. He began working in earnest about a year ago and succeeded in completing the first version of the CommuniTree software about four months later.

James says that he chose to program the conference tree in Forth because it's a flexible language that allows simple logic to prevail and makes good use of limited memory. The plan later on is to make information available to CommuniTree software owners that will enable them to modify their systems or to take advantage of new options suggested by users of the first edition software. This seems fitting since the tree is, after all, a growing thing.

Also of primary concern in the development of CommuniTree was that the medium be friendly to the user or, as Dean Gengle puts it, "disarming, without being frivolous." Before marketing the system, members of the CommuniTree group experimented to see how people responded to it. They tested the system on friends, mostly people in the humanities and fine arts who were not knowledgeable about computers. The learning curve of these inexperienced users averaged about fifteen minutes.

Part of the CommuniTree group's philosophy is that those who are knowledgeable about computers and about the kinds of changes that are being brought about in people's lives have an obligation—in essence, to help us all greet the next century with vigor a decade or so before it pounces upon us. In an age when untold amounts of social change are being unleashed on society, responsible, nonthreatening dissemination of helpful information is what's needed. The group doesn't like the idea of packaging information in a slick, glossy fashion that may be designed more to impress or intimidate than to educate; they strive instead to produce materials that are inviting and simple in format.

The Making of Experts. The conference trees accessed by users are sources of information, but they differ considerably from the centralized information sources you may have used, the most well known of which is probably *The Source*, a facility that provides information to users for a fee. CommuniTree sees its role differently. Its purpose is to serve as a free-two-way medium, one that allows people to give information as well as to get it and to interact with one another in the process. The emphasis is on participation and exchange. Unlike *The Source*, a centralized resource you may turn to when you require specialized information, CommuniTree is an evolving information resource users help to create and maintain.

Growing Your Own. A new seedling tree includes a help file, a comments file in which users can leave messages or ask for assistance, and a calendar file in which current events can be listed. According to Gengle, some seventy-two CommuniTree software packages are "out there in the universe." All are capable of becoming trees.

Some of the conference trees that have already been established are private, used by individuals and businesses to communicate among themselves. Examples of such trees are the one in operation at a Stowe, Vermont high school, and another at the University of Miami, Florida. Some of the other conference trees that have grown up since July are intended for public access. These include installations in Victoria, Texas; Hayward, California; and Kotzebue, Alaska.

Linking the World Together. CommuniTree organizers believe that, as computers become more commonplace, people will begin to focus on local issues as well as global ones. This is in keeping with the spirit of the first World Futures Conference held in Toronto, Canada, in July of 1980, the theme of which was "thinking globally, acting locally."

When people decide to establish new trees, no one at CommuniTree attempts to direct them toward emphasizing any particular subject area or application. People's areas of primary interest, concern, and expertise will emerge over time. This aspect of CommuniTree's attitude is based in a way of thinking known as bioregionalism.

According to bioregionalism, certain flora and fauna bloom best in certain bioregions, amid certain conditions and certain soils. The same thing applies when it comes to the abilities/affinities of various communities for gathering certain kinds of information. Local communities are thought to be much better equipped than outside experts to recognize their own special needs and to develop strategies for dealing with them. And often, as a result of having been especially interested in or concerned about a certain area, a local community becomes a sort of specialized information source that other communities can draw upon.

Half a dozen of the trees intended for use by the general

Who Is Natty Dread?

public have a special name—flagship—and serve a special function. Located in major metropolitan areas, these flagship trees are part of a communications network the CommuniTree group envisions will include forty trees eventually. CommuniTree will have an open channel to each of these flagship trees, through which vital information can be transmitted to all users within the network. The flagships will be linked together later on by a national flagship, the main purpose of which is to provide users with information and access numbers for each of the regional flagship trees.

People who approach the CommuniTree group with ideas are given assistance in making their ideas reality. If they want to create a flagship and their proposal is accepted, they receive the CommuniTree software free, along with guidance from the CommuniTree group. They, in turn, enter into an agreement that allows the CommuniTree group to make use of a portion of the message space available on the new tree for six months. This allows CommuniTree to continue to learn about the medium they've originated, and establishes a link between the group and founders of new trees that all concerned find valuable.

The trees already in operation provide good examples of bioregionalism in action. The Victoria, Texas, flagship supports a special interest in rockets and private enterprise in space, while the Palo Alto flagship specializes in disseminating health information for the disabled. Alaska's newly emerging flagship supplies information about Alaska to interested persons, as well as providing a communication structure for Alaskans themselves.

Active Voice. Central to the philosophy underlying CommuniTree is the belief that we can and must actively shape our future, rather than sit back and let it happen to us. CommuniTree is meant to be as "humanistic and nonauthoritarian" as possible and is intended as a means by which we can mobilize our energy and intelligence on our own behalf.

Members of the CommuniTree group radiate an energy and thoughtful optimism in the face of what they see as a crisis more serious than any we've ever come up against. They see "tapping into our own stores of personal and collective creativity" as "the most urgent need of our culture at this juncture of evolution" and are doing all they can to promote this process.

They, like Buckminster Fuller, to whom the CommuniTree is dedicated, believe that our economy is now based on energy rather than gold, and that energy consists primarily of information and imagination. Information and ideas are wealth.

Sharing information and ideas and discussing issues with other concerned people are seen as means of creating our own knowledge base. An outgrowth of such activity, say the CommuniTree cofounders, may be that instead of turning to the so-called experts for answers, we'll recognize our own capacity to solve problems and become experts ourselves.

As Dean Gengle expresses it, "Human ingenuity, imagination, and enthusiasm are our most abundant and precious resources." Each one of us can and must participate in "healing the planet." The CommuniTree system offers people a powerful avenue through which to discover their own competence, and a means of tapping into, contributing to, and mobilizing this bank of creative energy.

CommuniTree emphasizes our capacity to work together to solve problems and our abundant resources for doing so. It suggests that we share our riches, our wealth of ideas, rather than hoard them.

Because this way of thinking represents the antithesis of the scarcity orientation many of us were taught, we may feel uneasy about it at first. But the outcome of actions based in this philosophy is bound to be a positive one—an information/imagination exchange in which everybody wins. ◼

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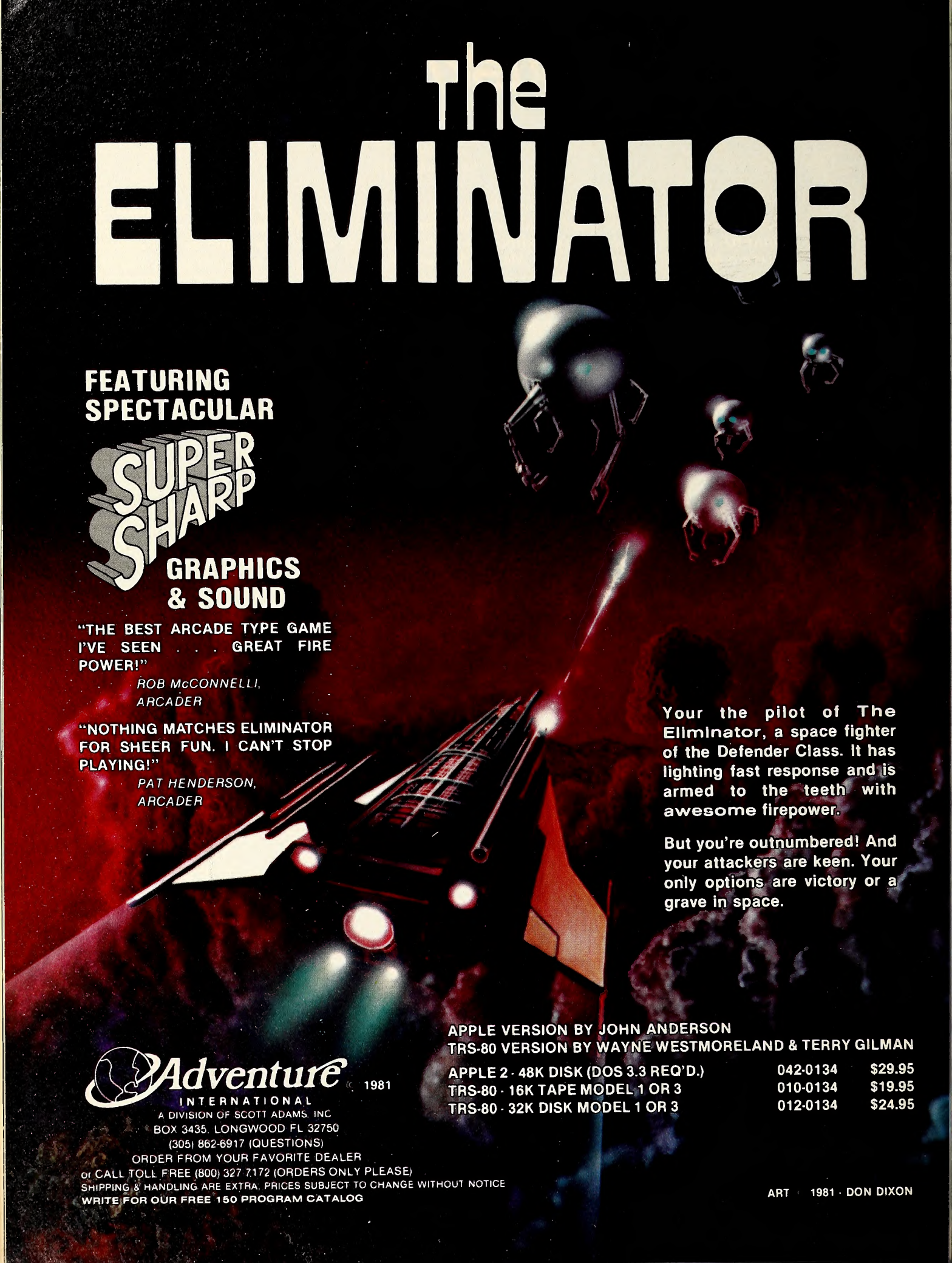

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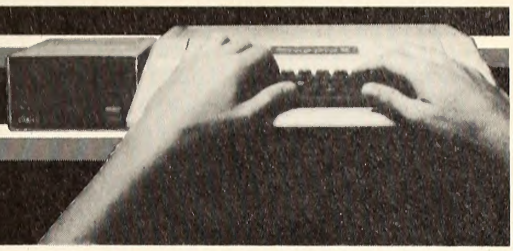


Unless otherwise noted, all products can be assumed to run on the Apple II, Apple II Plus, and Apple III in the emulator mode and to require 48K and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card.

☐ **Stoneware** (50 Belvedere Street, San Rafael, CA 94901; 415-454-6500) has announced the release of a new hard disk version of *DB Master*, compatible with the Corvus and Santa Clara disk systems. Has all the features of the standard Apple II version, with data retrieval for up to 350,000 records on line. $499. ☐ Accessories for the standard Apple II version now include *DB Master Stat Pak*, producing statistical information for file records including the Mann-Whitney U-Test, Chi square analysis, linear regression and correlation, others; *DB Master Utility Pak #2* adds more power with a global editor, label printer, and more routines for simplifying data management. $99 each. ☐ The company's version of Rubik's Cube, *Compucube*, by Richard Stauduhar, features the option of a two-square or three-square cube to solve, ability to store cubes in memory or on disk for recall, and have the program solve any displayed cube. $29.95.

☐ **Monument Computer Service** (Village Data Center, Box 603, Joshua Tree, CA 92252; 800-854-0561) has released software applications packages in the fields of business, law, and medicine. *Market Advisor*, designed to analyze trends and manage investor stock and bond portfolios, maintains inventories, purchase prices, commissions, selling prices, current values, and figures capital gains. Two disk drives and eighty-column printer. $139.95. ☐ *The Legal Clerk* includes an appointment/timekeeping element for recording professional service time and schedules, prepares daily schedules, time use activity reports, daily billable charge records, monthly billing summaries, aged accounts receivable reports, and year-to-date overhead charge activity. Two disk drives. $399.95 ☐ Running on the Apple III, *Medical Clinic* manages appointment schedules, does patient recall, and provides for patient file management. Full accounts receivable system, individual bill preparation, and cycle billing. Runs under the SOS operating system. $1,495.95.

☐ *Amateur Radio Software* from **Murray Data Systems** (677N. 800E. Layton, UT 84041; 801-376-9210) will generate graphics on a scan converter to transmit slow-scan TV. Logging system for contacts and a search for previous contacts plus check for duplication. Specify DOS. $15.95.

☐ Two daisywheel printers that incorporate automated paper insertion capabilities were shown at Comdex 81 by **Olivetti OPE** (505 White Plains Road, Tarrytown, NY 10591; 914-631-3000). The *DY 211/ASF* features twenty cps speed and a seventeen-inch removable platen, plus bidirectional printing; loads up to two hundred sheets and recovers and reverses stacking. Centronics card. ☐ The *DY 311/ASF* performs the same functions at thirty-two cps. $2,870. ☐ Their new thermal printer, the *TH 240*, handles eighty-character lines at the rate of two hundred forty lines per minute or up to three hundred twenty cps. $800.

☐ *Selecting a Desk-Top Word Processor*, by Phillip Good, guides the user in deciding if he needs a word processor and selecting one suited to his individual needs. Includes six rules for software selection, comparisons of 157 features of the leading desktop word processing systems, and checklist to complete before purchase of word processing software, terminals, printers, and computer. From **Information Research** (1037 Paw Paw Lake Drive, Mattawan, MI 49071; 616-668-2049). $19.95.

☐ The new *SBCS General Ledger* from **Small Business Computer Systems** (4140 Greenwood, Lincoln, NE 68504; 402-467-1878) features error checking, data entry prompting, budgeting, departmentalizing, audit trails, and detailed, user oriented documentation. Can be used with *SBCS Accounts Receivable*. $349.

☐ **The Big Red Apple Club** (1301 North 19th Street, Norfolk, NE 68701; 402-379-3531) has opened membership to anyone who, because of geographic limitations, does not belong to a local Apple club. All business conducted in club newsletter, *The Scarlett Letter*; large library of Apple software distributed to members free of charge. $12 a year.

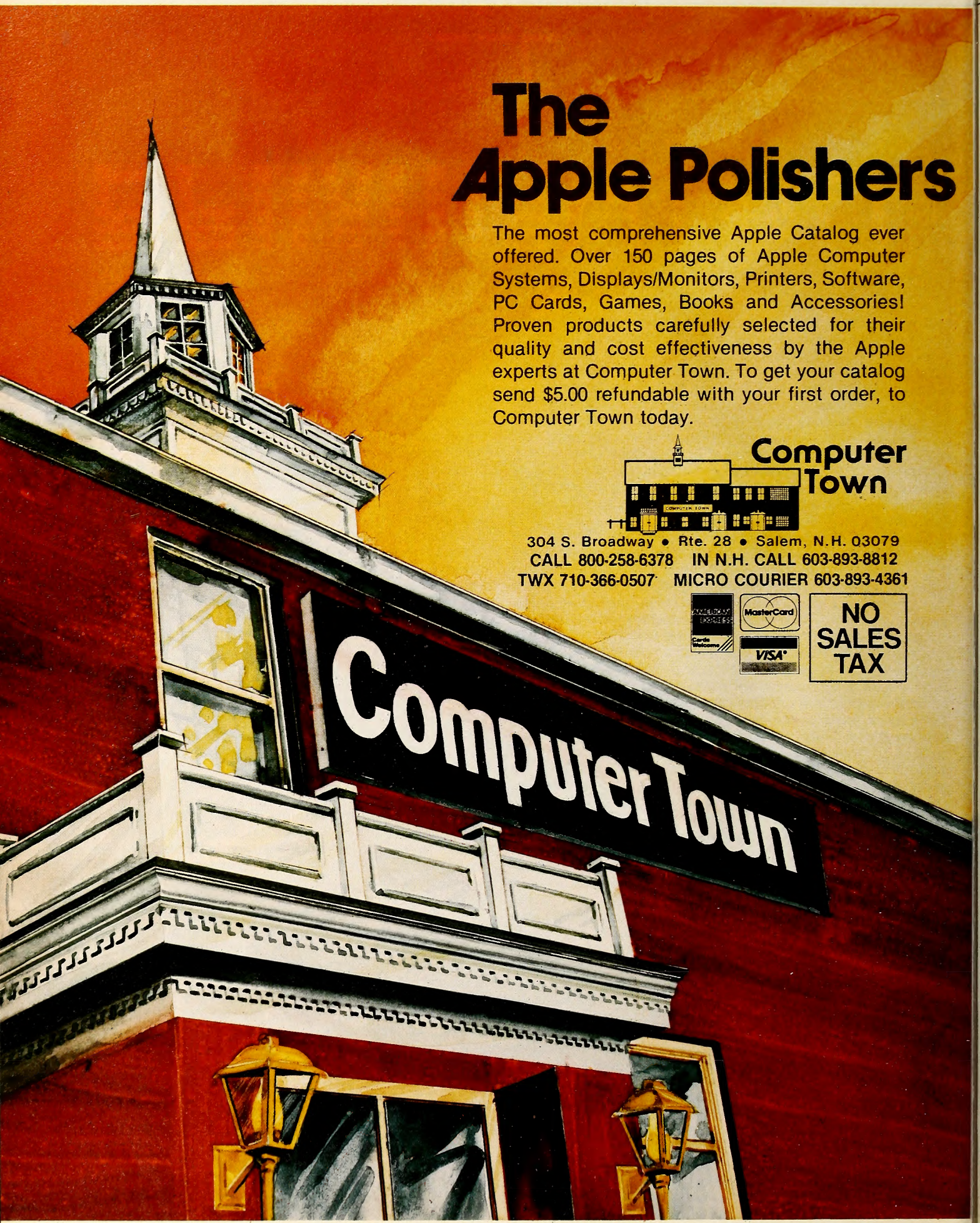
☐ A new educational system from **Hartley Courseware** (Box 431, Dimondale, MI 48821; 616-942-8987), *Capitalization* is a two-disk system providing for practice and testing on the application of the major rules of capitalization. Presents a rule followed by twenty random sentences providing practice of the rule. Stores records; modifiable. $49.95.

☐ Seeking to develop a low cost network system to tie multiple Apples together while eliminating additional disk drives for each remote computer, **Softworks** (14805 North 73rd Street, Scottsdale, AZ 85260; 602-998-3986) has introduced their *Remote Operating System Disk Access Card*, allowing networking of 127 Apples sharing one to eight floppy disk drives. ROS design permits user to network initially with floppy disk drives and upgrade with add-on hard disk drives for additional storage needs. The card's primary uses are for inter-office communication and in the classroom, where a teacher can control all students' remote terminals from central computer using one disk drive. Various remote, central, and starter packs available, with cable; $189 to $640.

☐ *Refundle Bundle*, a clearing house for consumer information about making and saving money through manufacturer's refund offers, is now provided on the **CompuServe Information Service** (5000 Arlington Centre Boulevard, Columbus, OH 43220; 614-457-8600). Tips on what to save from packages, definitions of terms involved in refunding, descriptions of refund offers. Subscriber access weekday evenings, all day Saturday, Sunday, and holidays. $5 per hour.

☐ Just published by **dilithium Press** (11000 S.W. 11th Street, Beaverton, OR 97005; 503-646-2713), *Inventory Management for Small Computers*, by Chuck Atkinson is written for owners and managers of retail businesses. Provides necessary stock-on-hand, goods sold, and price information for inventory control; helps to prepare purchase orders, compose and edit letters, post sales, and perform calculations. $12.95. ☐ **dilithium's** seminar series, "Small Computers in Business," continues through May. The one-day program introduces and explains computer terminology, identifies specific uses of the microcomputer in business, and describes the evaluation process necessary to define a business's computer needs. Nationwide. Full day, lunch, and materials, $195. Discounts for early registration and large groups.

☐ *Desktop/Plan III*, revised from the program enabling financial analysis and modeling on the Apple II, is now available for the Apple III from **Personal Software** (1330 Bordeaux Drive, Sunnyvale, CA 94086; 408-745-7841). Features flexible report formatting, on-board graphics, faster disk access, and use of the hard disk system. Row-and-column ledger pad now has eight thousand locations up to three hundred columns across; stores calculation rules, starting values, and computed model values on disk, allowing consolidation of identical submodels into one larger submodel and transfer of individual lines from one model into a summary model. Requires at least one external storage device, hard-copy printer, and video display. $300.



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☐ The latest program in *The Computing Investor* software series by **MicroComputing Research** (29 Estancia, Marana, AZ 85238; 602-682-4444) is *Strategy-S*, a "trading partner" program that trades within its investor/partner's portfolio in direct competition, weighs momentum of hundreds of stocks, advises when probabilities favor revision of price goals up and down, and prompts on overbought/sold stocks and earnings dates. $249.50.

☐ *VersaForm*, the business form processor from **Applied Software Technology** (15985 Greenwood Road, Monte Sereno, CA 95030; 408-395-1541) is a new generic class of software able to process multiple transactions under a single heading. Instantaneous updating within a specified form wields running totals, cumulative tax or tariff charges, and calculated subtotal extensions by line. Information can be sent back to preprinted form or blank paper; management reports can be produced summarizing information from the printed forms. Supports applications such as a purchase order/shipping-receiving/order processing/invoicing/check writing/cash journal reporting system. Similar to character-oriented word processing systems; user friendly interfaces, "help" screens, and process-oriented reference card; ability to override pre-established item values. Prices start at $389 for single copy system users.

☐ A program for analyzing listed stock option investments is now available from **Options-80** (Box 471, Concord, MA 01742; 413-369-1589). Analyzes buying and selling of listed call and put options, spreads, and shares; projects annualized percentage return on investments as a function of annualized percentage growth in share value; results displayed in graphic and tabular form to video display or printer. Manual serves as a guide to option investing. $125.

☐ Covering user, producer, and legislative trends in home information systems, videotext, and teletext systems and services, *Videoprint* is a twice-monthly newsletter of **International Resource Development** (30 High Street, Norwalk, CT 06851; 800-243-5008). Describes new products and information in the electronic information field and the regulation and policy issues affecting them. $155 per year.

☐ **Program Design** (11 Idar Court, Greenwich, CT 06830; 203-661-8799) has released sixteen titles in four educational categories.

Programming category: ☐ *The New Step By Step* (age 13 to adult) supplies voiced instruction on cassette while the computer illustrates Basic program concepts using sound, graphics, and animation. Thirty-three programs, two disks, two audio cassettes, workbook. $79.95.

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MCAT on disk with 10 page manual..... **$24.95**

CRAE and MCAT on one disk..... **$59.95**

NOTE: CRAE is Compatible with Niel Konzens PLE.

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Hangman. $23.95.

Study skills category: ☐ *Vocabulary Builder I* features a set of graded vocabulary questions on synonyms and antonyms and a test on vocabulary. Four hundred questions; two thousand words in course. $23.95. ☐ *Vocabulary Builder II* uses a more advanced list. $23.95. ☐ *Number Series* contains eight programs for practice in a common math problem type, from analysis of number series patterns to increasingly difficult problems. $23.95. ☐ *Analogies* consists of six programs in identification, analysis, and practice in handling analogies. $23.95.

Language arts category: ☐ *Preschool IQ Builder* (age 3-6) teaches form discrimination and matching. $23.95. ☐ *Reading Comprehension* (age 8 up) builds reading analytical skills. Student picks the one word in four that doesn't belong with the rest. $23.95. ☐ *Spelling Builder* (age 13 up) helps students and adults overcome spelling difficulties by teaching method for approaching difficult words. $26.50.

☐ **Strategic Simulations** (465 Fairchild Drive, Suite 108, Mountain View, CA 94043; 415-964-1353) has released *Southern Command,* a battalion-level simulation of the Israeli counterattack to the Suez during the October War of 1973. Twenty-eight by thirty-nine hex grid map can be viewed on one screen or twelve, using scrolling. Units able to reorganize after attack and ambush moving units. More than ten unit types; two players or against computer. Applesoft in ROM. $39.95.

☐ *The Home Accountant* from **Continental Software** (12101 Jefferson Boulevard, Culver City, CA 90230; 213-371-5612) features one hundred budget categories, keeps track of up to five checkbooks per system, and provides graphs for any category. Allows information to be extended over multiple disks; one thousand transactions per disk. Includes twelve printed reports and ability to start unlimited systems from the same disk. Applesoft in ROM. $74.95. ☐ *First Class Mail,* an enhanced version of the company's *Mailroom* mailing database, allows user to create own label format, print envelopes, and assign optional characters to each field. Up to three-field sort for each file. Printer. $74.95.

☐ *Security Account Monitor* is designed for professional investors to do quick reviews and studies of single or multiple securities portfolios. Provides automatic portfolio updating from on-line data service, valuation, reporting, and analysis; maintains and reports on any number of securities portfolios and handles stocks, bonds, options, and other equity and fixed income securities, in addition to money market funds and other cash equivalents. Part of the *SMART System* subscription service for the professional investor, financial analyst, or money manager. From **Software Resources** (186 Alewife Brook Parkway, Cambridge, MA 02138; 617-497-5900). License fee, $150; on-going annual fee, $850.

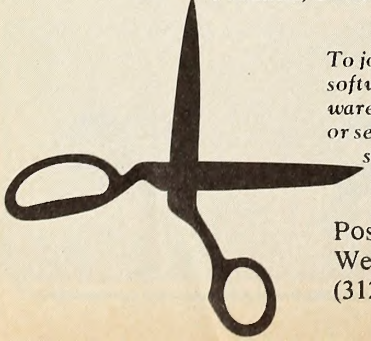
☐ **Computer Camp** (1235 Coast Village Road, Santa Barbara, CA 93108; 805-969-7871), pioneer of summer camps educating children in the use of microcomputers, now has a *Computer Camp for Adults.* The first session will be held February 6 at the Club Mediterranee in Ixtapa, Mexico, one hundred miles south of Acapulco. Designed for executives, managers, and businessmen; intensive daily training will cover financial forecasting, Basic programming, how to purchase the best hardware and software, accounting systems, and word processing. Evening lectures and specialized workshops for professional people; sailing, windsurfing, golf, tennis, dancing, and nightly stage shows featured. Maximum enrollment of fifteen people per one-week session. Roundtrip transportation, thirty-six hours of hands-on instruction, and three meals a day: $600 plus Club Med package fee.

☐ The *Solomon I* and *Solomon II General Accounting* systems, utilizing a single data base managed by the *MDBS* data base manager, are now available from **TLB Associates** (Box 414, Findlay, OH 45840; 419-424-0422). Both systems include general ledger, accounts receivable/payable, invoicing, fixed assets, payroll, cash receipts/disbursements, and address maintenance features. *Solomon II* also has job costing capabilities—different charge rates for different services; summary reports by job, phase, employee in job, job in employee; more. CP/M card. *Solomon I,* $2,395; *Solomon II,* $3,495.

Micro Co-op

Information about Apple software

Over a thousand Apple owners already belong to the largest software co-operative in the world. In Micro Co-op's bi-monthly newsletter our experts review and compare the latest software packages available for the Apple, keeping you up to date on the newest developments in applications, simulations, utilities, education, and gaming. In addition to our opinions, compilations of member surveys let you know how others rate software AFTER they've purchased and used it; information that will help you save money. You can also buy almost all your software through the co-op at special member prices, because we purchase in quantity as a group. The co-op has also just installed a toll-free ordering number for members. Some of the publishers whose products we regularly keep in stock for immediate service are Adventure International, Aurora Systems, Automated Simulations, Avalon Hill, Brillig Systems, Broderbund, Budgeco, California Pacific, Cavalier, CE Software, Continental, DataTransforms, Datamost, Datasoft, Delta, Denver, Edu-Ware, Gebelli, Hayden, Highlands, Howard, Infocom, Innovative Designs, Information Unlimited, Interactive microware, Lazer Systems, Link, LJK, Masterworks, Micro Lab, Micro Pro, Microsoft, MUSE, Nikrom, On-Line Systems, Penguin, Personal, Picadilly, Phoenix, Progressive, Quality, Riverbank, Sensible, Sentient, Sierra, Sirius, Sir-Tech, Softape, Software Publishing, Southeastern, Southwestern Data, Stoneware, Strategic Simulations, Sub Logic, Synergistic, TG Products, United, and Voyager.*



To join Micro Co-op, we charge only a $3 membership fee; we support our services primarily through the software that members buy through the co-op. Our goal is to get you the information you need to make software decisions you won't regret. Call or write for a free copy of the Co-op Newsletter and more information, or send your $3 membership fee with your name, address, and type of computer. Your comments and suggestions are always appreciated.

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Each is a classic, an entertainment more sophisticated than most games,
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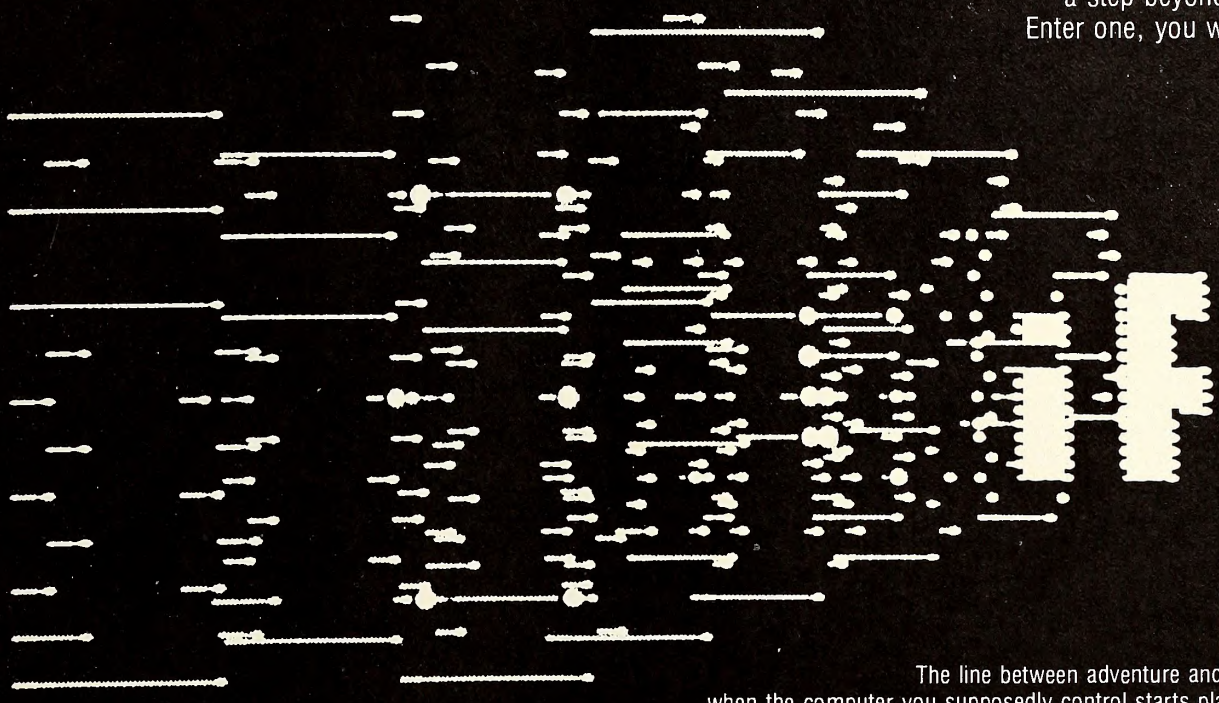

the Prisoner

The line between adventure and obsession wears thin when the computer you supposedly control starts playing games with you. **THE PRISONER's** challenge is compelling. In a surreal environment where the simplest clue becomes deception and a riddle may suddenly turn a deadly edge, will you keep your wits? In a bizarre world where your captor smiles sweetly at you, will you remain an individual? In a prison where you may never even find the bars, can you escape?

THE PRISONER, a nightmarish gaming fantasy, was written by David Mullich. Available in Applesoft, 48K, DOS 3.2 or 3.3 . . . . . **$29.95**

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Miner Hobart accumulated several million credits during the years he spent working the asteroid belts and investing wisely in gambling casinos throughout the galaxy . . . but now uranium poisoning is killing him.

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TERRORIST does not skirt the issues — whether nuclear blackmail, a jetliner hijacking, or seizure of the World Trade Center. **TERRORIST** simulates these confrontations more accurately than you may have wanted. Your every move is tangled in bureaucratic red tape, randomness, the ambiguities of international politics . . . and the unpredictable behavior of your opponent. You may choose the role of terrorist or authority. But choose; in **TERRORIST** there is no middle ground.

TERRORIST, a two-player game requiring strategy, steel nerves, quick thinking, game control paddles, and Applesoft, 48K, DOS 3.2 or 3.3 . . . . . **$29.95**

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☐ **The Foundation for the Advancement of Computer-aided Education** (Box 28426, San Jose, CA; 408-287-0985) now publishes *The Journal of Courseware Review*, covering the content, use, and educational validity of various microcomputer programs for the Apple. Quarterly. $5.95 from authorized Apple dealers; $6.95 from the Foundation.

☐ *The New Jersey Microcomputer Show and Fleamarket*, sponsored by **Kengore** (3001 Route 27, Franklin Park, NJ 08823; 201-297-2526) will be held at the Holiday Inn at the North Terminal of Newark International Airport, Newark, New Jersey, May 22, 1982. The third annual one-day event features over fifty commercial exhibitors and one hundred fifty fleamarket sellers. The fall show will be held September 11-12, 1982, featuring hardware, software, and accessories for all popular personal computer systems.

☐ **National Computer Shows** (824 Boylston Street, Chestnut, MA 02167; 617-739-2000) has two expositions upcoming in the spring. *Southwest Computer Show and Office Equipment Exposition* will be held in Market Hall at the Dallas Market Center in Dallas, Texas from April 15 to 18, 1982. The New York show will be held at the Nassau Colisseum in Uniondale, Long Island, from April 22 to 25, 1982. Admission to both shows is $5 for adults, $3 for children ten or younger.

☐ **ALS** (1195 East Arques Avenue, Sunnyvale, CA 94086; 408-727-6805) has introduced *The Synergizer*, giving Apple users CP/M compatibility by combining the company's *Smarterm* eighty-column board with *Z-Card*, a Z80A processor providing the full range of CP/M capabilities, and *Add-Ram*, a 16K board that permits addressing the full memory supported by the Z80A and the 6502 and also works with Apple Pascal, DOS, and assembly language programs. $749.

☐ Six programs in introductory physics by David L. Vernier are available from **Vernier Software** (2920 SW 89th, Portland, OR 97225; 503-297-5317). ☐ *Orbit* simulates the motion of a satellite in the earth's gravitational field allowing students to experiment with orbit shape and size, Kepler's laws, and escape velocity. $18. ☐ *Charged Particles* allows student to observe motion of a charged particle in a magnetic field and determine mass of an electron; select particle, speed, and field strength. $18. ☐ *Projectiles* creates seven modes of operation, launch angle, and speed in measuring effects of air resistance and wind in projectile motion. May also be used as a game. $18. ☐ *Wave Addition* demonstrates superposition of waves, specific phenomena of beats and square wave synthesis, shaping by addition of harmonics, Fourier synthesis, more. Nine modes. $18. ☐ *Vector Addition* demonstrates the head to tail addition of vectors, allows input of magnitude and directions, draws vectors and resultant, and displays resultant's magnitude and direction numerically. Up to nine vectors may be added. $18. ☐ With *Kinematics*, students control the starting speed, acceleration, and elapsed time for the motion of a truck moving across the screen; speed, displacement, average speed, and acceleration data constantly displayed. $18. All programs in cassette or disk, 20K or 32K, with user guide, teacher's manual, modification suggestions, table of variables, and annotated list of the Applesoft program.

