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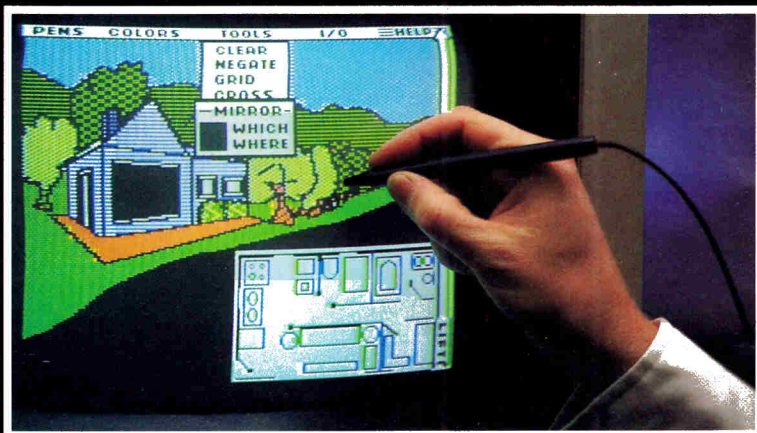
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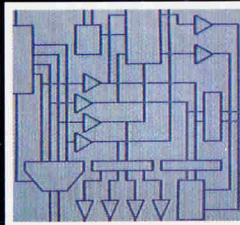
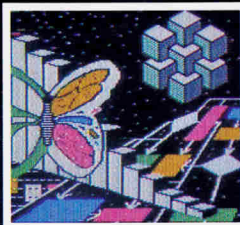
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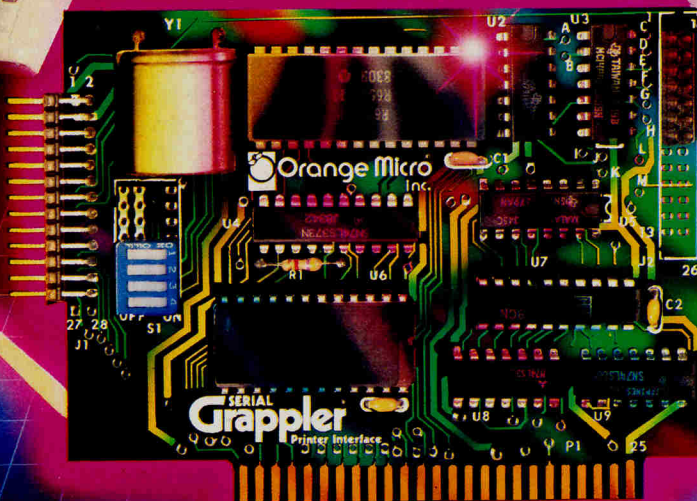
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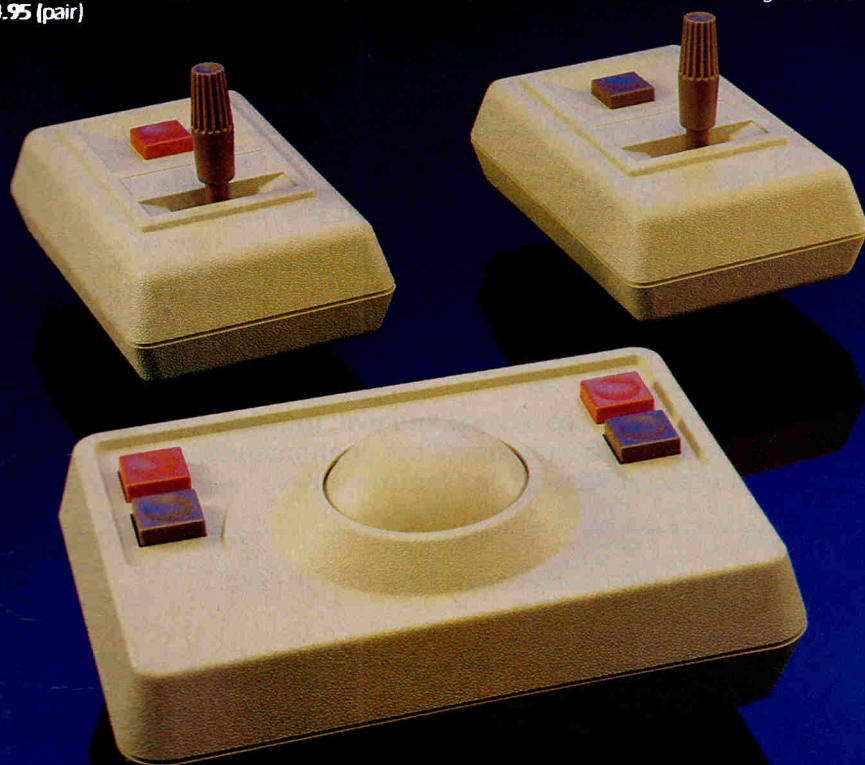
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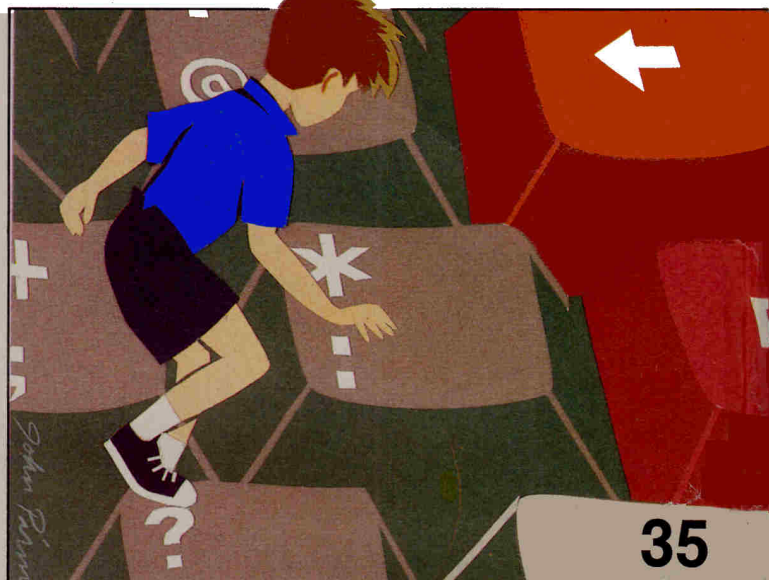
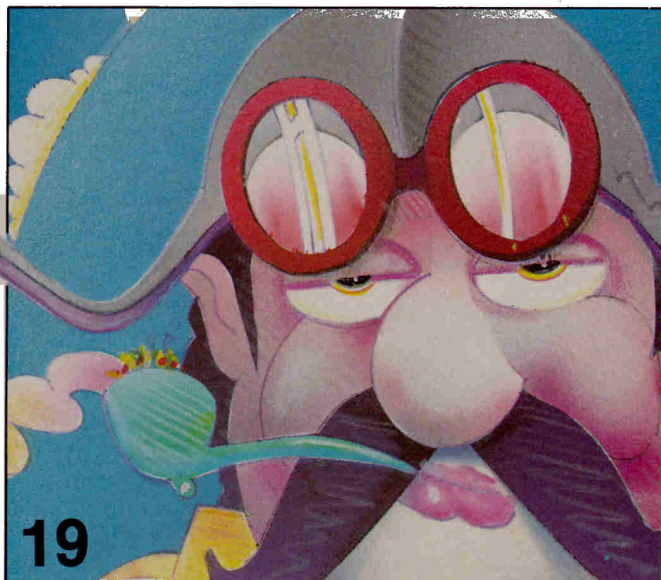
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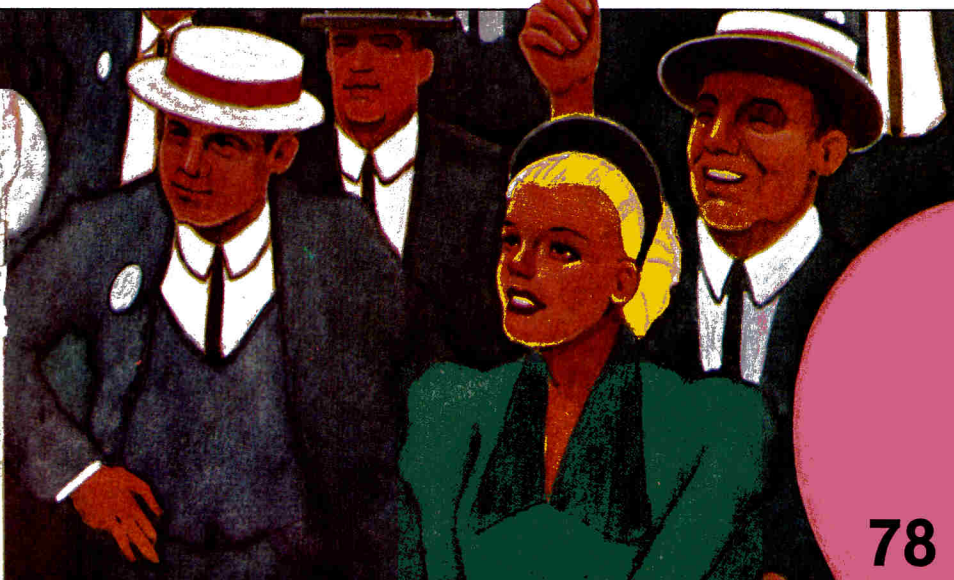
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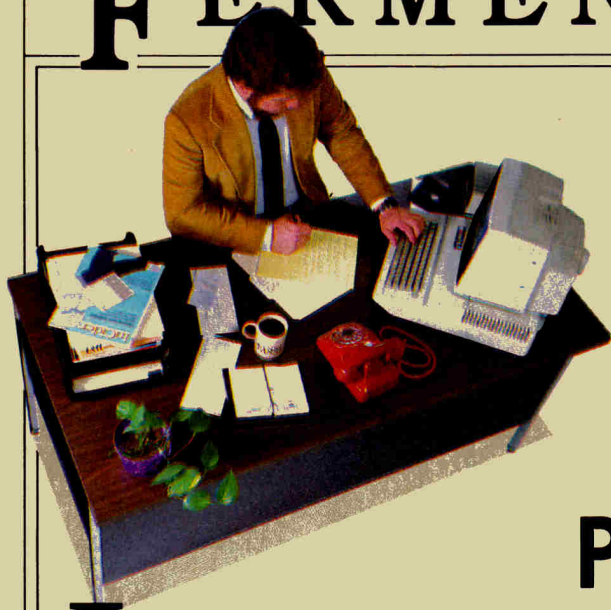


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Cover art by John Pirman

FERMENTATIONS



The Games People Will Play

It's a dirty job, but somebody's gotta do it—come up with new computer games, that is. Oh yes, the present crop is more than adequate; a lot of it is even remarkable. But a certain me-tooism is afoot these days. On the other hand, glimmers of genius are also lighting up the gamescape.

Witness FS2M Flight Simulator. SubLOGIC has taken its enormously successful simulation into the next dimension and made multi-machine play a reality. As many as 16 gamers can now fly in formation, each firmly in control of his own airborne Apple. Formation flying, multi-plane airshows, and airport traffic all can be simulated. Aerial warfare, too, is possible, and we should be seeing some exquisite dogfighting in the months ahead. And it's even possible for two players to fight from afar using modems. Nice work, SubLOGIC.

Another new wrinkle for gamers is voice control. Here, we have a new offering from Arctec Systems called Micro-Ear, a unit capable of recognizing up to 256 user-selected and defined words. These words are trained, so to speak, by the user's voice. Once given their instructions, the words will do your bidding on screen, a satisfying alternative to keyboard input.

Now here's a novel way for gamers to inject vitality into their entertain-

ment. Where somebody is more nimble of tongue than finger, voice control could put that player on equal footing with more manually dexterous opponents. The possibilities are endless. (Hmmm, there are certain words—usually monosyllabic and very fricative—that I don't get to use nearly enough...think I can make the old //e blush?)

Beyond these two examples, it hasn't been a bumper year for new games. Perhaps the game publishers need fresh ideas. How about these:

- Why not exploit robotics to devise microprocessor-controlled mechanical games? Consider computerized billiards where user-defined commands like top spin and stroke are relayed to a tiny hydraulic cue stick. Or if combat is your thing, imagine the fun of pitting miniature metal gladiators against one another as each tries to disconnect the opponent's interface cable.

Of course, non-contact competition could be equally challenging and even constructive. Apple-controlled robots and machines of every sort could test their mettle in sundry events requiring strength, speed, and agility. It doesn't take too much imagination to envision the first robotics olympiad. (Stand by, Jim McKay.)

More research and development

could be devoted to improving the graphics and sound capabilities of existing games. After all, when it comes to special effects, game players are gourmets. A worthy goal to shoot for is a game that offers hologram screen displays bathed in stereophonic sound. Also, a whole new peripheral is needed: a micro scratch 'n' sniff that addresses the sense of smell, which is now woefully neglected. Yes indeed, a new era in gaming will open up as the nose is served such olfactory delights as the smell of exotic fruits, cannon smoke, roast beef, burning rubber, or the ominous odor of a slithering alien. We're talking realism here.

- Along a related tangent, isn't it about time that we had significant games which explore the interfacing of Apples and video disks?

- Artificial intelligence, now there's an element that should be heavily incorporated by the next generation of games. Consider the deliciously devilish nature of a game—let's say a fantasy adventure—that can adapt itself to a variety of players; a game that will change the rules just when you thought you had it all figured out; a game that might even become a self-motivated extension of the player.

- And let's not overlook telecommunications. Picture yourself playing

by Paul Quinn

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FERMENTATIONS

your favorite arcade game against worthy opponents in every part of the United States. If you're good enough, you could win regional and national championships in carefully organized nationwide competitions—and never even leave your living room.

So far, we've only discussed activities wherein the computer itself is the main object of play. But by stretching the definition of "games" just a little we can envision Apples playing supporting roles in traditional athletic and leisure pursuits.

inCider has covered some of these already. For instance, in April we examined the role Apples played in developing Olympic athletes. Through the use of advanced sensory devices, vital data such as a high jumper's sprint and launch are subjected to computer analysis. The athlete's coach can then make critical adjustments in the training program to correct previously unobserved faults. Couldn't this technology be made available to "civilian" athletes?

Another story we've got in the works deals with computer poker. At a recent championship poker tournament in Las Vegas, an Apple did extremely well against some of the world's best players. Now why couldn't an amateur harness the same power to improve his or her own game? And why couldn't a bridge player do the same?

The poker scenario uses a bar code reader to enter the data—the cards the player is holding—into the Apple. (A bar-coded deck of cards is used.) Why couldn't the same technology coach performance in other traditional games?

All right, all right. I admit some of this is just a bit outrageous. Still, I have consummate faith in industry's ability to do strange things... if the ante is high enough. And from what I've seen of true, card-carrying gamers, the spirit is strong and the wallet is willing. ■

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Get the Apple juicer from Washington. Call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer.

**MICRO
SOFT**

SoftCard is a trademark and Microsoft is a registered trademark of Microsoft Corporation. Apple is a registered trademark of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corporation. dBASE II is a registered trademark of Ashton-Tate. WordStar is a registered trademark of MicroPro. CP/M is a registered trademark of Digital Research, Inc.

OUR ARCADE GAMES WE BROUGHT



Bally Midway's Spy Hunter puts you in the driver's seat of the hottest machine on four wheels. You're after enemy spies. The situation is life and death. You'll need every weapon you've got – machine guns, and guided missiles, oil slicks and smoke screens. But the enemy is everywhere. On the road, in the water, even in the air. So you'll have to be more than fast to stay alive in Spy Hunter. You'll need brains and guts, too.