☐ **C&H Video** (Box 201, Hummelstown, PA 17036; 717-533-8480) announces *The Slide Show*, allowing the Apple to emulate 35mm slides on a television with twenty different special effect transitions. Up to seventy-five hi-res pictures. Can be advanced manually, automatically by time, or "free run"; user friendly creation and editing. Compatible with NTSC processing hardware. Machine language. Either DOS. $49.95.

☐ **Osborne/McGraw-Hill** (630 Bancroft Way, Berkeley, CA 94710; 415-548-2805) is making its entry into software distribution with *Microfinesse*, a financial modeling, forecasting, and decision-making software package. The system can create investment and financial alternative models, pro forma statements, sales productivity and profitability forecasts, as well as perform model consolidation and report-generating functions. Color graphics. Pascal. $495.

☐ Providing full ninety-six-character ASCII character set with true lowercase descenders, *Powercase*, by **Beaman Porter** (Pleasant Ridge Road, Harrison, NY 10528; 914-967-3504), gives full typewriter functions, supports Apple Pascal, and makes *VisiCalc* information more readable. Specify DOS. $49.95.

☐ *Stiff Upper Lisp*, a new version of List Processing language, is now available from **Lifeboat Associates** (1651 Third Avenue, New York, NY 10028; 212-860-0300). Includes a library of functions written and callable as needed, symbolic debugging aids, customizable editor, on-line help facility, print formatter, and spelling correction function. $165.

☐ The *Z65 Data Base Processor*, consisting of a Z80 CPU, a 6502-Z80 interface, and a Z80 implementation of *MDBS*, has been announced by **Micro Data Base Systems** (Box 248, Lafayette, IN 47902; 317-448-1616). Offers increased speed relative to the 6502 and increased memory available for application programs; control over data redundancy, automatic data integrity, security enforcement, transaction logging and recovery; plus dynamic data base restructuring. $1,600 with Z80 CPU card; $1,500 without.

☐ **SSM** (2190 Paragon Drive, San Jose, CA 95131; 408-946-7400) has added the *108*, a multiple RS-232 port device, to its hardware line. Eight asynchronous individually accessible and programmable ports reduce the number of interface cards required for high-performance systems; data activity monitored via send/receive LED indicators on each line; timer function provides master interrupt clocking (50-60 Hz). Multiple interrupt modes and optional terminal and modem cables for complete interfacing potential. $550.

☐ *Terrapin Logo*, a procedure oriented language of artificial intelligence research, is now available from **Terrapin** (678 Massachusetts Avenue #205, Cambridge, MA 02139; 617-492-8816). Utilizes turtle graphics, with the list structure, recursiveness, and dynamic variable scoping features of Lisp, floating-point arithmetic, and an assembly language interface. RAM card or language card. $149.95.

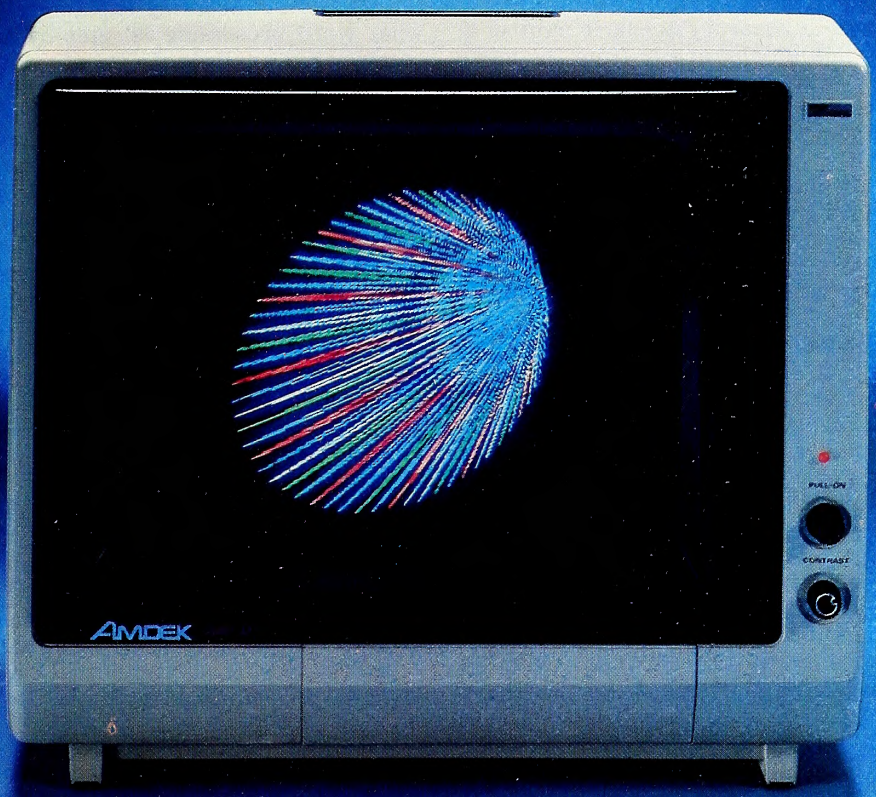
☐ **North Texas State University School of Music** (Box 5344 N.T. Station, Denton, TX 76203; 817-788-2791) announces its third national *Develop Your Own CAI System Music Workshop*, June 14-25, 1982. Emphasis will be on development of ear-training curriculum materials of immediate practical use to participants in computer assisted instruction at their home schools. Hands-on experience with state-of-the art equipment; limited to twenty participants. Write for brochure.

☐ *Job Control System*, providing management with measures of productivity by furnishing current job status data for determining the real cost of providing a product or service, is now available for the Apple III from **High Technology Software** (Box 14665, 2201 N.E. 63rd Street, Oklahoma City, OK 73113; 405-478-2105). Job listings, job cost summaries, detailed individual job reports, and work-in-process reports give profit/loss values and variances; customizable for rate structures, report formats, and five hundred cost centers to reflect requirements of a business. No computer knowledge necessary. 132-column printer required. $750. ☐ The newest additions to the series of chemistry laboratory simulations are *Chem Lab Simulations 3*, containing four calorimetry experiments demonstrating Hess's Law, and *Chem Lab Simulation 4*, utilizing two capillary tube experiments to illustrate principles of thermodynamics. Advanced high school or introductory college-level; reproduces actual steps of experiments in hi-res graphics. $100 each.

☐ **Basic Business Software** (Box 26311, Las Vegas, NV 89126; 702-876-9493) has announced its *Statistical Analysis* software package, featuring twenty-four statistical programs in regressions, distributions, hypothesis testing, and probability. Allows reading in data from user generated file or data file created with the included data file editor. $75.

☐ Designed to help elementary and junior high students to communicate more effectively by providing individualized instruction in basic word analysis, *Word Structure* is the latest addition to the *MicroSystem80* courseware line from **Borg-Warner** (600 West University Drive, Arlington Heights, IL 60004; 312-394-1010). Covers capitalization/abbreviation, spell-

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:

- RGB, TTL input for high resolution graphics.
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- 560 (H) x 260 (V) resolution.
- Molded-in carrying handle for easier portability.
- Front-mounted controls for faster fine-tuning.

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.

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ing/syllables, singulars/plurals, possessives, positives/comparatives/superlatives, prefixes, and suffixes. Either DOS. $600; through subscription at $120 initial year, $60 each subsequent year.

☐ The latest update to *Wizardry*, the popular adventure from Sir-tech (6 Main Street, Ogdensburg, NY 13669; 315-393-6633), is now available. Incorporating user suggestions, the faster-running option allows unlimited copying of scenario for as many characters as desired, backup copying and user retrieval of characters, and removes aging penalty for characters lost in dungeon due to power cutoff. ☐ Wizardry Scenario number 2, *Knight of Diamonds,* will pick up characters from the introductory *Proving Grounds,* from the eighth level up, with a greater emphasis on puzzles and strategy. Characters must reclaim a stolen magic scepter to save a valley of peace. Release is planned for March.

☐ **Sirius Software** (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195) is releasing a clutch of goodies: In *Borg*, based on the myth of Jason and the Minotaur, you must reach the center of a maze to slay Grud, after wading through the guard dragons and dealing with a deadly flying kangaroo. $29.95.

☐ *Snake Byte* features a sinuous snake that must be maneuvered through obstacles to eat apples, becoming longer and faster as it consumes them. $29.95.

☐ A spaceship full of your fellow *Twerps* has crashed planetside. From the space station, you fly your shuttle craft through an asteroid field to a landing pad, then go from crater to crater collecting the little Twerps. They toddle along trustingly behind you, knowing you'll protect them from the Gleepnoks and flying Glingas. At some point, you must choose between saving any more Twerps and getting back to your ship before your fuel runs out. $29.95.

☐ Nuclear war is now available in the comfort of your home with the latest from **Bez** (4790 Irvine Boulevard, Box 19633, Irvine, CA 92714; 714-752-3888). A malfunction in a *Bez-1* bomber has turned a training mission into a war. *Bez-MX* is the strategy-action simulation of the war, featuring solitaire and two-player basic and advanced versions. $29.95.

☐ **Sybex** announces publication of *Apple Pascal Games*, by Douglas Hergert and Joseph T. Kalash, a collection of the most popular microcomputer games written in Apple Pascal. Covers rules, guide to understanding the program, and a structure chart to show the organization and listing of the whole program. $14.95. ☐ Also just released is Hal Glatzer's *Introduction to Word Processing* explaining in nontechnical language what word processing is. Step-by-step guide on usage with comparative analysis of currently available equipment. $12.95.

☐ Young people eighteen and under are eligible to enter the *Earn a Computer Incentive Program* sponsored by the **Young People's Logo Association** (1208 Hillsdale Drive, Richardson, TX 75081; 214-783-7548). The program is designed to encourage young people to explore the graphic possibilities of their computer by developing creative graphic programs. Programs submitted can be in any language, and will be judged on originality and creativity, balanced against the capabilities of the language and system used, and the age and experience of the programmer. Programs can be submitted by individuals or in the name of a group; only one award will be granted to any single winning entry. **YPLA** is a nonprofit corporation organized to educate young people, parents, and teachers in the use of microcomputers. Monthly newsletter. Membership free to persons eighteen and under; $15 annual donation requested of adults.

☐ A sort/merge utility program with Applesoft and machine language programs, *Micro-1-Sort* allows up to eight sort keys specifiable in mixed ascending/decending order. User can define, edit, load, and save parameter tables, then overlay invoked Applesoft program and interface to DOS file manager. Runtime reports on progress of the sort, example input file, parameter table file, unlimited backups. From **Marshall Associates** (Box 12402, Huntsville, AL 35803). $99. ◨

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Sooner or later, you're going to need a 16K memory-expansion for your Apple. When you do, we suggest you buy it on the card that doesn't require poking about on the motherboard — nor removing a RAM chip, installing a strap, etc.

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In spite of its quality, the Ramex 16 costs less than most other expansion boards — just $139.95. And it comes with a *one year* limited warranty, instead of the usual 90 days.

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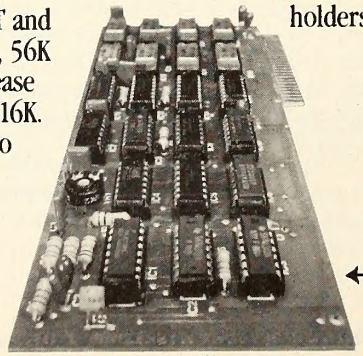

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WORD PROCESSING

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EASY TO USE — Letter Perfect is a single load easy to use program. It is a menu driven, character orientated processor with the user in mind. FAST machine language operation, ability to send control codes within the body of the program, mnemonics that make sense, and a full printed page of buffer space for text editing are but a few features. Screen Format allows you to preview printed text. Indented margins are allowed. Data Base Merge with **DATA PERFECT** by LJK, form letters, accounting files and mailing labels only with MAIL MERGE/UTILITY by LJK. **FEATURES** — Proportional/ Incremental spacing * Right Justification * File Merging * Block movement * Headers * Footers * Print Multiple Copies * Auto Page Numbering * Scroll forward/backward * Search and Replaces * Full cursor control * Underlining * Boldface * Superscripts * Subscripts * Auto page numbering * Insert character/line * Delete character/line * Centering * Horizontal tabs/changeable * Multifunction format line (line spacing — left margin — page width' — lines/page — change fonts — top/ bot margin adjust) **MUCH MORE! $149.95**

ATARI VERSION 2.0 #2001

Compatible with Atari DOS. Uses proportional font, right justified with Atari 825/Centronics 737, 739 printers. Uses EPSON MX* Series + Graftrax/italicized font. Can mix type fonts on same page; mix boldface and enhanced font in same line with justification. Can be used with 16K Atari/400.*

"Compared to the price of many other word processors, this package is a steal. It does everything the advertisement claims and more. On top of this the software is very easy to use." **A.N.A.L.O.G. MAGAZINE**

APPLE VERSION 5.0 #1001

DOS 3.3 compatible — Use 40 or 80 column interchangeably (Smarterm — ALS; Videoterm-Videx; Full View 80 — Bit 3 Inc.; Vision 80 — Vista; Sup-R-Term — M&R Ent.) Reconfigurable at any time for different video, printer, or interface. **USE HAYES MICROMODEM II*** LCA necessary if no 80 column board, need at least 24 K of memory. Files saved as either Text or Binary. Shift key modification allowed. Data Base Merge compatible with **DATA PERFECT*** by LJK.

"For $150, Letter Perfect offers the type of software that can provide quality word processing on inexpensive microcomputer systems at a competitive price." **INFOWORLD**

DATA PERFECT T.M. LJK

APPLE & ATARI DATA BASE MANAGEMENT $99.95

Complete Data Base System. User orientated for easy and fast operation. 100% Assembly language. Easy to use. You may create your own screen mask for your needs. Searches and Sorts allowed, Configurable to use with any of the 80 column boards of Letter Perfect word processing, or use 40 column Apple video. Lower case supported in 40 column video. Utility enables user to convert standard files to Data Perfect format. Complete report generation capability. **Much More!**

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This is a coresident — two pass **ASSEMBLER, DISASSEMBLER, TEXT EDITOR, and MACHINE LANGUAGE MONITOR.** Editing is both character and line oriented. Disassemblies create editable source files with ability to use predefined labels. Complete control with 41 commands, 5 disassembly modes, 24 monitor commands including step, trace, and read/write disk. Twenty pseudo opcodes, allows linked assemblies, software stacking (single and multiple page) plus complete printer control, i.e. paganation, titles and tab setting. User can move source, object and symbol table anywhere in memory. Feel as if you never left the environment of **BASIC.** Use any of the 80 column boards as supported by **LETTER PERFECT,** Lower Case optional with **LCG.**

LJK DISK UTILITY APPLE $29.95

This menu driven program allows the user to manipulate a variety of different file types. Binary, Text, and Source files may be easily converted into each other. The program may be used with **APPLESOFT*, VISCALC***, and other programs. These program files may be readily adapted for multiple use including editing with **LETTER PERFECT** word processings.

$29.95 MAIL MERGE/UTILITY APPLE & ATARI

This menu driven program combined with **LETTER PERFECT** allows user to generate form letters and print mailing labels. With the Atari, you may **CONVERT ATARI DOS FILES,** or Visicalc files compatible for editing with **LETTER PERFECT.** Utility creates Data Base files for Letter Perfect.

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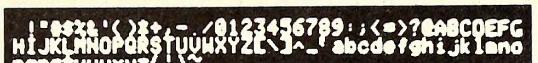

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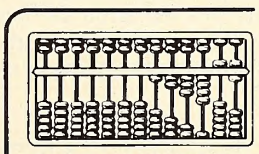

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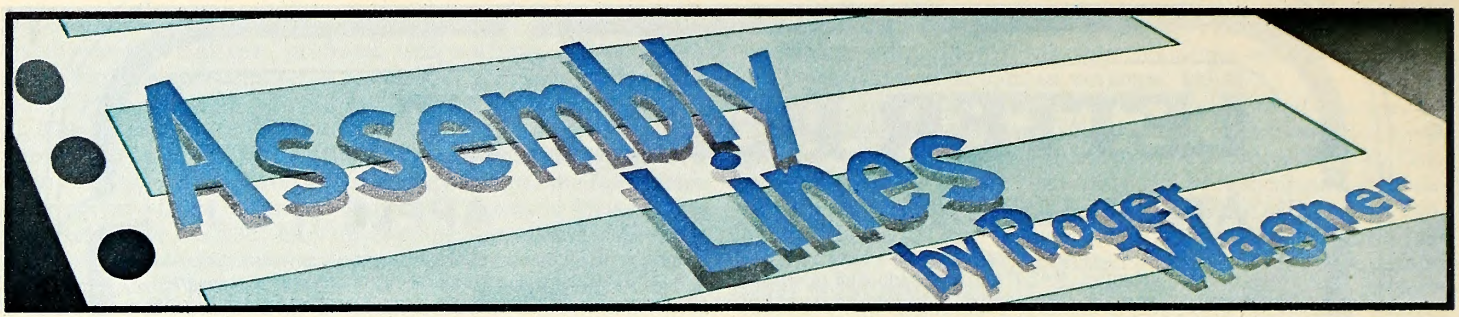

Everyone's Guide to Assembly Language, Part 17

Last month, we began a discussion of how to pass variables back and forth between Applesoft and machine language programs. This month we'll complete the discussion with more information on how all types of variables are handled and how data can also be passed back to the calling Applesoft program.

Applesoft Variables. There are six types of variables in Applesoft Basic. These are *real, integer,* and *string* variables, and their array counterparts. To understand fully how to use these variables, we must first take a moment to examine the differences between them and how the variables are actually stored in the computer.

Real variables are number values between 10^{38} and -10^{38}, which are very large positive and negative numbers. In addition, the values need not be whole numbers; a value such as 1.25 is allowed. *Integer* variables, on the other hand, are limited in magnitude to the range of +32768 to −32767. They are also limited to whole number values, such as 1, 2, 3, and so on. Values such as 1.25 are not allowed.

Real variables are indicated in Basic by an alphabetic character (A to Z) followed by a letter or number (A to Z or 0 to 9). Any characters after the first two are ignored when Applesoft looks up the value for the variable. Integer variables are similar, but the name is suffixed by a percent sign (%). Thus A would represent the real variable, whereas A% would represent an Integer variable.

When passing data such as a memory address or a single byte value to put in memory, Integer variables would be quite adequate and, additionally, would require no conversion in the machine language routine. However, it is generally more convenient to the Basic programmer not to have to put the % sign in the variable name, and, instead, to convert the value using the Applesoft routine "FRMNUM" ($DD67) as described in the last issue. For the record, though, I will present an example shortly on how to retrieve an integer variable from a calling Basic program.

String variables consist of a series of any legal ASCII characters, with a maximum length of 255 characters. Strings are indicated by a $ suffix to the variable name.

Any of these variables may be present either singly or in an *array*. Arrays are groupings of variables that use a common name and then a delimiting *subscript* to identify each individual element. Array variables are indicated by a pair of parentheses following the variable name between which a number or expression may be used to specify the desired element.

You are probably already somewhat familiar with the general points mentioned so far; they're raised not so much to teach you about Applesoft variable types as such but rather to set the stage for what is to follow, namely how each of these variable types is stored within the memory of the Apple computer.

Memory Maps. Quite some time ago, Assembly Lines presented a graphic representation of the memory usage of the computer. We'd like to revive the topic in the interest of our current subject.

A memory map is used to show the relative placement of data within the available memory locations in the computer. Recall that there are a total of 65,536 locations available, which we identify with hexadecimal addresses of $0000 to $FFFF.

The chart in figure 1 shows how a normal Apple would be shown, with DOS booted and an arbitrary Applesoft program in memory.

In previous articles, the areas shown have been described in varying degrees of detail. You'll recall that the area from $C000 to $CFFF is reserved for the interface card addressing, and that Applesoft Basic is stored in ROM, beginning at $D000. The Monitor ROM begins at $F800.

A normal Applesoft program starts at $800, with the highest available address usually being $9600, which is identified with the lower boundary of the Disk Operating System (DOS).

The area from $300 to $3CF is available for user machine language programs. $3D0 to $3FF is reserved for Apple system vectors, such as the DOS entry vectors. Zero page, the stack, and the input buffer have also been discussed in some detail.

Since our main concern is in the area of Applesoft variables, let's consider a revised map, emphasizing Applesoft programs:

Figure 2 shows that when an Applesoft program is run, simple (nonarray) variables are placed immediately after the end of the Basic program, followed by the array variables. Because the data for each string variable is ever changing in length, string data is stored dynamically at the top of memory, working down. The space in between these converging areas is the so-called free space of the system.

Himem: and *lomem:* are used by the Basic programmer to set the upper and lower bounds of variable storage. If not specifically declared within the program, these default to the bottom of DOS and the end of the Applesoft program, respectively. They *do not,* however, always have to be restricted to these locations. It is possible to move *lomem:* up, or *himem:* down, so as to set aside a portion of memory in the computer that won't be affected by the running program. This is done for one or both of two reasons. First, to protect either or both of the hi-res display pages from variable table encroachment, or, second, to provide a protected area for a user's machine language program.

Now that we know where the information for each variable is stored in the computer, let's examine the format of the information for each variable. Within the areas indicated, a variable table is constructed that contains the name of the given variable

$000	$100	$200	$300	$400	$800		$9600	$C000	$D000	$D800
zero page	stack	input buffer	user page	screen display	FP program	free	DOS	slots	FP Basic	F8 ROM

Figure 1

$000	$800	$XX	$XX	$XX	$XX	$9600
	FP program	simple variables	array variables	free	string data	DOS
	↑ $67,68–AF,B0	↑ $69,6A (lomem:)	↑ $6B,6C	↑ $6D,6E	↑ $6F,70	↑ $73,74 (himem:)

Figure 2.

and its value if the variable is a real or integer. If the variable is a string, a pointer is stored that indicates the exact location of the string stored at the top of memory and its corresponding length (0 to 255 characters).

Figure 3 summarizes the details of the format for these tables.

Each time a variable is first encountered in a running Applesoft program, an entry in the variable table is made for it. For simple variables, Applesoft looks to the pointer at $6B,6C to see where the end of the current simple variable table is. It then opens up seven bytes for the new variable and puts a block of data similar to that shown in figure 3, as is appropriate to the type of variable defined.

Real variables store the value in a logarithmic form, where each value is indicated by the exponent and four mantissas. Integer variables require only that the high and low order bytes of the value be stored. The remaining three positions are unused, with dummy zero values placed in the table. It's important to note here that, for integer variables, the two-byte representation of the value is reversed from what we would normally expect. That is to say, the high order byte is placed first, followed by the low order byte.

For strings only three bytes of information are required, namely the length and address data mentioned earlier. Again the last two positions are filled with dummy zeros.

It should be evident from this table that the same amount of memory is allocated for all simple variable types: there is no advantage in specifying integer variables versus reals to save memory. This will not be the case with arrays.

Notice that there are two distinct parts to each seven-byte variable entry. The first two bytes define the name, where incidentally, the high order byte is used in each character to indicate

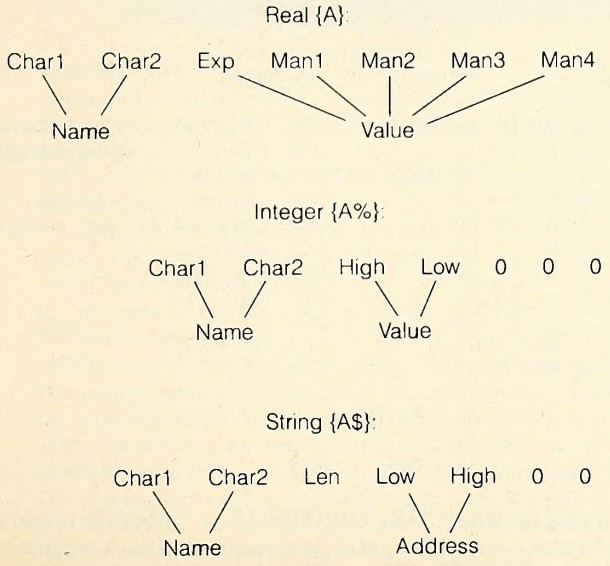

Figure 3.
Variable type/storage format.

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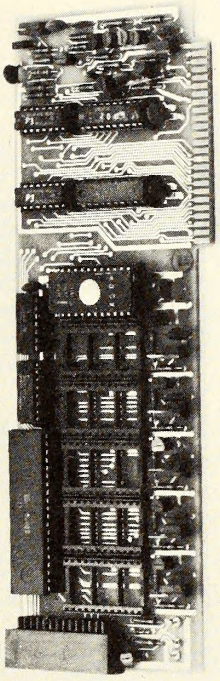

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which of the three variable types (real, integer, or string) that entry corresponds to. The last five bytes make up the actual data for each variable and consist of either the required numeric information or, in the case of a string, the length and address information.

The reason to stress this distinction is that, in examining arrays, we notice that it is this five byte block that gets repeated a large number of times, depending on the total number of elements in the array.

For arrays, a much larger table needs to be constructed, and this is created starting at the address indicated by $6B,6C. Whenever a new array is defined, the pointer at $6D,6E is examined to determine the end of the current array table, and a new entry is made according to the format shown in figure 4.

In this format, the entry is given a header that gives the variable name, followed by an offset value used to determine the address of the next array entry, if one is present. The offset is encoded in the usual two-byte manner. Following the offset is a byte indicating the number of dimensions in the array, after which is listed a byte for each dimension stating its size. Although not shown in the diagram, each size indicator is a two-byte pair, although in this case the high byte is always given first.

Immediately after the header is found the actual data blocks, each block consisting of 5, 2, or 3 bytes per array element, depending on which variable type is involved. Note that, in this case, integer variable arrays do take much less memory than an equivalent real array.

Real arrays {A(n)}:

```
Char1   Char2   OSL   OSH   Num   S(n)..S(0)   [5 byte blocks] . . .
  \     /        \     /     |      \   /        \       /
   Name           Offset   # of dims   Size       Actual data
```

Integer arrays {A%(n)}:

```
Char1 Char2   OSL  OSH    Num    S(n)..S(0)   [2 byte blocks] . . .
  \     /      \    /      |       \   /        \       /
   Name         Offset   # of dims   Size       Actual data
```

String arrays {A$(n)}:

```
Char1   Char2   OSL   OSH   Num   S(n)..S(0)   [3 byte blocks] . . .
  \     /        \     /     |      \   /        \       /
   Name           Offset   # of dims   Size       Actual data
```

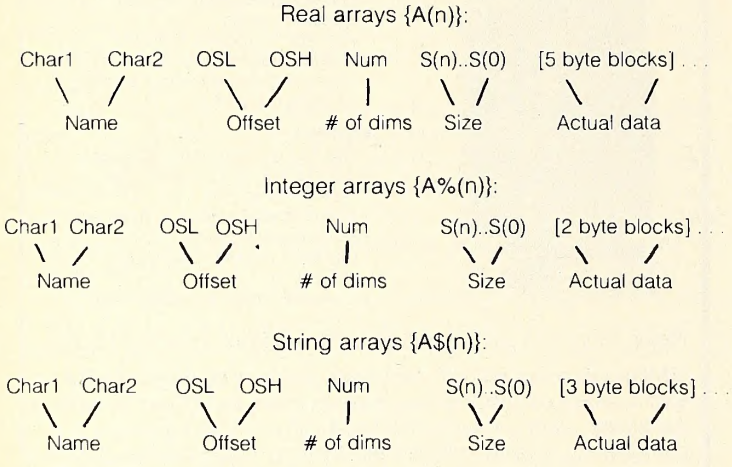


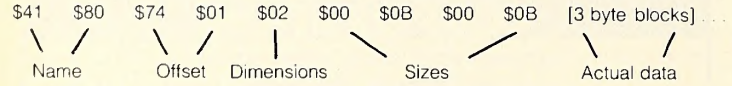
Figure 4.
Variable type/storage format.

As an example, if you were to dimension an array with this statement:

DIM A$(10,10)

the header block would look like this:

```
$41   $80   $74   $01   $02   $00   $0B   $00   $0B   [3 byte blocks] . . .
  \     /     \     /     |      \           /        \       /
   Name         Offset   Dimensions   Sizes              Actual data
```



Where $41,80 are the ASCII values for an A followed by a null. High bit is off in the first character, on in the second—indicating a string. The next array variable would be found at the address of the first name character plus $174. There are two dimensions to the array, as indicated by the $02. The $00 $0B indicates *eleven* elements in each dimension of the array. This should not be surprising when you recall that ten plus the zeroeth position makes eleven elements.

Following this header we would find 121 three-byte blocks, each indicating the length and address of a string array element, if present. 11 × 11 = 121; (121 × 3) + 9 (header) = 372 = $174!

Passing Variables from Applesoft to Machine Language. At this point you may well think that we have strayed very far from the topic of machine language programming, and have become overly involved with the structure of Applesoft. Upon a little reflection, however, it should become apparent that we must have some familiarity with how these variables are stored if we are to interact successfully with them.

In either reading or creating Applesoft variables, clearly we must handle effectively each component of the data. We must be able to identify the name and location of the variable we are interested in, and also to modify that information if necessary.

The tempation at this point might be to take this new-found knowledge and write our own routines to accomplish the needed operations; but such an undertaking would be quite unnecessary, not to mention likely to have you mindlessly babbling to yourself in no time.

Fortunately, Applesoft already contains all the necessary routines to do almost anything we wish. The main trick will be to identify properly and use the appropriate ones.

Last month I made use of a few of these to accomplish a certain degree of flexibility in passing numeric data to a machine language routine. Let's complete the study by formalizing the possible operations.

The first general category is passing data to a routine. We can pass any of six variable types. To minimize the confusion, let us establish a fairly simple goal: to pass the data successfully and prove so by storing the data in a non-Applesoft location.

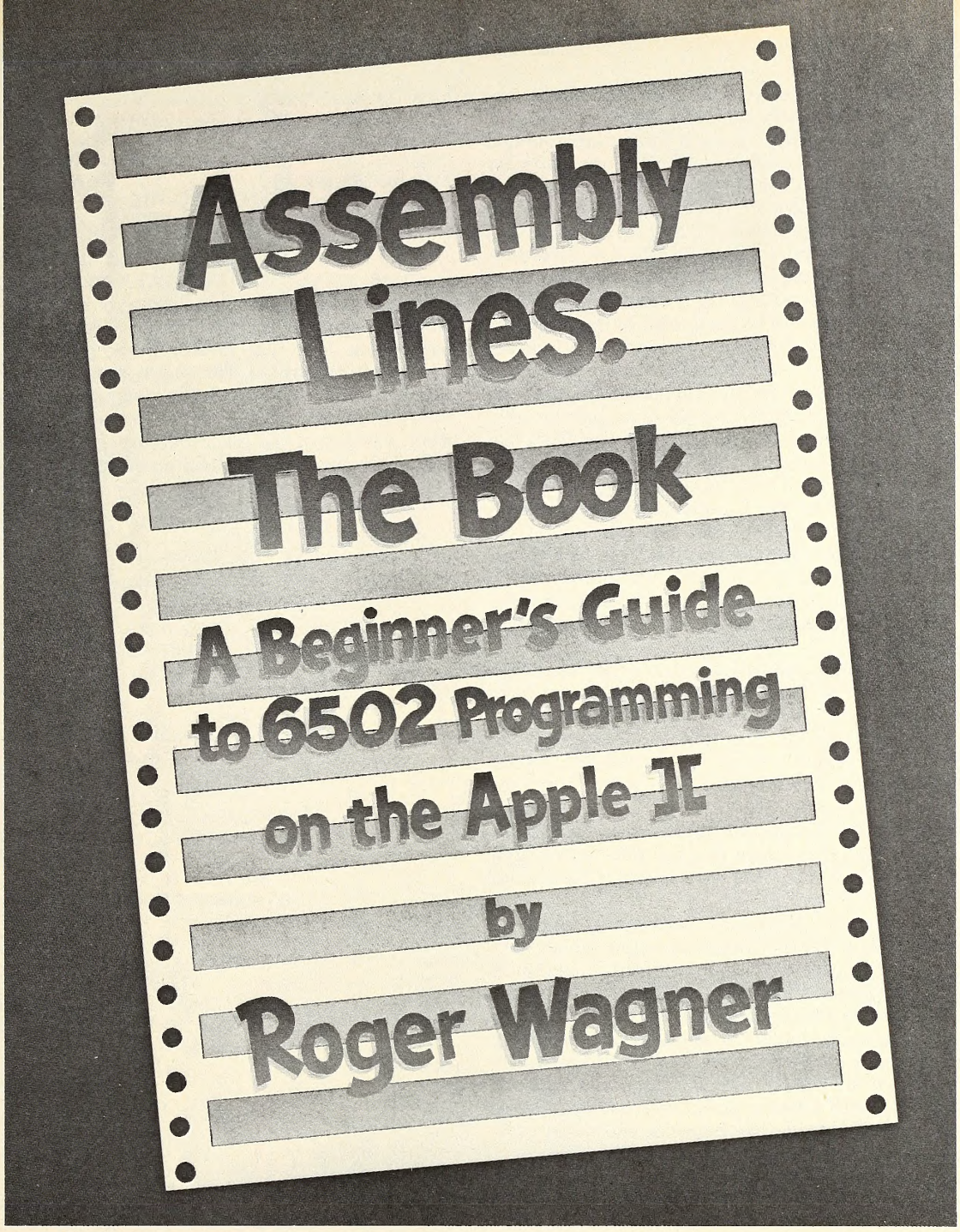
Integer Variables. First for integer variables. The calling Applesoft program looks like this:

```
10  A% = 258
20  CALL 768,A%
30  PRINT PEEK (896),PEEK(897)
40  REM 896,897 = $380,381
50  END
```

The machine language routine should be assembled from this listing:

```
                  ********************
                  * INT VARIABLE *
                  *    READER    *
                  *     2/1/82   *
                  ********************
                  *
                  *
                              OBJ  $300
                              ORG  $300
                  *
                  CHKCOM      EQU  $DEBE
                  PTRGET      EQU  $DFE3
                  VARPNT      EQU  $83
                  MOVFM       EQU  $EAF9
                  CHKNUM      EQU  $DD6A
                  DATA        EQU  $380
                  *
0300: 20 BE DE    ENTRY       JSR  CHKCOM    ;  CHK SYNTAX
0303: 20 E3 DF                JSR  PTRGET    ;  FIND VARIABLE
                  * Y,A = ADDR OF VALUE
0306: 20 F9 EA                JSR  MOVFM     ;  MOV VAL -> FAC
0309: 20 6A DD                JSR  CHKNUM    ;  FAC = NUM?
030C: A0 00                   LDY  #$00
030E: B1 83                   LDA  (VARPNT),Y
0310: 8D 81 03                STA  DATA+1
0313: C8                      INY
0314: B1 83                   LDA  (VARPNT),Y
0316: 8D 80 03                STA  DATA
                  *
                  * NOTE! HIGH BYTE FIRST!
                  *
0319: 60          DONE        RTS
```

In this routine, CHKCOM ($DEBE = "check for comma") is used to make sure the syntax is correct (that is, a comma), and to advance TXTPTR ($B8 = "Text Pointer") to the first byte of the variable name being evaluated. Refer to last month's issue for the original discussion on these two routines.



Assembly Lines: The Baak has still nat been published.

The calendar and the manth af this issue will tell yau mare elaquently than anything we cauld say that we missed the scheduled shipping date af December 7, 1981. Perhaps mare bathersame ta us is that we naw have na firm shipping schedule ta which we can commit withaut trepidatian.

We feel as thaugh we awe yau an explanatian far this execrable gaffe af cammercial practice and affer the fallawing ane far yaur edificatian:

Na baak publishing effart is a trivial ane. Under ardinary circumstances, a baak publisher schedules twelve ta eighteen manths fram inceptian af a praject ta shipping date. Rager Wagner and we felt we cauld significantly cut this lead time, especially considering that the bady af the baak wauld cansist af reprints af his *Saftalk* columns.

But we hadn't reckaned with the valatility af the Apple market. When we sat dawn in August ta firm up the schedule, *Softalk* had just finished printing its largest issue ta that date—88 pages. Rager had faur active items in his catalag. We cauld nat faresee that Rager's catalag wauld triple and that *Saftalk*'s size wauld increase ta a peak af 214 pages in December.

This grawth had abviaus impact an the baak schedule. As dedicated as Rager is ta perfarming faithfully his calumnist duties far *Saftalk*, the fact remains that his bread and butter is saftware publishing. The grawth af Sauthwestern Data Systems in the last faur manths af 1981 cansumed far mare af his time than any reasanable man wauld have fareseen in August. Likewise, the grawth at *Saftalk* obviated the passibility af praviding additianal suppart far Rager that might have kept him an ar near schedule.

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PTRGET ($DFE3 = "Pointer Get") is now called, which is a subroutine that reads a variable name in and then locates it in the variable table. As an added bonus, if the variable named does not currently exist in the table, it will create an entry for it. This applies to variables of all six types. After returning from PTRGET, the address of the value for the variable is held in the Y register and the accumulator (low byte, high byte). This thus indicates the location in memory of the two to five byte data block discussed earlier. The data in the Y register and the accumulator is also duplicated in VARPNT, VARPNT+1 ($83,84 = "Variable Pointer"), which will be used later in the program.

At this stage it would be a simple matter to use indirect addressing to retrieve the two bytes, but a little more effort will result in a much more thorough routine. It is possible that the user might have called the routine with an improper variable type following the CALL statement, such as a string. This can be checked for by the next two program steps.

MOVFM ($EAF9 = "Move to FAC from Memory") will move whatever data is pointed to by the Y register and the accumulator into the floating point accumulator ($F9–A2 = "FAC"). The contents can then be checked for variable type by the call to CHKNUM ($DD6A = "Check Number"). The presence of a string here would yield a "type mismatch error." Unfortunately, it is not particularly easy to test for a real variable having been mistakenly used here.

Presuming no error occurs, we will now make use of the data saved in VARPNT (since the Y register and accumulator have been no doubt altered by MOVFM and CHKSTR) to actually retrieve the two byte value passed. The indirect addressing mode is now used to move the variable data into our two data bytes. The address of $380,381 was in this case arbitrarily chosen for the example.

It is important to note that special care is used in lines 25 and 28, since integer variables store the two data bytes high order first, as mentioned earlier. This is opposite to the normal 6502 convention.

This routine will work equally well for retrieving data from simple integer variables and from integer array variables.

When you run this example, the numbers two and one should be printed out, these being the low and high order bytes of the number passed top the routine (258 = $102).

Real Variables. Once in machine language, the handling of floating point numbers, such as represented by real variables is somewhat involved. Additionally, the majority of the time you will be concerned only with passing an integer between 0 and 65535. Therefore, we will consider here how to use a real variable to pass a number in this range to a given subroutine.

This revision of our first Applesoft program will do the trick:

```
10  A = 258
20  CALL 768,A
30  PRINT PEEK(896),PEEK(897)
40  REM 896,897 = $380,381
50  END
```

The assembly language program for this is:

```
                      1  ************************
                      2  * REAL VARIABLE       *
                      3  *      READER         *
                      4  *       2/1/82        *
                      5  ************************
                      6  *
                      7  *
                      8           OBJ  $300
                      9           ORG  $300
                     10  *
                     11  CHKCOM   EQU  $DEBE
                     12  FRMNUM   EQU  $DD67
                     13  GETADR   EQU  $E752
                     14  LINNUM   EQU  $50
                     15  DATA     EQU  $380
                     16  *
0300: 20 BE DE       17  ENTRY    JSR  CHKCOM  ;  CHK SYNTAX
0303: 20 67 DD       18           JSR  FRMNUM  ;  EVALUATE NUM
0306: 20 52 E7       19           JSR  GETADR  ;  FAC -> INT
0309: A5 50          20           LDA  LINNUM
030B: 8D 80 03       21           STA  DATA
030E: A5 51          22           LDA  LINNUM+1
0310: 8D 81 03       23           STA  DATA+1
0313: 60             24  DONE     RTS
```

This is basically a repeat of last month's routine, with the results being put in DATA,DATA+1. The advantage of this routine is not only that it is shorter, but that it will accept either integer or real variables (simple or array), and still do the string error check. This then is usually the preferred method.

String Variables. The goal here will be to read some string data from the calling Applesoft program and then to put it somewhere in memory, where it would presumably be available to other portions of the machine language program. To illustrate this, enter the following two programs:

```
10  A$ = "TEST"
20  CALL 768,A$
30  END
```

```
                      1  ************************
                      2  * STR$ VAR READER     *
                      3  *       2/1/82        *
                      4  *     R. WAGNER       *
                      5  ************************
                      6  *
                      7  *
                      8           OBJ  $300
                      9           ORG  $300
                     10  *
                     11  CHKCOM   EQU  $DEBE
                     12  FRMEVL   EQU  $DD7B
                     13  CHKSTR   EQU  $DD6C
                     14  FACMO    EQU  $A0
                     15  FACLO    EQU  $A1        ;  FAC+5
                     16  VARPNT   EQU  $83
                     17  DATA     EQU  $380
                     18  *
0300: 20 BE DE       19  ENTRY    JSR  CHKCOM    ;  CHK SYNTAX
0303: 20 7B DD       20           JSR  FRMEVL    ;  EVALUATE
                     21  * (FACMO,LO) -> DESCRIPTOR
0306: 20 6C DD       22           JSR  CHKSTR    ;  VAR = $?
                     23  *
0309: A0 00          24           LDY  #$00
030B: B1 A0          25           LDA  (FACMO),Y ;  LEN OF $
030D: AA             26           TAX            ;  SAVE LEN
030E: C8             27           INY            ;  Y = 1
030F: B1 A0          28           LDA  (FACMO),Y ;  ADDR LO BYTE
0311: 85 83          29           STA  VARPNT
0313: C8             30           INY            ;  Y = 2
0314: B1 A0          31           LDA  (FACMO),Y ;  ADDR HI BYTE
0316: 85 84          32           STA  VARPNT+1
0318: 8A             33           TXA            ;  RETRIEVE LEN
0319: A8             34           TAY
                     35  *
031A: 88             36  LOOP     DEY
031B: B1 83          37           LDA  (VARPNT),Y ;  GET CHR
031D: 99 80 03       38           STA  DATA,Y
0320: C0 00          39           CPY  #$00
0322: D0 F6          40           BNE  LOOP
                     41  *
0324: 60             42  DONE     RTS
```

After running the calling program, enter the monitor, and list out the DATA region of memory with:

```
*380.383 <RETURN>
```

This should print out the following data:

```
0380- 54 45 53 54
```

This shows that the hex values for the characters "TEST" have been successfully transferred. Let's see how it was accomplished.

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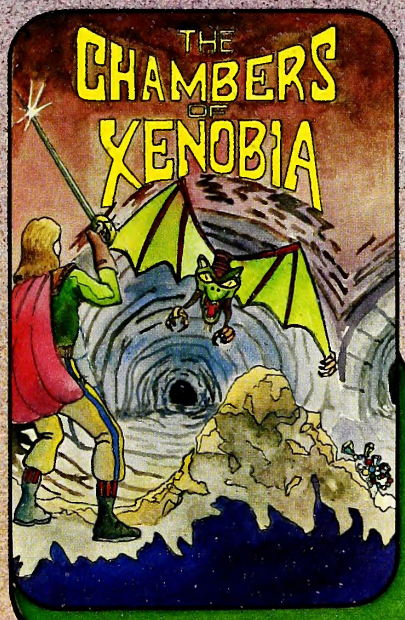

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The routine starts off rather like the previous ones by using CHKCOM to make sure a comma was used after the CALL and to prepare TXTPTR for reading in the data. FRMEVL ($DD78 = "Formula Evaluation") is a very nice general purpose routine that takes in virtually any numeric or string expression or literal, and places the final result in FAC. It is related to FRMNUM, but is much more omnivorous. Upon returning from FRMEVL, FACMO and FACLO ($A0,A1 = ". . . sorry, couldn't find out where they got the name! . . .") hold the address of the string's *descriptor,* that is, the three-byte group giving the length and address of the actual string data.

Our routine uses FACMO,FACLO in the indirect addressing mode to retrieve the first byte of the descriptor, which is the length of the string. This is put into the X register for temporary storage. Some people would prefer to push it onto the stack with a PHA command; it's a matter of choice. Next, the address of the string data is retrieved from the descriptor and put into VARPNT, which is assumed to be not in use at the time. Last of all, we use the VARPNT pointer to move the data from its location, indicated by VARPNT, to our DATA address.

In experimenting, notice that the area from $380 to $3CF is open, but starting at $3D0, the area is reserved for DOS. Entering very long strings in the example may lead to some problems. In your own programs, it would be necessary to set aside a one page area ($100 = 256 bytes) to put the data, unless of course you can limit the length of the string before doing the *call.*

You may also wish to try variations in the Applesoft program by deleting line 10 and rewriting line 20 as:

```
20  CALL 768,"ABC" + "DEF"
```

or

```
20  CALL 768,LEFT$("ABCDEF")
```

or

```
10  A$(5,5) = "TEST"
20  CALL 768,A$(5,5)
```

Passing Data from Machine Language to Applesoft Variables. The converse of the techniques we've discussed so far is actually fairly simple. The key to much of it is the PTRGET routine used earlier. Because this routine will even create a variable when it's not already present, we can simply more or less reverse the process of the previous routines to pass data back to a calling Applesoft program.

Again, I'll illustrate an example for each variable type.

Integer Variables. The Applesoft program:

```
10  POKE 896,2: POKE 897,1
20  CALL 768,A%
30  PRINT A%
40  END
```

The machine subroutine to be called is:

```
                        1  **********************
                        2  * INT VARIABLE*
                        3  *    SENDER    *
                        4  *     2/1/82   *
                        5  **********************
                        6  *
                        7  *
                        8           OBJ  $300
                        9           ORG  $300
                       10  *
                       11  CHKCOM   EQU  $DEBE
                       12  PTRGET   EQU  $DFE3
                       13  VARPNT   EQU  $83
                       14  MOVFM    EQU  $EAF9
                       15  CHKNUM   EQU  $DD6A
                       16  DATA     EQU  $380
                       17  *
0300: 20 BE DE         18  ENTRY    JSR  CHKCOM    ;  CHK SYNTAX
0303: AD 80 03         19           LDA  DATA
0306: AC 81 03         20           LDY  DATA+1
0309: 20 F2 E2         21           JSR  GIVAYF    ;  DATA -> FAC
030C: 20 E3 DF         22           JSR  PTRGET    ;  LOCATE VARIABLE
030F: 20 6A DD         23           JSR  CHKNUM    ;  VAR = NUM?
                       24  * Y,A = ADDR OF VAR DATA
0312: AA               25           TAX
0313: 20 2B EB         26           JSR  MOVMF     ;  PUT FAC -> MEMORY
0316: 60               27  DONE     RTS
```

The technique here is to use the routine GIVAYF ($E2F2 = "Give Accumulator and Y Register to FAC") to put the two bytes of our integer number into the FAC. GIVAYF requires that the accumulator and Y register be loaded with the low and high order bytes, respectively, for the integer number to be transferred. As an added bonus, the number may even be *signed,* that is, positive or negative. Signed binary numbers were briefly touched on in an earlier issue and are covered in greater detail in the book version of this series.

Lines 19 and 20 load the appropriate registers, and, after calling GIVAYF, PTRGET and CHKSTR are used to determine the name of the variable to use in returning the data. Recall that after returning from PTRGET, the Y register and accumulator will hold the low and high order bytes of the address of the data for the new variable digested by PTRGET.

MOVMF ($EB2B = "Move to Memory from FAC") is the routine we'll use to complete the process. It requires that the Y register and X register be loaded with the address of the memory

```
                       19           JSR  PTRGET    ;  FIND VARIABLE
                       20  * Y,A = ADDR OF VALUE
0306: 20 F9 EA         21           JSR  MOVFM     ;  MOV VAL -> FAC
0309: 20 6A DD         22           JSR  CHKNUM    ;  FAC = NUM?
030C: A0 00            23           LDY  #$00
030E: AD 81 03         24           LDA  DATA+1
0311: 91 83            25           STA  (VARPNT),Y
0313: C8               26           INY
0314: AD 80 03         27           LDA  DATA
0317: 91 83            28           STA  (VARPNT),Y
                       29  *
                       30  * NOTE! HIGH BYTE FIRST!
                       31  *
0319: 60               32  DONE     RTS
```

This program is a rather trivial exercise in that all that needs to be done is to reverse the operands of lines 24,25 and 27,28 from the first Integer Reader program. Again, the only caution is to make sure the bytes are transferred in the proper order, since integer data is reversed.

Real Variables. Real variables require the introduction of a few new routines. The same Applesoft calling program is used with only a minor modification.

```
10  POKE 896,2: POKE 897,1
20  CALL 768,A
30  PRINT A
40  END
```

The subroutine is entered as:

```
                        1  **********************
                        2  * REAL VARIABLE    *
                        3  *     SENDER       *
                        4  *      2/1/82      *
                        5  **********************
                        6  *
                        7  *
                        8           OBJ  $300
                        9           ORG  $300
                       10  *
                       11  CHKCOM   EQU  $DEBE
                       12  PTRGET   EQU  $DFE3
                       13  CHKNUM   EQU  $DD6A
                       14  GIVAYF   EQU  $E2F2
                       15  MOVMF    EQU  $EB2B
                       16  DATA     EQU  $380
                       17  *
0300: 20 BE DE         18  ENTRY    JSR  CHKCOM    ;  CHK SYNTAX
0303: AD 80 03         19           LDA  DATA
0306: AC 81 03         20           LDY  DATA+1
0309: 20 F2 E2         21           JSR  GIVAYF    ;  DATA -> FAC
030C: 20 E3 DF         22           JSR  PTRGET    ;  LOCATE VARIABLE
030F: 20 6A DD         23           JSR  CHKNUM    ;  VAR = NUM?
                       24  * Y,A = ADDR OF VAR DATA
0312: AA               25           TAX
0313: 20 2B EB         26           JSR  MOVMF     ;  PUT FAC -> MEMORY
0316: 60               27  DONE     RTS
```

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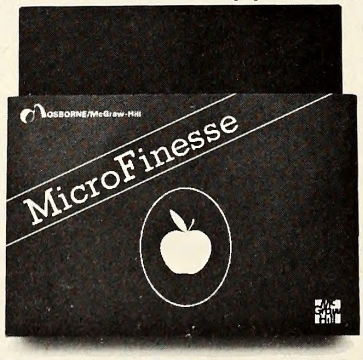

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location to which the contents of the FAC will be moved. Since PTRGET has just determined that for us, the only hitch is that PTRGET left the high order byte in the accumulator instead of the X register as we require. A simple TAX solves that problem, and the routine is concluded with the call to MOVMF and an RTS.

Programming Tip. Whenever a routine ends with a JSR to another routine, immediately followed by the ending RTS of the main routine, the line can be shortened one byte by changing the last JSR to a JMP. When the RTS in the last called subroutine is encountered, the RTS will cause an exit from the main routine instead. An example of this would be to rewrite the end of the program just listed as:

```
                    .
                    .
                    .
030F: 20 6A DD 23           JSR  CHKNUM  ; VAR = $?
              24  * Y,A = ADDR OF VAR DATA
0312: AA      25            TAX
0313: 4C 2B EB 26  DONE     JMP  MOVMF   ; PUT FAC -> MEMORY
                                           AND RETURN!
```

String Variables. String variables are not much different but will require a slightly clumsy calling Applesoft program to demonstrate. Line 10 is a series of *pokes* that will put the ASCII data for the string "TEST" into memory at our usual DATA ($380) location. Additionally, a delimiter will be placed at the end of the string so that the routines we will be calling can determine the string's length. Use of a delimiter is more practical especially in situations where you don't know the length of an incoming string until the carriage return or other delimiter shows up. The Applesoft routine we'll be using will automatically determine the length by scanning the string for the delimiter.

```
10  POKE 896,84: POKE 897,69: POKE 898,83: POKE 899,84:
    POKE 900,0
20  REM "TEST" + NULL DELIMITER
30  CALL 768, A$
40  PRINT A$
50  END
```

The subroutine for this is:

```
                1  ****************************
                2  * STR$ VAR SENDER *
                3  *       2/1/82     *
                4  *     R. WAGNER    *
                5  ****************************
                6  *
                7  *
                8           OBJ  $300
                9           ORG  $300
               10  *
               11  CHKCOM  EQU  $DEBE
               12  PTRGET  EQU  $DFE3
               13  CHKSTR  EQU  $DD6C
               14  FORPNT  EQU  $85
               15  MAK$    EQU  $E3E9
               16  SAVD    EQU  $DA9A
               17  DATA    EQU  $380
               18  *
               19  *
0300: 20 BE DE 20  ENTRY  JSR  CHKCOM  ; SYNTAX?
0303: 20 E3 DF 21         JSR  PTRGET  ; FIND VAR
0306: 20 6C DD 22         JSR  CHKSTR  ; VAR = $?
0309: 85 85    23         STA  FORPNT
030B: 84 86    24         STY  FORPNT+1; ADDR OF DESCR.
030D: A9 80    25         LDA  #$80
030F: A0 03    26         LDY  #$03    ; A,Y = $380
0311: A2 00    27         LDX  #$00    ; DELIMITER = '00'
0313: 20 E9 E3 28         JSR  MAK$    ; DATA -> MEMORY
0316: 20 9A DA 29         JSR  SAVD    ; VARPNT = NEW STRING
0319: 60       30  DONE   RTS
```

The new routines here are MAK$ ($E3E9 = "Make string") and SAVD ($DA9A = "Save descriptor"). MAK$ requires that the accumulator and the Y register hold the address (low, high) of the string to be scanned and that the X register hold the value for the delimiting character. This example uses '00', but another common variation would be to use a carriage return ($8D) or a comma ($2C). (Note that return is almost always found in the input buffer with the high bit *set*, that is, $8D versus $0D).

After scanning for the delimiter, MAK$ moves the data up to the string storage area at the top of memory.

SAVD is a companion routine which will take whatever string descriptor is currently pointed to by FORPNT ($85,86 = "Formula Pointer(?)"), and match it to the data just moved by MAK$.

Looking at the listing, we can see that the only creative work needing to be done is to move the contents of A and Y to FORPNT. The A, Y, and X registers are then prepared as was just described, and the remaining calls are done. Voila! Instant strings!

Closing Stuff. You'll notice that all of the routines handle arrays as well as simple variables. Additionally, certain more subtle points become apparent as you study the listings. For example, each of the last three Applesoft listings was done without defining the returned variable prior to the *call*. This was to demonstrate that PTRGET does a very nice job of creating the variable for us. In addition, in each case, the data that was put into a variable and then later retrieved at DATA (and vice versa) should be consistent, thus demonstrating the accuracy of the methods.

You may also wish to experiment with using formulas or string calculations after the *call* statement to confirm that all legal Applesoft operations are acceptable.

Last but not least, I would like to give credit and thanks to Craig Peterson for his help in providing some of the information used in preparing this article.

Next month, we'll look at some other applications of internal Applesoft routines within custom machine language programs. ◼

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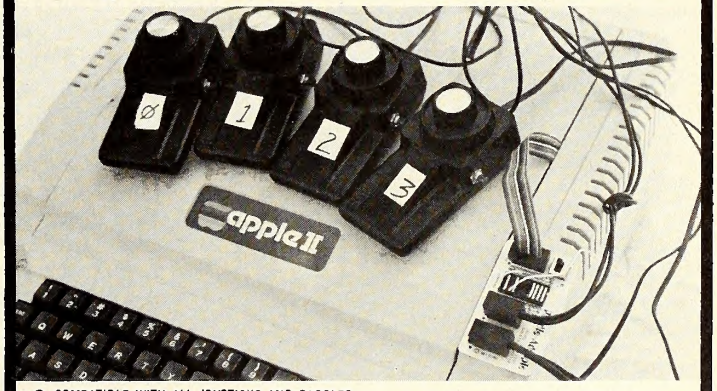

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☐ **Just Waiting for a Bus.** The field research teams of Southwest Research Institute's applied physics division, specializing in the problems of plant dynamics, structural design and analysis, materials engineering, and noise analysis and control, are ready to go anywhere in the world on twenty-four hours notice. A typical field package would include a multi-channel vibration/pulsation transducer amplifier, a strain gauge amplifier, proximetric pickups, a spectrum analyzer for amplitude and phase data — and, recently, an Apple II Plus micro.

The entry of the Apple into the world of on-site field data analysis was made possible by the ability of new-model spectrum analyzers—last link in the measurement chain—to output to an IEEE 488 general purpose instrument bus, allowing on-site computer analysis of retrieved data and eliminating the necessity of plotting the final data or reading its amplitude and phase components from a CRT.

Larry Blodgett, SwRI's senior research assistant, wanted a computer that met criteria of flexibility and portability (field equipment has to stand up to American Tourister-type simian baggage handlers), and, when he read of the capability of SSM's A488 card to turn an Apple into an IEEE 488 bus controller, he knew he'd found what he was looking for.

When the applied physics teams run tests now, they put all the acquired spectra into an Apple via the A488 for immediate access and computation, and also store on disk for use in the lab. Blodgett is pleased. They have three Apple/A488 combinations, and "we're already thinking about a half-dozen more."

☐ **Review Preview.** In James Martin's *The Telematic Society* (Marketalk Reviews, January 1982) it was futuristic speculation. But at CBS at the start of the 1981-82 television season, cast and crew of the new "Simon and Simon" series gathered in the Hollywood offices of producer Phil DeGuere to get immediate feedback on their first show, via computer. The telecommunicated criticism came from the east coast, before the show had even aired in its western time zone. DeGuere is one of the fourteen thousand subscribers to the Source, a national network of information services.

About one hundred subscribers responded the first week ("They told us to speed up the plot a bit and increase the sibling rivalry between Rick and A.J."), two hundred the second, and, according to DeGuere, "We should soon equal the total Nielsen sample of 1,250. When you consider that Nielsen ratings don't even tell us if viewers actually watch the show or care about it—well, I think this use of The Source has significant potential for involving viewers in the upgrading of television programming."

☐ **Arcade Brigade.** It was bound to happen sooner or later. The popular video games of the kind that require players to shoot down enemy aircraft and blow up tanks may soon be used as a training device for future soldiers in the United States Army. And the arcade galleries that attract so many draft-age young men who eagerly drop quarters in machines for the privilege of participating in war simulations could be turned into recruitment centers.

However farfetched it might sound for the army to be using video games as a new secret weapon—of sorts—take heed. The army is taking the games seriously. It has already commissioned one of the largest video companies to produce a game that would simulate a specific kind of army infantry carrier.

Captain Stephen Cox of the U.S. Army was quoted in the San Francisco *Chronicle* as saying the games would be used as a supplement to regular training. Since today's soldiers were raised on television, video games may prove a better way to train them than the hundreds of manuals now in use. Although plans for recruiting soldiers in mall arcades are still vague, several high-ranking officials in the army are not discounting this possibility. According to Cox, kids who can get a six-figure score right off the bat on a war game have the correct hand-eye coordination to have a "bright future" using the real thing.

☐ **And There Was Light.** James G. Burke, general manager of Optimem, called laser-based optical disk drives the wave of the future at the Dataquest Computer Industry Memory Conference in San Diego. Burke stated that optical drives will offer the potential for "dramatic improvement in storage performance and capability, whose potential impact on computer systems is certain to be tremendous." The drives will offer five thousand megabytes per surface, compared to the one hundred fifty per surface offered by magnetic technology, plus the potential for twenty thousand track-per-inch density, compared to one thousand tracks per inch for magnetics.

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developing an optical disk drive recorder for the OEM marketplace. Media improvements will eventually allow erasability; currently, key features are removability, allowing disks to be removed safely for off-line storage, and distributability, allowing optical storage users to make a nickel master and stamp out as many copies an needed, similar to record album production.

☐ **Let's Get Physical.** Fitness Systems, a six-year-old Los Angeles based company currently providing "managed fitness facilities" to Dart and Kraft, Shaklee, Teledyne, and Times Mirror Co., has devised CompuFit, a computerized, individualized fitness program designed for employees who don't have access to a gym. Atlantic Richfield of Los Angeles has been the first large client to take advantage of the program, which ARCO officials are monitoring with an eye toward expansion throughout the company.

Based on each participant's fitness data sheet, a computerized profile compares participants' fitness to the desirable established mean for their sex and age group, then devises the appropriate conditioning and exercise regimen for each individual. After four months, the original series of fitness tests is administered again and the participant receives a new fitness profile to compare with the first.

The program, while unsupervised and not providing actual facilities, is mainly of benefit in that it is available to all employees of a company.

☐ **Fun with Music.** Dr. Timothy Kolosick, of the North Texas State University School of Music, has received a grant from the NTSU Faculty Research Committee to investigate the potential for generation of music graphics on terminals not originally designed for it. NTSU's CAI lab will store musical notation symbols in EPROM chips for the project, allowing fast, sophisticated, and cost-efficient representation of music graphics, necessary for a complete instructional music system.

☐ **The Basest Data.** Product planning and marketing consultant David Ferris, speaking at last November's Mini/Micro show in Anaheim, California, commented that most data base management systems for personal computers are "little more than elementary ISAM file organizations, with no real understanding of such major issues for the software professional as relatability and multi-user concurrent access."

Citing limited edit masks and validation criteria for screen definition, Ferris felt that utilities such as query systems, report writers, screen formatters, and data dictionaries are still rudimentary and generally lack the facilities needed by programmers to build an integrated set of applications programs. Ferris noted that resistance of data processing managers to the introduction of the personal computer into business is to be expected but they will be forced to accept it because departmental users of personal computers running standalone applications are demanding access to data processing developed applications and the corporate data base.

Noting that "as people attempt to build an integrated portfolio of programs around a central data base, life suddenly gets much, much harder," Ferris dismissed the belief in the micro community that mainframe data processing departments are incompetent because of the long times and high costs associated with new applications development in that environment, predicting that the micro world will soon have the same problems.

☐ **Direct to Disk.** Digital radiology, a technique for converting x-ray images into electronic signals and storing them in a computer, allowing doctors to see more at less cost and less risk to the patient, is taking the medical world by storm.

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SPECULATING

One Stockholder's Fantasy

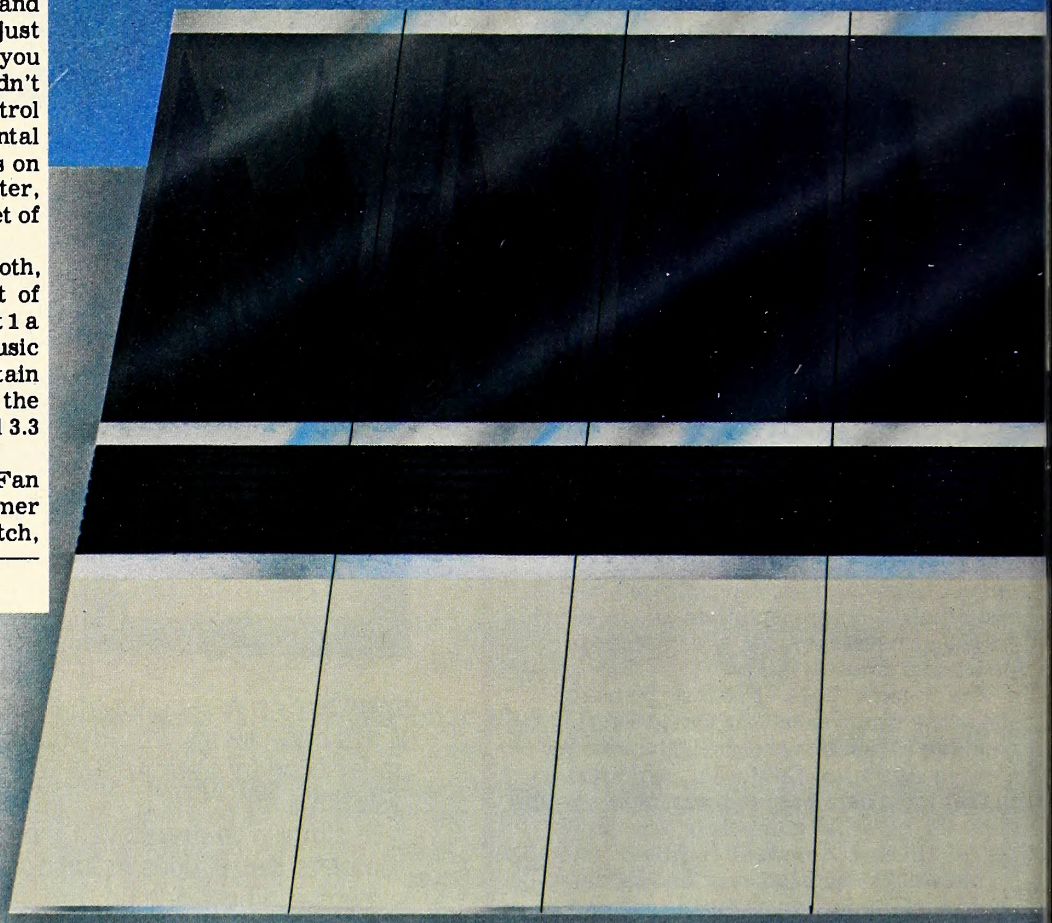
BY CHRISTOPHER U. LIGHT

My Old Flame. My Apple's case is coffee-stained. Its keys are dusty. There's a permanent black smudge below the space bar where my right thumb rests while I'm thinking. It's middle-aged as Apple IIs go, one of the first of the floating-point Plus models with that confounded, unprotected, misplaced, and thoroughly miserable reset key just above the return key. (For those of you new to Appledom, the older models didn't have the protection of requiring control along with reset to prevent accidental bombing of programs and disks). It's on its second monitor and second printer, third set of game paddles, and fifth set of buttons. It's barely two years old.

In addition to growing long of tooth, my Apple has put on a fair amount of weight. Slot 0 has an Integer card, slot 1 a printer interface, slot 3 an ALF music synthesizer, slots 4 and 5 the Mountain Computer MusicSystem, and slot 6 the disk drive card with both DOS 3.2 and 3.3 chips.

Hung on the outside are the Super Fan II, essential during a Midwest summer without air conditioning, the DOS switch,

Illustration by Kurt Wahlner



ON THE APPLE IV

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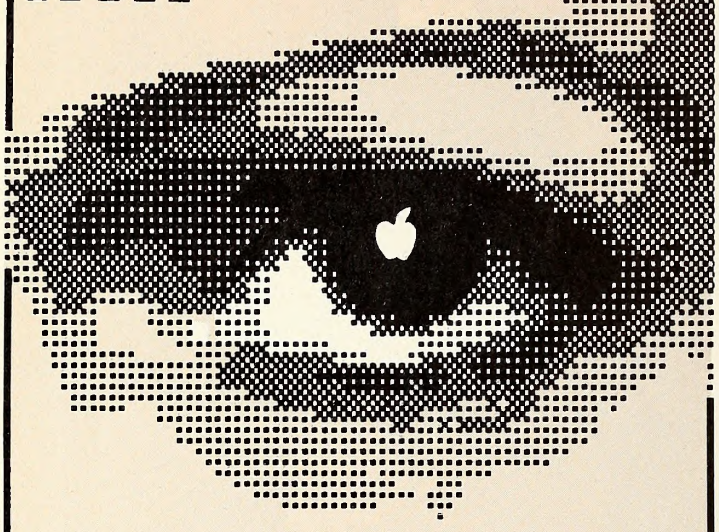

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Though it is very simple to use, the Dithertizer II represents the ultimate in video digitizing using the Apple II computer. The Dithertizer is an interface card which converts video input into digitized images. Because the Dithertizer II is a frame grabber, DMA type digitizer, it offers extreme high speed in the conversion process (it grabs an entire frame in 1/60th of a second). The camera supplied with the package is the Sanyo model VC1610X. Cabling is supplied for this camera so as to have the Dithertizer II system up and running in minutes. The video camera used for input must have external sync to allow for the frame grabber technology employed for digitizing. If a camera other than the model recommended is used, wiring adaptations by the user may be required. Software is supplied with the board to allow you to display up to 64 pseudo grey levels on your Apple's screen. The number of grey levels may be changed with one keystroke. The intensity and contrast of the image are controllable via game paddles. Also supplied is software for image contouring for those interested in movement detection or graphic design applications.

The Dithertizer II package is available ready to run with camera, interface card and the software described above for only: $650.00

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and two disk drives. Next to the computer itself is an Epson MX-80 printer. In a drawer under the printer is a Dan Paymar Lower Case Adapter that I hadn't gotten around to installing when On-Line Systems announced a word processor with software-generated lower-case letters.

Although my system's certainly much more than a 16K machine with cassette storage, it can't be called elaborate. As I look through the magazine ads at Apple peripherals that I don't have, I drool. In fact, while this system grew over these two years to meet my own specialized needs, I susect that, except for the music cards, it's a pretty typical system. It's likely to be typical because it grew as a compromise between my professional needs, my children's school needs, and my fourteen-year-old boy's love of arcade games.

For the first year and a half, we carried the Apple between home, office, and summer cottage. Packing it to take to the lake for the summer, I realized that it filled seven boxes, including one for software (the grey notebook has word processor files; the brown one, utility programs; the fat red one, games, and so on).