Do you have what it takes?



Bally Midway's Tapper would like to welcome you to the fastest game in the universe.

You're serving up drinks in some of the craziest places you've ever seen. And the service better be good, or else. You'll work your way through the wild Western Saloon to the Sports Bar. From there to the slam dancing Punk Bar and on into the Space Bar full of customers who are, literally, out of this world!

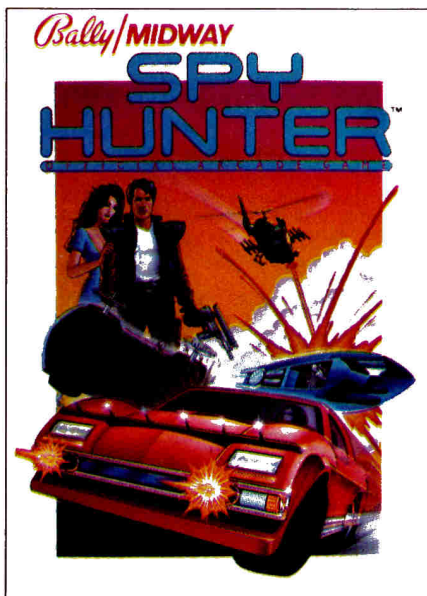
Are you fast enough to play Tapper? If you have to ask, you probably already know the answer.



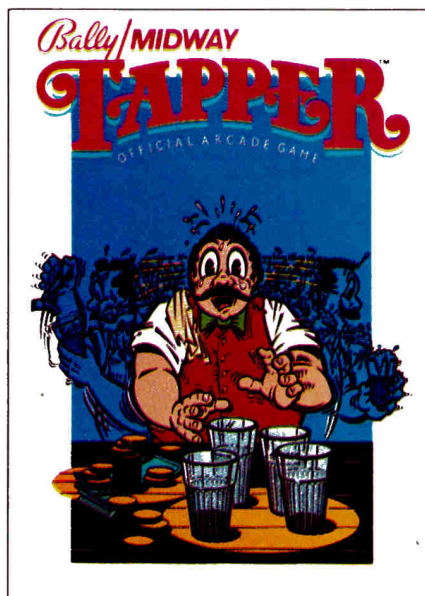
Bally Midway's Up 'N Down by Sega. In this game, a crash is no accident.

In fact, it's the whole object of the game. You'll race your baja bug over some of the worst roads south of any border. Leap dead ends, gaping canyons and oncoming traffic in a single bound. And if anyone gets in your way, crush 'em.

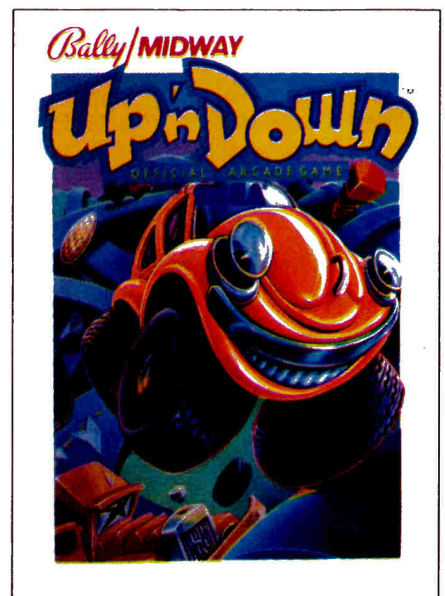
Crashing, bashing Up 'N Down. It's one smash hit that really is a smash.



The #1 Arcade Game of 1984.



Nominated as Most Innovative Coin-Op Game of 1984 by *Electronic Games* magazine.



#1 Arcade Hit, *Play Meter* Conversions Poll, 8/1/84.

WERE SUCH BIG HITS, THEM HOME.



Sega's Congo Bongo rocked the home game world when it shot up to Number 3 on the Billboard chart this summer.

And now it's available for even more home systems. So check the chart and get ready for jungle action. You'll pursue the mighty ape Congo up Monkey Mountain and across the Mighty River. Do battle with dangerous jungle creatures. Ride hippos, dodge charging rhinos and try to avoid becoming a snack for a man-eating fish.

Congo Bongo. It's fast and it's fun. But be careful. It's a jungle in there.



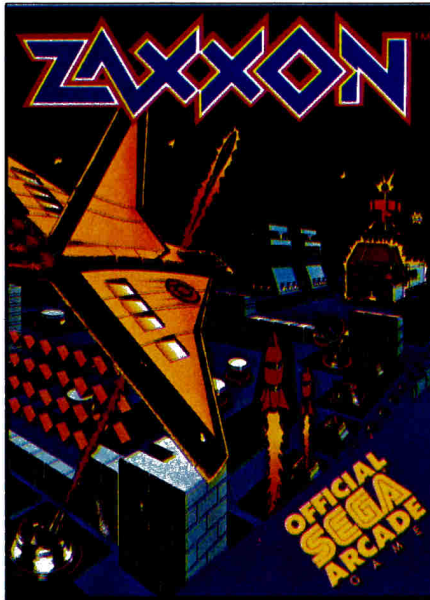
Sega's Zaxxon. If you haven't played Zaxxon, you must have been living on another planet for the past few years.

And now the ultimate space combat game is available for even more home systems. You'll pilot a space fighter through force fields and enemy fire on your way to do battle with the mighty Zaxxon robot. Countless others have gone before you in this Hall of Fame game. But this time your life is in your own hands.

Zaxxon killed them in the arcades. But compared to what it will do to you at home, that was child's play.



Arcade and Home Smash. Hit #3 on Billboard magazine's Top Video Games survey.



One of only ten games ever to make *Electronic Games'* Hall of Fame.

	SPY HUNTER	TAPPER	UP 'N DOWN	CONGO BONGO	ZAXXON
Atari 2600 cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓
Atari 5200 cartridge				✓	✓ NEW
Atari Computers* cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓ NEW
Atari Computers† diskette	✓ NEW	✓ NEW	✓ NEW		✓
ColecoVision & ADAM cartridge	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
Commodore 64 cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓ NEW
Commodore 64 diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
Apple II, IIe, IIc diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
IBM PC diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓ NEW

✓ Published by Sega Enterprises, Inc.
✓ Published by Datasoft, Inc. under license from Sega Enterprises, Inc.

✓ Published by Coleco Industries, Inc. under license from Sega Enterprises, Inc.

✓ Published by Synapse Software Corporation under license from Sega Enterprises, Inc.

*Atari 400, 800, 600XL, 800XL and 1200XL.

(Congo Bongo cartridge: 400, 800 and 800XL.)

†Atari 800, 600XL, 800XL and 1200XL.

**Also available for IBM PCjr.

All new games are scheduled to be in your stores for Christmas. Check your local dealer.

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LETTERS

Discrimination Against Servicemen

I have noticed in the past that you are not afraid to take editorial stands for things you believe in. I am looking for someone to stand up for thousands of Americans who are being discriminated against, yet have no voice to take up for us. I am talking about U.S. servicemen stationed overseas.

A look through most mail order ads reveals statements like "APO, FPO add \$15 minimum shipping" or "APO, FPO and overseas orders add 15 percent for shipping." I realize that most shipping is done through UPS these days; however, many still use the U.S. mail. Facts concerning APO/FPO mail show that the added cost is uncalled for. No matter what country a serviceman is stationed in, the postage paid for mail is only to the APO/FPO port, usually New York, San Francisco, or Seattle. Foreign postage is not required to send items. To be charged \$15 more for an item just to mail it to New York is stupid.

Not so many years ago, serving your country was a noble and honorable thing to do. People respected you for it. There were military discounts on planes and buses, and even in theaters. Needless to say, those days seem behind us. Now it seems we must pay extra to serve.

No matter how exciting it may sound, most of us servicemen who are stationed overseas would gladly trade even the best assignment to be back in the States with our families and with the conveniences which are so taken for granted by most. We are forced to do most of our shopping for computer supplies through mail order. I would imagine that the combined purchasing power of military computer enthusiasts would be enough to keep most mail order houses in business.

I would like to solicit the servicemen in the computer community

to band together to help reduce this uncalled-for abuse. I, for one, read each advertiser's shipping policy and if it discriminates against me, I refuse to order from the company, even if it has the lowest prices. I would like to see a movement to give our business to the people that still support us. I would love to see a company take a stand and advertise in big letters, "We support our servicemen overseas," and "No increased charges on APO/FPO orders." I daresay that if some enlightened company would offer free APO/FPO shipping, it would more than make up for the postage losses by the increase in business.

Call it flag waving if you must, but a lot of us over here would like to think that someone appreciates the sacrifices we are making for our country.

C. Thomas Towery
Capt., USAF
P.O. Box 2909
APO NY 09127

Your Rights and the IRS

I was interested to read Fred Huntington's account of his dealings with the IRS concerning the computer deduction on his tax return (July 1984). In the second paragraph he stated that he didn't have an option concerning his appearance at the IRS audit. Nothing could be further from the truth, and it is imperative that your magazine help clear the air on this point, as you have, however unintentionally, perpetuated the myth of the IRS.

The Fourth and Fifth Amendments to the U.S. Constitution protect all citizens from divulging any information that may in any way be used against a citizen in legal proceedings. A citizen cannot be forced to be a witness against himself, and he cannot be forced to turn over private documents without a valid court order, which requires proof to a judge of the probability

that a crime has been committed by the individual in question.

An audit is not a criminal investigation, and has no legal status requiring a citizen's presence or the submission of private papers. The IRS is only interested in using the myth to promote fear so citizens will voluntarily waive their rights and allow the IRS to pry into their private lives. As he noted later, the law allows the taxpayer to determine the validity of the computer deduction. If the auditing agent obeyed the law, there wouldn't have been an audit in the first place.

More of us must become educated to the government abuse of our rights at all levels. The use of computers to develop education data bases is a key to the efficient implementation of this objective. I would appreciate information on methods of disseminating information such as this via computer networking/bulletin boards. I presently have reams of information on the U.S. Constitution, but lack an efficient method to transmit it quickly and reliably.

John Diedrich
1254 West Booth Road Ext.
Marietta, GA 30060

The August 1984 inCider has several articles on modems which you would be interested in. It also mentions how you can set up your own bulletin board.
—eds.

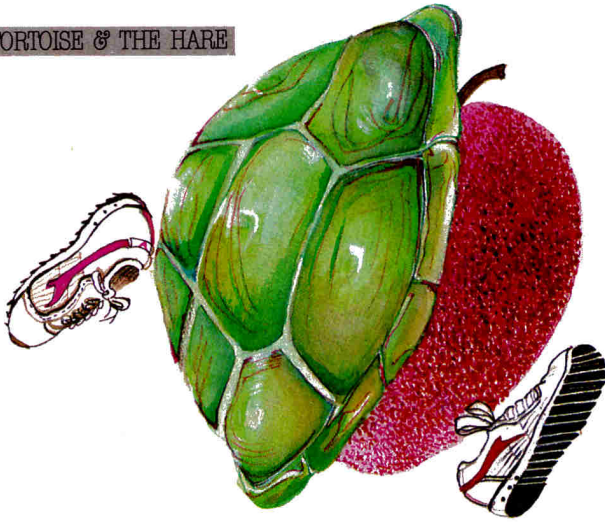
PFS:Problem

I recently purchased PFS:Write and PFS:Graph to use on my Apple IIe. These are very fine programs, but I did have one problem.

When I was using PFS:Write and printing with my Apple Imagewriter at 12 characters per inch, a merged graph from PFS:Graph shifted the printing mode of the Imagewriter from 12 cpi to 10 cpi. To solve this problem, insert es-

IT'S NO FABLE!

THE TORTOISE & THE HARE



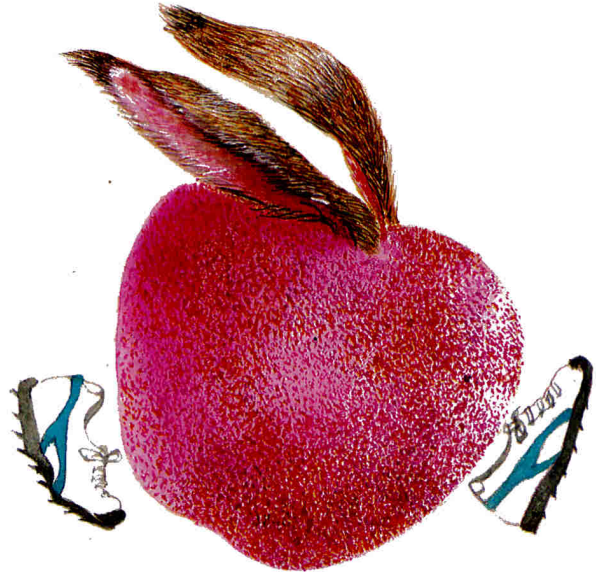
One day all the speedup cards for the Apple II+ and IIe got together to benchmark best-selling software.

Accelerate-Hare, a young, outspoken card, snickered when he spotted the Vitamill card from Stellation Two. "Why I'm surprised you showed up, since you know my 6502-C CPU makes your 6809 seem like a tortoise!"

All the other cards chuckled, but the Vitamill just grinned quietly and replied, "Your CPU may be a little faster, but I'll bet I can beat you in a race through the most popular Apple II business applications!"

Accelerate-Hare accepted the challenge and while all the other cards looked on, the Hare sped ahead at the start and into PFS File.

As soon as the PFS program needed information from disk however, the Hare fell asleep, it simply couldn't run when programs went out to disk. As it slept, our softspoken

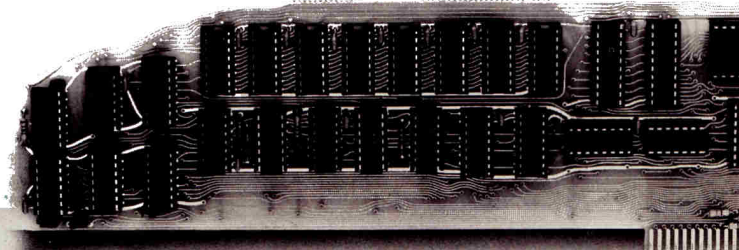
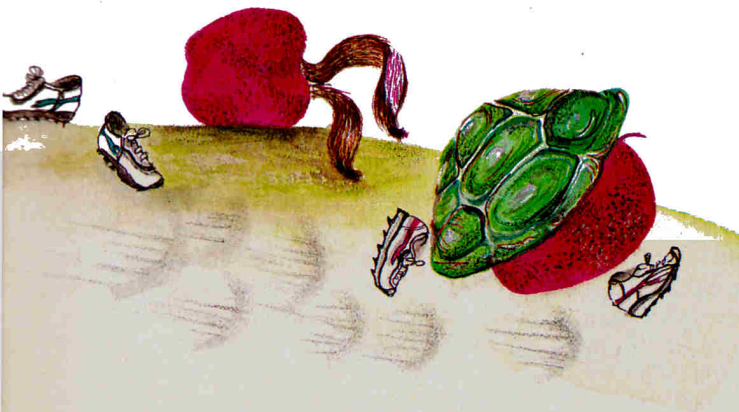


Vitamill went even faster, thanks to its ability to speed up disk access from 2 to 10 times! (No other card can speed up both the Apple and the disk drives!)

The course then took them through D BASE II where Hare took another nap during the ENTIRE PROGRAM since it was not compatible with most CP/M systems! By the time Vitamill finished the final program in the course, "State of the Art Accounting Software", Accelerate-Hare was so far behind, it had no chance of catching up!

Well, the other cards surely were surprised, especially when they found out that Vitamill sold for hundreds of dollars less. Vitamill just smiled and said "Contact Stellation Two today to find out how much faster I can run your programs!"

THE MORAL: It's not how fast add-on cards appear to be, but how quickly they run your entire program that makes them worth the investment!



VITAMILL

Circle 67 on Reader Service card.

*Accelerate-Hare is more commonly known as the Accelerator which is not compatible with most Z-80 cards, including the Microsoft Z-80 softcard (for CP/M in the Apple II, IIe).



Stellation Two, Inc., 26 W. Mission St. #3
P.O. Box 2342 Santa Barbara, CA 93120
Telephone (805) 569-3132, 966-1140

Vitamill:™ of Stellation Two
Accelerator II™: of Titan Technologies
State of the Art Inc.

PFS™ Software Publishing, Inc.
CP/M™ Digital Research
D BASE II™ Ashton Tate Publ.
Apple II, IIe™ Apple Computer Corp.

LETTERS

cape-E (*P 27,69*) in the draft after the graph. This will return the Imagewriter to a 12 cpi printing mode.

William D. Grant
Director, Education and
Research Services
The University of Oklahoma
P.O. Box 26901
Oklahoma City, OK 73190

Parmesan DOS?

Regarding "Coded Patchwork for The Inspector" (July 1984, page 114), what makes the author so certain the tape I/O routines are useless? A cassette recorder can be a convenient rescue device when, for example, DOS decides not to function when you try to save an hour's or an evening's work or when all the disks in the house are full, you don't want to delete anything, and you don't want to have the last hour's editing lost to posterity. Tape also makes an excellent back-up medium.

The Apple II floating-point routines are just that: They provide a convenient way to do floating-point arithmetic for Integer BASIC. Documentation for them, along with routines such as the "Sweet 16" interpreter, was available from A.P.P.L.E.

While DOS does have some open space, saying that "There are lots of holes" is gross exaggeration. You can make space by disabling certain commands such as INIT and by shortening others (CAT instead of CATALOG), but DOS isn't Swiss cheese.

F. Kuechmann
8113 N.E. 25th Avenue
Vancouver, WA 98665

Better Than Bar Codes

Bar codes! Bar codes! Enough about bar codes! While they may be fine for the supermarket, they have no place at all in the home, and for excellent reasons: The ones that work are fairly expensive; they are

strictly a one-use item; they require a fair amount of maintenance; and their state of the art, at this time, leaves a lot to be desired. Granted, none of these reasons alone detracts greatly from the utility that a bar code reader might offer, but how about when taken collectively?

Actually, the readers who have responded to this issue are addressing a real problem that requires a much better solution than a bar code reader. Typing in a long program is a real pain in the assembler, especially when a microscopic typing error occurs in a binary subroutine, crashing the entire program.

The solution is fairly simple and less prone to failure than your computer. Dozens of different models have various capabilities and features. It's rapidly becoming much less expensive, and thousands of Apple owners already have it. Just what is this miracle device, you ask? A modem, of course! Come on, inCider, get with the times and get on-line!

Edward E. Brown
4114 N.E. 105th Street
Vancouver, WA 98665

And so we did. Dial 408-275-8350 (APL-TELO) to get selected inCider programs ready to run. —eds.

Pity the Poor Owner

In Fermentations (July 1984, page 6) you said, "A growing number of readers are more inclined to purchase software than program their own or key in industrial strength listings from a magazine."

I disagree. I don't like spending \$35 to \$200 on a program every time I need one. If I did, I'd be broke. My friends and I like the programs listed in your magazine, and I type in all that are of use to me. I hope this doesn't mean you will stop printing programs to key in.

I would like to see bar code program listings in this magazine. I don't own a bar code reader now,

but I would certainly get one if you carried program listings with bar codes.

Edward L. Waters
17 Fernbank Avenue
Delmar, NY 12054

The important point to keep in mind, Ed, is the term "industrial strength." It had become painfully clear that only a handful of people were keying in those monstrous programs of yore. The democratic thing to do was to abandon those long listings and replace them with programs whose length would be acceptable to a majority of our readers. In reality, while the number of programs has actually not gone down much, the quality of the listings has been raised significantly. Good examples of this are right in this issue.

Nobody's more tight-fisted than New Hampshire Yankees, so we have no trouble identifying with your frugality, and we therefore intend to keep those free listings coming. Let it never be asked of inCider, "Where's the beep?" —eds.

Corrections

We regret that a mistake appeared in the "Directory of Modem Manufacturers" on page 61 of the August 1984 inCider. The third listing under Anchor Automation should be the Mark XII Apple modem, and its price should be \$399, not \$499 as published.

Credit for the photos accompanying the article "Populist Computing," September 1984, pages 62-63, belongs to Dr. James H. Finkelstein, former Senior Research Associate, College of Education, Ohio State University.

Back-up Your Floppy with Diversi-Copy™

A New Breakthrough

Diversi-Copy will copy unprotected floppy disks faster and more easily than any other copy program.

Don't get burned by a bad disk!

Back-up your disks with Diversi-Copy.

Verifies Every Byte

Diversi-Copy checks every byte written on the disk, so you know your copies are good.

Shows Motor Speed

Diversi-Copy displays motor speed on each track while making a copy, eliminating a major source of disk errors.

Formats Data Disks

You can use Diversi-Copy to format data disks for ProDOS, DOS 3.3, Pascal, or CP/M (18 seconds per disk).

Mass Production

Diversi-Copy can mass produce 1 disk every 18-20 seconds, faster than most duplication machines (may require extra 128K card for full disks).

A Must For The Apple //c

You'll be amazed how much easier it is to make back-ups on the new Apple //c. Diversi-Copy makes copies without all those annoying re-insertions of the disks. You'll save over 2 minutes per copy, and save your sanity too!

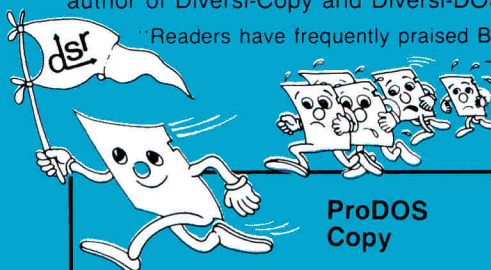
For Unprotected Disks

Diversi-Copy will copy all unprotected Pascal, CP/M, DOS 3.3, and ProDOS disks. It can't copy protected program disks, but it usually will copy data disks produced by these programs. Works on Apple //c, //e or II+ compatible computers.

We Back You Up Too

Mail and telephone support is available from Bill Basham, author of Diversi-Copy and Diversi-DOS.

"Readers have frequently praised Basham's support."
—Softalk Magazine



	ProDOS Copy	Diversi-Copy*
1-Drive Copy (50% Full Disk)	172 sec. 18 insertions	36 sec. 2 insertions
1-Drive Copy (100% Full Disk)	172 sec. 18 insertions	44 sec. 4 insertions
2-Drive Copy	80 sec.	33 sec.

* On 128K Apple //e or //c

Also From DSR, Inc.

Diversi-DOS™ Still The Best!

The top-rated DOS 3.3 enhancement program. Speeds up read/write of BASIC, Binary and Text files. DOS mover frees 10K additional memory. Includes new insert/delete mode, improved BASIC listings, keyboard MACROS, wildcard file-names, text file printer, keyboard/print buffers, and MORE! Works on Apple //c, //e, or 64K II+.

RAM Disk Emulator Now Included

Use the extra 64K in the //c or //e extended 80-column card as a high-speed pseudo-disk drive. Also works with most 128K cards in any slot.

24-Hour Toll Free Ordering

800-835-2246 ext. 127 (orders only)
For information, call 815-877-1343.
Disks normally shipped within 24 hours.
Sold by mail-order only.
Price includes 1st class or foreign airmail.
Return in 30 days for full refund if not totally satisfied!
FREE: Dogfight II arcade game, by Bill Basham included on each disk.

NEW: Diversi-DIAL™

Start your own CB-simulator on an Apple with 7 modems. Try our station at 815-877-9521 (300-baud modem).

"More fun than humans should be allowed to have!"

☐ Diversi-Copy ... \$30
☐ Diversi-DOS \$30

dsr

Diversified Software Research, Inc.
5848 Crampton Court
Rockford, IL 61111

Name: _____

Address: _____

City: _____

State: _____ Zip Code: _____

Visa/MasterCard, C.O.D., or personal check accepted

Card #: _____

Expiration Date: _____

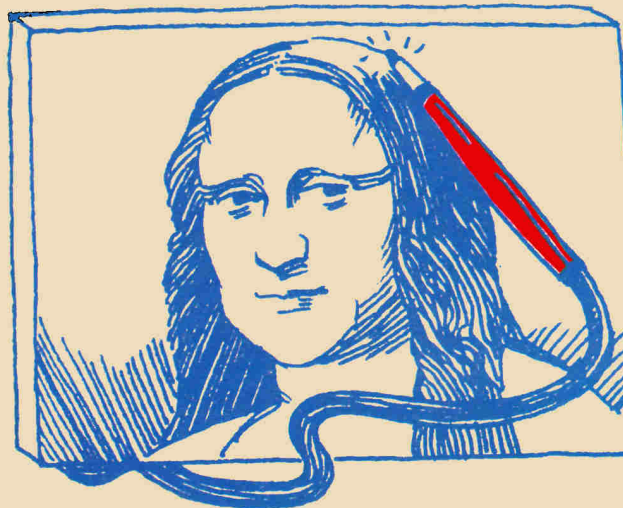


Nuclear Power Play

Almost like a military coup, Apples have infiltrated schools, homes, and offices. Now they've made their way into the United States Defense Department. *The New York Times* reported that the United States uses the Apple II as part of its defense system to target nuclear weapons.

The information was released to stress the military value placed on sophisticated, small computers—and how their availability to Soviet nations should be controlled. According to *The New York Times*, the United States, 13 NATO allies, and Japan have agreed to place an embargo on small, personal computers to the Eastern bloc.

It seems Apple has entered not only the education and business fields, but the military as well. One question: Which slot does the nuke-controller card go in?



You Call This Art?

Artists obsessed with the computer as an art form have a chance to display their works through the Bronx Museum of the Arts exhibition competition. Open to artists who use computers as expressive tools, the competition is funded in part by the National Endowment for the Arts and the New York State Council on the Arts.

Entries include work in computer graphics, com-

puter animation, sound installations, and audio art. Submissions should be videotaped (3/4-inch or VHS format) or 35 mm slides, and sent to Computer Graphics Exhibition, Bronx Museum of the Arts, 1040 Grand Concourse, Bronx, NY 10456. Entry deadline is December 20, 1984.

The museum will not be responsible for original work, so send duplicates with a self-addressed, stamped envelope. For more information, call Christopher Strome at (212) 681-6000.

Life in the Fast Lane

Gentlemen, start your engines!

Auto racing fans and participants rally when they hear the familiar starting call. Race enthusiasts can extend the high-powered excitement past the checkered flag with Auto Racing Charts, a specialized program that recaps the season's race results.

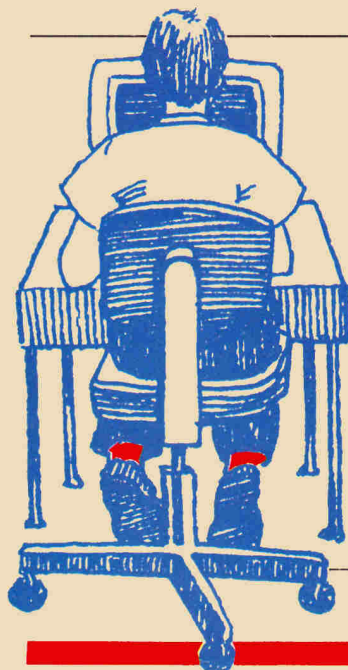
With the program, you can keep statistics for drivers, cars, teams, engine reports, speeds, and win/loss percentages. The sort feature prints more than 30 charts such as highest lap speeds, times, and distances. Files are set up by series and race for suitable charting of local, regional, and professional races.

Auto Racing Charts puts an end to the waiting racing followers experience for year-end statistics.

"At the end of the racing season, major magazines come out with a recap of the year. What this [program] will enable the racing enthusiast to do is have information on a weekly basis," Car Soft President David Moe said. "It's similar to baseball statistical programs where you get an instant analysis."

For the professional racer, Moe said the program evaluates his or her personal performance.

Designed for the Apple II family, Auto Racing Charts is from Car Soft, Box 28313, Tempe, AZ 85282.



Computer Competency

Why can't Johnny compute? is the question computer literates are asking of the academic world these days. So, when some 90,000 third, seventh, and eleventh grade students take competency exams next year, they'll be quizzed on how much input they've had with the computer.

USA Today (July 12, 1984) reports that "a special committee completed work on guidelines for the first computer section of the National Assessment of Educational Progress."

The exam, which tests math, science, and reading skills, will also include written questions on computer programming and operations. According to *USA Today*, the exam will help determine if computers improve academic achievement.

edited by Cynthia Carr



Kid's Stuff

Believe it or not, kids, there is life beyond joysticks. That's the emphasis of Bits & Bytes, the first computer show for children.

Scheduled for November 30 through December 2 at the Disneyland Convention Center in Anaheim, California, Bits & Bytes promotes the use of computers in the classroom and the home while stressing educational applications.

The idea of a computer show for kids was "born out of the need to involve kids in computers beyond joysticks," said Clifton Mitchell, co-founder and vice-president of marketing for Information Processing Group, the show's producer. "We convey to young people that all things are possible. You don't have to carry books, wear horn-rimmed glasses, and be a math whiz [to use computers]."

More than 20,000 people—educators, retailers, industry specialists, and young people—are expected to attend the three-day event which features 50 exhibitors, panel discussions, and a hands-on equipment demonstration area. Apple, IBM, Acorn, Commodore, Radio Shack, Scholastic, and Disney Software Publishing are among the

companies represented at the show.

Bits & Bytes highlights sessions for adults and children to help sort out the barrage of often confusing information concerning the computer industry. Approximately 40 sessions are designed especially for young people.

According to Mitchell, Bits & Bytes gives parents and children the "opportunity to become product aware, consumer aware, and technically aware. . . . Computers are not all joysticks and arcade games. We want to give them [children] the opportunity to be creative."

Mitchell said response to the show has been great. Bits & Bytes has also received the support of Steve Jobs, co-founder and chairman of Apple Computer, Inc. "No one has said no; no one has said Bits & Bytes is a bad idea," Mitchell commented. "We are committed to this. Kids and computers are a natural resource that will benefit us in the future."

During 1985, IPG intends to move Bits & Bytes eastward. Future show sites include Dallas in May and either Boston or New York City in the fall. For details on Bits & Bytes, write to Information Processing Group, 87 North Raymond Avenue, Suite 305, Pasadena, CA 91103.

On-Line Investor Service

The financial flavor of Wall Street arrives at your doorstep courtesy of The Source and Spear Securities, Inc. Individual investors can take advantage of the investment services previously available only to professional and institutional traders. These services include on-line trading and confirmation, instant stock quotations, automated portfolio services, and investment data bases.

"Now individual investors will be able to take advantage of movements occurring throughout the day in the stock markets," said Charles M. Spear, president of Spear Securities. "In addition, the automatically updated portfolio services allow immediate review of current investment holdings and ensure accurate record keeping for year-end tax reporting."

Jay Keller, president of Source Telecomputing Corporation, said the service will change the way people buy and sell securities. For those interested in learning about investing, Keller noted the service will "allow them to simulate trading and to test investment strategies and approaches without ever risking a dime."