I also realized that, because it had been at the office, my children hadn't had much chance to use it recently. My daughter, who was studying Basic at school, couldn't do her homework at home. My boy was forced to spend his allowance on Pac-Man at a local arcade parlor. If I wanted to work in the evening, I had to go back to my office. Clearly it was time for a second computer.

So Many Others Who Had Fascinating Ways. Which computer should I get? I mulled the pros and cons of having to get all new software versus the lower cost of a TRS-80 which, I thought, would be just fine for the kids. My boy wanted Mattell's Intellivision, which he thinks has the best action games. I vetoed that because the computer module wasn't available yet (and, it appears, may never be).

It seemed to make sense to get the most advanced and flexible "state of the art" machine I could find and add memory and peripherals as I could afford them. In my heart, of course, I knew I had to have an Apple III with its 128K of memory. Of course, this would be my machine at the office, and the kids would get the old II Plus with that exposed reset key. The price was a lot steeper than I wanted, but I reminded myself that it would be a business machine at my office, and I could write off its cost and recover a portion through very legitimate tax deductions.

But, I decided, I'd better make a proper search. After all, if I made the wrong selection, I'd be stuck with it for a couple of years. My first computer had turned out to be a horrible choice. It was a Heathkit H-8 with an H-9 terminal, both of which I built over one long, cold, Chicago winter. When I finished, I found that the operating manual was so badly written that I had to call the factory to find out how to boot the system and that the only preprogrammed software available consisted of Basic and half a dozen games, all on cassette tape.

It ran intermittently, and I felt pleased if I could get a good cassette load in less than five tries. The day the terminal caught fire was the day I decided to trade it in for an Apple. Unfortunately, no Apple dealer wanted it. Would you buy a used Heathkit that somebody else had put together? I wouldn't. After another year of using a pocket calculator, a manual typewriter, and a wooden chess board, I gave the H-8, H-9, and about ten pounds of unintelligible manuals to Goodwill and started over again with an Apple. Since I didn't want another expensive disaster like that, I planned to search carefully before committing myself to another system.

Luckily, searching would be easy. Within a ten minute walk from my office are a DEC store (Digital Equipment Company—remember the PDP 11?), a Xerox dealer, two Radio Shacks (there's one on every corner), and an Apple dealer. I decided not to bother with all those obscure names you see advertised ad infinitum in *Byte*.

It was easy to eliminate the Xerox and DEC machines. The first turned out to be a word processor only, and the second was simply too expensive and was limited to DEC's own software. Radio Shack's TRS-80s, however, were appealing

(heresy!). There was a lot of software available, and the price seemed right. In addition, the Model II, which was designed for business, had an eight-inch, built-in disk drive as well as a built-in monitor. Maybe its battleship-grey wouldn't complement my office as well as Apple's light beige, but that seemed minor. I promised the salesman I'd think about it and took home a catalog to study, but I knew in my heart when I did it that I really had to have that 128K Apple III. Besides, as a shareholder of Apple Computer Inc., I had to support my company, didn't I?

Before I had a chance to get a proper demonstration of the III, a friend asked, "Did you see the *Wall Street Journal* article about the Apple III?" I hadn't, so I went to the library to look it up. As a loyal Apple owner, you've probably heard of that article even if you didn't read it. Appearing in the *Journal*'s April 15, 1981, issue, it documented the woes of the Apple III. There were basically two problems when it was introduced: (1), its quality control was apparently abysmal, and early owners could expect breakdowns and repairs as a matter of course; (2), Apple introduced this 128K computer, then the largest micro in the industry, with virtually no software except Basic and *VisiCalc*. Worse, the article went on, it would be almost another year before much additional software would be available. While at the library, I checked on the price of my Apple stock and found that it had fallen by a dollar and a half a share the day that story came out.

Nevertheless, I decided to ask my neighborhood Apple dealer for a demonstration. The III looked nice, and its separate numerical keypad and (hooray) recessed reset button were great additions. He showed me *VisiCalc* and acknowledged that there was nothing else just then. I asked about running my Apple II software. He said some of the programs would run in the "emulator" mode and some wouldn't but that he didn't know which ones would and also that this mode then limited the III to the II's 48K.

I asked about peripheral boards, and he replied that he didn't know whether or not any of them were compatible electrically. In any case, he said, they probably wouldn't fit physically because the III's case is shaped differently. Scratch my music synthesizers. Then I noticed that the III had only one built-in disk drive. The dealer said that a Disk II sitting on the table next to the model III served as the second drive. I was aghast. There are only two correct numbers of disk drives for a micro computer: zero, if you want to keep the initial cost down, and two, if it's to be a $5,000 business system like the Apple III purports to be.

No wonder the price of my stock had gone down. The Apple III was the Edsel of the eighties.

I shook my head and packed up my old II Plus for its annual trip to the lake. Over the summer I heard a fantastic rumor: the Founding Father was going to bring out a micro with 256K that you could buy at your local Sears Roebuck store. Nonsense, I thought, but in the fall it turned out to be true—except that you had to go to a special Sears Business Center or a Computerland store.

Right after the Midwest computer show in late September, I drove to a Computerland out in the suburbs to look at this latest miracle from IBM. There it was in typewriter grey with a matching monitor, a printer that looked just like my Epson (which makes them for IBM) and two—count 'em, two—built-in disk drives. It was sitting on the table this dealer used to use for his Apple III demonstrator. I asked him where the III was, and he replied, "We don't keep one on display any more, but we do have one in the back room in case somebody insists on buying it." I had a horrible vision of my stock slipping even lower.

I turned to the IBM. After I had watched the continuous sales pitch that it was running finish up and start over again, I asked if I could look at something else, perhaps IBM's *VisiCalc*. The salesman apologized: sorry, no software. I pointed to IBM's sales brochure, which promised Basic, *VisiCalc*, and *Adventure*. "We wish we had them," he replied. I asked how he could sell IBM's without software any better than Apple IIIs without software. He shrugged and I left.

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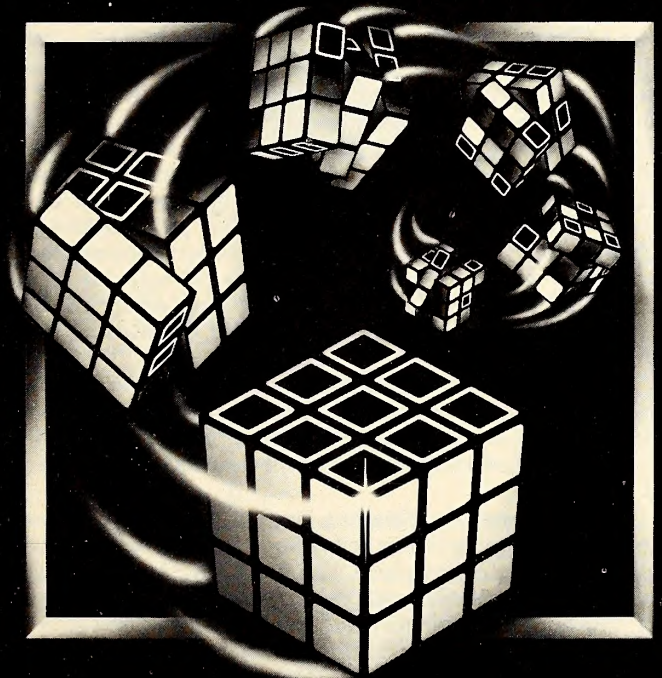
By Richard Stauduhar



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The Edsel has become a Mustang.

Barely a month and a half ago, Apple Computer Inc. released a new, improved version of the Apple III that has greatly expanded memory and mass-storage capability and professional application programs. The original Apple III had a tough act to follow after its older sisters, Apples II and II Plus, changed the world of personal computing. So when some vocal consumers uncovered flaws in the original system, the Apple III suddenly became a lemon.

The New Baby. This is not intended to be a redeeming essay on the merits of the original Apple III; at first, it *was* a lemon. But, for the record, the system *Softalk* acquired several months ago, one of the last original IIIs, has proven absolutely flawless. And it goes through a rigorous test at this office, working straight through periods of forty-eight hours and more without hesitation. But a bad reputation is hard to change in a single essay, so suffice it to say, our Apple III has a secure place in our office and we're glad we adopted it.

But now Apple Computer Inc. has a new baby, which they have named the *new* Apple III. Apple President Mike Markkula says tests have proven it to be even more reliable than the Apple II, despite being a much more complex machine than its predecessor. The new Apple III packs an improved operating system, fully reliable hardware, and up to 256K of internal memory. All this and it is even lower priced than the earlier Apple III. Owners of original Apple III systems—such as *Softalk*'s—can upgrade to the new version at no charge, even if the warranty has expired.

Rattles, Teddy Bears, and Other Toys. One of the major complaints about the original Apple III system was that there was no software, or at least very little, available for it. A personal computer owner can be compared somewhat to a new Barbie doll owner who demands lots of things to dress it up with and lots of peripherals to buy.

The new Apple III has seven new or enhanced software packages from Apple alone, but the most exciting supporting package is hardware: the new Apple III/ProFile Personal Mass-Storage System. As far as desirability, the ProFile Mass-Storage System is like the prom dress in the Barbie wardrobe. Designed to be integrated into Apple III systems, ProFile is a five-million-byte, Winchester-type, hard-disk system that gives Apple users nearly thirty-five times the mass-storage capacity of a single floppy disk.

A completely self-contained unit, the ProFile features an intelligent controller, a five and a quarter-inch Winchester technology disk drive, a power supply, an interface card, and driver software. According to Markkula, "The storage capacity of ProFile will bring true database management applications to personal computing for the first time.

"All the data needed to run a small business or a department within a large organization can reside on a single ProFile for easy access, data manipulation, and analysis. Previously, the information often had to be stored on many floppy disks."

The Apple III is targeted at traditional Apple customers in business, professional management, and education. Because of its greatly increased mass-storage capacity, the new Apple III is also particularly well-suited for OEMs (original equipment manufacturers) and system integrators who need larger data capacity.

Now III Owners can Take Up Running. The seven new or enhanced application programs were also introduced last December. *Access III* allows Apple III computers to communicate with large mainframe computers. This is a significant breakthrough because, for the first time, Apple IIIs can be turned into remote data processing work stations, retrieving information from the larger database and returning completed work to the central computer.

An *Apple Writer III* is the old standby *Apple Writer* expanded almost beyond recognition and very, very powerful; it's main resemblance to its parent is its user-friendly ease of implementation. *VisiCalc III* and Business Graphics III prepare and analyze detailed business information; Business Basic and Pascal III offer a choice of languages for developing

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So much for 256K. So much for 128K. I called my dealer and ordered a second Apple II Plus. It works just fine, and all I have to carry between the house and the office are a few disks that will run on either machine.

Still, despite the money I saved, I was disappointed. I'd had my heart set on a real number-cruncher. After all, a 256K machine was the biggest IBM ever offered in the Model 360 line that was the main frame workhorse of the world for over a decade. A well-equipped version of it had set some companies back more than their corporate jets. For about the price of a Volkswagen I could have had the same computing power. But IBM's micro had no software, and Apple had built an Edsel.

So it'll be two, three, maybe even five years before I get my own number-cruncher. By then my favorite computer stores will have walls covered with software for both the III and the Founding Father Junior. But I won't have either one of those. Now that I have two Apple IIs, I'm going to wait for the Apple IV.

In fact, I've already got my Apple IV system pretty well planned out if my company, Apple Computer Inc. (as a stockholder, I am a part owner, you know) introduces the Model IV that I hope it will introduce. I'm already having visions of what it will be like.

My Thoughts Go Flashing Back Again. Although I suspect that technology will further reduce the size of circuit boards and electrical components, the Apple IV that I see visions of when I close my eyes will be somewhat larger than the Apple II. The human finger just isn't going to shrink, so the keyboard can't be smaller. In addition, my IV will need the physical space for music boards and clocks and all already developed for the II.

My Apple IV's case will, of course, be beige with a rainbowed, prechewed apple logo: no black or grey for my company, not when its image is so strong that peripheral manufacturers are making printers and monitors in the same color to

advanced application programs; and *Script III* formats Pascal text into layout-perfect printouts. An updated version of *Mail List Manager* for maintaining lists and printing labels using the Apple III/ProFile system will be on the market soon.

Gifts from the Relatives. These new application programs and memory expansion capabilities promise to make Apple III owners as well as computer dealers happy and satisfied, but this isn't where it ends. In keeping with Apple Inc.'s established but highly unusual policy, the Apple III is wide open to the programmer's curious probing; and so the software from outside publishers that's begun to trickle onto the market is likely to become a torrent as the reliability of the new system becomes widely known.

As of January 1, outside companies had produced at least four word processors, five accounting packages, an outstanding memo calendar, and a working clock just for the III. Other publishers have revised Apple II packages to take advantage of the III's capabilities. And the new III has an enhanced emulation mode that makes virtually all your Apple II software workable on the III.

Someone Else's Children. In 1958, with great fanfare and foofara, Ford Motor Company introduced the Edsel; in 1959, production on the worst-selling and shortest-lived member of the Ford family ceased. In 1964, with some fanfare, Ford Motor Company introduced the Mustang; fourteen years later, Mustang, the small car with tons of power, still held the all-time record for car sales in its first year. Today, Mustangs are still popular and early models are worth more than five times their original price.

The first Apple III looked a lot like the Edsel. But Apple wasn't Ford with a long line of other models. So it pulled up its shirtsleeves and went to work to make the III the machine it was intended to be. As they worked, they graciously replaced original IIIs with improved models, without charge and as many times as necessary for all pioneering III owners to end up with the computer they thought they were buying. We know of one individual who had eight different IIIs over the first few months.

The Edsel Becomes a Mustang

BY MELISSA MILICH

Feelin' Good. With the introduction of the new Apple III/ProFile system, with thirty-five times the storage and ten times the speed of the IIs, the premature baby has come home from the hospital, brand-new, healthy, happy, and strong.

So it looks like it's good-bye, Edsel, hello, Mustang. And Apple Inc.'s owners, like Chris Light, can rest easy, dream about Apples VIII, IX, or X, and watch the charts rise. ∎

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coordinate with it. The keyboard will be half again as wide as it is now. I guess the industry is stuck with the old-fashioned typewriter layout for the alpha characters, the QWERTY format, as it is nicknamed. So we'll just keep the current keyboard—letters, symbols, numbers, and all.

To the right of the regular keyboard will be a numeric keypad for inputting large amounts of data for scientific and business research; the Apple III has one already. Because such a keypad requires keys zero through 9 and a decimal point, one space is left over. This will contain a second return key so that the operator won't have to take his or her hand away from the numeric keypad.

On the left of the main keyboard will be the function keypad and I/O switches. Like the IBM Junior, my Apple IV will have user-defined function keys. If I'm using the keyboard as a calculator, for example, and repeatedly have to solve the simple derivative

$$dY/dX = f'(1/X \wedge 2) = -2(1/X \wedge 3),$$

I will enter this function into memory labeled as Function Key Number 1. If I need to solve this for Y when, let's say, X = 27, I will type "X = 27," hit the function key labeled F(1), and see the screen print out

```
F(1) of X = -1.0161053E-04    -.0001016.
```

There's nothing remarkable about function keys like this. As I said, the IBM has them, and some pocket calculators do also. Certainly there's no reason why Apples have to be limited to the functions present in Basic.

Since a three-by-three keypad has nine keys, mine will have eight function keys and a shift key, allowing a total of sixteen user-programmable functions. In addition, my Apple IV's Basic will be able to program these function keys using software, so that I will be able to run a quick disk program to define all sixteen keys.

Above the function keypad will be about a dozen carefully labeled switches, either toggle or pushbutton. These will give the user hardware control over his I/O ports and slots. Instead of having to type PR#1 or insert it in your program to turn on the printer, you'll be able to hit a switch, and you'll be able to do it after you've already started running that program in which you forgot the command PRINT PR#1.

The fourth keypad my Apple IV will have will contain eight cursor control keys. As any of you who have done any editing know, there is a need to control the cursor both vertically and horizontally. Most of the music editors such as ALF and MusicSystem use the game paddles, but these tend to shift the cursor out of place if you brush against them accidentally. *Apple Writer,* some other word processors, and many games use the J,K,I, and M keys for left, right, up, and down movements of the cursor. It works, but, because they're in the middle of the keyboard, it's possible to hit the surrounding keys accidentally; the consequences of writing a document are correcting the errors, but in a game you may get zapped for your inattention. *VisiCalc* has half of the ideal cursor control system, the left/-right arrows. Unfortunately, it's necessary first to hit a shift key to convert them to a vertical mode in order to move from row to row and another shift key to go back to the horizontal mode.

We need at least four arrow keys dedicated exclusively to cursor control: two horizontal ones, as we have now, and two for vertical movements. That shouldn't be difficult. After all, that Heathkit terminal I built so long ago had all four—on the keyboard, that is; unfortunately, the existing software didn't recognize them.

In addition, there are times in some games when it would be very useful to move diagonally. It would also save time in word processing. Therefore, my Apple IV will have four more arrow keys pointed NE, SE, SW, and NW.

Since I've now planned a keyboard that'll be wider than the one on a Bosendorfer concert grand (that's the $61,000 piano with an extra octave at the bass end), I'll make this cursor keypad a portable one attached to the Apple IV by a tether just as the paddles now are.

It'll be the size of a hand-held calculator and have eight large keys on the top and, of course, two buttons on the sides which duplicate those on the game paddles. When my boy's playing *Apple Panic* (I'll let him use this machine every Sunday morning between three a.m. and six a.m.), he'll be able to lean back comfortably in his chair where he can survey the whole screen at once, hold the cursor keypad comfortably wherever he wants and pound the life out of those #%$&'* apples, butterflies, and death masks before they can zap him.

This portable cursor keypad will also have a bracket so that it can be fastened above the numerical keypad and be made part of the main keyboard for use in word editing. The current arrows will remain where they are for backspacing and erasing.

One of the most time-wasting operations with an Apple II is changing from game paddles to joystick and back. If your system is set up like mine, you have to remove the monitor from atop the disk drives, place the drives on top of the monitor, unsnap the top of the Apple's case, remove the paddles from an integrated circuit socket, insert all sixteen of the joystick's fragile and easily damaged pins into the socket, and put everything back together, hoping that you didn't bend a pin and also that you didn't reverse the disk drives so that the boot drive is now on the right instead of the left.

My Apple IV will have built-in, external game-paddle and joystick ports, and the sockets for these will be on the front of the machine so that we won't need an extra two feet of cable going to the back, as will the socket for the portable cursor control keyboard; lastly, they'll connect by sturdy plugs that can be inserted and removed countless times rather than fragile IC pins that should be installed once and left in place.

In fact *all* the most common I/O ports on my Apple IV will use plug-in types of external connections. Interfaces for the printer, disk drives, and monitor, as well as for game paddles, will be permanently installed just as they are on the III. Their plugs, of course, belong at the back of the set.

I'm ambivalent about slots for specialized devices. Certainly the IV must be able to use music synthesizers, graphics pads, time clocks, and so forth. The only question is, where to put them. Because empty slots waste a lot of space and require much larger cabinets than otherwise necessary, and because perhaps more than half the users will be content with disk drives, printer, and monitor with their built-in external ports, it might be best to use an expansion chassis for most optional peripheral cards with a sturdy, easily unpluggable cable connection on the back of the computer itself. These could, perhaps, be modular units holding two boards each that could be fastened together to provide up to eight in all.

So much for the external hardware. Among the cards permanently installed in my Apple IV will be both Integer and Applesoft Basic on ROM cards, with a front panel switch instead of one that takes a contortionist to reach, and DOS on a ROM card, also with a hardware switch.

If you've ever spent half an hour or so writing a program that you wanted to save before you discovered that you had switched on the Apple without booting DOS, you'll know why I want this last one. I have the impression that the Apple was designed around cassette storage and that the ability to use disks was an afterthought.

Not only is there no built-in, plug-type socket for the disk drives as there is for the cassette, but the instructions for running disks must be loaded from an initialized disk each time the system is turned on. At least one competing model has its DOS permanently in ROM (in a plug-in module). It's time Apple offered this also.

I'm also ambivalent about the number of disk drives the IV should have. As I said, the correct number is either zero, to keep the initial cost down, or two, in order to use the computer's full potential. If costs didn't have to be considered, there ought to be two Winchester hard disk drives for multimegabyte storage plus two floppies for loading canned programs and saving programs to be sent to other installations.

But at current prices two hard disk drives would add some

$10,000 to the cost of the system, and that's just too much. Eight-inch drives hold twice as much information as the 5¼-inch ones, but there's so much preprogrammed software available on the 5¼-inch size that we'd need at least one of the smaller diameter drives anyway.

For the moment, I guess that two 5¼-inch floppies—built into the case, of course—will have to do. But the Apple Computer Inc. industrial designer who designs the IV's case should plan for adding a compatible dual hard drive unit, perhaps in place of a desk drawer.

Also inside the case, we'll need an RF modulator and a fan. The external fans made by after-market manufacturers for the II work fine and cool my machine adequately in the summer, but they'd look a lot better inside the case.

I Can't Even Think of Her Name. What else? . . . Oh, yes . . . memory . . . *memory* . . . *MEMORY*. Apple Computer Inc.'s marketing people missed a bet when they began talking about 16K and 48K Apple IIs. The "48K" Apple actually is a 64K machine; only 48K of memory is available for the user's programs because Basic is in ROM and uses the other 16K. But if Basic weren't in ROM, it would have to be loaded each time the system was turned on and would still occupy about the same amount of memory.

Well, the binary number system being what it is, doubling is the norm in the computer business. Everything seems to work by powers of two. Thus it must have appeared not only logical but inevitable that the Apple III would have 128K, double that of the II. But the Founding Father's micro very shortly thereafter redoubled this memory up to 256K. And Apple is vulnerable.

Logically, then, the Apple IV would have 512K of internal memory. But marketing logic isn't the logic of binary arithmetic. Marketing logic says—don't just double. Don't stop at 512K of memory. Even though it would be the giant among the microcomputers, this doubling just means that a 512K Apple IV would be the biggest of the small. Marketing logic calls for a number with some pizzazz.

And the next number with pizzazz is 1024K—Double 512K, four times 128K, and eight times 64K. That's shorthand, of course. Just as 64K (two to the sixth power) really is an abbreviation for two to the sixteenth power (65,536), so 1024K (two to the tenth) is short for two to the twentieth power or 1,048,576 bytes. That's right: one million, forty-eight thousand five hundred seventy-six bytes.

That's a *megabyte*!

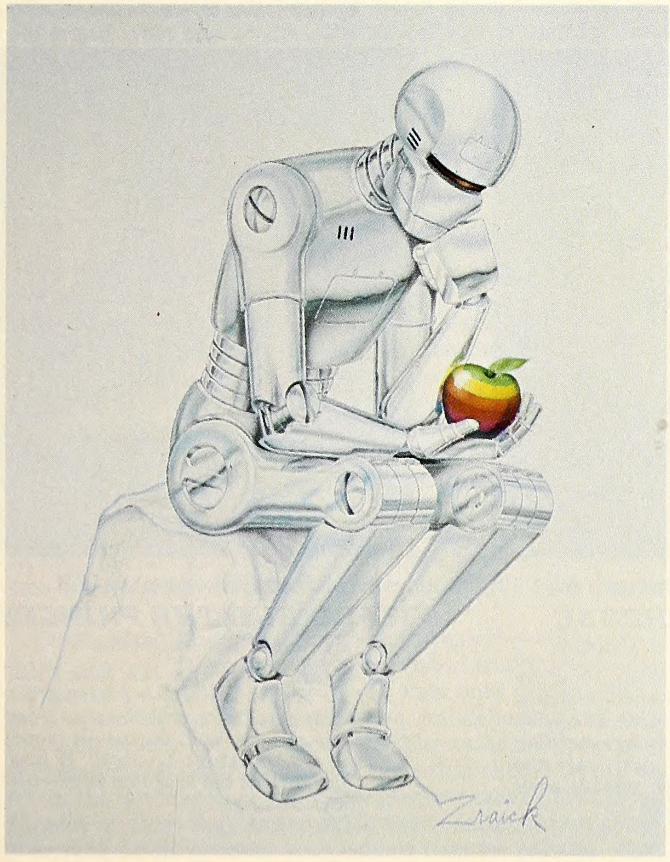
And that's a number with Pizzazz.

And it's also the internal memory I want in my Apple IV.

Will Apple Computer Inc. develop a model IV along these lines? I have no idea. I hold only a few shares in the firm and am not privy to its plans. But it's the kind of computer I'd like to buy if the price isn't out of sight. If it's what I'd like, I suspect that it's what a lot of others would like, too.

If Apple can come up with the right machine that will not merely compete with but will far outshine the Founding Father's micro, the price of Apple stock should go back up. . . . Maybe the company could even start paying dividends. That would be nice. There's a bunch of us loyal Apple II owners who bought stock at the public offering that would like that a lot.

■



contemplating a byte

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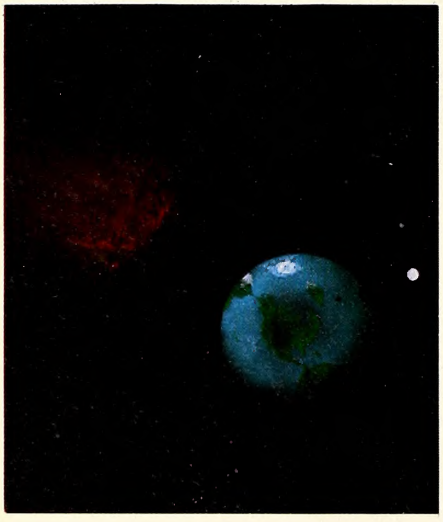

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HARD TALK

BY JEFFREY MAZUR

Anything that connects to the apple computer must do so through an interface of some sort. In most cases, this involves the use of a circuit board that plugs into one of the Apple's peripheral slots. Many devices, for example, the Disk II, Graphics Tablet, and the Silentype come with their own special interface boards; others may require a separate, standard interface board. Most printers fall into the second category.

Any standard for communication between electronic devices must define two factors. The first of these is the technical description of the hardware interface—the quantity and nature of the signals used, the voltage and timing of these signals, and the types of connectors and pin designations to be followed. After the hardware interface has been defined, a procedure for utilizing it must be presented. This is known as a *protocol.*

From the hardware side, any communications interface starts as a collection of wires between the two devices that are being connected. Each wire can be either *unidirectional* (meaning that signals travel from only one device to the other) or *bi-directional* (in which case the same wire is used to carry information in both directions). An electronic signal can be transmitted either as a voltage or as a current (technically, voltage and current are related, but a given interface will be concerned with one or the other). Voltage is usually chosen, and in such cases, one or more ground wires must be used as a reference for the other signals.

The second factor involved in defining a standard is the magnitude of the voltage (or current) that will be used. Again, a choice must be made between uni-polar or bi-polar logic levels. A uni-polar scheme usually relies upon positive-only signals; that is, a logic high might be represented by a signal greater than 2.5 volts. Any voltage between 0 and 2.5 volts would then be considered a logic low. In bi-polar signalling a positive voltage would be used to indicate a high while a negative voltage would be found when the signal was low.

The complexity of an interface standard can usually be deduced by the number of signals needed to achieve it. While a simple serial interface can be made with only two wires, more sophisticated communication can require an array of signals. These signals fall into three categories. *Data lines* are those signal wires that carry the actual information being passed. If data is being sent in parallel form (that is, one byte at a time), there will be eight distinct data lines, usually labelled DATA0 to DATA7. Serial data transmission takes place over one or two lines, since each byte is broken down into individual bits which are sent one at a time.

Controlling the flow of data are the *synchronizing* or *handshake signals.* These lines have the job of making sure data is transferred correctly and only at a rate both devices can handle. Depending upon the application, handshaking can be either uni-directional or bi-directional. The remaining signals can be classified as control or status lines that report on the condition of the devices involved. While not necessary for the actual transfer of data, they can provide useful information about the communication process with which they're related. For example, a paper empty signal that informs the computer that its printer needs to have new paper installed might be useful.

With all this in mind, let's examine some of the common interface standards in use today. While these standards have been devised to connect various types of equipment (printers, modems, laboratory equipment, and so on), we will focus on their use as an interface for printers. This simplifies matters greatly since only one-way transmission of data—from the computer to the printer—is involved. Even with the existing standards, however, connecting a printer can prove to be a complicated and confusing task.

Parallel Interfaces. The most popular scheme for connecting a printer is via a *parallel interface.* In its simplest form, this consists of ten uni-directional wires. Eight wires carry the data from the computer to the printer. Data will usually be in the form of the ASCII code for the character being sent. The other two lines represent the handshaking necessary to coordinate the transfer. Figure 1 shows how it works.

When the computer has a character to send, it will put out the appropriate code on the data lines and then send out a signal over the *strobe* line. Although the polarity and timing of this signal are not standardized, the popular *Centronics* interface uses a low-going pulse of at least one microsecond. (It turns out that for signalling purposes, a low, or negative going, pulse is sometimes more desirable than a positive one. In that case, when the particular signal is to be transmitted, the voltage on its line is brought low. Such signals are usually identified by writing them with a line over their names, such as *strobe.* When the printer receives this strobe signal, it looks at the data lines to see what character to print, and then responds with an *acknowledge* signal to the computer.

The Centronics standard printer interface also allows for several status signal lines, such as the following (unless otherwise noted, all signals are from the printer to the computer):

Select—On printers that have a local operation select mode, this line can inform the computer of this status.

Busy—Signifies that the printer is not ready to receive any more data.

Fault—Informs the computer that there is some problem with the printer.

Paper empty—The printer has run out of paper and therefore has ceased printing.

Input prime—This is a signal from the computer to the printer. On printers that support or require it, this signal is used to initialize the state of the printer.

Although these status signals are not required for the transmission of data, they give the interface some intelligence to make it operate more effectively. If the printer is turned off or has been de-selected, for example, it will not generate the *acknowledge* signal. Therefore, the first time the computer tries to print something, it will hang up. A better approach is to check the status of one or more of the lines above to make sure the printer is ready before sending any data.

Serial Interfaces. Producing a serial stream from parallel

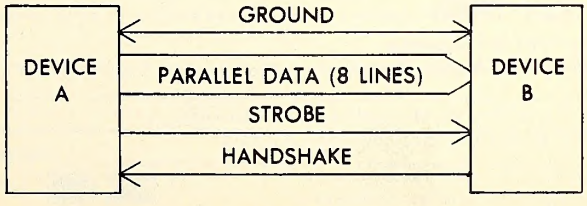

Figure 1. Parallel Transmission

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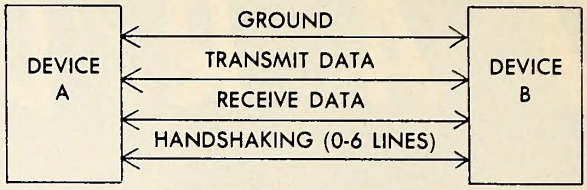

Figure 2-A Serial Transmission

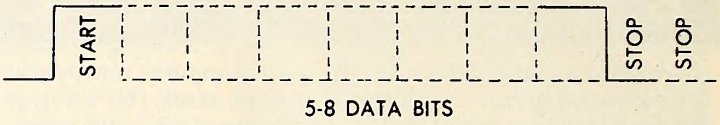

Figure 2-B Serial Data Format

data involves examining each data bit at a specified time. The transmitting device will send each bit, one after another, down the signal line. The receiving device must be able to convert this bit stream back into the original parallel form. To do this, it has to know the rate at which the data is being sent, as well as how to distinguish one byte from another. This could easily be handled by having two more signal lines, a "next bit strobe" and a "next byte strobe," but this would defeat the purpose of serial transmission. Therefore, such information must be encoded into the data stream. Figures 2a and 2b show how this is done. Note that the entire transmission is represented by one signal that can be in only one of two states. The signal idles in the low state, also referred to as a *mark,* which represents a logic *one.* In the high state, called a *space,* it signifies a logic *zero.*

Transmission is begun by sending a *start* bit which is always a *space.* Then the data bits are sent. There are usually between five and eight data bits and they are sent out starting with the least significant one. An optional parity bit may follow. This bit can be used at the other end to check the validity of the data received. Parity can be either odd or even—it refers to the total number of ones in any transmitted byte.

With odd parity, if the data to be sent has an even number of *one* bits, then the parity bit will also be a one, making the total number odd. If there's already an odd number of data *ones,* then the parity bit becomes a zero, keeping the total number still odd. By keeping track of the number of *one* bits read in, the receiving device can detect most errors (for example, where one bit was read incorrectly). Although this seems like a very handy feature, parity error detection is almost nonexistent in current peripherals.

After the parity bit, there will be at least one *stop* bit, a *mark,* signifying the end of this character. The length of time each bit is sent depends upon the baud rate used. A baud rate of 1200, for instance, means that 1200 bits can be sent each second. Taking into account one start bit, eight data bits and one stop bit, each byte takes ten bit-times to send. Thus one hundred twenty characters per second can be sent at 1200 baud. This system of synchronizing the transmitting and receiving devices by adding start/stop bits is known as *asynchronous serial data transmission.*

The main standards for serial communication are current loop and RS-232. Current loop is the older of the two, having been the standard for the early teletype terminals. It works by connecting the two devices in a continuous loop or circuit. One loop is used for each direction of data transfer. The sending device signals a *space* by allowing a small current (usually 20 milliamperes) to flow through both devices. The mark state is signified by no current flow.

Much more popular today is the RS-232 standard which was established by the Electronic Industries Association. This standard uses bi-polar voltage signals to communicate between two devices. Specifically, a *mark* is defined as a signal level in the range of −3 to −25 volts. A *space* is represented by +3 to

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INTRODUCTION

This edition the THE BOOK OF APPLE COMPUTER SOFTWARE – 1982 combines previous editions (some re-written) and new articles, reviews and evaluations. Judging from the response accorded the first edition, which immediately sold out, there is a great need for a guide to the hundreds of programs that compete for the Apple owner's dollars. With the introduction of the Z80 card, choices get even harder concerning what to purchase; therefore, we dedicate this book to you, the consumer. We hope you will use it for a guide and as a reference to assist you in making intelligent and informed decisions when purchasing software.

Currently, the Apple Computer owner is presented with a bewildering selection of software from which to choose. On the one hand, this should please you in that, as the owner of probably the most popular micro-computer in the world, you have a wide and rapidly growing selection of software from which to choose. On the other hand, this wide and growing selection presents some problems. The vast majority of retail computer store staff people simply just do not have the time to adequately review each new piece of software that comes in their store. The problem is compounded if the new program is an extensive or complicated one, such as an accounting package or a word processing system, or a comprehensive data base management program. This does not mean that store personnel do not want to give you the best service possible; it's just that it is an almost impossible task. If you purchase software through the mail, the risks that you assume, without a reliable guide to assist you should be apparent.

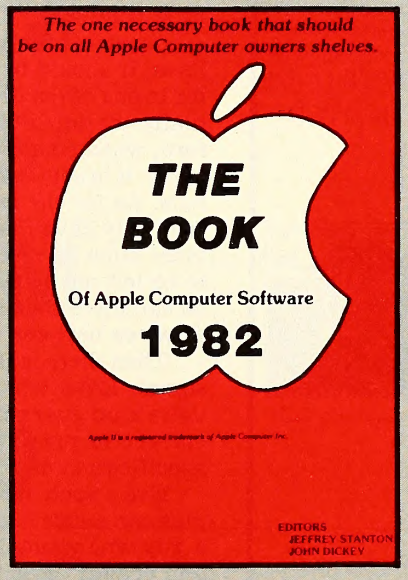
Other pitfalls await the uninformed buyer. For instance, in too many cases you cannot by the appearance of the package whether the program requires Integer Basic or Applesoft Basic or whether it needs 16, 32 or 48K of RAM. It is also often difficult to tell when you purchase a program on tape whether it can be transferred to disk or, if a disk program is purchased, whether it can be copied or not.

Another area that can present problems to the buyer is the similarity of software. A well-stocked computer store may possibly offer five different word processing packages, four assemblers, ten different adventure type games and/or several mail list programs, (the choices seem endless); all of which have obvious advantages and disadvantages as well as different prices.

The goal of "The Book" is to eliminate as many of these potential problem areas for the software buyer as possible.

We welcome any comments or criticisms from readers that will help us in reaching this goal.

*Obviously, Apple and Apple Computer Co. is mentioned many times throughout "The Book." Apple II is a registered trademark of Apple Computer Inc.



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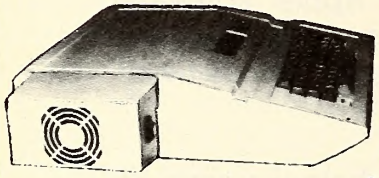

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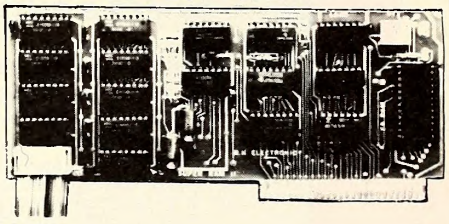

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BB	3
CA	4
CB	5
CC	6
CD	20
CE	22
CF	8

Signal Nome	Symbol
Protective ground (Frome graund)	FG
Signol ground	SG
Tronsmitted data (Send doto)	TD (SD)
Received dota	RD
Request to send	RTS (RG)
Cleor to send (Reody to send)	CTS (RS)
Dota set reody (Modem reody)	DSR (IT)
Dota terminol reody (Connect to line)	DTR (CL)
Ring indicatar	
Carrier detect	CD

Figure 3

+25 volts. Figure 3 outlines the signals used and their pin numbers on the standard's DB-25 type connector.

RS-232 was designed to connect data terminal equipment (DTE) to data communications equipment (DCE). Basically, these terms refer to computers and modems, respectively, for which the standard is very well defined. When other devices are connected using this standard, however, things can get a little confusing.

Consider, for example, the *transmit data* and *receive data* lines. It should be obvious that this nomenclature can only refer to one of the devices—the transmitted data on TD line is actually the input signal for the other device's receiver. Therefore, when connecting two computers, or a terminal and computer, it is sometimes necessary to cross connect these two signals. As for the rest of the handshake lines shown in figure 3, they only have meaning when connected to communication devices such as modems. Some interfaces will allow these lines to be left unconnected, but others require that the full protocol be satisfied. This is usually accomplished by connecting jumper wires between one or more pairs of pins on one connector.

Then there is the matter of where to hook the printer's *busy* signal. Even when the proper connections have been made, there's no guarantee that the timing of the *busy* signal will be correct to prevent loss of data. This is because there is no specification of such criteria in the RS-232 standard.

Even such harmless things as the unassigned connector pins can cause a great deal of trouble. Case in point. There was a guy who wanted to put a longer cable between his computer and printer. With this in mind, he purchased a high quality, albeit used, cable from a surplus dealer. Assuming that the cable was nothing more than twenty-five wires running straight between the two connectors, he replaced the original cable in his system with the longer one. You can imagine his words when he powered up his printer and smoke began to pour forth from it. Further investigation of the replacement cable revealed that there was a jumper wire installed within one of the connectors (this discovery required physically taking the connector apart). Apparently, this jumper had been necessary to the function of the former equipment. These particular pins, however, being undefined by the RS-232 standard, were also used by the printer and, unfortunately, were connected directly to two of its power supply voltages. Thus, as soon as the cable was attached, it presented a short circuit to the printer.

The moral of this true story is that standards should not be relied upon too heavily. Do not assume that two devices can be connected immediately just because they both claim to be "RS-232 compatible."

Serial Protocols. Three forms of serial protocol have been used to control the transmission of data from one device to an-

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other. The main object of a protocol is to ensure that no data is sent to a receiving device while the receiving device is not prepared for it. The simplest way to do this is via one or more additional signal wires which reflect the readiness of each device to receive or transmit. Some of these signals are shown in figure 3.

RS-232 was developed mainly for communication through modems, however, and there's no way to pass any of these extra signals over the modem link path. Therefore, all handshaking between the two devices must be carried out over the existing full-duplex channel. This is accomplished by using special codes to signify when to start and stop sending.

One such technique is known as the *x-on/x-off* protocol. When the receiving device is ready to accept data, it sends out the *x-on* code (the same as the ASCII DC1, or hex 11) to the transmitting device. If the receiving unit becomes unable to accept more data, it sends out the *x-off* code (ASCII DC3 or hex 13) which causes the transmitting device to stop sending data until it receives an *x-on* signal again.

Another form of handshake is the *etx/ack* method. This technique assumes that the receiving device has an input buffer and that the sending device knows the size of this buffer. Under these conditions, the sender will transmit a block of text followed by the *end of text* code, *etx* (hex 03). As the receiving device is processing the data from the output of the buffer (printing it, for instance), it looks for the *etx* code. When it finds this code, it sends back the *acknowledge* code, *ack* (hex 06). This signals the other device to send another block of text.

The *x-on/x-off* and *etx/ack* protocols work well for transmission through modems. When connecting a printer through a serial interface, however, these techniques are awkward and slow, and require duplex operation (two-way data communication). Since a printer is usually going to be connected directly to the computer (no modem or telephone link involved), the logical answer is to use a hard-wired signal to indicate a ready or busy state. This is exactly what is done, but unfortunately it is not clear which line of the RS-232 standard to use. The two most likely candidates are the DTR and CTS lines, but neither is clearly the more popular. Therefore, when connecting printers via RS-232, some pin swapping or re-cabling may also have to be done to put the appropriate signals on the correct pins.

Other Interfaces. Aside from simple parallel and serial interfaces, there are many other bus structures for transferring data. Probably the next most common is the *IEEE 488 general purpose interface bus.* This standard, pioneered by Hewlett-Packard, was designed primarily for connecting programmable test instruments to each other to build automated-measurement systems. This standard, along with its implementation on the Apple II, will be discussed in greater detail in a future column.

The latest trend in interface structures lies in the concept of a *network.* A single high frequency signal cable is routed between one or more computers and their peripherals. All data to be transferred between any of the devices is transported over this single wire.

Even though there is only one wire, several distinct transmissions can be carried out simultaneously. Each device on the network must be given a unique code so that it can know which data on the line is meant for itself. One beauty of this approach is that a new peripheral can be added to the system by simply tapping into the network cable.

Graphics Routines. Many of the new printers have graphics capabilities similar to the Apple's hi-res graphics displays. Several programs have appeared that make it possible to dump an entire hi-res screen to the printer with one simple command.

Since any good peripheral board for the Apple will contain some firmware routines, a few printer interface board manufacturers are including graphics dump routines right on the board. This is very convenient because then it only takes a few keystrokes to dump a picture, instead of requiring that you load a separate routine from disk. One of the first boards to

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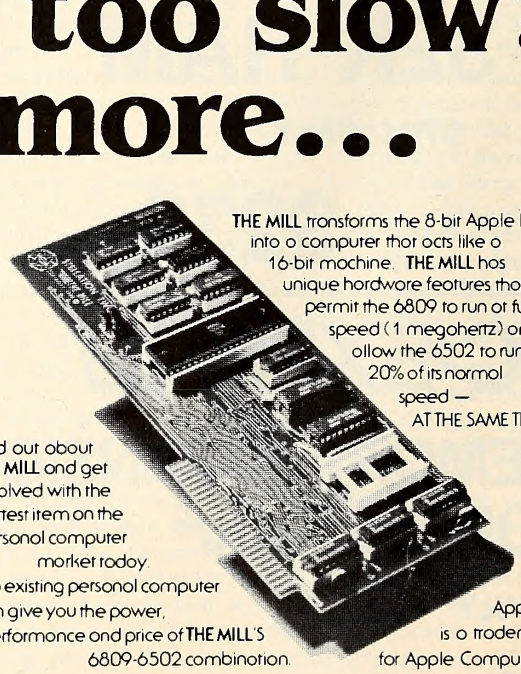

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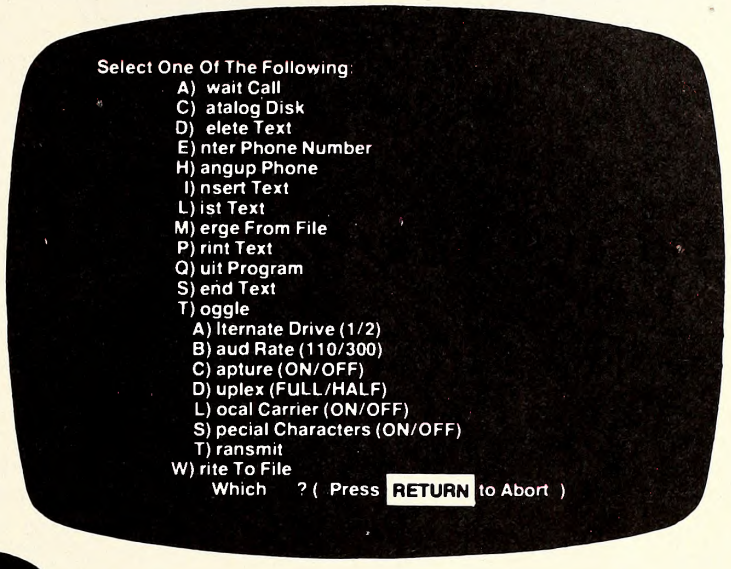

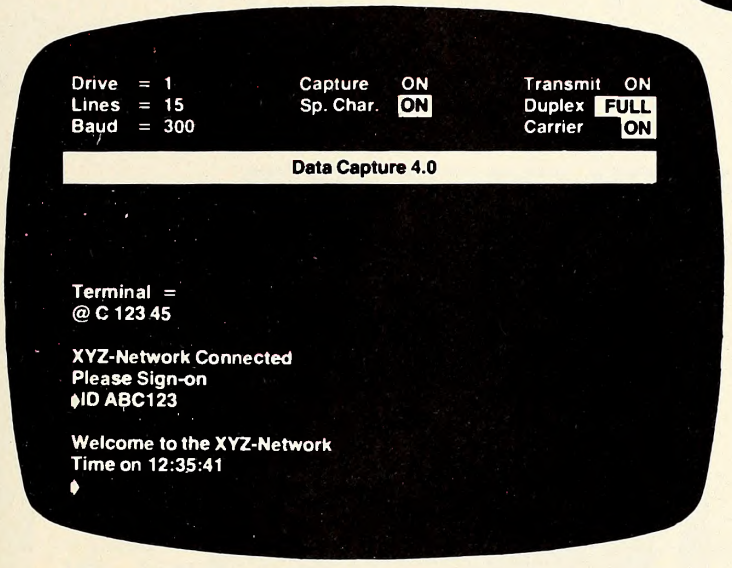

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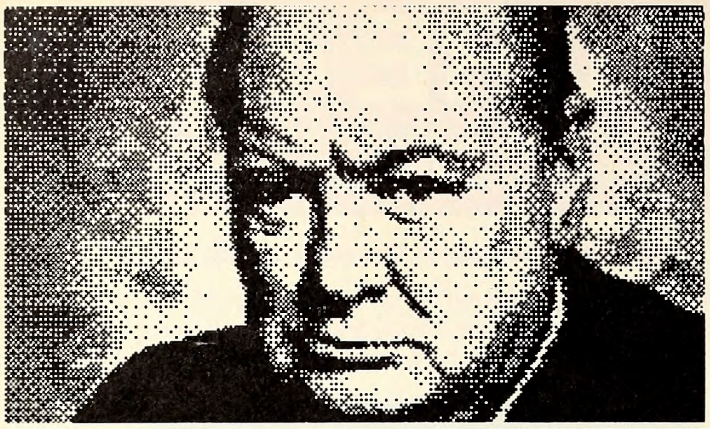

Figure 4

have this feature was the *Grappler* from Orange Micro. Besides handling simple dumps from either hi-res screen, this board can rotate an image ninety or one-hundred eighty degrees, make it full size or double size, and/or produce a negative image (see figure 4). All of this is done with very simple control commands that can be issued from the keyboard. The particular command letters chosen for the *Grappler* have already become somewhat of a standard with which other manufacturers are striving to be compatible.

Buffers. Since the printer will handle data at a much slower rate than the computer, it usually is responsible for tying up the computer while it is printing. One way to avoid this is to use a printer that has a buffer that can accept data at the computer's speed and then spit it out at the slower printer speed.

Unfortunately, most printers don't have a very large buffer, if they have one at all. Therefore, they don't offer much relief for long printouts such as a program listing. Another solution to this problem is the software print spooler which can print a file while the computer continues to work on something else. Unfortunately, the unmodified Apple is not very well suited to handle such a task.

A better approach is to put some sort of *fifo* (first in, first out) buffer between the computer and the printer. If the buffer is large enough to hold the entire text to be printed, then the computer can dump all of the text into the buffer at high speed. Then, while the printer takes its time to finish printing, the computer is free to do other things. With the capacity of memory chips increasing and their price dropping, this feature is sure to become standard on many printer interface boards. At least two such boards are already on the market; they'll be reviewed in detail next month. ◨

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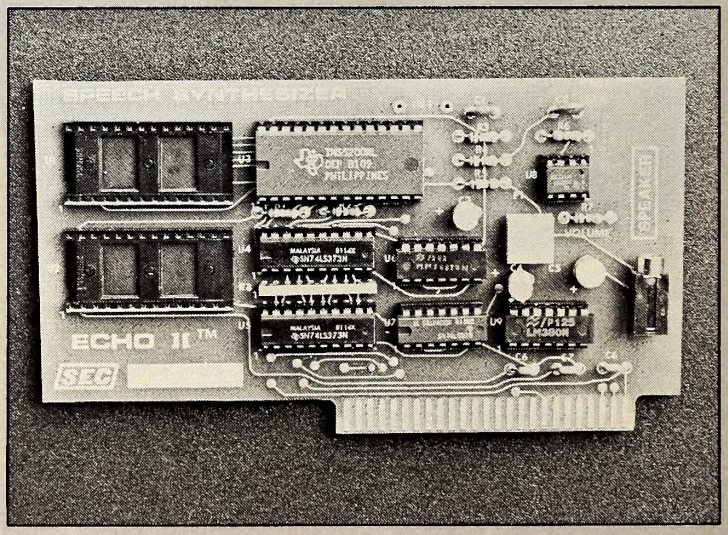

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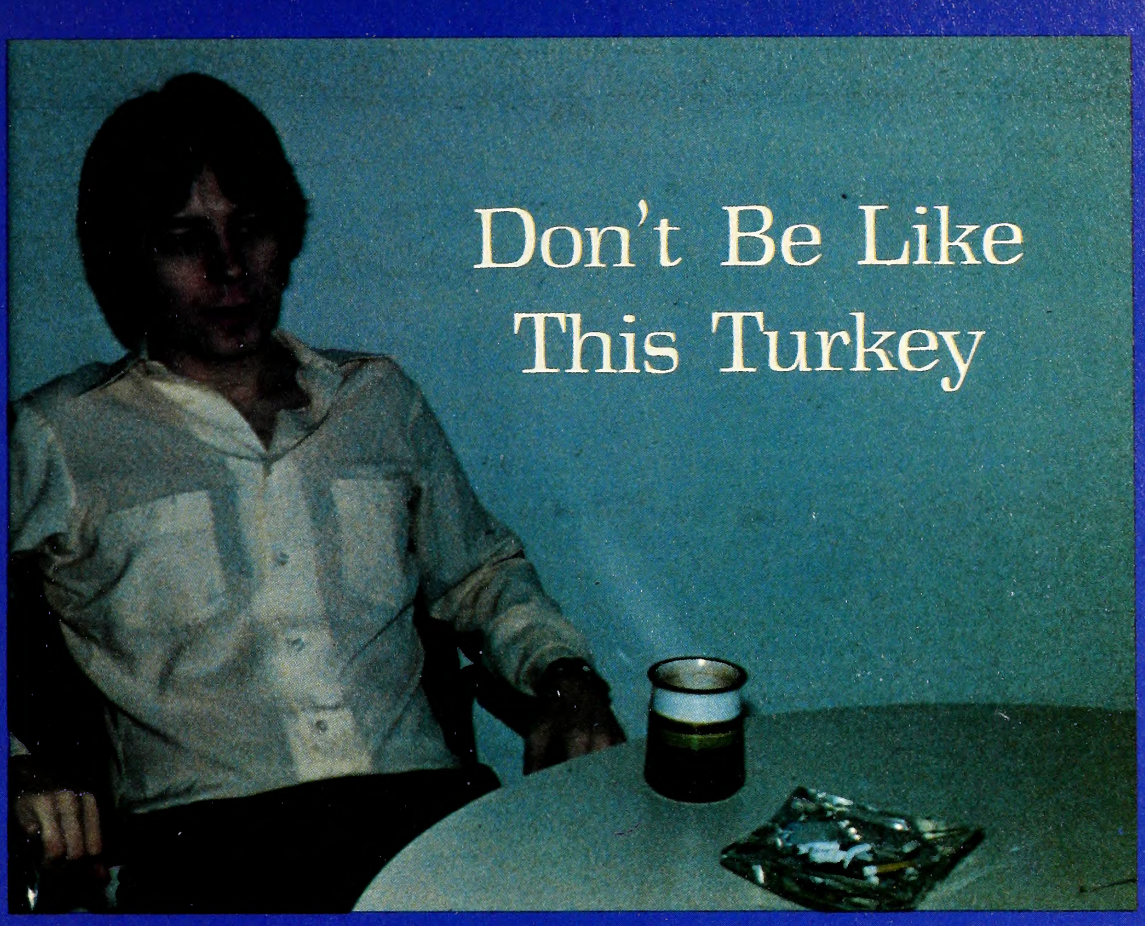

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If you're among the majority of Apple users, you do most of your communicating with the computer by way of its built-in keyboard and a video monitor or television set. That is, you talk to the Apple with your fingers and it replies with various kinds of messages and displays on screen.

That's a marvelous, simple, and convenient way of doing business, but it's by no means the only possible way. Looking ahead, the computer user of the fairly near future will probably have the option of addressing the computer with his or her own voice and getting responses from it in the form of synthesized speech. Voice-entry terminals that will let you teach your Apple to recognize and respond to the unique sound of your own voice are already available for the Apple. And speech-synthesis technology is coming along apace.

Looking off in the other direction, it was not too long ago that computer programmers expressed themselves to their machines through the awkward medium of punched cards and received feedback on slow and clumsy teletype terminals.

What You See Is What You're Gonna Get. Because the video screen is so predominantly the center of attention when you're working or playing at the computer, we're going to devote this month's column to a discussion of the Apple's various video display modes. In the process, we'll round out our survey of memory usage in the Apple, because, as you'll see, when you gaze at your television set or monitor, you're actually looking in, as through a window, at a certain region of the computer's memory.

The Apple has several different display modes, all of which are controlled by a process known as memory mapping. The so-called default state of the machine—the one in effect when your first turn the computer on or when you hit reset—is text mode. As the name suggests, that's the mode appropriate for displaying ordinary text characters on the screen. When you're typing in a program, cataloguing a disk, or doing anything else that doesn't require graphics, you'll be using the Apple in text mode.

A Shaggy Dog Program. To see what memory mapping is all about and how it applies to the Apple's text display, type in and run the following otherwise worthless little program:

```
10  HOME
20  FOR I = 1024 TO 2047
30  POKE I,128*RND(1)+128
40  NEXT I
50  FOR I = 2047 TO 1024 STEP -1
60  POKE I,160
70  NEXT I
```

If all has gone well, here's what should happen. The first line of the program clears the screen. The next three lines, 20 through 40, put a random value between 128 and 255 into every memory location in turn from address 1024 to address 2047. The computer's random number generator picks a number between 128 and 255 and pokes it into address 1024; then it picks another number and pokes it into address 1025, and so on until it reaches address 2047.

Each time a number gets stored in one of those memory locations, a character gets printed on the screen. That's because this particular area of the Apple's random access memory is reserved for the function of controlling the text screen. In fact, each address within this range controls a specific location on the screen.

Well, that's almost true. The Apple will display a total of twenty-four lines of text, and each line can have as many as forty characters. Forty multiplied by twenty-four equals 960, and the memory range in question holds 1,024 addresses, so there are sixty-four that are left over and have nothing to do with the text screen.

As Key Given, ASCII Returned. The computer looks at the value stored at each of the text screen memory addresses and translates it into a specific alphanumeric character according to a code called ASCII (see Beginners Corner, October 1981). Actually, for the purpose of text display, the Apple has its own idiosyncratic way of handling the ASCII code. Only 128 distinct values are required to represent all the various upper-case and lower-case alphabetic characters, the numbers, and punctuation symbols. Since each memory address on the Apple is an eight-bit byte that can be made to hold any value from 0 to 255, there's actually room for a bigger code than normal ASCII.

If you've got a disk handy, save this little program (we'll come back to it), type *new*, and enter the following ditty:

```
10  HOME
20  FOR A = 0 TO 255
30  POKE 1024 + A,A
40  NEXT A
```

When you run this one, you'll see how the Apple translates ASCII for display purposes. The values from 0 to 63 produce inverse characters—black characters on a white background (or a green background, if you have a green phosphor monitor). The next sixty-four values in the ASCII code translate to flashing characters, and, finally, the last 128 values—from 128 to 255—produce normal display.

By now you can't have failed to notice something peculiar about the way the text screen is mapped. You might expect that *poking* values into consecutive memory locations from 1024 to 2047 would fill the screen row by row, from top to bottom. It doesn't work that way. For reasons that are best known to experts in television electronics, the memory map splits the screen into three segments. The first forty addresses cover the top row of the screen; the next forty get the top row of the second segment, the following forty the top row of the third segment, and so on. That arrangement makes life a little more difficult for programmers, but then it wouldn't do for them to get too complacent, anyway.

When You Go Home, You Space Out. Let's return now to our original program. The last three lines (50 to 70) clear the screen, by *poking* the value 160 into each of the relevant addresses, starting at the bottom of the text screen and working upward. The value 160 represents a space in ASCII; it's the character you print when you hit the spacebar. It's also the value that the system stores in all those memory locations when you type *home* or hit escape-shift-P.

Notice how much faster the last three lines of our program are executed than the first three are. It takes time for the Apple to pick a random number, and that slows down the screen-filling section of the program.

Notice too that when you clear the screen by typing *home* or

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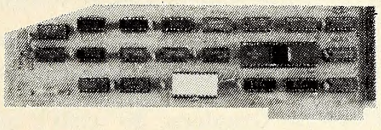

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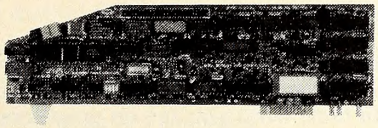

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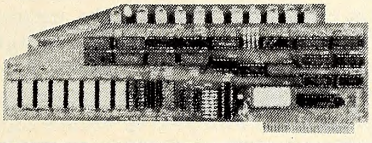

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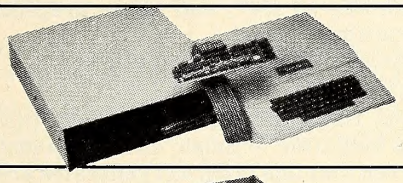

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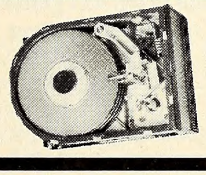

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hitting escape-shift-P, the order is carried out instantaneously, even though the computer has to do essentially the same thing that the last three lines of our program accomplish—it has to put the value 160 into each of those memory locations. The difference is that *home* and escape-shift-P call up machine language routines in the Monitor, so the computer can carry out the order without consulting the Basic interpreter. Basic is quick, but machine language speeds can be pretty awesome by comparison.

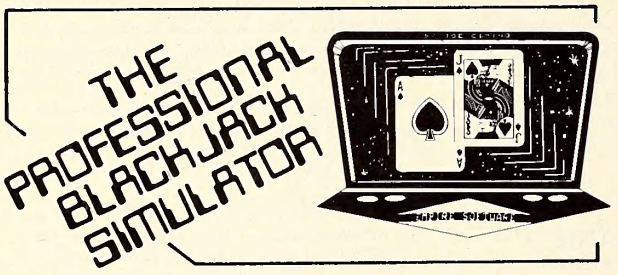
Now we're going to add a couple of lines to the program. If the program isn't in memory right now, load it back in from disk. Type the following:

```
15  X = PEEK (-16302)
16  X = PEEK (-16298)
17  X = PEEK (-16304)
```

Those peeks will be explained presently but, for the moment, just type *run* and notice what happens. If you've got a color monitor, your screen first will fill with gray stripes. One by one, the stripes will be covered over by a random quilt in sixteen lo-res colors. Finally, the screen will revert—from bottom up—to gray stripes.

A Picture's Worth a Thousand Characters. Here's what's going on. The second and third *peeks* that you added to the program (in lines 16 and 17) have put you into another of the Apple's display modes—lo-res graphics. The rest of the program does exactly the same things it did before, only now our memory area—still 1024 to 2047—is used to map out a lo-res screen instead of text. Those 960 addresses that govern the location of characters on the screen can put pictures there instead, providing that a couple of soft switches in memory are thrown.

A soft switch, you may recall from last month's discussion of the Apple speaker, is a location in memory that affects some input/output function of the computer. It's called a soft switch because you control it with software—with program commands. All you have to do to throw a soft switch is ask the computer either to read the value stored at the switch's address or to put some value there. Just *peek* it or *poke* it.



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There are four soft switches that govern the Apple's video display. We'll get to a summary of them before this article is done, but for now you can note that lines 16 and 17 in our program set switches to produce lo-res graphics; line 15 sets a different switch to ensure that the entire screen will be in lo-res graphics mode. Try changing line 15 to read

```
15  X = PEEK (-16301)
```

and *run* the program. You'll see that you also have the option of mixing text and graphics. This is handy for programmers who want to put pictures on the screen but still be able to communicate verbally with the user.

Playing with Blocks. The text mode used 960 memory locations to govern an area forty-by-twenty-four—forty characters (sometimes called columns) per line, twenty-four lines. In lo-res graphics you get to control twice as many spots on the screen—40 columns by 48 rows. Each memory location now is responsible for two lo-res blocks, one directly above the other.

For elucidation of this process we need to return once more to binary and hex. Each memory location holds an eight-bit binary number. To plot in lo-res, the computer treats the byte as two separate, unrelated, four-bit quantities (these are called nibbles). So, for example, after our program has finished running, the address 2039 holds the value 160. In binary that number looks like this: 10100000. The Apple checks the first four bits and sees 1010. From that it knows to plot a gray block in the lower right corner of the screen. Then it looks at the other nibble and sees four zeros. That value tells it to plot a black block directly above the gray one.

Many people find it easier to talk about these matters using hex notation. To paraphrase the previous paragraph, using hex: the decimal value 160 stored at location 2039, in the computer's way of thinking, looks like A0. The nibble A means plot a gray block, and the nibble 0 means plot black. The second, or so-called low-order, nibble gets plotted directly above the first, or high-order, nibble.

Since there are sixteen possible values for either nibble, the Apple is capable of plotting sixteen colors in its lo-res graphics mode.

Top-Hat-and-White-Tie Graphics. So what's next? Hi-res graphics, naturally. Change line 16 in our overworked little program to read:

```
16  X = PEEK (-16297)
```

and now *run* it. Surprised? What you're looking at now is a hi-res graphic display of some sort, but our program is not doing anything to affect it. In fact, what you see on your screen now depends on what you were doing with your computer before you started reading this column. If you had the machine off, you may now be looking at some regular pattern of light and dark areas on your screen.

The reason why our program isn't having any effect on the screen is that our program is still *poking* values into the region of memory from 1024 to 2047, and hi-res graphics are controlled from somewhere else.

Type in the following new version of line 20:

```
20  FOR I = 8192 TO 16383
```

Now, when you hit run, you'll get some action. But it's pretty boring, it takes a long time to finish, and the random patterns of dots on the screen that this program generates aren't very illuminating. So, unless you're especially long on patience at this moment, you might want to type control-C, to stop the program, and then *text* to get back to where you can manipulate the program some more. You won't be able to see the word *text* as you type it, but as soon as you hit return, the video window into the computer's memory will shift from the hi-res area back to the zone we were working with before—addresses 1024 to 2047—and your words will suddenly reappear.

You'll get a better handle on how hi-res graphics are plotted if you poke specific values, rather than random ones, into the appropriate memory locations. First we'll clear the screen to black. Type *new* and create the following program:

```
10  X = PEEK (-16304)
20  X = PEEK (-16302)
30  X = PEEK (-16300)
40  X = PEEK (-16297)
```

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True descenders	N	N	Y	Y	—	optional	N	N	optional	—
Optional fonts avail. (ROM, disk)	N	N	N	Y	—	Y	N	N	Y	—
2716-compatible character generator compatable with fonts created by HIRES character generators	N	N	N	N	—	Y	N	N	Y	—
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Shift key mod	N	N	Y	Y	N	N	N	Y	Y	Y
All 128 characters available from keyboard	—	—	N	N	—	—	—	Y	Y	Y
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```
50  FOR A = 8192 TO 16383
60  POKE A,0
70  NEXT A
80  FOR B = 1 TO 1000
90  NEXT B
100  TEXT
```

This program isn't real swift either, but it takes less time to finish than the other one, because it doesn't require the computation of random numbers. The first four lines of this program set the soft switches to give us a full screen of hi-res graphics. The next three lines put the value of zero into every memory location concerned with this hi-res screen. The last three lines provide a short pause, so you can see what you've done, and then return you to the text mode. If you want that pause to be longer, put a larger number than 1000 in line 80.

Author Goes Dotty, Makes for Bar. From this experiment we observe the following: *poking* zero into every address controlling the hi-res screen turns everything to black; the hi-res screen, like the lo-res/text screen, is mapped in three segments; and there's a great deal more territory to cover in hi-res than there is in lo-res/text.

If you now modify line 60 to read