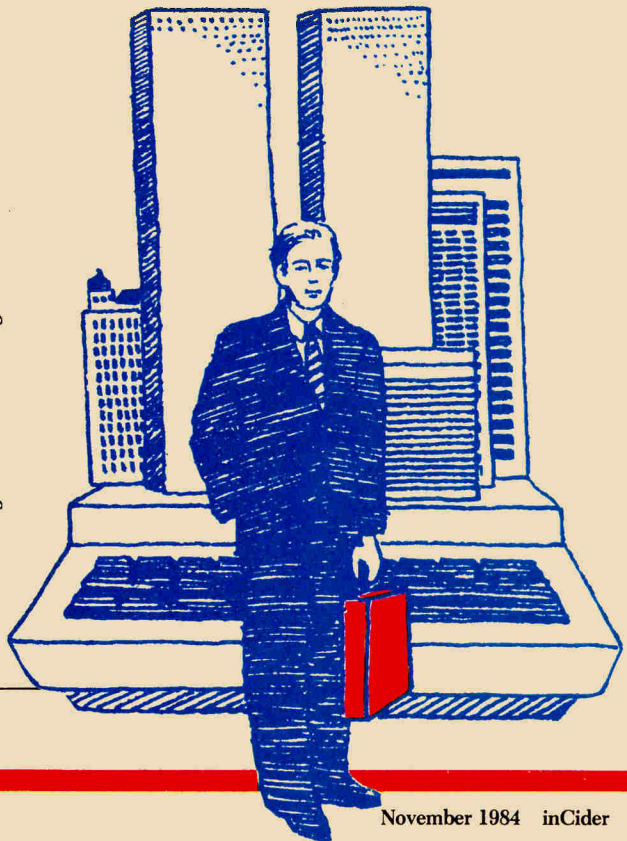
Members of The Source who wish to trade on-line must open a brokerage account with Spear Securities. STC is merely the network that delivers the investment service to customers.

Those interested in the service should write to The Source, 1616 Anderson Road, McLean, VA 22102.



Are you making news in the world of Apple computing? Spread the word through The Cider Press, inCider, 80 Pine Street, Peterborough, NH 03458.

Illustrations by Katherine Mahoney



Turn your Apple computer into a complete color graphic workstation.

A complete system for only \$299.

Our new Digital Paintbrush System™ gives you the ability to express your ideas dramatically with color graphics.

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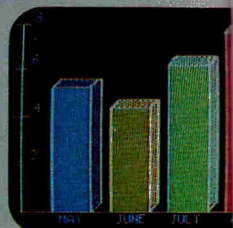
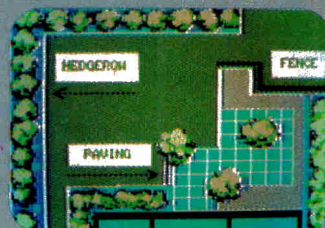
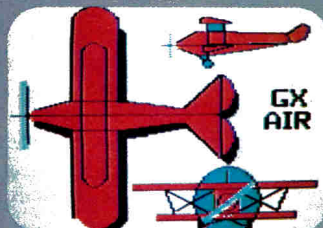
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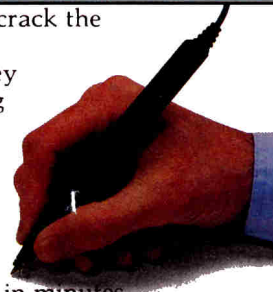
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Captain's Log

Pith helmet matted with jungle rot, handlebar moustache dripping with sweat, and meerschaum pipe blowing bubbles of fetid swamp water, the intrepid explorer and his assistants plunge deeper into the steamy Amazon jungle.

Suddenly, they hear the approach of a party of Jivaros Indians. The leader cautions his party to tread softly and notices a little upset in his stomach. Looking down, he thinks it odd that the business end of a Jivaros spear is growing out of his belly button.

Bedlam breaks loose! The party sprays pistol fire in all directions and

lobs grenades at the scattering Indians. As our hero's eyes close forever on this mortal scene, he hears his radioman shouting excitedly, "Wow! Look what we found, Warden Shiftky! A whoopee cushion and a Rubik's Revenge!" O Death, where is thy sting?

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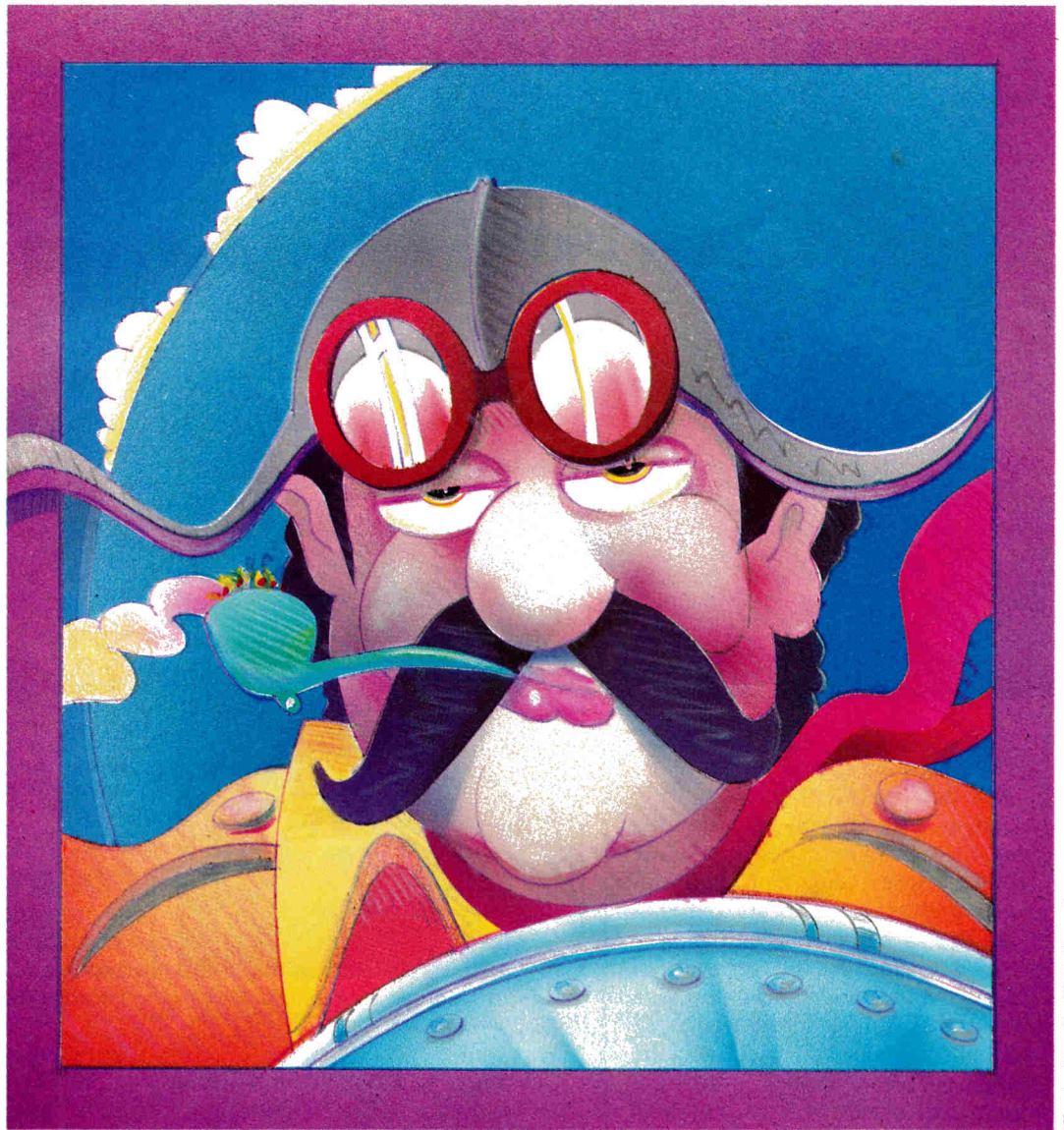


Illustration by Phil Geraci



Expedition Amazon

Role-playing can be a tough, dirty business, especially if you play the way I do. That's why a new game from Penguin called Expedition Amazon (**Photo 1**) appeals to me.

As the game begins, your assignment is to find the lost Inca city of Ka. A research assistant, a doctor, a radioman, and a guard make up your party. You set off for Iquitos, the jungle outpost where you meet Pedro, a provisioner who just happens to be a scoundrel and a thief. Pedro's prices are outrageous, but with no K-Mart nearby, you have no choice but to make the best of it. Your funds are limited, so you'll have to do without some useful items at first.

I advise buying at least one medical kit and a mosquito net for each member of the party. Get plenty of grenades and ammo, one boat, and at least one lamp. Now move on to the jungle base camp.

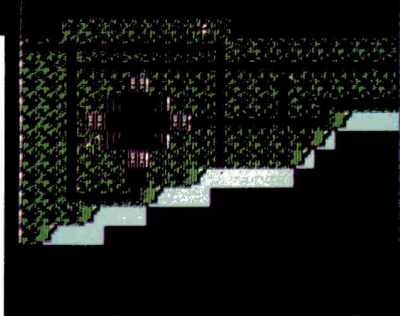


Photo 2. Map develops as you explore Expedition Amazon.

You see only a tiny portion of the sector you're in. There is nothing to tell you where ruins, Indian camps, valuable artifacts, pits, or the river may be. As you use the IJKM keys to move the party north, west, east, and south, respectively, more and more of the terrain appears (**Photo 2**).

Be sure to map your travels! When a monkey drops a ripe mango on your video map, or it blows into the campfire and your screen goes blank, you'll wish you had drawn your own map. There are ten of

Photo 1. Title page from Expedition Amazon shows some dangers in store for you.

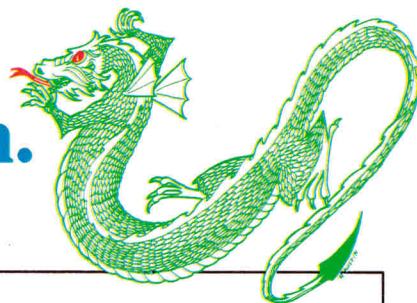
these big sectors to explore, as well as pyramids and other ruins with subterranean passages, so sit back and relax for the next month or two. You have a lot of mapping to do.

Survival of the Fittest

Finding the lost city of Ka is a matter of basic survival. Your characters each start the game with an energy level (EL) rating of ten. The rating drops with every wound a character suffers until it reaches zero—and you're left with a vacancy on the team. Med kits come in handy. They enable your character to recharge energy at the end of the day when food supplies and energy levels are re-calculated. Another handy tool for survival is a collection of hand grenades.

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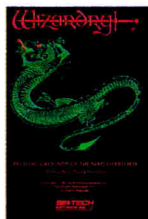
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When you gain enough experience and have enough weapons, begin to explore the dangerous subterranean passages cautiously. Come well-armed and make maps!

Penguin Software has done it again. The Warden thinks Expedition Amazon is creative, colorful, funny, exciting, addictive, and challenging. It also gives me a legitimate reason to wear my pith helmet when sitting at the computer.

SunDog

I don a space helmet for playing SunDog/Frozen Legacy, a 64K outer space role-playing adventure game by Bruce Webster.

You are both pilot and owner of the one-man freighter SunDog. As in most role-playing games, the persona you manage is characterized by strength, dexterity, intelligence, charisma, and luck. These values can increase as the game progresses, improving your ability to survive combat, deal with traders, and solve problems.

The scenario of the game puts you under contract to haul freight and cryogenically frozen workers to a new colony site on the planet Jondd. If you fail to carry out your contract, it's off to the mines for you.

The game is controlled by joystick.

Photo 3. Main control panel of the spaceship SunDog.



Moving the stick and pressing the fire buttons control the menu choices available to you. Once you've mastered the technique and learned a few of the game's basic secrets you should have no difficulty piloting the ship (**Photo 3**) around the planet, through the solar system, and across interstellar space.

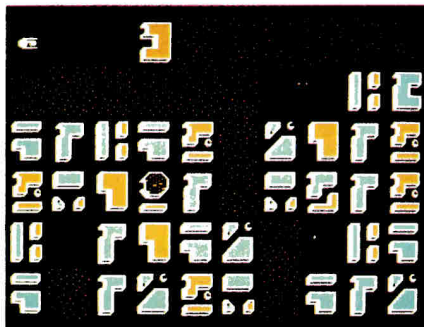
Travelling on foot around the ship and through the 50 cities on the 12 accessible star systems is easy, once you get the hang of it. Your joystick controls the cursor. A white dot representing your character follows that cursor. By maneuvering the cursor to various points around the ship or on the ground, you access repair/refit facilities for your ship, ale and food shops (where you can buy valuable information), automatic-teller machines, and equipment stores.

Sometimes while on foot you encounter particularly vicious thieves who steal your funds and valuables. They don't mind killing you in the process, either. If you're carrying a stinger pistol and have learned the coordination of joystick and fire button it requires, you can fight back. Here's a hint: Be especially wary of attack after visiting an automatic-teller machine. (Come to think of it, that's good advice for real life.)

SunDog's hi-res graphics are clean and colorful. The city maps are especially attractive (**Photo 4**). The program uses attractive Lisa-like window graphics for many of its menus and action scenes.

I like this game a lot, and if I weren't so busy evaluating games for my loyal readers, I'd surely have solved this very interesting puzzle by now. I am also a world-class excuse-maker.

Photo 4. As SunDog waits in upper left, you explore part of a great city.



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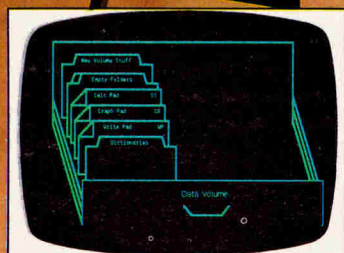
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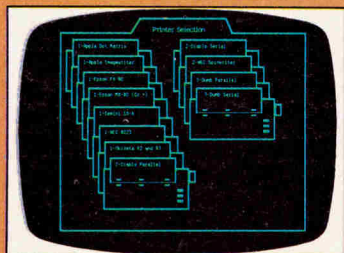
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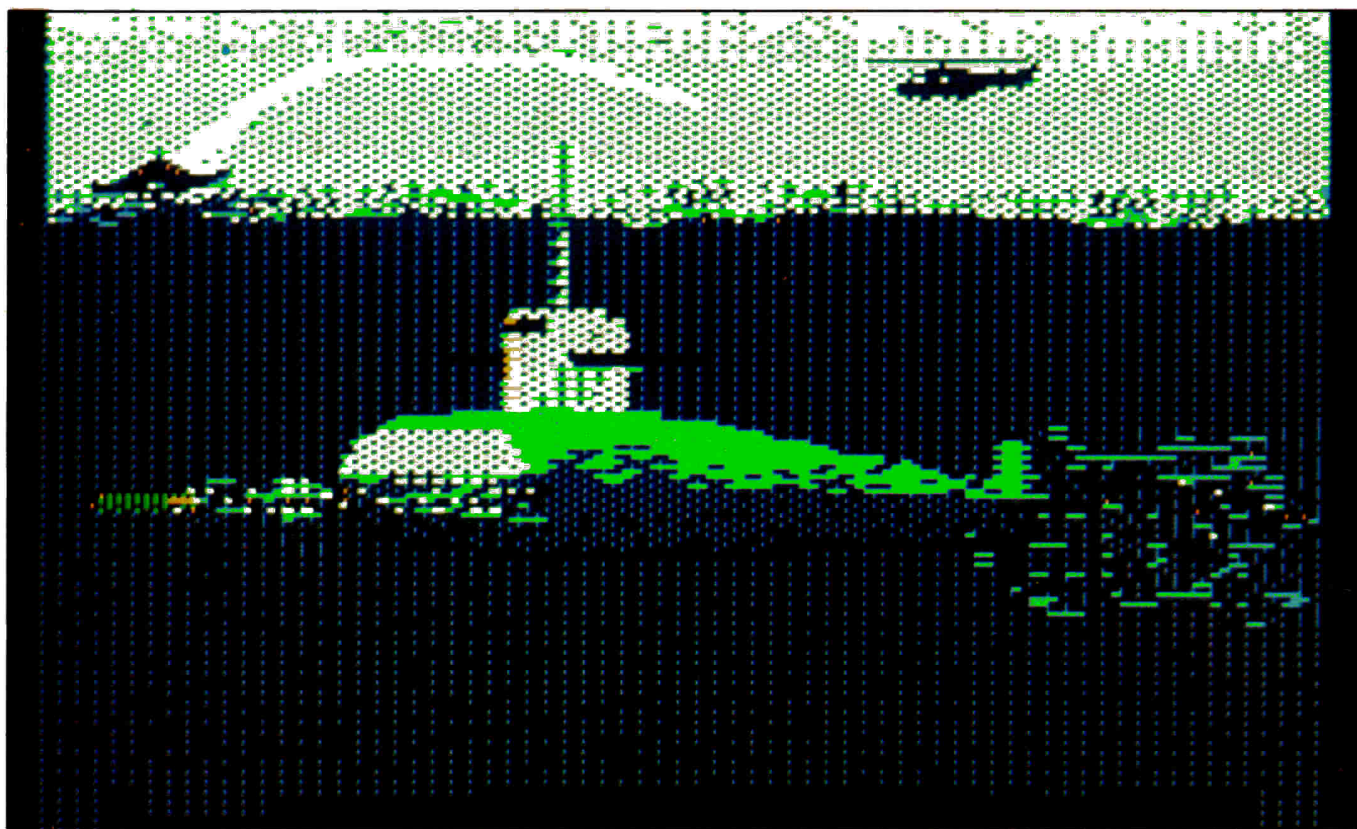
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Grey Seas, Grey Skies

Now, I remove my space helmet to put on a steel pot that was all the rage in the cold waters off the Falkland Islands back in '82. That was when the Brits pulled the rug out from under the Argentines in the only naval battles fought since the end of World War II.

In *Grey Seas, Grey Skies* from Simulations Canada you have the chance to test your tactical skills in seven scenarios. They include: the Falklands War, a Japanese-Soviet encounter off the Kurile Islands, and NATO-Soviet battles off Norway. The game allows you to construct your own scenarios using missile-firing frigates, destroyers, carriers, and submarines.

You have sophisticated radar and sonar to detect enemy forces and establish their locations. As in real life, however, the use of these devices reveals your own position to the foe. The decision to turn on your sensors is a tricky choice.

Layers and biologics add to the realism. Biologics are marine animals that can be picked up by sonar, making the detection of real targets

more difficult. Layers are temperature differences in the water which deflect sound detection and can hide a sub.

Your primary weapons are missiles, including NATO's anti-submarine ASROC and the world famous anti-ship EXOCET. The arsenals include nuclear-tipped devices that destroy any target within a 3000-yard radius of the impact point. In addition you have a selection of anti-aircraft missiles, conventional guns, helicopters, and torpedoes.

You choose from an imposing array of ships to create a scenario. The Soviet player, for example, can choose from 11 classes of attack submarines and 11 classes of surface ships, ranging from carriers to frigates. The U.S. player can select from among nine classes of subs and 11 classes of surface ships, including Nimitz-class carriers and Iowa-class battleships.

Wargaming in Earnest

Grey Seas is a hybrid format, coming with a map and ship counters. The screen display is all text and designed to assist you in moving your

Photo 5. Title screen from the text simulation *Grey Seas, Grey Skies*.

pieces on the map and plotting radar and sonar contacts. Fortunately, only a few pieces will be on the board at any given time. If the dog knocks over the table or if a gust of wind takes the map, it won't take long to figure out where the pieces were.

During every turn you can plot targets and their headings from each of your ships in order to triangulate a target that appears on the sonars or radars of two or more ships. After a ship has tracked a target for two or three moves, the computer will offer a "fire solution" that enhances your missile's accuracy. If the enemy threatens your immediate destruction you may opt to fire a "snapshot" missile or torpedo, before you have a fire solution, though at a reduced possibility of a hit.

The program has one technical fault. It is sometimes unforgiving of input errors. For example, during a test play I ordered one of my Soviet subs to load torpedoes when there were none left to load. This hung up the program and there was no way

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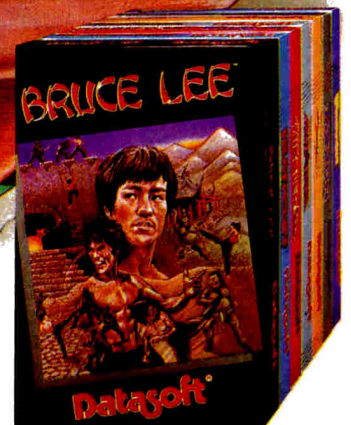
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out except into BASIC. I couldn't recover the game after four hours of play.

As sophisticated and entertaining as this game is, I must point out to Simulations Canada that such bugs are not acceptable. In the early days of home computer gaming, program bugs like Grey Seas' traps were accepted as a common hazard. Today, the accepted standard in the industry and in the marketplace is bug-free software. When you pay \$59.95 for any software product, you have the right to expect it won't hang up when you make a trifling error. I hope it will be corrected in future editions of the game.

For the time being, if you're careful not to make any input errors, I think you'll love the realism, excitement, and action of Grey Seas, Grey Skies. In the last analysis, it is a very fine war game.

Flight Simulator II

As you can tell by now, I wear many hats, but none as interesting as the leather aviator's helmet I don to play Flight Simulator II. It is, without any doubt, the finest flight simulation program (or simulation program of any type) that I have seen for any computer.

The simulated Piper 181 Cherokee Archer flies over a full-color North America. Taking off from a simulated Sikorsky Memorial Airport in Bridgeport, Connecticut, I flew westward toward New York following the visible track of I-95 along the green New England shore. I flew over the Throg's Neck and Whitestone bridges spanning Long Island Sound and then over a highly detailed LaGuardia Airport.

Next, using the Empire State Building and World Trade Center as pylons, I made the big turn south-southwest to JFK International Airport. As I passed over the mammoth air terminal, I could see the intricate network of taxiways and runways scrolling across my radar screen. A third of the way along the south shore of Long Island, I made the turn north toward Bridgeport.

I would like to report that I landed safely at Sikorsky at the end of my grand tour. However, in the interests of honesty, I must admit that I

stalled and crashed ignominiously in the swamps just shy of the field. The plane is easy to fly, but no one said it was easy to land.

You can fly your Cherokee around four major metropolitan areas including Seattle-Olympia, Los Angeles-San Diego, Chicago, and New York-Boston. In all there are 76 different airfields you can use. You can fly from one metro area to another, crossing North America and touring Canada, the Caribbean, and Mexico. However, it takes just as long to fly 1000 miles in simulation as it does to fly it in reality. This means you'll probably be satisfied with short hops, instead of transcontinental journeys.

**"It takes just as long
to fly 1000 miles in
simulation as it does
to fly it in reality."**



Photo 6. O'Hare control tower from the cockpit of Flight Simulator II.

Up, Up, and Away

Flight and navigational controls can be operated by keyboard alone or by joystick and keyboard. I found that the more realistic and controllable simulation is with keyboard commands. You have a radio beacon, navigational aids, elevator trim tabs, rudder, ailerons, throttle, and brakes. Instrumentation includes bank, climb and airspeed indicators, an altimeter, and magnetic compass.

You can choose to fly at any time of day, in any weather, at any degree of difficulty. By using the program edit mode you can begin at any of the

program's 76 airports, or in the sky over any location you choose.

The manuals accompanying this program are so exhaustive that reading them, taking all the flight lessons, examining all the features, and learning all the theoretical material on flight physics will become a hobby in and of itself. As you gain skill, you can eventually make cross-country trips, perform aerobatics, fly on instruments alone, and even learn to land—my ultimate ambition!

Once you've learned all the radio navigation that you can and you feel comfortable with aerobatics, you can load the 1917 "World War I Ace" scenario that places you in a grid world for an old-fashioned dogfight. In this game you bomb targets in enemy territory and shoot down biplanes sent to intercept you. Even if you've mastered flight control you'll find completing a bomb mission and getting past the enemy interceptors a real challenge.

Even More to Come

As if all these features aren't enough, subLOGIC is adding simultaneous multi-user capabilities to a new version (FS2M) which should be on the market by the time you read this. You are able to network Apple II's and IIc's through serial ports.

One of the astounding features of this new version is views out of different windows of the simulated aircraft. Multiple players can each fly their own aircraft in the same scene. Several people fly in formation, stage air circuses, and play World War I Ace with an entire squadron of fighters engaging each other in battle. If players have modems, the simulation can be conducted over phone lines.

Flight Simulator II is simply astounding. The more you probe Flight Simulator II, the more you'll discover. I end this month's column by recognizing Flight Simulator II as the best entertainment program of the year, and the best Apple II simulation to date. Sorry, subLOGIC, but there's no prize to go with the award—just the knowledge that you've knocked the socks off the Warden and everyone else lucky enough to play with Flight Simulator II. I take my many hats off to you.

Next month, I look at two World War II eastern front "monster" war games by Gary Grigsby. Also, I'll examine a simulation of arcade game simulations and take a nostalgic look back at the Summer Games. In January, arcade gamers come into their own with some hot new-comers for the New Year.

This is the last call for votes in the best games' poll. Until next time, the Warden sends you a genial aloha. ■

When at home from adventuring, the Warden receives mail at inCider, 80 Pine Street, Peterborough, NH 03458.

Product Information

Flight Simulator II

subLOGIC Corporation
713 Edgebrook Drive
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\$49.95

Any Apple II, 48K. Some features require 64K. Networking needs //e or //c and serial port. Keyboard, joystick, or mouse control.

Grey Seas, Grey Skies

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Like the ability to lock on-screen messages into your Apple's RAM, and then move the information onto a disk for easy reference and review. A terminal program that turns your computer into a communications command center, with on-screen "help" menus, continuous updates of memory usage, carrier presence, and communication status.

The Networker supports both originate and answer modes, so you can send and receive information, in full or half duplex modes. Just plug it into any slot in your Apple computer, and then into your phone jack. Now you're part of a vast network of computers.

For \$179 we include with the Networker the Netmaster Communications Software for advanced users. Netmaster will let you transfer games, computer graphics, programs, sales reports, documents—in fact, any Apple file of any size—to another computer, directly from disk to disk, without errors, even through noisy phone lines.

For transferring information between computers, Netmaster's superb error checking and high speed are an unbeatable combination. With a Netmaster on each end, you can transfer information three to five times faster than other communications packages like Visiterm™ or ASCII Express™. Error free.

But Netmaster's not stuffy. It will talk to those other communications packages, but they don't work as fast and they don't check errors like Netmaster. And Netmaster doesn't only work with the Networker modem. Even if you already have another modem for your Apple, Netmaster is an outstanding value in communications software, so we sell Netmaster by itself for \$79. Netmaster requires 48k of RAM, one disk drive, and the Networker or another modem. It can also be used without a modem when two Apples are hard-wired together.

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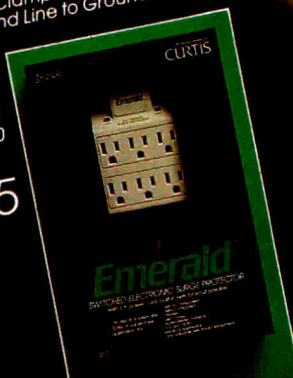


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- Noise Rejection Frequency: 150 KHZ - 30MHZ
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Dino Math

My four-year-old daughter is a dinosaur freak. She can identify them by name and tell you what they ate, where they lived, and maybe even why they became extinct. Since she is also learning the rudiments of counting, adding, and subtracting, I combined her favorite dinosaurs with a few lines of BASIC to produce Dino Math, an arithmetic drill program with color graphics and sound.

Dino Math offers simple arithmetic problems illustrated by colorful dinosaurs. If the child presses the wrong key, the computer sounds a buzz. If the child presses the correct key, the computer plays a short piece of dinosaur music.

Dino Math contains four modes of play. Press the escape key to enter the mode selection screen and then select one of the following modes: mode 0 for counting, modes 1 and 2 for addition and subtraction, and mode 3 for mixed addition and subtraction. If the child runs the program without selecting a mode, it defaults to the counting mode. If the child accidentally hits the escape key and doesn't select a mode, the

program reverts to counting in a few seconds.

To type in the program, clear your computer by typing NEW and pressing the return key. Then type in the program in **Listing 1** just as it is given, pressing the return key at the end of each line. Once you've typed in the program, type SAVE DINO MATH, press the return key, and the computer will save your program to disk.

Now type in the shape table in **Listing 2**. It contains five different dinosaur shapes in bright colors and the plus and minus signs. To type in the shape table, type CALL -151 and press the return key to enter the



Illustration by Nancy Kaplan

Basic arithmetic lessons with *T. rex* and orchestra.