```
60  POKE A,1
```

and run the program, you'll see rows of dots form on the screen, with the dots spaced about a pica from each other horizontally. Gradually the dots will coalesce to form forty vertical bars.

When you get back to text mode, change the value *poked* in line 60 to 2 and *run* the program once more. Now you'll see straight lines turn temporarily to wavy lines as the bars shift piece by piece to the right.

Run the program a third time, with the value *poked* in line 60 changed to 3, and you'll see the lines fatten up. It looks as if *poking* 3 into each location combines the effects of *poking* 1 and *poking* 2. And that's exactly what occurs.

The hi-res screen is plotted in bits rather than nibbles. To be precise, the computer plots according to the status of the seven low-order bits in each byte. The eighth bit has to do with the determination of color, and the subject of color in hi-res is somewhat too complex for discussion here.

When we first ran our program, *poking* 0 into each location, the computer saw the value 00000000 stored in each hi-res location and turned everything to darkness. After we *poked* 1 in everywhere, each byte held 00000001, so the computer plotted one dot for each byte. When each byte held the binary value 00000010, the computer turned off the dots it had previously lit, and illuminated the adjacent ones. *Poking* 3 at every location yielded the binary number 00000011, so the bars grew to be two dots in width. You can see, perhaps, that if you were to change the value *poked* to 127, you'd create a binary number full of 1s at every memory address and the screen would turn to solid color. Try it.

You Take the Hi-Res and I'll Take the Lo-Res. In the Apple's hi-res mode, you can plot 53,760 points. Each of the forty positions available in lo-res is now subdivided into seven locations (one each for seven low-order bits), yielding a total of 280 points horizontally. And each of the twenty-four lines available in text mode is now subdivided into eight separately plottable points, making for a total of 196 positions vertically.

That large chunk of memory that maps the hi-res screen, from 8192 to 16383, is often called the hi-res page. This is unfortunate, since the word *page* is also used to describe another unit of memory—the 256-byte frames mentioned in last month's column. The hi-res page is also sometimes called a hi-res buffer or a picture buffer.

The Apple actually has two such areas of memory, usually called the primary and secondary hi-res pages or hi-res page one and hi-res page two. The second region, following directly upon the first, extends from 16384 to 24575. Having two hi-res areas allows programmers to store more than one image in memory at a time and to flip quickly from one display to another for animation effects.

There is also a secondary display area for the text and lo-res modes, extending from 2048 to 3071. This is also the area, however, where Applesoft program instructions normally reside, so you can't ordinarily use this secondary display region from an Applesoft program.

Throwing the Switch on Graphics. Now that we've covered all this territory, we can summarize the soft switches that affect the video display. There are four of them, and each can be in either of two positions. The first governs whether the Apple will be displaying graphics (either res) or text. Peeking −16303 puts the Apple into text mode. Peeking −16304 throws the switch the other direction and sets a graphic mode; which graphic mode depends on the condition of the second soft switch, at locations −16297 and −16298. *Peeking* the former puts the Apple in hi-res; the latter puts it in lo-res. If the Apple is in text mode, then the condition of this second switch is irrelevant.

If the Apple is in either graphics mode, then a third switch determines whether the entire screen will be devoted to graphics, or whether the screen will be in a mixed mode, with the bottom four lines remaining in text display. Peeking −16301 sets a mixed display, while peeking −16302 turns the whole screen over to graphics—assuming the graphics switch is set.

The fourth switch, at address −16300 and −16299, sets either the primary page or the secondary page. The first of these locations puts you in primary page, the second in secondary.

The soft switches are not the only way to get from graphics to text and back. There are commands in Applesoft that accomplish the same thing. Actually they do a little more. Typing GR, for example, will put you in lo-res graphics, primary page, with mixed graphics and text display. It also clears any material that may have been lurking on the lo-res screen.

Similarly, HGR puts you in hi-res page one, with mixed display, and clears the screen. HGR2 puts you in the secondary hi-res page, without the four lines of text at the bottom of the screen, and clears everything to black.

The moral of all this is that the soft switches are useful to programmers because they provide more flexible ways of getting in and out of various display modes. ■

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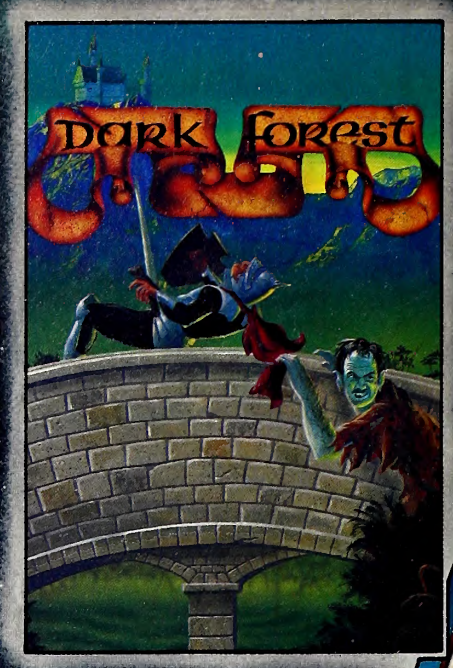

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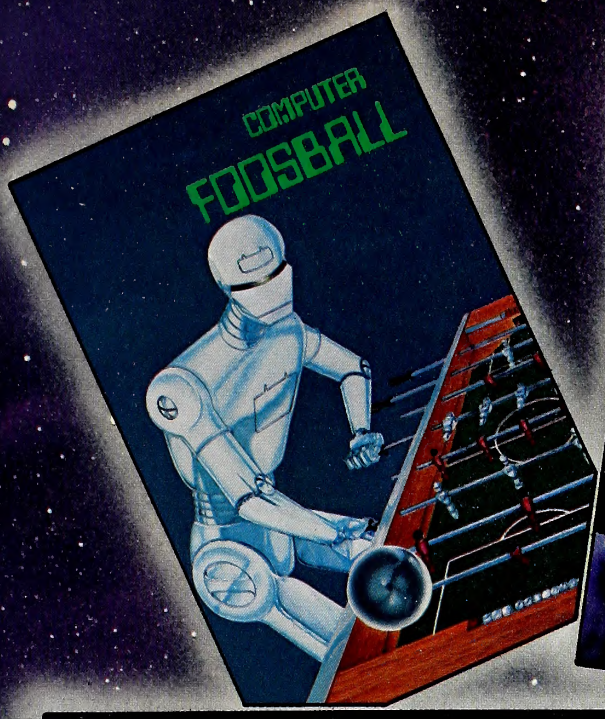

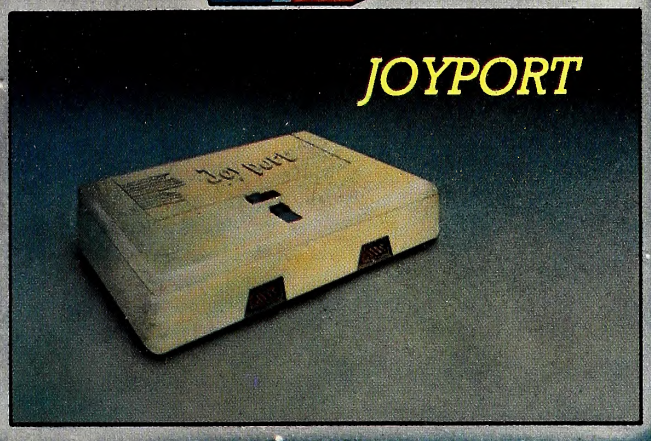

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Secrets of the Whispering Disk

The Making of the Magnetic Media for Micros

BY DALE ARCHIBALD

We take them for granted, those little square packages that contain so many hours of work and thought. We expect them to function, and, usually, they do.

But how? What are they really? How are they made? How did they acquire their strange powers? In short, *qua* floppy?

Many are the brand names that emblazon our floppies—Verbatim, Dysan, Inmac, Memorex, Maxell, Scotch, and more—each with its loyal following. Because it shares a home base with this author, Minnesota Mining and Manufacturing, makers of Scotch disks (and a few other plaid-emblazoned products you might have a passing acquaintance with), was the company whose disk manufacturing procedure willingly suffered our investigation. It can be assumed that the others bring their floppies forth by substantially similar means.

From Humble Clay to 48K. Kent Didriksen, marketing development supervisor for data recording products for the memory technologies group at 3M, and Len Meissner, technical services specialist for the same outfit, were our guides on a tour of the disk manufacturing process. Here, then, is a narrative account of the arduous journey of the delicate yet plucky little brown disk, from the initial bonding of its goassamer genetic material with life-giving primordial magnetic goo; then to be poked at, punched out, racked up, dried out, and cut up for a seeming eternity until its restless wanderings bring it finally to the soft, protective fold of a PVC fabric liner, when it finally settles down and goes to work.

Every 3M disk, whether 5¼-inch or 8-inch, starts from a polyester substrate some .003 inches thick manufactured by 3M in "jumbo" rolls.

At the firm's Camarillo, California, plant, an iron oxide magnetic dispersion material is brewed. These particles and binder system form a magnetic paint that's coated onto the polyester under strict constraints. It is applied to a thickness of 100 micro-inches, or .0001 inches.

Meissner pointed out that "the requirements for diskette media also have to have a random orientation of these magnetic particles." In effect, if the particles were all to point the same direction, there would be modulation of the signal: it would alternate coming in strong and weak as the disk spun. So the coating must be done in a web form. A random orientation procedure makes the particles face in all directions, as if magnets around the media were switched on and off in random patterns.

After the roll is coated, it goes through various drying procedures. The jumbo stock roll is slit down to smaller rolls, and these are transferred to 3M's Weatherford, Oklahoma, plant.

At the Oklahoma converting, packaging, and testing facility, the rolls are punched to the two sizes.

"The punching is very critical to maintain the dimensional tolerances required for the media," Meissner says. "The center hole for the diskette has a tolerance of plus-or-minus .001 inches for proper registration in the equipment."

After punching, the product goes through a burnishing or polishing operation to provide good contact with the head for uniform signal level. The burnishing also smooths the surface of defects or rough spots that would cause a dropout.

The Weatherford plant manufactures the jackets that protect the disk surface. These are polyvinyl chloride (PVC) with a fabric liner laminated to the inside. This is then folded into a jacket. The liner gives uniform torque and rotational characteristics to the disk, cleaning the surface at the same time.

Time of Trial. Next, the plant begins to test the disk. "There are various stages of testing all through the process for the various parameters," Meissner explains; "although it's a very simple construction, there are quite a few specifications in the process that relate to the electrical and mechanical performance of that product."

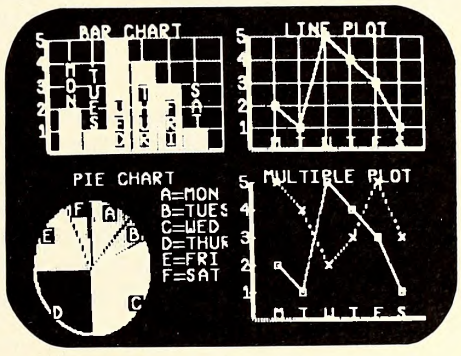
The frequent tests during the manufacturing process measure such aspects as specific signal amplitude level, resolution, modulation, overwrite (when data is rewritten time and again; this would be a measure of the remaining signal from a previous record), torque tests, surface smoothness, dimensional parameters, and many more.

Some of the 8-inch disks are formatted with prewritten information that identifies tracks and sectors. This is a courtesy for equipment that either can't format disks or uses them in such high volume that the time factor in formatting them would be a problem.

The 5¼-inch mini disk is not formatted. "Most of the mini equipment goes through a formatting procedure," Meissner said. On the Apple II and II Plus, for instance, a new disk is routinely initialized. All disks that go out nonformatted are bulk degaussed.

Some disks have reinforced centers applied during production. Meissner is wary of kits on the market offering ways to strengthen the center hole. He questions whether the .001 tolerance of the center hole can be maintained faithfully by a handheld unit. Obtaining the reinforced center from a manufacturer, therefore, he believes is a good investment. It improves the clamping characteristics inside the drive.

PLOT POWER



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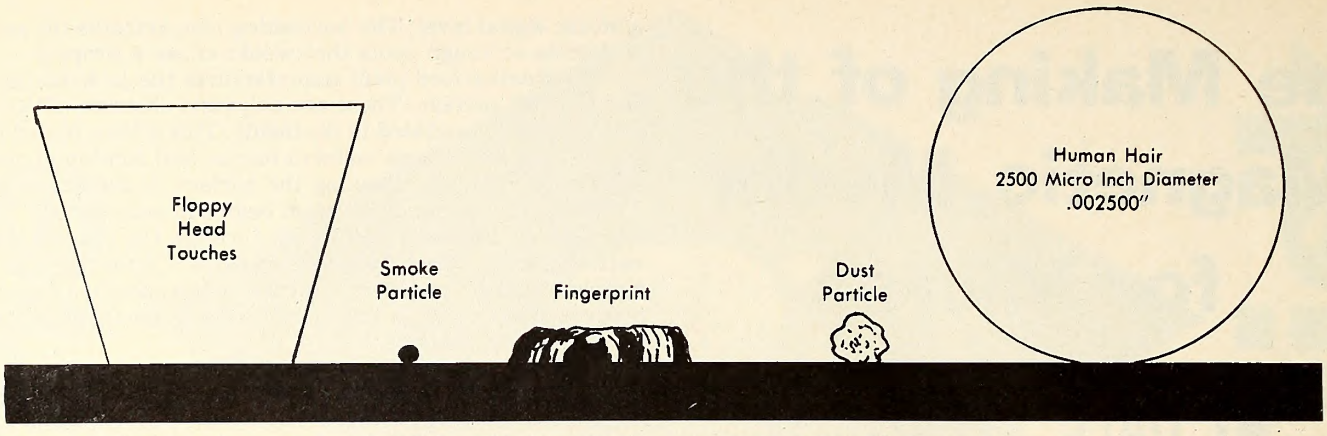

Floppy disks have a second, smaller hole. This is an index hole that defines the beginning of the track. In effect, it's a mechanical marking point used by almost all 8-inch disk drives and by most 5¼-inch drives; Apple and Atari are notable exceptions.

When the disk is placed into the drive, it begins to spin: 300 rpm for mini disks, 360 rpm for 8-inch. The read/write head receives pulses signalling it how many steps the head should move in. A stepper motor—the whirring sound you hear when a disk is booted—moves the head in the correct number of steps.

Turn On, Boot Up, Drop Out. For those of you interested in buying a disk drive, consider this: the width of a track is .012 inch. The section of the read/write head that takes information from it is .0001 inch wide. Didriksen explained that this gully has current passing through it from one side to the other to read the bits of information—ones and zeros—on the track. Some of the less expensive stepper motors used in some inexpensive disk drives may not put the head at the correct spot. The result: information dropping out.

Another problem that can cause information to be dropped is the presence of dust, iron oxide, or polyester on the disk. Even cigarette smoke, with all the other things it does, can cause a head to bounce and data to be missed, just as you'd miss words if you were to move the telephone receiver away from your ear during a conversation. Hitting a hair would be like a speedboat hitting a floating tree.

Notching a disk to use both sides can be a mistake. Meissner points out that the disk you buy has been closely tested to select the good side; the other side may be very bad. Notching the disk could damage the media or introduce particles inside the jacket.

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ARTSCI explains why some word processing systems are better than others.

Let's begin with an easy to understand explanation of what a word processor is and how ARTSCI has created a professional system.

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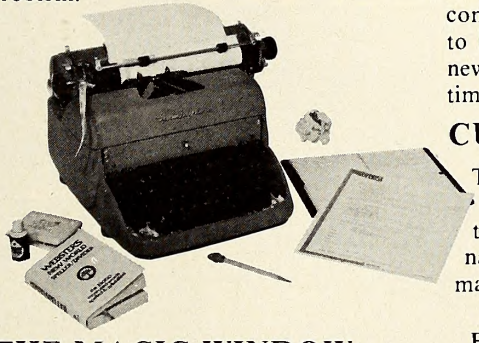

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The first feature of a professional word processing system is the ability to enter and edit data in a fast and friendly manner. The **Magic Window** operates just like a standard typewriter. The electronic paper moves to the left across the video screen as you type. Almost any size document can be represented on the video screen. You can see the edges of the paper through this **Magic Window** as you type.

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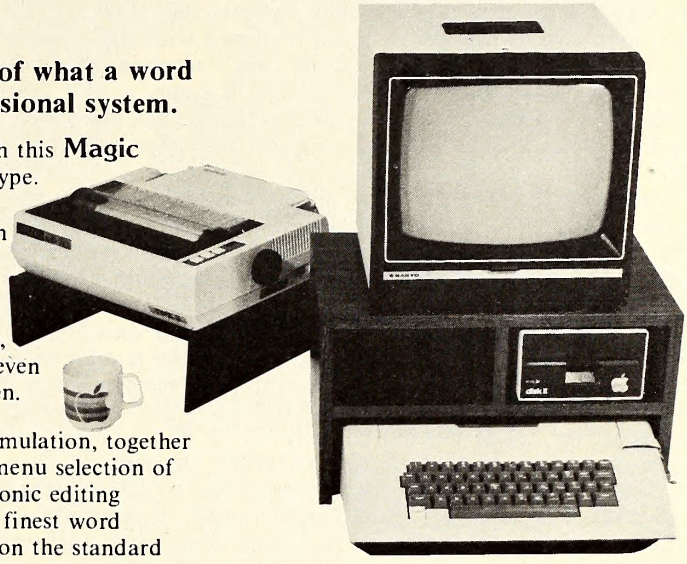

This typewriter simulation, together with simple to use menu selection of functions and electronic editing abilities, creates the finest word processor available on the standard APPLE II.

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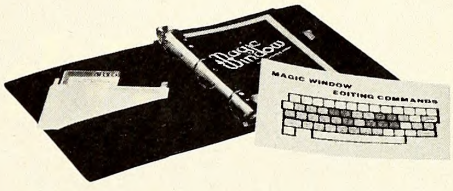

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Yet another disadvantage, according to Meissner, is that running the disk in the opposite direction will almost certainly cause the fabric liner to unload its store of dust, smoke particles, and other debris onto the read/write head of your drive.

This is a good argument for using a head cleaning kit: it clears the gully of the dust and gunk it collects. Didriksen describes 3M's head cleaner as consisting of two disklike pads of a nonwoven material inside a jacket with no liner. Included with these is a bottle of an alcohol/fluorocarbon cleaner. To use it, you simply dampen a nonwoven pad with the cleaner and run it in the disk drive for about thirty seconds. The pad scrubs and dries the read/write head as it spins.

Each pad is meant to be used fifteen times, then discarded. For double-headed drives, removing a label allows both heads to be cleaned at once.

Didriksen suggests that the frequency with which you use the head cleaner depends on how you use your machine. For some users, every second day might be necessary; others might need to clean the heads less than once a month. It's simply a preventive step.

Sometimes a drive's alignment can go out, causing the media to be suspect. If you're constantly having trouble with a disk, ask a friend or two to try to run your programs.

What about demagnetizing the heads? In pre-floppy days, tape recorder heads needed demagnetizing so that high-frequency tones wouldn't drop out. Meissner explains that the read/write heads on disk drives are of a ceramic design that doesn't magnetize. That's what Yankee ingenuity is all about.

The majority of disks are of very good quality. The American National Standards Institute (ANSI) specifications are the industry standard.

"That defines the physical and electrical parameters of the media and what's needed in the drive for an interchange criteria. There can be, at times, areas that might not relate to that specification that can cause specific problems such as flimsiness or noise created as the diskette spins," Meissner said. In some cases, flimsy jackets make the media seem lightweight, but these shouldn't affect the operation of the disk.

At 3M, tight control means ensuring that the jackets, disk, and magnetic material are consistent.

The disk lifetime industry standard, according to Meissner, is 3.5 million passes per track, minimum. On a minidisk this would add up to ten twenty-four-hour days per track. Internal specifications at 3M are even tighter.

Care and Feeding. The operating and storage environment of a disk should range between 50 degrees and 125 degrees Fahrenheit. Higher temperatures can cause the PVC to warp. Relative humidity should be kept between 8 percent and 80 percent.

Finally, if you're planning to reuse disks, it isn't necessary to run them through any type of degaussing to rid them of magnetic fields. Just reuse them. They have experienced much, and shall endure.

Is there a difference between disks? Probably the greatest differences are in the subjective feelings of users. Some disks just feel better. It is a fact, however, that only about a half dozen manufacturers control every process, from mixing their own PVC to blending their magnetic paint. Others buy the materials to manufacture disks in their name, but don't make the basic parts. Though all disks must meet the aforementioned ANSI standards, there is of course a potentially wide range in quality once those standards have been met. The buyer must perforce beware that though all disks are theoretically created equal, some are more equal than others. ◻■

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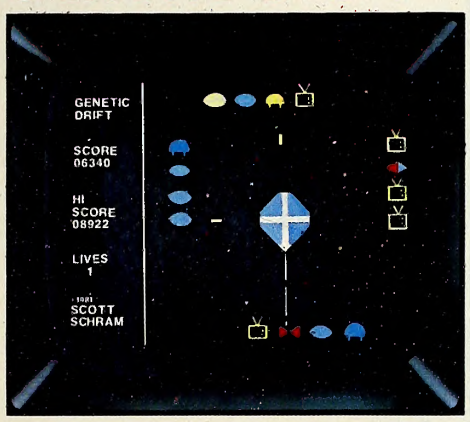

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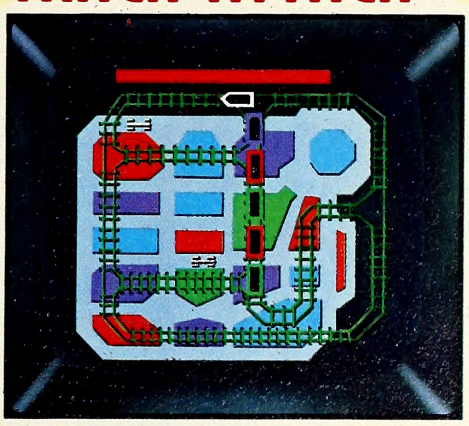

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THE PASCAL PATH

By Jim Merritt

Tools of the Craft, Part 8

Procedures and Parameters. You've met both kinds of workers, I'm sure. There's the sociable one, who is always checking with superiors and co-workers to find out exactly what needs doing and report success or failure (or deliver results). Then, there's the "loner," who wants only to be told "do your thing," then goes off to work in isolation, until the job is done. Apple Pascal permits you to write procedures that behave in either fashion.

So far, I've only shown you examples of "loner" procedures. As I mentioned last month, the way to call such a procedure is simply to use its name as a statement in your program. For example, here's a program that includes, and calls, a procedure named *Beep*.

```
PROGRAM
  TestBeep;

  PROCEDURE
    Beep;
    (* Causes the Apple to emit an audible tone. *)
BEGIN (* Beep *)
  Write(Chr(7));
END (* Beep *);
  BEGIN (* TestBeep *)
    WriteLn ('I feel a beep coming on.');
    Beep;
  END (* TestBeep *).
```

You may be curious about the *Chr(7)* that appears in *Beep*'s only statement. Remember the ASCII character set? I mentioned once that each printable character corresponds to a unique integer value from the range 0 to 127. Capital A, for instance, corresponds to the integer 65, capital B to 66, and so on. There are certain "invisible characters" in the ASCII set. One of these corresponds to the integer 7. If you Write it to the screen, you won't see it, but you will hear it. "Chr(7)" stands for this "bell" or "beep" character. (Also, as you may already have guessed, *Chr(65)* corresponds to capital A and *Chr(66)* stands for capital B. "Chr" is an example of a Pascal *function*. I'll talk at length about it, and functions in general, next time.)

Try compiling and executing *TestBeep*. (If it doesn't beep at you, your Apple may be broken.) *Beep* is a good example of a "loner" procedure. It is self contained: it doesn't take anything from, or make assumptions about, the main program. It doesn't use global objects. It can be transplanted to another program without any difficulty whatsoever (as you'll soon see). *Beep* simply does its job when called, then retires until called again, leaving behind no trace, no clue concerning the success or failure of its mission. The "loner" procedure has no way to communicate with its caller. It just forges ahead with its fixed task, oblivious of all else, in much the same way that a telephone answering machine without message-taking ability will spew forth its recorded greeting to completion, even when the telephone connection is prematurely broken by a disgruntled human on the other end of the line. Like such a mechanism, a "loner" procedure is handy, up to a point, but that point is often reached very quickly.

The majority of useful procedures resemble the "sociable" worker more closely than they do the "loner." Instead of going off and doing something independent of supervisor or co-workers, most procedures cooperate with not only their caling programs, but also with other procedures, in sharing the workload so as to accomplish a large task.

Most often, a calling program will pass information to a procedure; actual data that the procedure needs in order to perform a certain calculation. For instance, two integer numbers might be passed to a procedure designed to compute and display the sum of their squares.

Calling programs may also pass encoded commands to certain versatile procedures. Suppose you write a procedure that can display the name of any one of the days of the week. The information passed to such a procedure might consist of a digit, between 1 and 7, inclusive, corresponding to the current day of the week. In this case, the information passed to the procedure by the caller forms the basis of decision, not computation, and so I'd classify it as a command.

Occasionally, a procedure will pass information back to its caller, or will accept some information, transform it according to some predetermined plan or formula, then hand it back to the caller. A commonly encountered procedure of this type accepts a character, and, if that character is a lower-case letter, returns the upper-case version to the caller; otherwise, the original character is returned.

Parameters: The Channels of Communication. A "sociable" procedure communicates with its caller through *parameters,* which are very similar to the "in-baskets" and "out-baskets" that human beings use for inter-office communication. You tell the compiler that a procedure requires parameters by including a parenthetical parameter list in the procedure definition, between the procedure's name and the semicolon that ends the procedure heading. (For specific details, see Figure 1: the syntax diagram for a parameter list. Figure 2 is the syntax diagram for a procedure, reprinted from last month's discussion.) There are two types of parameters, regular or "value" parameters, and so-called "VAR" or "reference" parameters. Regular parameters correspond to "in-baskets." By their very nature, they can transmit information from the caller to the procedure, but not in the opposite direction. A VAR parameter may be either an "in-basket," an "out-basket," or both. Pascal puts certain tricky restrictions on the use of VAR parameters, and it is more difficult to use them properly. Consequently, I will examine them last, after having primed you with a discussion of regular parameters.

You define any parameter (regular or VAR) much as you'd define a variable. An identifier, used as the parameter's

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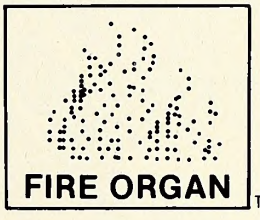

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name in the body of the procedure, is associated with a data type. However, only the names of previously declared data types may be used in a parameter list. Look at the following two procedure headings (which, for brevity's sake, are presented here without the bodies that must accompany them in a real program):

```
PROCEDURE
  ShawDay1(DayNumber
  :DayNumRange);
PROCEDURE
  ShawDay2(DayNumber
  :1 .. 7);
```

Assuming that the data type *DayNumRange* has been declared in the surrounding program's TYPE section, the Pascal compiler will accept the first procedure heading as valid, but reject the second. In the second heading, the regular parameter *DayNumber* is defined with an explicit subrange of Integer. This kind of type specification is permissible in the VAR section of a program or procedure's declaration area, but not in a parameter list. The compiler will reject such a parameter definition, complaining of *Error 2* ("Identifier expected"), when it encounters the explicit subrange. (In other, similar situations, the compiler may report *Error 103*—"Identifier is not of the appropriate class.")

The Pascal compiler requires that you associate a data type with a parameter for much the same reason that you must associate a data type with a variable: doing so makes you think about the nature of the parameter, and permits the compiler to warn you if, later, you try to use that parameter in a way that is contrary to its stated purpose.

Here's a procedure that requires two regular Integer parameters, *NumA* and *NumB*.

```
PROCEDURE
  SumSqrs1(NumA,
  NumB
  :Integer);
  (* Compute, and display on the screen,
  the sum of the square of NumA and NumB
  in a display field at least 6 columns wide. *)
BEGIN (* SumSqrs1 *)
  WriteLn( ((NumA * NumA) + (NumB * NumB)):6 );
END (* SumSqrs1 *);
```

SumSqrs1 demonstrates the fact that, as in variable declarations, you can group several parameter identifiers together in a sublist, each separated from the next by a comma. All the items in such a sublist will be parameters of the same data type. Examine the following procedure and try to imagine its behavior:

```
PROCEDURE
  Report(BadValue
  :Boolean;
  ItemNumber,
  ItemValue
  :Integer);
  BEGIN (* Report *)
    Write('Item #', ItemNumber:4,': ',
    ItemValue:7);
    IF BadValue
    THEN
    Write(' *** BAD VALUE');
    WriteLn;
  END (* Report *);
```

Report sends a message to the screen concerning the validity or invalidity of *ItemValue*. No matter what *BadValue* is, both *ItemNumber* and *ItemValue* are displayed on the screen, presumably for the benefit of some hypothetical user. If *BadValue* is True, however, the displayed message is extended in order to indicate that *ItemValue* is somehow inappropriate. *ItemNumber* and *ItemValue* are "data" parameters—in other words, they are information that the procedure either displays (as here) or uses in computation. *BadValue*, on the other hand, is a "command" parameter; its sole purpose is to alter *Report*'s behavior.

Report demonstrates another aspect of the parameter list (which can also be gleaned from the syntax diagram, of course): the definitions of parameters that have different types must be separated from one another by semicolons.

How to Call Procedures. Now that you know how to define regular parameters, let's look at the process of using them to pass information to procedures during a call. In the procedure definition, you specify and name a set of "in-baskets," in other words, the formal parameters. In the procedure call, you provide a parenthetical list of data values, called the actual parameters. Regular formal parameters are nothing but local variables that are declared in a special place. When the procedure is called, Pascal as-

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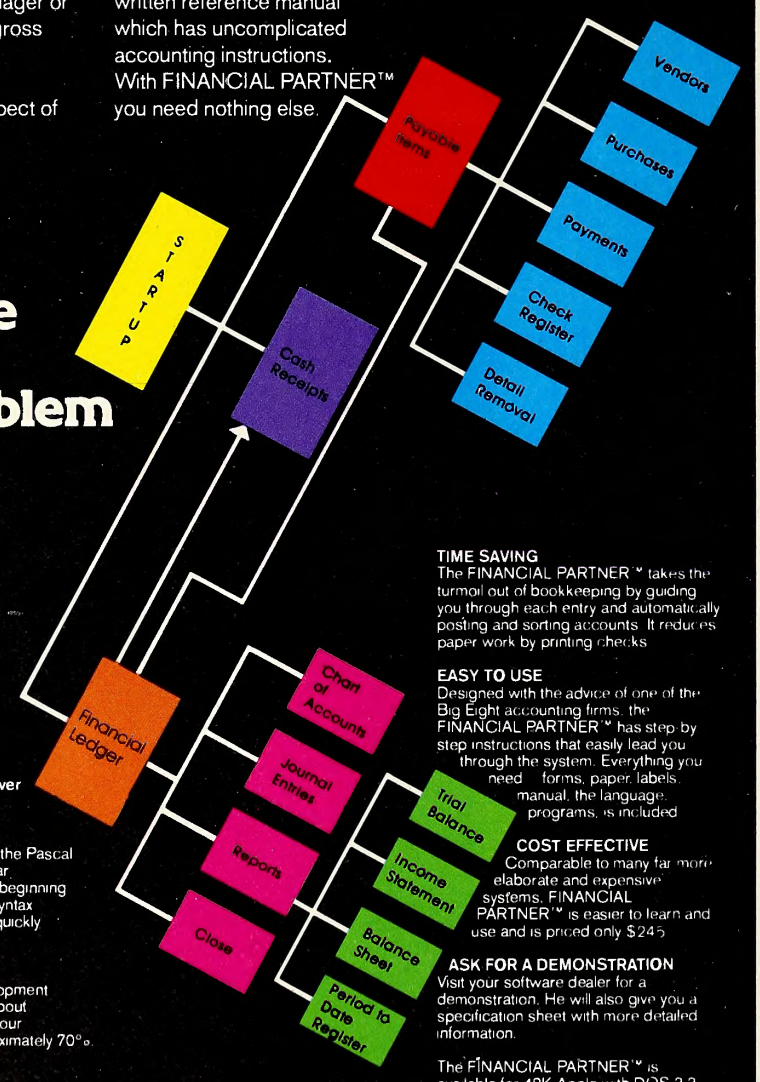

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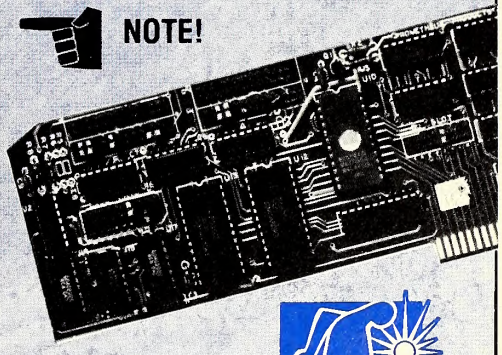

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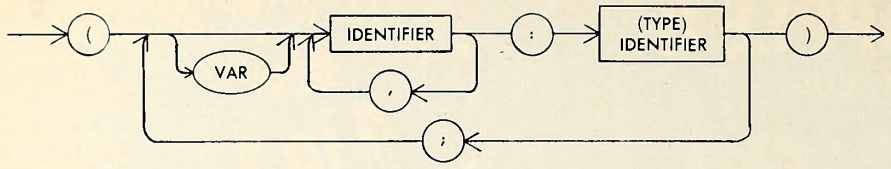

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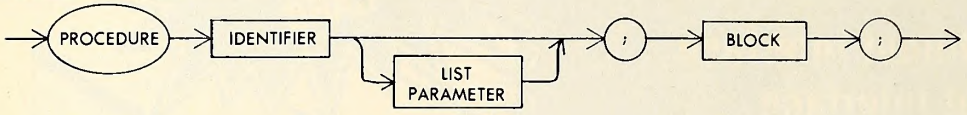

Figure 1.

signs the values of the actual parameters to the corresponding formal parameters. The value of the first actual parameter is assigned to the first formal parameter, the second actual value goes into the second formal parameter, and so on down the line. The number of actual parameters given in a procedure call must be the same as the number of formal parameters declared in the procedure's definition. The compiler will note a syntax error (Error 126—"Number of parameters does not agree with declaration"), if your program attempts to pass too many or two few parameters to a procedure. Also, the type of an actual parameter must agree with the type of the corresponding formal parameter. Pascal will not permit you to call a procedure if, for instance, that procedure requires a Boolean value as its first parameter, and you supply an Integer instead. In this instance, the compiler will report *Error 142* ("Illegal parameter solution").

With the procedure body, a regular formal parameter behaves exactly like a local variable. The only difference is, a local variable must be initialized by an explicit statement in the procedure body, while a regular formal parameter is initialized automatically at the time of the call. There is, however, nothing else that is special about regular parameters. If you wish, you can assign new values to such parameters during the execution of the procedure body, just as you can change the contents of local variables. Doing so has no effect on anything that is outside the universe of the procedure.

To help you better understand the relationship between actual and formal parameters, here's a procedure definition along with several examples of legal and illegal calls to that procedure, as they might actually appear in programs.

Procedure definition:

```
PROCEDURE
  Exomple(Porom
  :Integer);
```

Legal Calls to Example:

```
Exomple(42);
Exomple(IntObj); (* Assuming IntObj is o
CONST or VAR of type
Integer *)

Exomple(78 MOD 10); (* This moy look like two
or three porometers,
but is, in foct, one
single Integer expression *)
```

Illegal Calls to Example:

```
(Exomple('Hello'); (* Porometer must be on Integer *)
Exomple(1,2); (* Only one porometer is ollowed *)
Exomple; (* There must be exoctly one
   porometer *)
```

Notice that, when dealing with regular parameters, you need not restrict the corresponding actual parameters to being merely constants or variables. If you wish, you may use entire expressions as actual parameters.

VAR Parameters: Not Magic, but "Voodoo." I tend to use long, descriptive variable names in my programs, and, as much as they contribute to program readability, sometimes they can be cumbersome. For example, suppose I have an Integer variable named *ExplosionCount*. To increment this variable by one, I must normally use the following statement:

```
ExplosionCount := ExplosionCount + 1;
```

In having to type such a long variable name twice, I run the risk of making a typographical error in one or the other (or both). It's also rather boring to type so much. What I often do, to alleviate this problem, is define a procedure named *Inc* (for Increment), which takes an Integer variable and increments the contents by one. Using Inc, this is all I need write, in order to add one to ExplosionCount:

```
Inc(ExplosionCount);
```

The above is more succinct than the assignment that I presented earlier. You don't want to go to all the trouble of defining a special procedure, of course, unless you face the prospect of having to increment long-named variables often, throughout your program.

Suppose, however, that you need, and want to write, the *Inc* procedure for your own use. Regular parameters are insufficient for the task. What this procedure requires is some way to grab hold of, and manipulate, an arbitrary external object. This is exactly the capability that is provided by the VAR mechanism.

I have often seen computer programmers described as "witch doctors" or "wizards," because programs frequently resemble collections of weird, unintelligible incantations, at least in the minds of those who haven't taken the time to seek out the method in the madness. It

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strikes me as ironic that we Pascal programmers, despite our mania for writing readable programs, may just have to plead guilty to the charge of witchcraft, because VAR parameters are nothing more than computer-age voodoo dolls. The voodoo doll and the VAR parameter were created to serve the same basic function: someone needed to affect an object that, for one reason or another, could not or should not be approached directly. The ju-ju man (or woman—voodoo is an equal opportunity sorcery) solved the problem by creating a little doll, which voodoo magic linked to some person or animal. From that point on, anything that happened to the doll would also happen to the real victim. Secure and secluded in a tiny backwater hut, the voodoo practitioner could inflict all kinds of suffering on the hapless victim by remote control.

When a procedure that uses VAR parameters is called, Pascal links the formal VAR parameter with the corresponding actual parameter. During execution of the procedure, the formal VAR parameter is merely a synonym for the variable that is the actual parameter. Anything that happens to the formal parameter within the procedure body also happens to the actual parameter in the world outside the procedure. Thus, a procedure can affect variables that belong to the calling program, even while remaining quite separate from it.

As figure 1 shows, VAR parameters are defined in the same formal parameter list as regular parameters. They are defined using the same rules as regular parameters, except that the definition of a VAR parameter is prefaced with the keyword VAR. Here are the headings for several procedures that use VAR parameters:

```
PROCEDURE
  Vexampl1(RParm
  :Integer,
VAR
  VParm
  :Integer);

PROCEDURE
  Vexamp12(RParm1
  :Integer;
VAR
  VParm1,
  VParm2
  :Integer,
  RParm2
  :Integer);