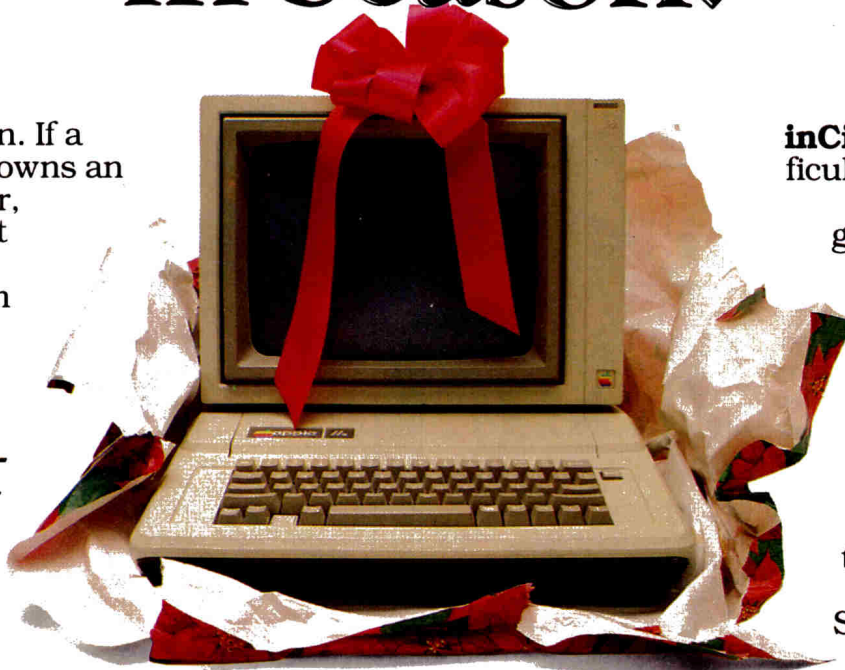
 by Michael A. Seeds 

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Listing 1. Dino Math program.

```

100 REM *** DINO MATH ***
110 REM *** BY ***
120 REM *** MIKE SEEDS ***
130 REM
140 REM
500 REM *** INITIALIZE ***
510 FOR J = 1 TO 53: READ N: POKE 767 + J,N: NEXT J
540 TEXT : HOME :SU = 0: FOR J = 1 TO 10:SU = SU + PEEK
    (16383 + J): NEXT J: IF SU = 375 THEN 560
550 PRINT CHR$(4);"BLOAD SHAPE:DINO"
560 POKE 233,64: POKE 232,00
670 REM
800 REM *** MAIN PROGRAM ***
810 GOSUB 1100: REM CREATE PROB
820 GOSUB 2000: REM DRAW PROB
830 GOSUB 3000: REM GET ANSWER
840 GOTO 810: REM START OVER
850 REM
1100 REM *** CREATE PROB ***
1110 A = INT ( RND (1) * 7 + 1):AN = A
1120 IF F = 0 THEN 1600
1130 B = INT ( RND (1) * 7 + 1)
1140 IF F < > 1 THEN 1200
1150 AN = A + B:S$ = " + ": GOTO 1500
1200 IF F = 3 THEN 1300
1210 AN = A - B:S$ = " - ": GOTO 1500
1300 IF RND (1) > .5 THEN 1400
1310 AN = A - B:S$ = " - ": GOTO 1500
1400 AN = A + B:S$ = " + "
1500 IF AN < 1 OR AN > 9 THEN 1100
1600 RETURN
1610 REM
2000 REM *** DRAW PROB ***
2005 SA = 40 + (7 - A) * 2:SB = 40 + (7 - B) * 2
2010 X1(1) = 140 - SA * (A / 2):X2(1) = 140 - SB * (B /
    2)
2015 IF RND (1) > .5 THEN X1(1) = X1(1) + 1:X2(1) =
    X2(1) + 1
2020 HGR : HCOLOR= 3: SCALE= 2: ROT= 0
2030 SH = INT ( RND (1) * 5 + 1)
2040 FOR J = 1 TO A
2050 X1(J) = X1(1) + (J - 1) * SA:Y1(J) = 40
2060 XDRAW SH AT X1(J),Y1(J)
2070 NEXT J
2075 HOME : IF F = 0 THEN 2900
2080 FOR J = 1 TO B
2090 X2(J) = X2(1) + (J - 1) * SB:Y2(J) = 120
2100 XDRAW SH AT X2(J),Y2(J)
2110 NEXT J
2120 SS = 7: IF S$ = " + " THEN SS = 6
2130 XDRAW SS AT 131,71
2800 HOME : VTAB 22: HTAB 15: PRINT A;S$;B;" = "
2900 RETURN
2910 REM
3000 REM *** GET RESPONSE ***
3010 VTAB 1: GET A$: PRINT ""
3012 IF A$ = CHR$(27) THEN GOSUB 6000: RETURN
3015 IF A$ = "E" THEN TEXT : END
3020 R = VAL (A$): IF R = AN THEN 3500
3030 GOSUB 4000: REM PENALTY
3040 GOTO 3000
3500 GOSUB 5000: REM REWARD
3900 RETURN
3910 REM

```

Listing continued.

monitor. An asterisk will appear as a prompt. Type 4000:07 00 10 00 51 00 71 00 9E... and so on. Each of the hex codes will go into its assigned slot automatically beginning with 07 at memory location 4000. Be sure to type a colon where the listing shows a dash. You could type a dozen lines before pressing the return key, but if you make a typo, the computer will probably ignore most of the line. It's better to type in a few lines, proofread them, press the return key, and begin again with the next line. When you've typed in the shape table, type 4000.41DF and press the return key to check your work. Use control-S to stop the listing. When you are satisfied with your typing, type BSAVE SHAPE: DINO, A\$4000, L\$1E0, press the return key, and the computer will save the table to your disk.

You can make other tables to use with this program—five flowers, a plus sign, and a minus sign, for instance. The dinosaur shapes are 19 bits wide and 10 bits high, and are drawn at twice normal scale.

The dinosaur music is really just a sequence of ten random notes played by a short machine-language program. The program is in the data lines at the end of the program and is poked into memory by line 510. CALL 768 plays a random tune. To change the number of notes played in a tune, change the second number in line 10000.

You can easily change the penalty and rewards by changing the subprograms that begin at lines 4000 and 5000. Any graphics or sound you can devise would go here too. A friend recently purchased a speech synthesizer and used it to modify home-brewed children's programs. The results are striking. The computer speaks the child's name and encourages the child to try again or praises the child for a correct answer.

Notice that this program doesn't keep score or pressure the child. Small children don't need to learn competition, so keeping score is inappropriate. Pressuring the child to respond within a certain number of seconds or within a given number of guesses is self-defeating since small

children will work amazingly hard at things they enjoy.

Don't be surprised if children respond to this program in ways you had not expected. They may play only a few minutes at a time instead of exploring all of the possibilities. If they had fun using the computer with you, they will return when they're ready. They may also find it fun to tease the computer with wrong answers. My daughter discovered that the buzzer sounds like the buzzers on an amusement ride she likes. She claims the penalty sound is more fun than the dinosaur music! The best laid plans of dinosaurs and fathers. . . .■

Direct your questions about Dino Math to Mike Seeds and daughter at Franklin and Marshall College, P.O. Box 3003, Lancaster, PA 17604.



Listing continued.

```

4000 REM *** PENALTY ***
4010 IF F = 0 THEN 4100
4020 INVERSE : GOSUB 2800: NORMAL : GOSUB 2800
4100 FOR I = 1 TO 4
4110 P = PEEK (49200) + PEEK (49200) + PEEK (49200)
      + PEEK (49200)
4120 NEXT I
4200 RETURN
4210 REM
5000 REM *** REWARD ***
5010 CALL 768: RETURN
5020 REM
6000 REM *** SELECT MODE ***
6010 J = 0: TEXT : POKE 49168,1: VTAB 10
6020 PRINT TAB( 16)"COUNT 0"
6030 PRINT TAB( 16)"ADD 1"
6040 PRINT TAB( 16)"SUBT 2"
6050 PRINT TAB( 16)"MIX 3"
6060 J = J + 1
6070 P = PEEK (49152)
6075 IF J > 50 THEN F = 0: RETURN
6080 IF P > 175 AND P < 180 THEN 6090
6085 GOTO 6060
6090 F = P - 176
6100 POKE 49232,1: POKE 49168,1
6110 RETURN
9000 REM
9010 REM
10000 DATA 169, 10, 141, 80, 3, 169, 96, 141, 81, 3,
      32, 174
10010 DATA 239, 165, 159, 201, 5, 16, 6, 24, 105, 2,
      76, 15
10020 DATA 3, 141, 82, 3, 173, 48, 192, 206, 82, 3,
      238, 82
10030 DATA 3, 206, 82, 3, 208, 245, 206, 81, 3, 16,
      222, 206
10040 DATA 80, 3, 16, 209, 96

```

Listing 2. Dinosaur shape table.

4000- 07 00 10 00 51 00 71 00	40A0- 08 18 35 0E 24 0C 36 76	4140- 3E 3F 3F 07 00 FF 00 08
4008- 9E 00 6A 01 C7 01 D6 01	40A8- 24 24 2C 36 36 2E 24 24	4148- 08 08 08 48 31 0E 20 0C
4010- 08 18 08 18 08 18 08 18	40B0- 15 36 76 24 24 C4 21 0C	4150- 30 36 36 0E 20 24 24 8C
4018- 25 0C 36 16 25 24 28 36	40B8- 36 36 36 2E 24 24 24 64	4158- 12 76 20 04 00 08 08 08
4020- 36 36 3E 57 09 08 38 24	40C0- 36 B6 36 36 C5 21 24 C4	4160- 48 09 2C 2E 2C 2E 2C 2E
4028- 24 24 15 36 36 35 0E 24	40C8- 09 18 C4 A9 B2 36 36 25	4168- 00 FF 18 08 18 08 24 08
4030- 3C 2C 35 36 B6 9B 2D 25	40D0- 24 24 35 36 36 C5 21 24	4170- 36 36 0E 24 08 18 60 96
4038- 24 24 24 35 36 36 2E 20	40D8- 15 36 C5 21 35 06 00 24	4178- 32 96 21 20 C4 C1 C1 21
4040- 24 AC 36 2E 24 8C 36 25	40E0- 00 08 08 08 48 09 2C 2E	4180- 0C 16 96 36 76 20 24 C4
4048- 64 36 25 24 08 30 36 36	40E8- 2C 2E 2C 2E 00 FF BF 24	4188- 09 18 64 B2 32 36 0E 24
4050- 00 20 0C 36 25 15 25 24	40F0- 24 AC 32 25 05 00 FF 00	4190- 64 36 76 24 64 32 B6 0E
4058- 95 36 C5 21 24 08 36 36	40F8- 08 08 08 08 48 29 2D 2D	4198- 20 24 8C 36 0E 20 8C 0E
4060- 25 2C 36 25 24 AC 32 76	4100- 3E 3F 3F 07 00 FF 00 08	41A0- 24 18 08 60 32 36 76 08
4068- 24 C4 09 36 2E 35 2D 2D	4108- 08 08 08 48 31 0E 20 0C	41A8- 18 24 00 FF 00 2D 24 35
4070- 00 18 08 24 08 36 36 25	4110- 30 36 36 0E 20 24 24 8C	41B0- 2E 35 3F 36 27 3C 3F 00
4078- 2C 36 C5 21 C4 09 36 B6	4118- 12 76 20 04 00 08 08 08	41B8- FF 00 2D 24 35 2E 2D 3E
4080- 25 24 24 C4 09 36 36 36	4120- 48 09 2C 2E 2C 2E 2C 2E	41C0- 3F 36 27 3C 3F 04 00 2D
4088- 0E 20 64 36 2E 24 2C 36	4128- 00 FF BF 09 36 36 2E 24	41C8- 24 2C 36 2E 2D 3E 3F 36
4090- 2E 24 35 36 25 2C 2E 2C	4130- 24 AC 32 25 05 00 FF 00	41D0- 3E 24 3C 3F 2C 00 2D 2D
4098- 2E 20 25 27 3F 00 08 18	4138- 08 08 08 08 48 29 2D 2D	41D8- 2D 35 3F 3F 3F 3F 2C 00



Mightier Than the Pencil?

Are you a negligent parent if your child can't whip out a quick letter on the computer? Should you teach your child how to use a word processor at home?

Word processing will help your child do better in school and get better grades. Your child will do better on his or her homework, will work faster, and will be freed from paperwork drudgery that bears no relationship to his or her knowledge of the subject matter. In addition, word processing can free your child to learn to write creatively, as well as improve letter-writing and reading skills. It can even help your child become computer literate.

What are the arguments against word processing for children? First of all, it's expensive. A //c, printer, and

software cost about \$2000, not counting the related expenses of printer paper, disks, ribbons, and so forth. You may even have to buy a CP/M card for a word-processing program like WordStar.

Another argument is that if everything is done on the computer students won't practice handwriting, which then would become a lost art. And when a computer isn't available, they literally won't be able to write.

**Word processing
frees children
to be both
creative and
correct.**



Illustration by John Pirman

by Fred Huntington

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Some may even argue that computers are just a passing fad or primarily a business tool.

A final criticism is that students already spend too much time at the computer, and now we need to think of ways to get them away from it.

The Case for Word Processing

Besides helping improve school-work, word processing might make a student's job search easier since writing resumes is important in job hunting. Some argue, ultimately, that computers are the coming technology and children need to be familiar with them.

I feel children can benefit from using a word processor as soon as possible. Start them in the first grade on some simple programs like Spinnaker's Story Maker. By the time a child is in the second grade he or she can advance to a full-fledged word processor like Broderbund's Bank Street Writer or Sierra's HomeWord, or to one of the many others available for home use. They are all easy to learn

and to use, and take a minimum amount of start-up time.

Though MicroPro's WordStar is a little complex for most grade-school children, high school students can use it or one of the other more complex programs on the market.

Don't underestimate the power of a program like Bank Street Writer. My mother, a professional typist, uses WordStar all the time. But she also uses a copy of Bank Street Writer whenever she types a letter or wants something done quickly and easily. As she puts it, "I can be working on my letter in less than five seconds from the time I turn my computer on."

Learning to Type First?

I can hear some of you saying, "How can a kid learn word processing when he or she doesn't even know how to type yet? Don't you have to type at least 30 words a minute first?"

That is a good point, but it isn't valid in this case. A child doesn't have to learn to type first because he or she

can learn to type while using a word processor. Kids at any age love to play on a typewriter, and it's even more fun to play on a computer. With a program like MasterType or Type Attack your children can spend a few minutes a day polishing their typing skills while at the same time learning and using the word processor. These two typing tutors, suitable for all ages, make drill work fun and are not a chore to use. (You shoot down aliens while learning to type.)

Once your children are working ten minutes a day on typing skills and ten minutes a day on the word processor, how do you integrate the word processor into their studies?

Integration

Start with your child's homework. If your child has an assignment that requires him or her to use spelling words in sentences, then the word processor would be a natural. Here's an important tip: Don't ask the teacher if your child can use the computer to compose sentences. A teacher may not be familiar with computers and respond with an emphatic "No." If you don't get permission first the worst that can happen is that your child won't be able to use the computer again (in which case you go to the principal and argue your case). To be on the safe side, don't advertise the fact that a computer is being used.

And don't be concerned if your child uses a dot-matrix printer. Some universities allow dissertations to be done on dot-matrix printers with just the final copy done on a letter-quality printer. Since universities permit the use of dot matrix, surely elementary through high schools can permit it also.

If your child has to write a term paper or a social-studies report, let him or her use the word processor. Encourage its use for homework and reports. Your child can easily edit an essay when it comes back with the teacher's corrections.

As your child becomes better on the word processor, his or her work will look much neater, thereby instilling a sense of pride in the work. Not only will your child spend less time on homework but his or her grades can improve.

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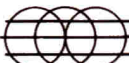
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Another practical application, as well as a good way to start, is to have your child write all his or her birthday and Christmas thank-yous on the computer. This tedious task is made more enjoyable through word processing.

Using the word processor for creative writing frees children to create. They start off writing, not worrying about spelling, grammar, or even syntax, because they know they can always come back and easily improve on the original. Word processing allows ideas to flow and greatly improves the end product.

If you feel your son or daughter needs to practice writing every day, then combining the computer with a good word-processing program is an ideal way to improve your child's language and reading skills. You may have a problem, however, convincing your child that it's to his or her advantage to spend time daily learning to type and writing letters.

Contract with Your Child

To motivate students at my school, I have offered them the chance to voluntarily participate in contracts to complete specified tasks in return for gaining certain privileges or rewards.

Parents might adopt this procedure by setting up 20 minutes a day for word processing and typing practice for their children. The student voluntarily agrees to this because he or she gets a gold star (or gets to stay up 20 minutes past bedtime). Accumulating five gold stars entitles him or her to a special treat, like going out to dinner at a favorite pizza place or skipping a turn at doing the dishes. Four special awards then entitle him or her to a new computer game, or a day off from chores, or whatever the two of you decide.

If the child fails to do the agreed task, there is a negative consequence: 20 minutes early to bed or no television that night, and so forth.

You must focus on one task—working with the computer—and concentrate on that. Your child's leaving his or her room dirty has no relationship to the contract; an unrelated act cannot undo what the computer contract has done. The child must help choose both rewards and consequences. If he or she has some ownership in the contract, then it will succeed.

“Word processing allows words to flow and greatly improves the end product.”

Once you and your child decide on daily writing, you have to decide what will be written. I'll assume you've already written thank-you notes, letters to relatives, friends, and newspapers, and are now ready for some creative writing.

For creative writing ideas, you might check with your child's teacher first. I like to start a story and have children finish it. You might also have your child write his or her own version of a favorite television program or movie. Another idea is to have him or her write a software review of a favorite program. Then send it to a computer magazine for possible publication. I know of at least one 12-year-old who has his software reviews published.