PROCEDURE
  VExampl3(RParm1
  :Integer;
VAR
  VParm1
  :Baalean;
VAR
  VParm2
  :Real;
  RParm2
  :Char;
VAR
  VParm3
  :CHar);
```

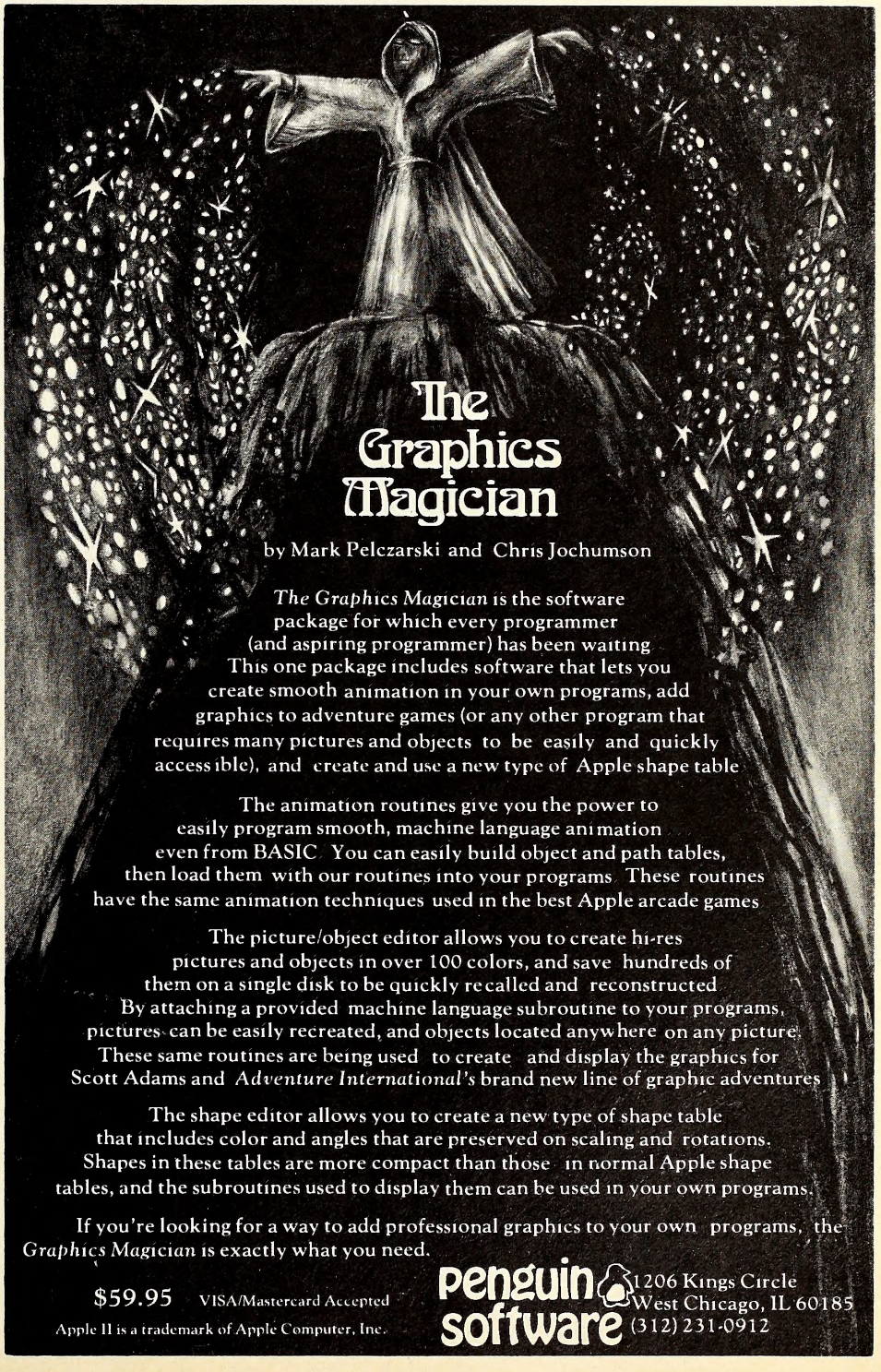
In these examples, any parameter whose name begins with "RParm" is a regular parameter, while any whose name begins with "VParm" is a VAR parameter. Of course, the Pascal compiler finds nothing significant in my choice of names. I could have prefixed all the regular parameter names with "VParm," and all the VAR parameter names with "RParm." It is only my use of the keyword VAR which enables the compiler to distinguish VAR parameters from regular ones.

In calling a procedure which uses VAR parameters, you must be careful that the corresponding actual parameters are variables, not constants or expressions. Since a procedure is allowed to assign a value to a formal VAR parameter, Pascal insures, at the time of the call, that the actual parameter is an object into which a value can be stored (in other words, a variable). If it is not, Pascal reports that *Error 154* ("Actual parameter must be a variable") has occurred.

Consider the following:

Definition:

```
PROCEDURE
  Capitalize(VAR
  Ch
  :Char);
```



Call:

```
Capitalize(CommandCode);
```

The job of *Capitalize*, as you may already have guessed, is to convert the contents of Ch from a lower-case letter to an upper-case one. (Therefore, if Ch doesn't contain a lower-case letter, *Capitalize* leaves it alone.) The body of *Capitalize* will be presented and examined next time; although interesting, it is irrelevant to this discussion.

Suppose that *Capitalize* is called, as in the example above, with CommandChar as its actual parameter. For the duration of the call, the formal parameter Ch becomes a voodoo doll representing CommandChar. If the procedure examines the value of Ch, it actually looks at the value contained in CommandChar. If the procedure body modifies Ch, CommandChar is likewise modified.

Given knowledge of how to define and use VAR parameters, it is very simple for us to write the *Inc* procedure:

```
PROGRAM
  TestInc;

VAR
  Number
  :Integer;

PROCEDURE
  Inc(VAR
  Destination
  :Integer);
  (* Increments destination by one. *)
  BEGIN (* Inc *)
    Destination := Destination + 1;
  END (* Inc *);

BEGIN (* TestInc *)
  Number := 100;
  WriteLn('Number before Inc: ', Number:7);
  Inc(Number);
  WriteLN('Number after Inc: ', Number:7);
END (* TestInc *).
```

To contrast the VAR parameter mechanism with that of regular parameters, you might try compiling and executing another version of *TestInc*, in which the keyword VAR is absent from *Inc*'s formal parameter list. How does this second version of *Inc* behave? Can you predict the behavior before executing the program? Another informative experiment involves leaving the keyword VAR in *Inc*'s parameter list, but calling *Inc* in the body of the test program with an integer expression, instead of an integer variable, as the parameter. Does the program compile? If so, what happens when you execute it? If not, what error message(s) do you receive?

Write and WriteLn: Anomalous Procedures. By now, you have probably realized that Write and WriteLn look very much like procedures with parameters. In fact, both of them are classified as "standard" procedures, and the parenthetical lists of items that you supply to each are, indeed, lists of actual parameters.

Unfortunately, Write and WriteLn do not behave entirely as do the Pascal procedures that you are able to define. For one thing, we've seen that a regular procedure must require a fixed number of formal parameters, if it requires any parameters at all. You cannot get away with supplying only two parameters to a procedure that requires three. When calling regular procedures, you must supply exactly as many actual parameters as there are formal parameters in the procedure definition. What's more, the actual parameters supplied must be listed in the correct order, so that the type of each actual parameter agrees with that of the corresponding formal parameter.

In contrast, Write and WriteLn may accept an arbitrary number of parameters. In the case of WriteLn, you need not supply any parameters at all! There is no prescribed order to parameters for these procedures, because any parameter to Write or WriteLn may be of Char, Integer, Real, or String type. Finally, the provision that Write and WriteLn make for display field width specifications is beyond the scope of regular procedures. Write and WriteLn, then, are "magic" procedures. While they resemble the regular Pascal procedures, they are actually quite different in nature.

Toward a Software Toolkit. One of the nicest things about procedures is that, if you design them carefully, you can physically transplant them from program to program with little or no difficulty, thus saving yourself the work of having to re-

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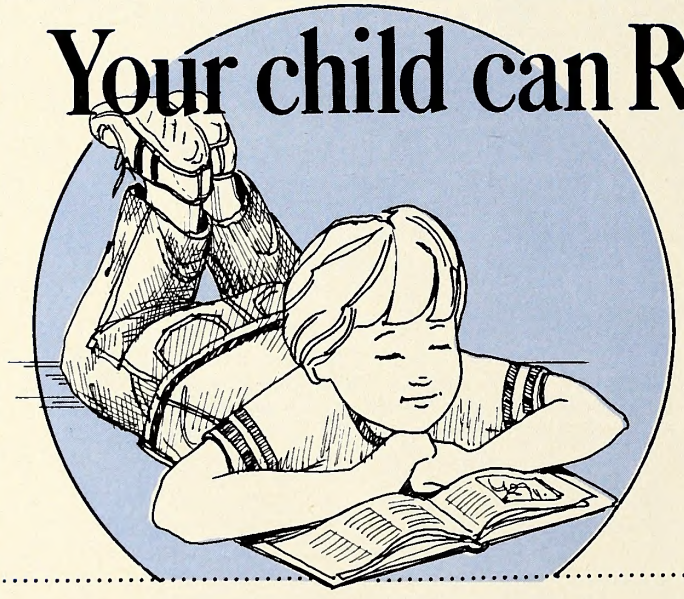

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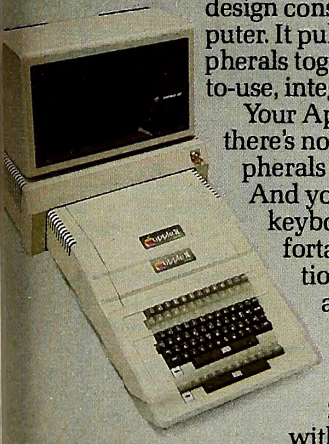

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invent them for every new program. I mentioned earlier that *Beep* was such a procedure, and we are about to use it again, in yet another example program. Procedures that exhibit *Beep*'s portability, and which perform common tasks or solve common problems, are examples of "software tools." One of the goals of this series is to help you develop a toolkit of your own, containing an assortment of procedures and other objects with which you can more easily build interesting, complex programs that address your own particular problems and interests.

If you wish, you may consider and use *Beep* as your first software tool. The following example defines another tool, the procedure *Pause*:

```
PROGRAM
  TestPause;

  PROCEDURE
    Beep;
    (* Couses the Apple ta emit an oudible tane. *)
    BEGIN (* Beep *)
      Write(Chr(7));
    END (* Beep *); .

  PROCEDURE
    Pause(Duratian
    :Integer);(* Generote a "da-nathing" pause.
    Pause(1) = 0.1 second (approx.),
    Tested on o standord Apple ][ with
    Apple Poscal 1.1.
    *)

  CONST
    TickLength= 159;
  VAR
    Tick,
    TickLet
    :Integer;
    BEGIN (* Pause *)
      FOR Tick := 1 TO Durotian DO
      FOR TickLet := 1 TO TickLength DO
      (* Nothing -- this is just a time woster *);
    END (* Pause *);

BEGIN (* TestPause *)
  Beep;
  Pause(100); (* Ten secands *);
  Beep;
END (* TestPause *).
```

Pause's only purpose is to keep the computer busy until a certain amount of time has passed. You may think that such a procedure is worthless, but there will be many times when you write programs which, for example, process and display information so quickly that a human being can't follow it all. In such situations, you can call *Pause*, to force the computer to wait for a specified length of time, in order to give the human a chance to catch up.

Pause's accuracy is controlled by the constant *TickLength*, and the speed with which the Apple Pascal P-Machine executes instructions. If you use *Pause* on a different computer (such as the Apple III, which executes Pascal more quickly than the Apple II), or if a new version of Apple Pascal is released, *Pause* will not keep proper time, and you will need to adjust *TickLength* until *Pause* is accurate again. This readjustment process is very tedious: You must recompile the test program, then execute it and observe the actual time *Pause* takes for some large value of *Duration* (for example 1200, which should correspond to two minutes). If *Pause* runs too fast or slow, you must adjust *TickLength* up or down by some arbitrary amount that you feel is appropriate, and repeat the whole sequence.

Besides its touchiness, there is something else which is noteworthy about *Pause*, and I mention it here to conclude the "lecture" part of this month's excursion along the Pascal Path. Although it is a "sociable" procedure, in that it allows the caller to specify the duration of the pause that it generates, *Pause* keeps secret the exact details of how it does its job. The variables *Tick* and *Ticklet*, and the constant *TickLength*, are all local to *Pause*, at once invisible and inaccessible to any caller.

As *Pause* modestly demonstrates, the integrity, security, and privacy of a procedure body need not be compromised for the sake of communication and cooperation with the calling program. By carefully defining and using a combination of local objects, regular parameters, and VAR parameters, you can usually achieve both desirable conditions, to the detriment of neither.

An Exercise. Earlier, in the section "Parameters: The Channels of Communication," I introduced a procedure *ShowDay1*, whose body I never defined. Assuming that the TYPE *DayNumRange* has been defined (in the calling program's declaration section) as the integer subrange 1..7, write your version of the complete *ShowDay1*. My version is printed below.

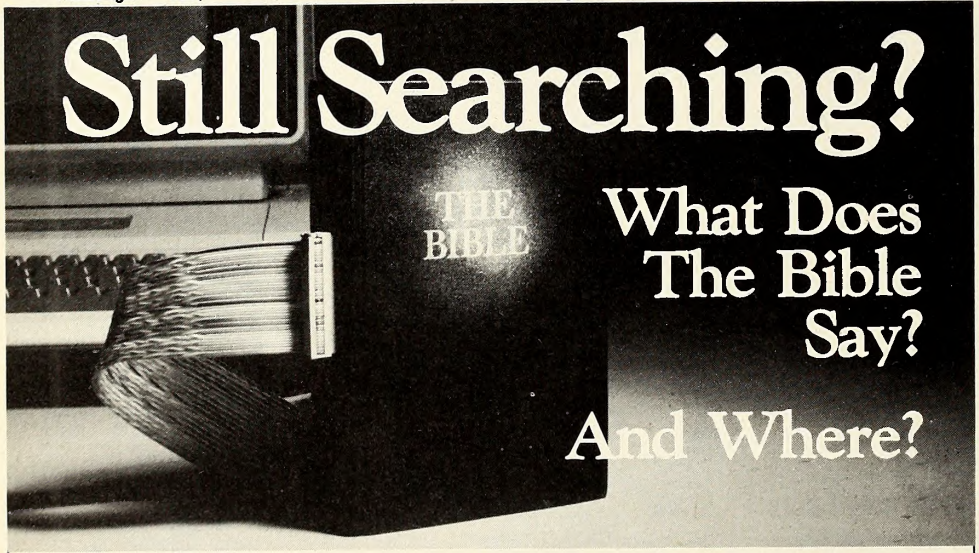
Answer to Exercise.

```
PROCEDURE
  ShowDay1(DayNumber
  :DayNumRange);

(* Displays on the screen the name of the day that cor-
responds to DayNumber (1 = Monday, 7 = Sunday)
Note that the code for the day of the week could have
been implemented os an enumerated, scalar type, for
example (Monday, Tuesday, . . . Sunday). Most of the
time, you're better off using the enumerated type. *)

BEGIN (* ShowDay1 *)
  CASE DayNumber OF
  1:
    Write('Monday');
  2:
    Write('Tuesday');
  3:
    Write('Wednesday');
  4:
    Write('Thursday');
  5:
    Write('Friday');
  6:
    Write('Saturday');
  7:
    Write('Sunday');
  END (* CASE DayNumber *);
END (* ShowDay1 *);
```

■



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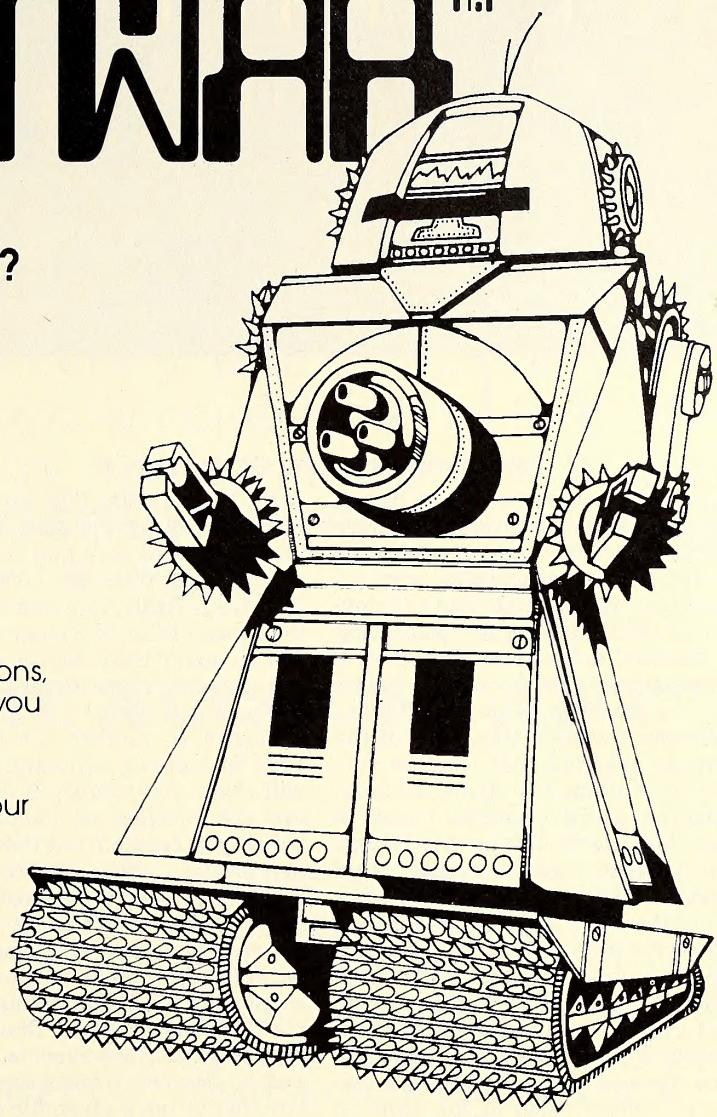

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Exploring Business Basic, Part 6

Last episode covered a mixed bag of topics and ended with a promise to cover some parts of the new *request* invokable module and techniques on using *print using*. Fear not, all that and more is covered herein, including some tips on long integer decimal arithmetic. But first, a few digressions based on comments some of you made on previous articles.

Digression Number One. One of the first articles asserted that random record files were limited to 32,767 records, the maximum positive integer value. In fact, there is no particular limit in SOS on which this Basic limit is based. Basic even allows a real number to be used as a record number, but because Basic uses an integer type internally to keep track of the record number, the value still cannot exceed 32,767. The actual position in the file is determined by multiplying this record number by the record size assigned when the file was originally created (default is 512 bytes). This 32,767 limit on record numbers does not hold for Pascal. Now that the Profile hard disk is available, some thought is being given to removing this restriction. Speak up if it's been a problem for you.

Digression Number Two. As demonstrated last time, the *get#* statement in Basic can be used to read the exact contents of most files on the Apple III, one byte at a time. We even created a special formatted dump program to investigate the contents of Basic *data* files. Some types of disk files cannot be opened by Basic, however. Most notably, these include Pascal *code* and *data* files. If you need to examine the contents of those files from Basic, you can do so by using the Pascal Filer to change the file type to ASCII, which Basic knows as the *text* file. You Pascal programmers will enjoy Basic once you try it!

There is another file type which is very interesting to examine, and Basic will allow you to open it directly. Those are the *Catalog* or *Subdirectory* files, which you create from Basic or the Utilities program. The subdirectory capability of SOS is one of its most powerful features. If you aren't using subdirectories to group your files and programs logically, you might want to read the relevant sections of the Basic manual and the Apple III *Owner's Guide*. One problem with files in Basic, however, is that it is difficult to discover from a running program whether or not a given file or program already exists. There are some ways using *on err* to work up a solution to this problem, but nothing very tidy. However, being able to open and read a directory or subdirectory allows us to check on everything before opening a file or chaining to another program.

Those of you who read last month's article know about our handy-dandy file dump program using *get#*. Let's pick a typical subdirectory named *mysub* containing the files *myprogram* and *directorydump*. Using the formatted dump program from last time, the file contents look something like figure 1.

```
0000-001F  00000000E54D595355420000000000000000000760000000000000009DA3060F
           . . . . e M Y S U B . . . . . . . . . . v . . . . . . . . # . .
0020-003F  000000270D0200090002271 94D5950524F4752414D0000000000000982000100
           . . . ' . . . . . . . ' . M Y P R O G R A M . . . . . . . . . . .
0040-005F  A301009DA3070F0000E300029DA3070F81002D4449524543544F525944554D50
           # . . . # . . . . c . . . # . . . . - D I R E C T O R Y D U M P
0060-007F  00000484000600760900 9DA3090F0000E300029DA3090F810000000000000000
           . . . . . . . v . . . # . . . . c . . . # . . . . . . . . . . .
```

Figure 1.

For those of you who did not read last month's column, this may look bizarre, but it's really easy. Remember that this is a byte-by-byte image of the file. The numbers to the left (like 0000-001F) are the byte numbers in hexadecimal of that particular row. Each row contains thirty-two bytes. The top row in each pair is the actual hex contents of the file, and the next row is the ASCII equivalent characters. If the byte is a nonprinting character, it is represented by a period. This is all fine, but you will immediately protest that other than being able to spot the subdirectory name and the file names, the printout is a big mystery. Business Basic to the rescue! It turns out that Basic is knowledgeable of the contents of directory files, so that when you open a directory or subdirectory file, Basic will automatically format the contents for you, just as it does in the *catalog* command. The following simple program will illustrate, on the same subdirectory we just looked at:

```
1   INPUT"Directory to dump: ";a$
10    OPEN#1,a$
15    ON EOF#1 GOTO 60
20    INPUT#1;a$
30    PRINT LEN(a$)":"a$
50    GOTO 20
60    CLOSE
70    END
```

The only thing unusual here is that we arranged to print the length of each string that is read, to check for any special formatting. The output looks like figure 2.

Since all the columns are in very predictable places, it is possible to extract the information desired easily by judicious use of the *mid$* function. Also, since this is a subdirectory, there is no line showing blocks free and blocks in use. Try using this program on a volume directory. The last string read from the file will contain this information, very useful if you want to check for imminent disk full errors. Also, since the volume directory lists all the subdirectories (labeled CAT in the file type column), it is possi-

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```
68: MYSUB      (12/29/81) VO
68:
68:  TYPE   BLKS   NAME          MODIFIED TIME  CREATED TIME  EOF
65: BASIC  00001  MYPROGRAM     12/29/81 15:07 12/29/81 15:07 419
66:  TEXT  00006  DIRECTORYDUMP 12/29/81 15:11 12/29/81 15:09 2422
68:
```

Figure 2.

ble to get a full list of all the files on a volume by successively reading the individual subdirectory files. Another treat for the esoteric members of the audience is to compare the information in the hex dump with the formatted output to discover where and how SOS hides all the information about files.

New Stuff. As promised last time, we'll now go briefly into one of the most powerful new capabilities of Business Basic, the *request* invokable module. Normally, all access to SOS files is done through the *input, print, read, write,* and *get* statements of Basic. Basic interprets your desires and performs operations called *SOS calls* to do the actual work of reading and writing to physical devices. There are times, however, when the programmer needs direct access to the information which SOS has about files, and other times when certain status and control information needs to be interrogated or set. More information about what this information consists of for a particular driver can be found in the appropriate reference manual for that driver.

Of greatest interest to us now, however, is the ability to use SOS directly to read and write data to files. A single SOS *fwrite* command can transfer up to 64K bytes of data to a file. Normally Basic allows writing only one variable at a time, and although it is possible to put more than one value in a single *print* or *input* statement, there are real limits on the amount of data which can be transferred at one time. This generally means that arrays of data get written using *for-next* loops—adequate, but hardly a speed-burner.

To help solve this problem in situations where performance is at a premium, the *request* module contains two procedures: *filread* and *filwrite*. They are documented in the *request.doc* file on the Basic disk, but for reference, here are the formats:

```
PERFORM  FILREAD(%filnum,@array$,%num-
  bytes,@count)
PERFORM  FILWRITE(%filnum,@array$,%num-
  bytes)
```

Filnum refers to the file number you used in the *open* statement for the file to be read or written. It can be any file which Basic is allowed to open. This includes device files like .console as well as disk-based *text* and *data* files. The percent symbol in front of the *filnum* indicates that you should either use an integer variable, or put the % in front of any constant you use, to insure that an integer value is passed to the procedure. *Array$* refers to a string variable which contains the name of the array which you wish to read or write. The @ character on the front of the string variable name instructs Basic to pass the memory address of the string, not the actual contents of the string itself. The invokable module is responsible for finding out what array name is in the string, and then locating the array in memory. The *numbytes* parameter tells the procedure how many bytes are to be read or written from the array. In the *filread* procedure, the extra parameter *count* allows the procedure to pass back information about how many bytes were actually read, in case an *eof* or other event prevented the reading of the full amount of data specified. It must be an integer variable.

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One note is important here. These procedures read and write the exact contents of arrays. In the case of disk files, there is no way to read this data back once it is written, except by using the *filread* procedure. That is, if you write an integer array to a *data* file, no type bytes are placed in the file, just the binary integer values, one after the other. The same is true for *text* files. Normal writes to *text* files convert the binary internal format to ASCII character format. If you write to a *text* file using *filwrite*, the exact binary data is written. You can position the file pointer using random access statements, but once a *filwrite* starts, it does not respect record boundaries. Great care must be taken if you have any ideas about mixing this kind of data with the normal contents of *text* and *data* files. A good approach is to use record 0 of the file to document the use of *filread* and *filwrite* within an ordinary file by putting information there about the types of arrays, their location within the file, their length, and so forth.

Now that we've documented how it works, let's look at an example which will demonstrate how it can improve the performance of your programs.

The following program represents a benchmark of the time it takes to write a real and an integer array to a data file:

```
10   DIM realarray(10,100),intarray%(10,100)
20   OPEN#1,"test.request"
30   REM fill arrays with randam data
40   FOR i=1 TO 10
50     FOR j=1 ta 100
60       val=RND(1)*30000:valint%=INT(val)
70       realarray(i,j)=val:intar-
         ray%(i,j)=valint%
80       NEXT j,i
90   PRINT"Arrays filled."
100  PRINT"Writing real array with FOR-
     NEXT."
110  PRINT"Start time: "; TIME$;
120  FOR i=1 TO 10:FOR j=1 TO 100
130    WRITE#1;realarray(i,j)
140    NEXT j,i
150  PRINT" Stap time: "; TIME$
160  PRINT"Writing integer array with FOR-
     NEXT."
170  PRINT"Start time: "; TIME$;
180  FOR i=1 TO 10:FOR j=1 TO 100
190    WRITE#1;intarray%(i,j)
200    NEXT j,i
210  PRINT" Stap time: "; TIME$
220  CLOSE
230  END
```

As you can see, this is a relatively straightforward program that writes a 1000-element real array and a 1000-element integer array to disk. Apologies to those of you without clock chips. If you run this program, the timings should look something like this:

```
)RUN
Arrays filled.
Writing real array with FOR-NEXT.
Start time: 13:37:42 Stap time: 13:38:17
Writing integer array with FOR-NEXT.
Start time: 13:38:17 Stap time: 13:38:38
```

All this adds up to about thirty-five seconds to write the real array, and thirty-one seconds to write the integer array. A great deal of this time is spent in the *for-next* loop and in writing each element separately. Now let's look at the same program using *filwrite*:

```
10   DIM realarray(10,100),intarray%(10,100)
20   OPEN#1,"test.request"
25   INVOKE".d1/request.inv"
30   REM fill arrays with randam data
40   FOR i=1 TO 10
50     FOR j=1 TO 100
60       val=RND(1)*30000:valint%=INT(val)
70       realarray(i,j)=val:intar-
         ray%(i,j)=valint%
80       NEXT j,i
90   PRINT"Arrays filled."
95   array$="realarray"
100  PRINT"Writing real array with FILWRITE"
110  PRINT"Start time: "; TIME$;
120  PERFORM filwrite(%1,@array$,%4000)
150  PRINT" Stap time: "; TIME$
160  PRINT"Writing integer array with FIL-
     WRITE"
165  array$="intarray%"
170  PRINT"Start time: "; TIME$;
180  PERFORM filwrite(%1,array$,%2000)
210  PRINT" Stap time: "; TIME$
220  CLOSE
230  END
```

Notice in the filwrite *perform* statements, that %1 was used to denote the fact that we wanted to write to file number 1, and the string *array$* first contained the array name *realarray* and then *intarray%*. Also, a length of 4000 was used in the case of the real array (1000 elements at 4 bytes each) and 2000 in the case of the integer array (1000 elements at 2 bytes each). The result when this version is run is quite dramatic:

```
)RUN
Arrays filled.
Writing real array with FILWRITE
Start time: 13:54:45 Stap time: 13:54:48
Writing integer array with FILWRITE
Start time: 13:54:48 Stap time: 13:54:49
```

That's right! Approximately three seconds were required for the real array, and only one second for the integer array, between ten and twenty times faster than the previous example. Remember, though, that data written with this technique is readable only with a similar *filread* statement, and if you ever lose track of the way in which it was written, it's tough toenails. Even with those minor difficulties, you're sure to find lots of good uses for this new invokable module.

New Stuff—Part Two. For several months now you've been promised some information about the *print using* capabilities of Business Basic. Rather than go into detail about every little feature, we'll take a quick look at the main features, and then examine a program that shows off some of the power of *print using*. We'll also explore the use of the long integer data type for financial accounting applications. That's a lot to stuff for one section, but here goes:

Like most *print using* implementations in various dialects of Basic, Business Basic permits the printing of a list of variables according to a format described in an *image* statement. In fact, if you have programs in Microsoft Basic, Cbasic or most others with simple *image*

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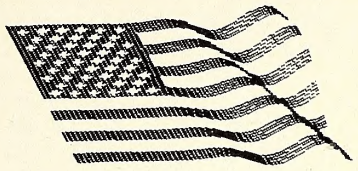

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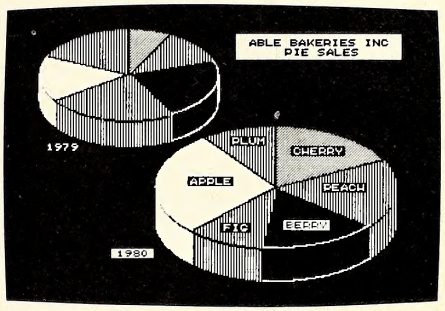

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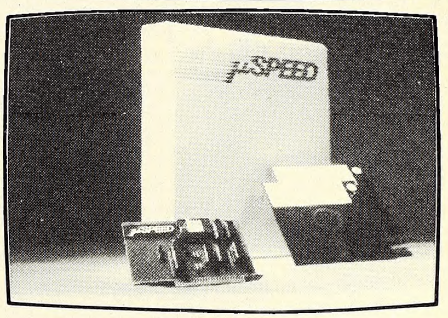

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statements, they should convert readily. It is in the extensions to these simple capabilities where Business Basic really starts to shine. The standard format is, as was said, like the following:

```
10  PRINT USING 20; first$,firstnum,secandnum%
20  IMAGE AAAAAAAAAAAAAAA,XXX,#####.##,
    XXX,#####
```

In the *image* statement, *A* reserves a space for one alphabetic character, *X* inserts a blank space, # reserves a space for one numeric digit, and . tells Basic where to align and print the decimal point in a numeric field. Therefore, the example in line 20 is interpreted as follows:

"Print the string variable *first$* in the first fifteen positions of the output record, skip three spaces, then print the real variable *firstnum* with five digits to the left of the decimal point, and two decimal places to the right. Then skip another three spaces and print the integer variable *secondnum%* right justified in a five-digit field."

Assuming the values "My test string" for *first$*, 123.443 for *firstnum*, and −2345 for *secondnum%*, the output would look like this:

```
My test string 123.44 -2345
```

Other questions, like what happens when the number or string is too big to fit, are best left to a careful reading of the Basic reference manual. Now the fun begins. Business Basic allows considerable flexibility in the way the simple example above can be expressed. For one thing, it can be simplified by placing repeat factors on the specification characters, like this:

```
20  IMAGE 15A,3X,5#.2#,3X,5#
```

Another feature is that the *image* string can be a string value replacing the line number reference in the *print using* statement. The following are equivalent:

```
10  PRINT USING
"15A,3X,5#.2#,3X,5#";first$,firstnum,secandnum%
10  farmat$="15A,3X,5#.2#,3X,5#"
20  PRINT USING farmat$;first$,firstnum,secand-
    num%
```

It is this last variation, and the power it gives us to change the format under program control, that we will explore in depth a little later.

So far we have covered the *X* specification, called a *literal* spec, the *A* spec, called a *string* spec, and the # spec, called a *digit* spec. Others available are shown in figure 3.

As you can see, these options give the programmer quite a bit of flexibility in outputting information, especially in business and scientific applications. What gives even greater flexibility is the fact that *print using* works with files, by using the *print using#n* form of the statement, and even works with random access text files by substituting *print using#n,rec*.

One other feature of *print using* is important to mention. Many business programmers, especially in accounting applications, must use integer arithmetic to ensure "penny accuracy"—no round-off errors from floating-point calculations. Ordinary Basics hamper this effort, however, because *print using* cannot insert decimal points in integer values. Business Basic has a special function, used only in *print using* output lists, to solve this problem. The function is called *scale*, and can be used with any numeric value to apply a relative power of ten (decimal point shift) to the number being printed. The format looks like this:

```
SCALE(scalefactar,numericvariable)
```

For example, the following:

```
10  langnum&=12345678
20  PRINT USING "7#.2#"; SCALE(-2,langnum&)
```

would result in the output:

```
123456.78
```

To illustrate the use of these features in business applications, the following program will be used. We'll set it up to accept numbers with decimal points in them, convert them to long integers with a scale factor based on the number of places to the right of the decimal point, and then create a subroutine which can add any two scaled integers together without loss of precision. Finally, we'll set up a routine which uses *scale* and a *print using* spec in a string variable to print out the result with the correct number of decimal places.

First, the routine to input two numbers and do the conversion and scaling:

```
10   PRINT:INPUT"First number: ";a$
12   IF a$="" THEN END
15   GOSUB 905
17   IF errarcade THEN PRINT"Range exceeded,
     try again.":GOTO 10
20   scale.first%=scale%:first&=a&
25   INPUT"Secand number: ";a$
30   GOSUB 905
32   IF errarcade THEN PRINT"Range exceeded,
     try again.":GOTO 25
35   scale.secand%=scale%:secand&=a&
40   PRINT USING 45;first&,scale.first%
45   IMAGE " first value= ",20#," scale factar=
     ",3#
50   PRINT USING 55;secand&,scale.secand%
55   IMAGE "secand value= ",20#," scale fac-
     tar= ",3#
60   END
899  REM
900  REM subrautine ta canvert input ta lang in-
     teger plus scale
905  errarcade=0:ON ERR errarcade=
     ERR:OFF ERR:RETURN
915  x=INSTR(a$,".")
920  IF x=0 THEN a&=CONV&(a$):scale
     %=0:OFF ERR:RETURN
925  scale%=-(LEN(a$)-x)
930  a$=MID$(a$,1,x-1)+MID$(a$,x+1)
935  a&=CONV&(a$):OFF ERR:RETURN
```

The subroutine is really pretty simple. It uses the trusty *instr* function in line 915 to look for a decimal point in the input string. If none is found (the number is an integer), then the string is converted to a long integer, the scale factor is set to zero, and a return is taken. Note that conversion errors (such as overflow) are handled by the *on err* statement, which passes back the errorcode to the calling program. If a decimal point is found, the scale factor is set to the number of digit positions from the point to the end of the string (line 925) and line 930 and 935 scrunch out the decimal point and convert the resulting integer to a long integer value. Once back in the input routine, the errorcode flag is checked, and if everything is okay, some simple *print using* statements print out the result for comparison. It should be noted that these routines are not bulletproof but were deliberately kept simple to illustrate the major points involved.

Literal Spec

X	prints a space
/	prints a carriage return
"any text"	inserts literal strings in the output

Digit Spec

#	Reserves one digit, leading zeros are suppressed
&	Reserves one digit or comma. Commas are inserted every 3 digits
Z	Reserves one digit, leading zeros are printed

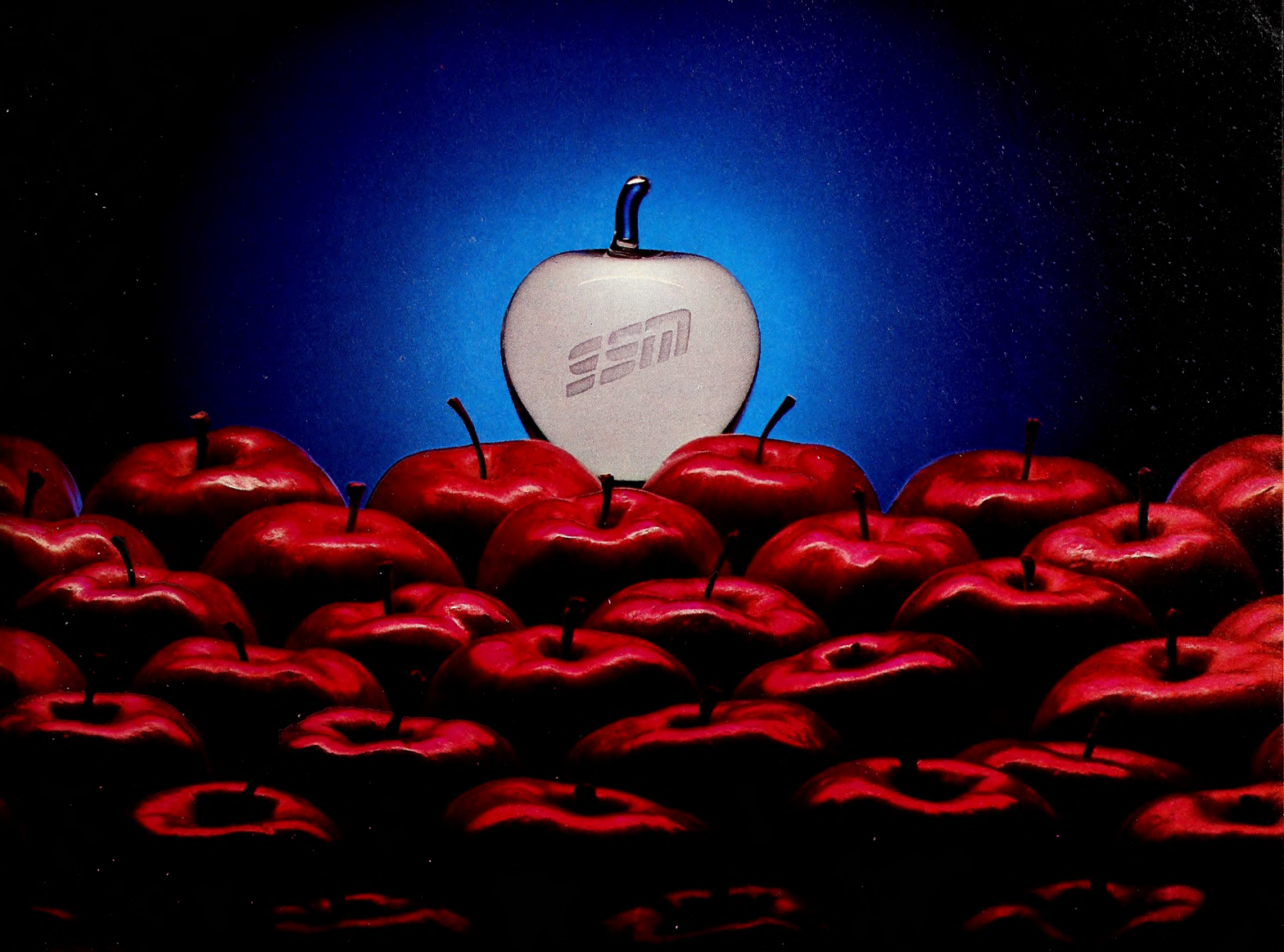
Special Numeric Specs

+	Reserves position for a sign
−	Prints sign only if negative (default)
++	Prints "floating sign" in rightmost unused position
−−	Prints "floating sign" only if negative
$	Reserves position for dollar sign ("$")
$$	Prints "floating dollar sign"
**	Fills leading spaces with asterisks
E	Prints the number in scientific or engineering notation

String Specs

A	Prints string left-justified in the field
C	Prints the string centered in the field
R	Prints the string right-justified in the field

Figure 3



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Now that we have long integer representations of these decimal numbers, with appropriate scale factors, it is possible to create a routine which will perform arithmetic on them, even though they may have different scale factors. The following routine will illustrate addition:

```
1000  REM add a& and b& and return result in
      sum&
1001  REM use scalea% and scaleb% ta return
      scalesum%
1005  errarcade=0:ON ERR errarcade= ERR:OFF
      ERR:RETURN
1010  IF scalea%=scaleb% THEN sum&
      =a&+b&:scalesum%=scalea%:OFF ERR:
      RETURN
1020  IF scalea%>scaleb% THEN 1070
1030  factar%=scaleb%-scalea%
1040  b&=b&*CONV&(10^factar%)
1050  sum&=a&+b&:scalesum%=scalea%:OFF
      ERR:RETURN
1070  factar%=scalea%-scaleb%
1080  a&=a&*CONV&(10^factar%)
1090  sum&=a&+b&:scalesum%=scaleb%:OFF
      ERR:RETURN
```

The first thing checked for is if the two numbers have the same scale factor. If so, then simple addition is all that is required, and *scalesum%* (the resulting scale factor from the operation) is set to the common scale. If the scale factors are unequal, then the two scale factors must be adjusted to be the same by multiplying the one with the larger scale by the power of ten required to make them equal in scale. An example will clarify:

Initial number	Integer value	Scale factar
12345.6789	123456789	−4
98765.43	9876543	−2

Obviously, just adding the two integers will produce meaningless results. But multiplying the second number by 100 and adjusting the scale factor correspondingly to −4 will make it possible to add them directly. The situation now looks like this:

New farmat	Integer value	Scale factar
12345.6789	123456789	−4
98765.4300	987654300	−4

The sum of the integer values is 1111111089 and, after applying the scale factor of −4, the result is 111111.1089. You should realize that most floating-point Basics, no matter how many digits they allow in double precision mode, have extreme difficulty with these types of problems. The reasons are complex, but they have to do with the fact that there are some decimal fractions which cannot be represented exactly with a binary floating-point (real) number. This leads to potential loss of precision in the last decimal place, rendering the answer inaccurate. While one place out of ten or fifteen might not be critical in an empirical scientific calculation, accountants are fussy about all the pennies (or in the example above, tenths of mils) adding up exactly. Note also that scale factors can just as easily be positive. That is, 567890000 could be represented as 56789 with a scale factor of 4. The principles of addition would work exactly the same as in the example with decimal fractions.

With the techniques described above, you can now figure out the way the subroutine works. One final note, though. In line 1040 and 1080 we use an expression "10^factor%" to represent the power of ten to be multiplied by the long integer value. Mixed mode expressions are not allowed between long integers and other data types, so the *conv&* function was used first to convert the power of ten expression to a long integer.

Now that we have a subroutine which will correctly add two scaled numbers, we can put it into our previous input program. The combination looks like this:

```
5     PRINT"Test af extended precisian add
      rautines":PRINT
10    PRINT:INPUT"First number: ";a$
12    IF a$="" THEN END
15    GOSUB 905
17    IF errarcade THEN PRINT"Range exceed-
      ed, try again.":GOTO 10
20    scale.first%=scale%:first&=a&
25    INPUT"Secand number: ";a$
30    GOSUB 905
32    IF errarcade THEN PRINT"Range exceed-
      ed, try again.":GOTO 25
35    scale.secand%=scale%:secand&=a&
40    PRINT USING 45;first&,scale.first%
45    IMAGE " first value= ",20#," scale fac-
      tar= ",3#
50    PRINT USING 55;secand&,scale.sec-
      and%
55    IMAGE "secand value= ",20#," scale fac-
      tor= ",3#
60    scale%=scale.first%:scaleb%=scale.sec-
      and%
65    a&=first&:b&=secand&
70    GOSUB 1010
72    IF errarcade THEN PRINT"Range af pre-
      cisian exceeded, try again.":GOTO 10
75    PRINT"sum= ";sum&;" scale factar=
      ";scalesum%
105   GOTO 10
899   REM
900   REM subrautine ta canvert input ta lang
      integer plus scale
905   errarcade=0:ON ERR errarcade=
      ERR:OFF ERR:RETURN
915   x=INSTR(a$,".")
920   If x=0 THEN a&=CONV&(a$)
      :scale%=0:OFF ERR:RETURN
925   scale%=-(LEN(a$)-x)
930   a$=MID$(a$,1,x-1)+MID$(a$,x+1)
935   a&=CONV&(a$):OFF ERR:RETURN
999   REM
1000  REM add a& and b& and return re-
      sult in sum&
1001  REM use scale% and scaleb% ta re-
      turn scalesum%
1005  errarcade=0:ON ERR errarcade=
      ERR:OFF ERR:RETURN
1010  IF scalea%=scaleb% THEN sum&=
      a&+b&:scalesum%=scalea%:OFF
      ERR:RETURN
1020  IF scalea%>scaleb% THEN 1070
1030  factor%=scaleb%-scalea%
1040  b&=b&*CONV&(10^factar%)
1050  sum&=a&+b&:scalesum%=scale
      a%:OFF ERR:RETURN
1070  factar%=scalea%-scaleb%
1080  a&=a&*CONV&(10^factar%)
1090  sum&=a&+b&:scalesum
      %=scaleb%:OFF ERR:RETURN
```

Notice that, in addition to adding the subroutine at line 1000, we have some code at 60 through 105 to set up the call to the subroutine and then print out the results. This is all fine, but this was supposed to be an exercise in advanced uses of the *print using* statement. An ideal use of *print using* here would be to print out the results of the addition, with the decimal point in the proper place. But, since our answers can range from nineteen digits to the left of the decimal place to nineteen digits to the right, and only a total of thirty-two positions are allowed in a single numeric *image* field, it is not possible to create a single format which will handle all possible variations. Here's where Business Basic's ability to have variable format definitions really comes in handy. The following routine can be added to the program above to print the result correctly, no matter what the scale factor:

```
80    x%=LEN(CONV$(sum&)):neg%=CONV
      %(sum&<0)
85    IF x%+scalesum%-neg%<=0 THEN
      farm$="2#":ELSE:farm$=CONV$(x%+
      scalesum%)+"#"
90    IF scalesum%>=0 THEN 97
95    farm$=farm$+"."+CONV$(ABS(scalesum
      %))+"#"
97    PRINT "scaled result af sum:";
100   PRINT USING farm$; SCALE
      (scalesum%,sum&)
```

Line 80 gets the length of the number to be printed in *x%* and *neg%* is a flag to tell if the number is negative (the minus sign will require an extra position in the output). Line 85 uses this information, including the value of *scalesum%*, to figure out how many positions are needed to the left of the decimal point. Line 85 then creates *form$*, the output format specification, to match. Line 90 checks to see if *scalesum%* is positive (if value is a true integer). If so, it's finished. Otherwise, line 95 creates the rest of the format spec by including the proper number of positions to the right of the decimal point. Lines 97 and 100 then print out the long integer using the *scale* function to place the decimal point properly.

Voila! This routine should give exactly correct answers over its range of values. One thing you might want to add to help in tracing what the program is doing is to print out the value of *form$* along with the result in line 100. Also, for your personal entertainment, you might want to create subroutines for subtraction and multiplication. Division can be done using a combination of the *div* and *mod* operators, but you will become embroiled in what to do about rounding off the results of certain divisions. Multiplication has the virtue of being exactly correct within the possible range of values.

Well, what an exercise! Next month's article should be a goodie, because there is a lot left to explore in our favorite Basic. If you've got a favorite subject you'd like to see examined, why not write in and suggest it. This column should be as useful as possible to those of you working with the language and creating applications. Until March, then . . . .

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Softalk Presents The Bestsellers

December 1980 was a landmark month in the *Softalk* Bestseller Poll. That was the month that *Apple Galaxian* dethroned *VisiCalc*, the first time *VisiCalc* had ever been something other than first.

Space Eggs and *Raster Blaster* followed *Apple Galaxian*,

Strategy 5

This Month	Last Month	
1.	1.	**Castle Wolfenstein,** Silas Warner, Muse
2.	2.	**Flight Simulator,** Bruce Artwick, SubLogic
3.	4.	**Sargon II,** Dan and Kathe Spracklen, Hayden
4.	—	**Dark Forest,** Tom Mornini and Jerry Jewell, Sirius
4.	—	**Hi-Res Computer Golf,** Stuart Aronoff, Avant-Garde Creations

Adventure 5

This Month	Last Month	
1.	1.	**Hi-Res Adventure #3: Cranston Manor,** Harold DeWitz and Ken Williams, On-Line Systems
2.	3.	**Hi-Res Adventure #2: The Wizard and the Princess,** Roberta and Ken Williams
3.	2.	**Hi-Res Adventure #4: Ulysses and the Golden Fleece,** Bob Davis and Ken Williams, On-Line Systems
4.	4.	**Zork II,** Infocom
5.	—	**Zork,** Infocom

Fantasy 5

This Month	Last Month	
1.	1.	**Wizardry,** Andrew Greenberg and Robert Woodhead, Sirtech
2.	2.	**Ultima,** Lord British, California Pacific
3.	—	**Empire I: World Builders,** David Mullich, Edu-Ware Services/Interactive Fantasies
4.	3.	**Crush, Crumble and Chomp,** Automated Simulations
5.	5.	**Alkemstone,** Level-10, Dakin5

Business 10

This Month	Last Month	
1.	1.	**VisiCalc,** Software Arts/Dan Bricklin and Robert Frankston, Personal Software
2.	3.	**Personal Filing System,** John Page, Software Publishing Corporation
3.	2.	**DB Master,** Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
4.	4.	**VisiTrend/VisiPlot,** Micro Finance Systems/Mitch Kapor, Personal Software
5.	5.	**VisiFile,** Creative Computer Applications/Colin Jameson and Ben Herrman, Personal Software
6.	6.	**BPI General Ledger,** John Moss and Ken Debower, Apple Computer
7.	8.	**PFS:Report,** John Page, Software Publishing Corporation
8.	7.	**VisiDex,** Peter Jennings, Personal Software
9.	10.	**Accounting Plus II General Ledger,** Systems Plus
10.	9.	**Data Factory,** Bill Passauer, Micro Lab

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penguin software

The Leader in Apple Graphics

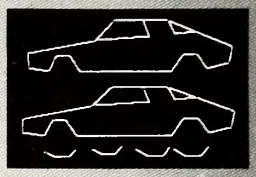
The Graphics Magician

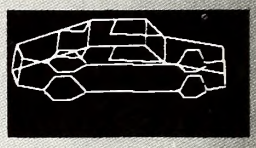
by Chris Jochumson, Mark Pelczarski, and friend

This is the graphics package for which every programmer has been waiting. Written by three of the "wizards" of Apple graphics, it contains the same machine language animation routines that have been used to create some of the finest Apple arcade games. It also gives you the power to create 108-color screen images and graphic objects the way professionals do for adventure games and other programs that require dozens of pictures and objects to be quickly accessible from a minimum of space. Add to that new, "super shape tables"; a new approach to saving shapes that allows multiple colors, preservation of angles on scaling and rotation, and taking less space than standard shapes stored on the Apple. Extensive documentation and the same user-friendly approach of all Penguin Software products make the "Magician" incredibly easy to use.

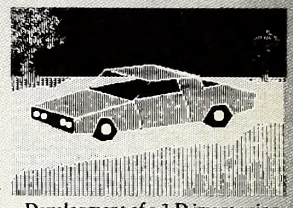
THE COMPLETE GRAPHICS SYSTEM

by Mark Pelczarski





Contains everything you need for designing 2-dimensional and 3-dimensional graphics with the Apple, previously available only on expensive graphics computers. Create color screen images with lines, circles, ellipses, automatic 108-color filling, and "paintbrushes". Use high-resolution text anywhere on the screen in dozens of colors. Create and edit shape tables, and shrink pictures for multiple displays. Amazing 3-D routines let you draw the parts of 3-D objects on the screen, then assemble, rotate, and edit them visually in true 3-D perspective. All the software is easy to use, even for the novice. Programmers can use the graphics, and even our machine language routines, in their own software. This one package gives you more than most other graphics software packages combined. Find out why *The Complete Graphics System* is top rated in Apple graphics.



Development of a 3-D image using The Complete Graphics System.

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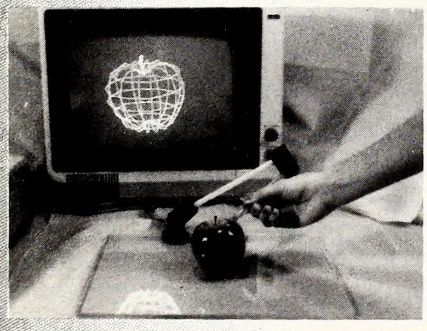
a 3-D Graphics Tablet



This incredible new device produced by Micro Control Systems, Inc. functions as a standard graphics tablet in two dimensions, until you decide to expand to real-world 3-dimensional input. Now you can trace 3-D objects, either real or imaginary, then view and modify them in 3-D perspective with your Apple computer. The 16"x13" tablet comes with a customized version of *The Complete Graphics System*, specifically designed to accept input from three dimensions. In addition, the *Space Tablet* includes machine language software that allows you to design your own programs using 3-D input. This unique hardware/software package also comes at a very palatable price -- half the cost of most standard graphics tablets. See your Penguin Software dealer today!

Special Effects

by Mark Pelczarski

Like nothing else on the market, this unique software package allows you to escape the "coloring book" approach to computer graphics, giving you a palette of 108 colors and 96 different brushes for creating or enhancing color computer images. Also included is a magnifying mode that lets you magnify images 2 or 4 times and edit them point-by-point, a "picture packer" that lets you store images in a fraction of the space normally taken, and a set of tricks that allow you to reverse colors, perform mirror images, and move parts of screen images around and to other pictures. *Special Effects* is great as a stand-alone package -- or the perfect complement to *The Complete Graphics System*.

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which underwent a name change to *Alien Rain*, before *VisiCalc* was able to reclaim the top spot.

December 1981 has all the appearances of also being a landmark month in the poll's history. Because this month, in the midst of the biggest splurge of software buying in history, *VisiCalc* not only remained securely ensconced in first place, it trounced the opposition. No other two programs combined sold as many units as did *VisiCalc* by itself.

The wide lead by Personal Software's bellwether program necessitated a change in the way *Softalk*'s index is calculated. Always before, the leading program was assigned a number nearly equal to, but less than 100 and all other numbers followed from that original calculation. With this month's poll, the second-place program is assigned the number nearly equal to 100. This more clearly elevates *VisiCalc* above its companions while still indicating the strength of the competitors.

December 1981 will also be remembered fondly by certain software publishers who were the beneficiaries of Apple Computer's experimental family plan marketing approach. Half of the top ten programs were included in the family plan, although such sales were not included in the *Softalk* calculations.

Family plan software making the top ten were *Olympic Decathlon*, *Personal Filing System*, *Typing Tutor*, *Personal Finance Manager*, and *Apple Writer*. It seems clear that the programs were the beneficiaries of the increased attention focussed

Home 10

This Month	Last Month	
1.	3.	**Typing Tutor,** Image Producers, Microsoft
2.	1.	**Personal Finance Manager,** Jeffrey Gold, Special Delivery Software, Apple Computer
3.	7.	**Tax Preparer,** James Howard, Howard Software
4.	4.	**Home Money Minder,** Bob Schoenburg and Steve Pollack, Continental Software
5.	—	**VisiTerm,** Tom Keith, Personal Software
6.	—	**Dow Jones Portfolio Evaluator,** Apple Computer
7.	—	**Home Accountant,** Bob Schoenburg and Steve Pollack, Continental Software
8.	9.	**Mastertype,** Bruce Zweig, Lightning Software
9.	—	**Dow Jones News and Quotes Reporter,** Apple Computer
10.	5.	**Data Capture 4.0,** David Hughes and George McClelland, Southeastern Software

Hobby 10

This Month	Last Month	
1.	2.	**DOS Tool Kit,** Apple Computer
2.	8.	**Super Disk Copy III,** Charles Hartley, Sensible Software
3.	1.	**DOS 3.3,** Apple Computer
4.	—	**Locksmith,** Omega Microware
5.	—	**The Inspector,** Bill Sefton, Omega Microware
6.	—	**Zoom Grafix,** Dav Holle, Phoenix Software
7.	—	**Elementary, My Dear Apple,** Apple Computer
8.	—	**TASC,** James M. Peak and Michael T. Howard, Microsoft
9.	—	**Assembly Language Development System,** Microsoft
10.	—	**Electric Duet,** Insoft

Word Processors 5

This Month	Last Month	
1.	1.	**Apple Writer,** Apple Computer
2.	3.	**Superscribe II,** David Kidwell, On-Line Systems
3.	4.	**Magic Window,** Gary Shannon and Bill Depew, Artsci
4.	2.	**Word Star,** Micro Pro
5.	5.	**Easy Writer,** John Draper, Information Unlimited Software

on them as part of the marketing approach.

For Microsoft, a company with its eyes on the top spot now that it's announced its own electronic forecasting tool to compete with *VisiCalc*, this month marked a temporary zenith in their penetration into the personal computer market with applications programs.

Not only was *Olympic Decathlon* second and *Typing Tutor* sixth, but they placed *TASC* and their *Assembly Language Development System* in the Hobby 10.

December was an important month for the folks at Software Publishing Corporation as well, as they finally wrested the lead in database sales from Stoneware. Their *Personal Filing System*, fueled by inclusion in the family plan, dethroned *DBMaster*.

PFS thus becomes the fourth database to lead the pack in the short period of eighteen months. First, *CCA DMS* was the leader, then *Data Factory 3.0*, then *DBMaster*. With *VisiFile*, *Data Reporter*, and *General Manager* joining *Data Factory 5.0* and *DBMaster* in the chase, the future looks equally as interesting and as volatile.

December also saw the last of the bestseller regulars, other than *VisiCalc*, fall by the wayside when SubLogic's *Flight Simulator* wound up thirty-second. It was the first month out of the money for the durable performer and came, oddly enough, during an uptick in sales.

One old war horse that benefitted from Christmas buying was *Space Eggs*, which rejoined the list after a brief hiatus. Sirius Software, publisher of *Space Eggs*, also placed the highest flying newcomer on the list when *Beer Run* grabbed the blimp to rise to thirteenth.

Leaders remained the same on all the specialty lists except Home 10, where *Typing Tutor* displaced *Personal Finance Manager*, and Hobby 10, where *DOS Tool Kit* displaced *DOS 3.3*.

Dark Forest from Sirius Software and *Hi-Res Computer Golf* from Avant-Garde Creations cracked the Strategy 5. It's the first time that any Avant-Garde product has made the bestsellers.

Zork joined *Zork II* on the Adventure 5 list. *Empire I: World Builders* from Edu-Ware Services/Interactive Fantasies gained third spot on the Fantasy 5.

Continental Software placed two home finance packages in the Home 10, as *Home Accountant* joined *Home Money Minder* on the list. *VisiTerm, Dow Jones Portfolio Evaluator,* and *Dow Jones News and Quotes Reporter* rejoined the list.

Only *DOS 3.3*, *DOS Tool Kit*, and *Super Disk Copy III* survived from last month's Hobby 10. *The Inspector* and *TASC* rejoined the list while *Locksmith, Zoom Grafix, Elementary, My Dear Apple, Assembly Language Development System,* and *Electric Duet* made the list for the first time.

The Apple marketplace has the look of robust health as it ventures into the new year, with January promising perhaps the second biggest month in history. ■

Apple-franchised retail stores representing approximately 9.0 percent of all sales of Apples and Apple-related products volunteered to participate in the poll.

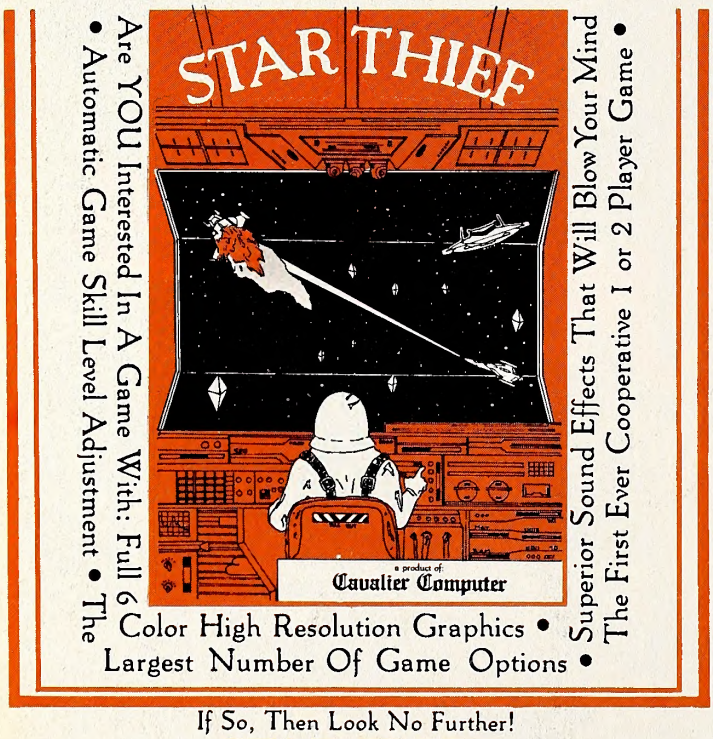
Respondents were contacted early in January to ascertain their sales leaders for the month of December.

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 January 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 4.5 percent, which translates roughly into the theoretical possibility of a change of 3.11 points, plus or minus, in any index number.



The Top Thirty

This Month	Last Month	Index	
1.	1.	213.62	**VisiCalc,** Software Arts/Dan Bricklin and Robert Frankston, Personal Software
2.	10.	98.48	**Olympic Decathlon,** Tim Smith, Microsoft
3.	3.	97.31	**Personal Filing System,** John Page, Software Publishing Corporation
4.	15.	88.78	**Snack Attack,** Dan Illowsky, Datamost
5.	4.	84.52	**Gorgon,** Nasir, Sirius Software
6.	17.	79.87	**Typing Tutor,** Image Producers, Microsoft
7.	20.	74.44	**Castle Wolfenstein,** Silas Warner, Muse
8.	7.	66.68	**Personal Finance Manager,** Jeffrey Gold, Special Delivery Software, Apple Computer
9.	8.	57.77	**Sneakers,** Mark Turmell, Sirius Software
10.	13.	54.67	**Apple Writer,** Apple Computer
11.	11.	54.28	**Raster Blaster,** Bill Budge, BudgeCo
12.	2.	51.95	**DB Master,** Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
13.	—	51.18	**Beer Run,** Mark Turmell, Sirius Software
14.	23.	49.24	**Superscribe II,** David Kidwell, On-Line Systems
15.	19.	45.75	**Wizardry,** Andrew Greenberg and Robert Woodhead, Sir-tech
	27.	45.75	**DOS Tool Kit,** Apple Computer
17.	—	44.59	**Tax Preparer,** James Howard, Howard Software
18.	5.	43.81	**Apple Panic,** Ben Serki, Broderbund Software
19.	24.	42.65	**Bug Attack,** Jim Nitchals, Cavalier Software
20.	—	40.32	**Magic Window,** Gary Shannon and Bill Depew, Artsci
21.	6.	39.93	**VisiTrend/VisiPlot,** Micro Finance Systems/Mitch Kapor, Personal Software
22.	22.	39.60	**Threshold,** Warren Schwader and Ken Williams, On-Line Systems
	9.	39.60	**VisiFile,** Creative Computer Applications/Colin Jameson and Ben Herrman, Personal Software
	—	39.60	**Home Money Minder,** Bob Schoenburg and Steve Pollack, Continental Software
25.	—	30.63	**Space Eggs,** Nasir, Sirius Software
26.	12.	29.86	**Snoggle,** Jun Wada, Broderbund Software
27.	14.	28.69	**Word Star,** Micro Pro
28.	—	26.37	**Super Disk Copy III,** Charles Hartley, Sensible Software
29.	21.	25.59	**DOS 3.3,** Apple Computer
30.	27.	25.20	**Pegasus II,** Olaf Lubeck, On-Line Systems

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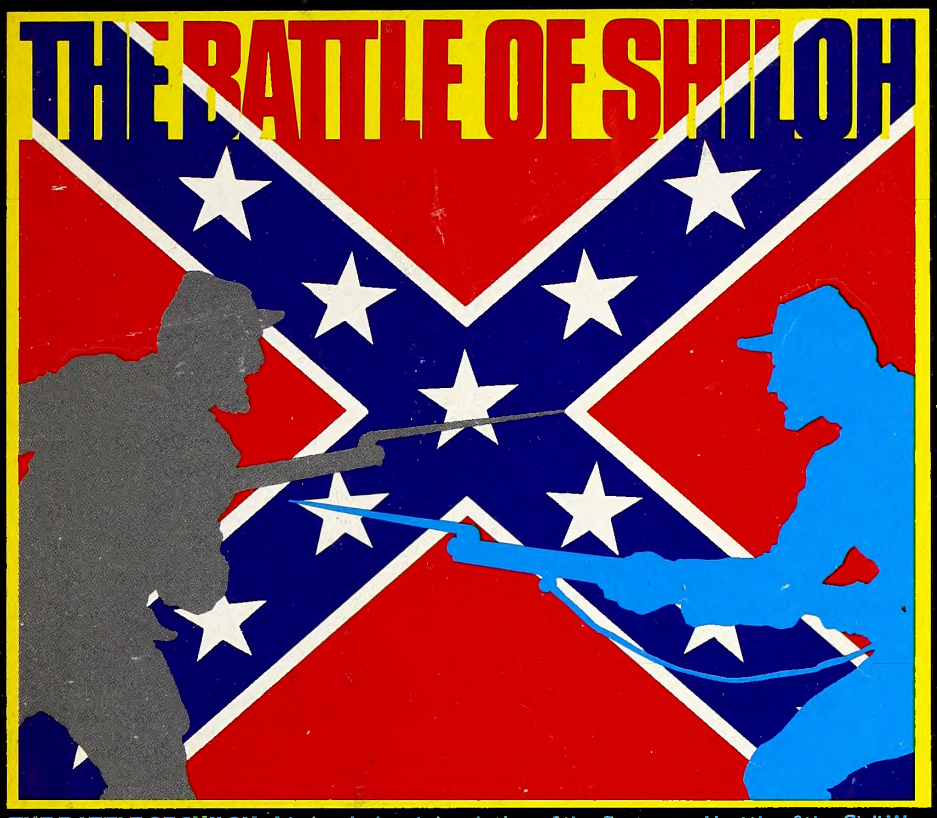

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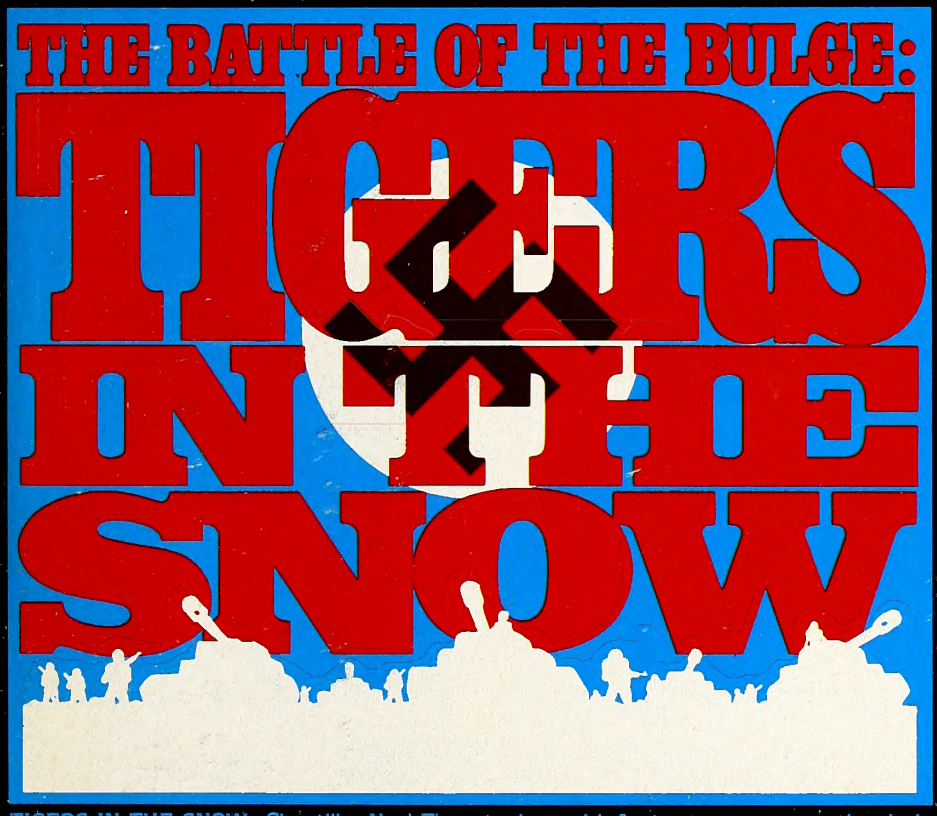

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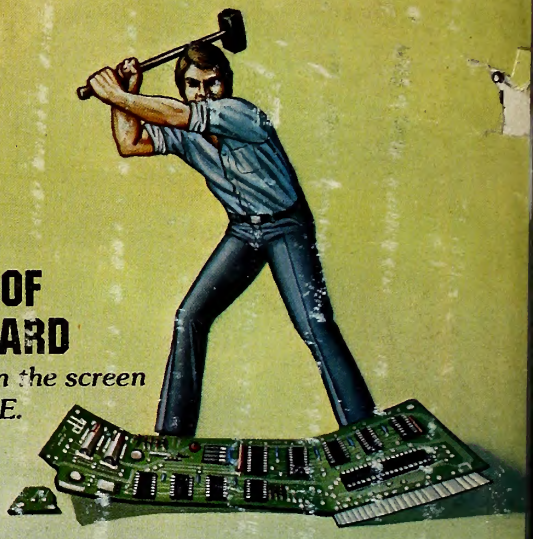

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