Don't correct the first draft. Let your child's mind expand without

worrying about the mechanics of writing the first time through. After an acceptable creative effort is offered, the child can check for errors in syntax, spelling, and grammar. Don't be afraid to purchase a spelling checker to go with the word processor.

One last point: It's great for your child to use the computer to do homework, but not if he or she comes home with an assignment to write “I will not chew gum in class” 100 times. That's still an assignment that is best done by hand.

The Milliken Word Processor Reviewed

The Milliken Word Processor, a nifty little program similar to Broderbund's Bank Street Writer and Sierra's HomeWord, is easy to use and

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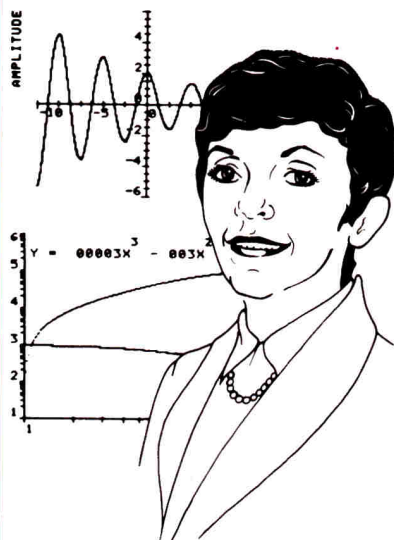


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loads quickly, thanks to Diversi-DOS, a high-speed DOS.

It's an ideal choice for a youngster just learning word processing. The Milliken Word Processor comes with excellent documentation and some great ideas for getting children involved in writing activities that are suited for home as well as for school. It wins my approval because I was able to use it within five minutes without directions. Pictures help students identify functions, but there are no icons (which I dislike).

When you first turn on the computer, the program asks you to insert a data disk that is included in the package along with a back-up copy of the program. Adjustments are then made automatically for either the //e or the II Plus. After inserting the initialized data disk, you can start to write, view the help manual, open an already existing file, print, or quit.

Directions are simple. On the //e you use the up- and down-arrows for cursor control; otherwise, it operates like a typewriter. The II Plus uses control-A for up and control-Z for down, and you must use control-Q for capital letters, as you do with the word processors mentioned above. Other features include easy block moves, printing, and an easy-to-read file system.

I did have trouble deleting a letter because the cursor is put behind the letter instead of in front of it as in most word processors. Also, you must go to another menu or delete it a letter at a time. Switching to another screen was instantaneous but a little annoying.

Of the three programs mentioned, I recommend the Milliken Word Processor for home use with children because it comes with a complete guide for helping students learn to write. If I were to judge strictly on the ease of use of software, it would be a toss-up between Milliken and Bank Street.

(For a more complete review of HomeWord, Bank Street Writer, and Word Handler, see *inCider*, August 1984, p. 47.)

Thanks for reading. ■

You can address correspondence to Fred Huntington at P.O. Box 787, Corcoran, CA 93212.

Product Information

Bank Street Writer

Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
\$69.95

HomeWord

Sierra On-Line
36575 Mudge Range Road
Coarsegold, CA 94306
(209) 683-6858
\$69.95

MasterType

Scarborough Systems, Inc.
25 North Broadway
Tarrytown, NY 10591
(914) 332-4545
\$39.95

Milliken Word Processor

Milliken Publishing Co.
1100 Research Boulevard
P.O. Box 21579
St. Louis, MO 63132
\$69.95

Story Maker

Spinnaker Software Corp.
215 First Street
Cambridge, MA 02142
(617) 868-4700
\$34.95

Type Attack

Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827
(916) 366-1195
\$39.95

WordStar III

Micropro International Corp.
33 San Pablo Avenue
San Rafael, CA 94903
(415) 499-1200
\$375





Business Pictures

One of the magic functions your Apple gives your business is to transform the numbers it calculates and stores into business pictures—charts and graphs that put your data in perspective. This month I'll look at four graphics packages: Apple Business Graphics, The Graphics Department, PFS: Graph, and VisiTrend/Plot.

Your choice among these programs depends on both what you'd like to do with it and who in your company will be working with the system. While each has the same basic purpose—to create line, bar, area, and pie charts based on your numbers—how you interface with each program and how complex (or simple) each is to operate are key considerations.

What You Need

Apple Business Graphics requires two disk drives and 64K of memory. The Graphics Department and PFS: Graph can run with a single drive, although PFS: Graph is easier to use with two disk drives. Both of these programs only need 48K of memory. VisiTrend/Plot requires two drives connected to your 48K Apple.

Both VisiTrend/Plot and PFS: Graph come with instructions on how to interface their graphics systems with a hard disk. All four programs can access data files created

with the data interchange format (DIF), and Apple Business Graphics can pull information directly from VisiCalc worksheets.

Philosophy

Apple Business Graphics is a *command-driven package*—you tell the system what to do through commands. For example, if you want to draw a bar graph, you type DRAW BAR. The only problem with this approach is in remembering all the commands. SAVE is easy (as are commands like DRAW or LOAD); the instructions for horizontal grid lines are a bit more difficult, especially if you don't use the program regularly. Apple Business Graphics also allows *Take Files*, command sequences that instruct the program to follow a series of commands to build the picture you want to see. You can save your Take File instructions and reuse them later.

Four programs to turn ordinary numbers into impressive graphs and charts, and give you a new perspective on your firm's financial situation.



by Gregory R. Glau

The other three packages are menu-driven: Your options are clearly spelled out on the screen. Menu-driven programs are usually slower than those that use commands, especially for the experienced user, since you must wade through each menu to do what you want. Apple Business Graphics is as slow as the menu-driven programs, however, since it almost always goes to its program disk after you issue a command.

The Graphics Department is made up of four modules. You create screen images with its Charting Kit. The Lettering Kit lets you put legends and titles almost anywhere on your pictures. A slide-show function lets you create on disk a series of pictures that you can display in a timed mode, or manually, through a joystick or the keyboard. The Graphics Department also has a free-draw mode for creating flow charts and organizational diagrams.

With PFS: Graph, the simplest of all these programs, you do everything through one major menu. It also interfaces with PFS: File, so you can pull numerical data from stored information and examine it in a graphics context.

VisiTrend/Plot is broken into three

main areas: editing, where you save and load data; plotting, which creates graphs; and a trend subsystem that analyzes information.

Basic Design

Most business graphs plot time-series data. The horizontal axis measures time, while the vertical axis reflects the quantity of each plotted point. Apple Business Graphics, The Graphics Department, and PFS: Graph, all axis-oriented, accept data only in an x and y format. You must enter data for both the x-axis and y-axis, even if that information is incremented in a standard measurement—monthly or quarterly, for example.

Conversely, with VisiTrend/Plot, once you indicate a starting point (say, November 1984) and an increment (monthly), you simply type in your data. The other three programs force you to enter both periods and data for each plotted point, essentially doubling data-entry time.

The Graphics Department assigns a number to each file in your disk catalog, so you load things simply by typing a number. VisiTrend/Plot asks you to move a cursor over the file you want to load or save. Both Apple Business Graphics and PFS: File require

that you type in the names of your files to load or save them—a more time-consuming and error-prone approach.

Reading Up

Apple Business Graphics comes with a 232-page, indexed manual. Its 22-page tutorial is too brief for my taste, and the rest of the manual—the reference section—is poorly designed. Each chapter starts with a list of commands to be covered, many of which don't make sense until *after* you've read the chapter. This program is the only one of the four with on-screen help, and it needs it.

The Graphics Department has a 134-page, indexed manual covering each section of the program in detail. The whole manual is a tutorial, so you learn the easy way: by doing.

PFS: Graph, the easiest package to learn, comes with a comparatively brief 78-page indexed manual that is a clear, well-written tutorial. You work with sample data on disk as you learn how to operate each section of the program.

VisiTrend/Plot has the best manual, as well as the longest: 271 pages, with an index. Its tutorial is 131 pages long and as we've come to expect from VisiCorp products, is easy to understand, yet thoroughly detailed.

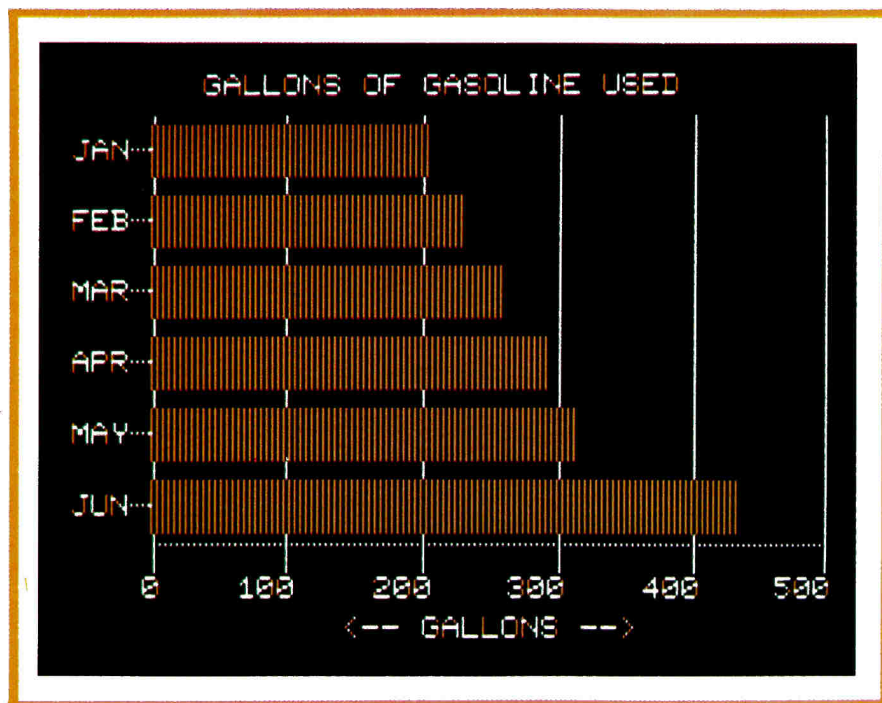
Available Power

All four systems produce standard graphs: line graphs, pie charts, and column charts. Column or "bar" charts run either horizontally or vertically. Only Apple Business Graphics lets you create a horizontal bar chart (see **Photo 1**), useful when your data increases at about the same rate over consecutive time periods.

PFS: Graph can't create area charts—line graphs with the area below the line filled in. These are especially helpful for showing the cumulative quantity of your data.

Except for The Graphics Department, these packages calculate and let you plot cumulative data; both Apple Business Graphics and VisiTrend/Plot have advanced mathematical capabilities the other two lack. Apple Business Graphics and VisiTrend/Plot let you shift a data series backward or forward in time—especially useful for finding out if your current

Photo 1. A horizontal bar chart created with Apple Business Graphics.



advertising affects next month's sales. VisiTrend/Plot can create a moving average, smooth your plotted line, and calculate the percentage difference between each item in two data sets.

Apple Business Graphics, The Graphics Department, and VisiTrend/Plot can create and display a trend line, based on your data; PFS: Graph cannot. All four systems can create stacked bar charts; **Photo 2** shows an example, created by PFS: Graph. This kind of chart is particularly useful to the manufacturer, but only works well when *one* of the data sets shows a variation. In this illustration, materials are stable, while labor costs fluctuate.

Using the Packages

Apple Business Graphics accesses and uses an 80-column card—no advantage in a graphics package, since the screen must shift between the 80-character display (for your commands) and the standard mode (for your graphs).

One of Apple Business Graphics' strongest features is the *virtual file* it lets you set up on disk to store information. Normally, you'll store 50 data points in memory at a time. With a virtual file started on a blank disk, you can enter up to 3821 data points. You may never need that capacity, but charting monthly sales over the past ten years, for example, means 120 pieces of information—more than some others allow.

For math applications, Apple Business Graphics is comprehensive. To multiply one data set by 10, for example, just type MULTIPLY BY 10.

While designed to function as a straight plotting package, The Graphics Department is more like a literal graphics department. You can make text charts (upper- and lower-case), create slide shows, and even add freehand drawings to charts and graphs. The system boasts an impressive array of text fonts and sizes. The slide-show function accesses and uses charts you've saved in standard 33- or 34-sector binary format; it had no trouble reading graphs I created with VisiTrend/Plot and making a slide show out of them.

The Graphics Department is the fastest screen-drawing program of

Graphics at a Glance

Apple Business Graphics is a powerful program that takes some time and effort to learn because you interact with the system through more than 100 commands. The Graphics Department is a fast menu-driven package with a couple of bonuses: It can manipulate text and pictures, and present your charts as a slide show. PFS: Graph is easy to operate and interfaces with the PFS: series of programs. It's functionally handicapped by not allowing statistical analysis of data. VisiTrend/Plot is the most powerful program of the four, and because it uses menus to guide you through all its functions, you have easy, workable access to its complexity. □

the four. Many functions require only a one-keystroke entry; you don't have to press the return key. Unfortunately, the standard characters used for titles and legends aren't as readable as they could be. The system calculates the mean, standard deviation, and a best-fit trend line, almost instantly. You can display this information and either or both lines on your

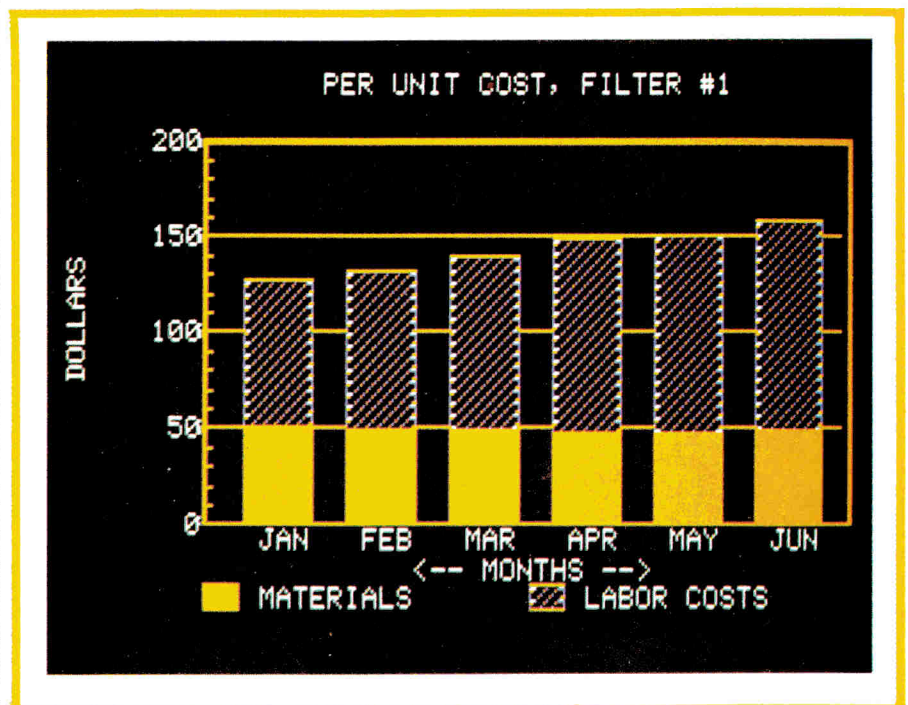
chart. **Photo 3** shows both the mean plotted as a straight line and The Graphics Department's standard character set. The manual does not explain what these figures mean—a significant weakness if you don't already know their purpose and definitions. When you do ask to see this data, the box that displays the numbers obscures the top of your picture.

The Graphics Department can sort information. While we usually store our business numbers on a monthly or quarterly basis, it's often useful to see when the highest figures occurred, when we used the lowest, and so on. The Graphics Department allows up to 99 data points for each set you plot. You can overlay more than one set on the same graph.

PFS: Graph lets you access all its functions through one main menu, so you *must* return to that menu each time you want to change your graph. The system allows only horizontal grid lines, but they're the most common, and it's quick and easy to tell Graph to add them to a picture. The system can keep four data sets in memory at once.

A big advantage in using PFS: Graph is that it interfaces with PFS: File to use any information you've stored there. The process is simple:

Photo 2. A stacked bar chart created by PFS: Graph.



Design a form (as you do with PFS: File) to tell the system which records you want to extract and plot. You can always edit data, regardless of the source of the information. The program can print out your figures as well as its screen pictures, and the package supports a variety of printers and plotters.

PFS: Graph can save the pictures you create for later insertion in PFS: Write documents. It's the only one of the four programs that can easily interface with a word-processing package.

VisiTrend/Plot, the most powerful of the four, is completely menu-driven, so I found it easier to use than

Apple Business Graphics. It's more difficult to operate than PFS: Graph or The Graphics Department, but VisiTrend/Plot provides more mathematical functions and capabilities than these two do.

With VisiTrend/Plot you can have up to 645 data points in memory, with up to 150 data points in a series—about 12½ years' worth of monthly data.

The manual's tutorial section takes you through loading data from disk (a sample data disk comes with the system), to editing information, to making different kinds of graphs based on the numbers. To position a title, go to a TITLE menu and select placement; no x- or y-coordinate information is required. You can simply move a cursor around on your screen and type text wherever you need it.

VisiTrend/Plot lets you change the range of the data you plot. To display only some of the figures from the middle of the data, the other programs force you to adjust your data to change the range of information charted; VisiTrend/Plot doesn't.

A grid line adds a border to your picture as it plots the grid. If you create a trend line, the program asks how far you'd like to forecast. (See **Photo 4.**) VisiTrend/Plot can also make a high-low-close chart (for stock prices) and window charts to display two graphs on the same screen.

As you modify your graph, you see the picture adjust in front of you, without disk access. Titles or legends or grid lines appear as you add them. In contrast, you must return to PFS: Graph's main menu when you want to change the grid, and Apple Business Graphics goes to the disk for instructions each time you add or change anything on your chart.

Minor Complaints

Apple Business Graphics is considerably wounded by its manual. The tutorial is helpful, but brief, and the rest of the manual is worse. The command structure is logical; once you figure out what you'd like to do, you can usually guess at the required instructions. You can use abbreviated commands to tell the system what to draw, but in some cases that's not much of an improvement in terms of remembering what to type: The sys-

Photo 3. The mean plotted as a straight line by The Graphics Department.

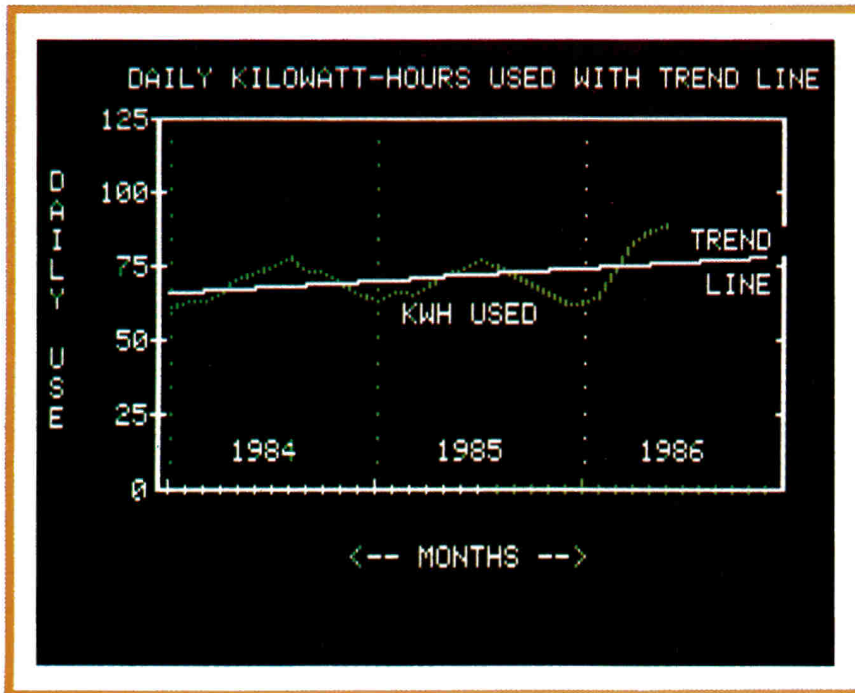
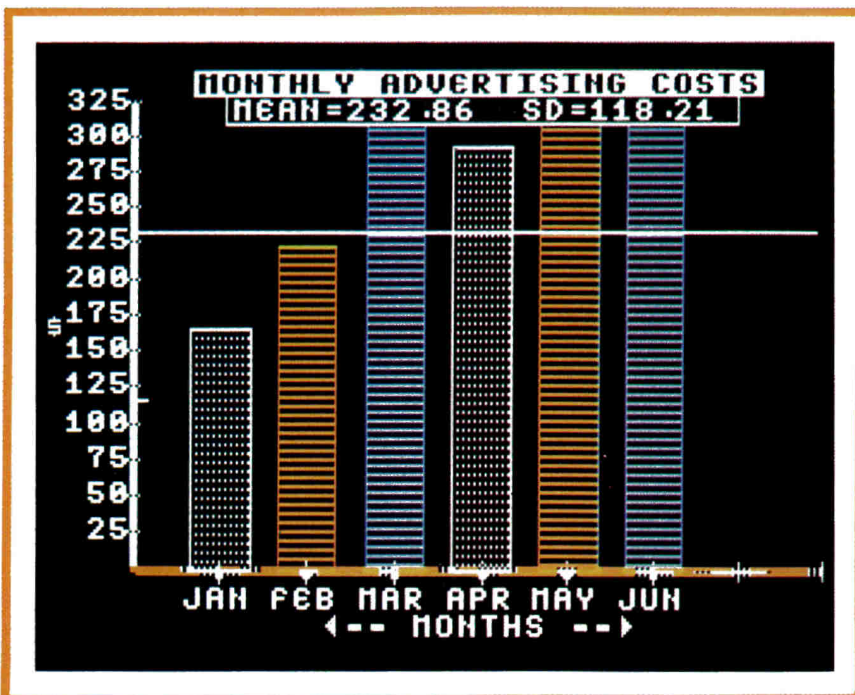


Photo 4. A VisiTrend/Plot chart with a trend line.



tem comes with a quick reference card that details 129 commands and eight control-character sequences. You're asked to get some practice data from screen pictures in the manual; these are too small and hard to read. To forecast a trend line, you must load blank labels to the end of your data set to make room for the projection.

Because of Apple Business Graphics' Pascal heritage, each disk must have a unique name, and when formatting, you must use drive 4 to mean your normal drive 1, and drive 5 for your drive 2. When you format a disk to store data or screen images, the instructions are unclear and incomplete. When you're finally told on page 201 how to exit the system, you don't get back to BASIC, but to a Pascal command line.

I wasn't able to access and use the images I created with Apple Business Graphics with a print program. Since I don't have one of the supported output devices (HiPlot or HP 7225A/B plotters, Qume Sprint 5 or Silentype printer), I couldn't get a hard copy of my pictures.

The Graphics Department has its faults, too. When you request a grid, you get one going both horizontally and vertically—an image impossible to read for a graph with a lot of data points.

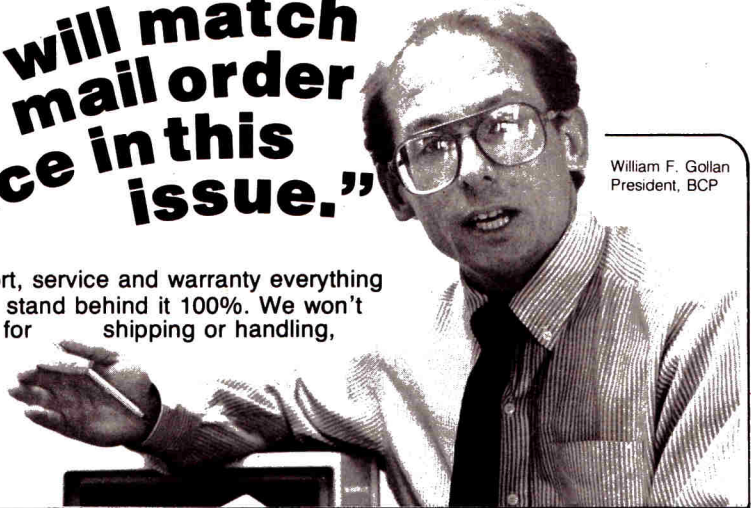
This program also doesn't let you change the scale dimensions of your picture without going to your data and entering a command to inform the program of the scale you want to use in the data itself. Pie charts are arbitrarily colored. When you want to plot more than one data set on the same graph, you must not only indicate that when you start, but also load each data set individually.

While The Graphics Department uses information saved in a data interchange format (DIF) file, it says it will return you to the main charting menu after you use this function. It didn't for me; instead, it rebooted the system.

The program has no true area chart. Instead, you draw a line chart and fill in the area below the line with a pattern—after you load in another program module and draw lines to enclose the start and end of your data. The Graphics Department supports only the Silentype printer, but its im-

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ages can be accessed with hard-copy printing programs (like Graphtrix or Image Printer).

PFS: Graph requires disk access whenever you change anything on a graph: You must return to the main menu (disk whirs), make your change, then go to the plotting section (disk whirs) to see your new picture. When you do make a change, you must tab through each possible selection; to change the scale of the y-axis, you must tab 17 times. When you change a legend or title, or misspell a file name, the old letters remain on the screen until you move the cursor over the characters to erase them.

If you're already using one of the PFS: series of programs, you know that you press control-C when you're done with a selection or data entry, instead of pressing the more conventional return key. If you're not used to it, this unusual sequence could take some time to get accustomed to.

I wasn't able to access and print (with a printing program) the images I created with PFS: Graph, but the system does support a good range of equipment, including Epson, IDS, Silentype, the NEC/C.I.TOH, and Apple's dot-matrix and Imagewriter printers. PFS: Graph also supports the Grappler and PKASO graphics interface cards, and five plotters.

PFS: Graph automatically shades pie charts, forcing you to compare the shading in a legend box with the shading on the graph itself to determine which piece means what. Other packages label their pie chart slices with numbers or letters—a more effective way to see what a slice represents.

PFS: Graph can only plot data sets up to 36 characters in length, or three years of monthly information. PFS: Graph also doesn't let you place descriptive text in the body of your graph, something often necessary to clarify information.

VisiTrend/Plot prints a screen picture slowly. You almost have to use an additional printing program to get printed versions of your images. You must move from one section of the program to another when you want to edit data or do math. While the system supports a variety of printers, no plotters are mentioned in the manual.

VisiTrend/Plot is also a poor choice

for pie charts. Additional disk access is required even to draw them. When they didn't look right on my 12-inch screen, I measured one: It was 3¼ inches wide and 3¾ inches tall. So rather than a pie, I got an egg.

Apple Business Graphics and VisiTrend/Plot are copy-protected. PFS: Graph lets you make one copy of its main program disk, then that option disappears from its menu. The Graphics Department's disks are copyable.

What to Buy

The easiest system is PFS: Graph. This program is an especially good choice if you want to plot information already stored in PFS: File records, or if you want to use charts in PFS: Write documents. But the program can't create area graphs and comes without any significant mathematical functions. If you feel you might want to project a trend line based on your business numbers or compare one data set to another, this program won't let you. It's also restrictive in the number of data points it can plot per series (36).

The Graphics Department is more complex and powerful than PFS: Graph. It draws the fastest and lets you add titles and other information to your pictures. The system also functions as a slide show; if you make presentations to other people in your company, The Graphics Department is a real asset. Its main limitation is a lack of functions to analyze your numbers statistically.

Apple Business Graphics is a strong, powerful program but it's difficult to operate, especially for someone who enters data only once or twice a month. If your business uses horizontal bar charts, Apple Business Graphics can create them for you. If you have information stored in Apple Plot files (a discontinued program), the program can load and use that data. This system, like The Graphics Department, can hold only one file in memory while you work, so you spend time loading in more data to create overlays.

VisiTrend/Plot is the best package of the four, and at its current price is a true bargain. Since it's menu-driven, the system is not only easy to get around in, but also to pick up and use even if you haven't run the program

for a while. VisiTrend/Plot easily uses the DIF file to extract numerical data from other programs. For a general-purpose, powerful business graphics package, you won't go wrong with VisiTrend/Plot. ■

Greg Glau plots his course at P.O. Box 1627, Prescott, AZ 86302.

Product Information

Apple Business Graphics

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
\$175

64K Apple required, with two disk drives
Apple Business Graphics works on the Apple II Plus, //e, and //c.

The Graphics Department

Sensible Software
24011 Seneca
Oak Park, MI 48237
(313) 399-8877
\$124.95

48K Apple required, with one disk drive
The Graphics Department works on the Apple II Plus, //e, and //c.

PFS: Graph

Software Publishing Corp.
1901 Landings Drive
Mountain View, CA 94043
(415) 962-8910
\$125

64K Apple required, with one disk drive (two recommended)
PFS: Graph comes in one version for the Apple II Plus and another that works on both the Apple //e and //c.

VisiTrend/Plot

VisiCorp
2895 Zanker Road
San Jose, CA 95134
(408) 946-9000
\$99

48K Apple required, with two disk drives
VisiTrend/Plot works on the Apple II Plus, //e, and //c.

The Gaming Life

Games aren't just child's play. In a recent *inCider* survey 50 percent of the readers we polled said they planned to buy game software within the year. That preference ranked over education, word processing, home finance, and stock market analysis programs. Whatever your gaming proclivities—arcade, strategy, adventure, or simulation—the only way to win is to play.



A Galaxy of Games

One of Warden Shiftky's—that grand master of the game paddle—recent preoccupations in The Game Reserve is quite apropos in this presidential election year: polling *inCider* readers to learn what Apple games they consider the best of all time. While the results won't displace George Gallup or Lou Harris in the front pages of *The Times* and *The Post*, we're eager to learn what particular games you folks out there enjoy.

The *inCider* staff itself includes some computer-game aficionados. In fact, working on a magazine like *inCider*—where new games arrive almost daily—could be considered a gamer's heaven. Because we get a crack at most of them before sending them out for review, we get a global perspective on Apple games. So we decided to supplement the readers' poll with one of our own. As someone on the staff put it, "Our readers have a right to know how far off-base we are around here."

Participation in the poll was limited to Review Editor Kerry Lanz, Game Reserve Columnist Warden Shiftky, and yours truly.

The polling consisted of two phases. In the first, each participant listed his favorite games. We then combined the three lists into a single ballot and made our final selections from this list. Of course, the final selection process wasn't easy. A fair amount of politicking preceded the selection since each of us prefers different kinds of games. For instance, Kerry favors arcade and fantasy/role-playing games whereas I like games beginning with the letter O and anything that Infocom does. Generally, the Warden remained aloof from the preselection squabbling—easy enough to do since the Reserve is half a world away from Peterborough, New Hampshire. He did, however, get on the short-wave long enough to make a few pithy comments and to make his final selections.

In the end, we managed to hammer out a list of what we consider to be the best Apple games of all time. We decided against ranking the top 40; we simply didn't have the stomach for that kind of fight. (I didn't see how I could get the other two to agree that *Old Ironsides* is the acme of Apple games.) Instead, we listed the games in alphabetical order and included a capsule description of each. If you take your fun seriously, you can do a lot worse than base your library of games on the recommendations that follow. ■

—R.R.



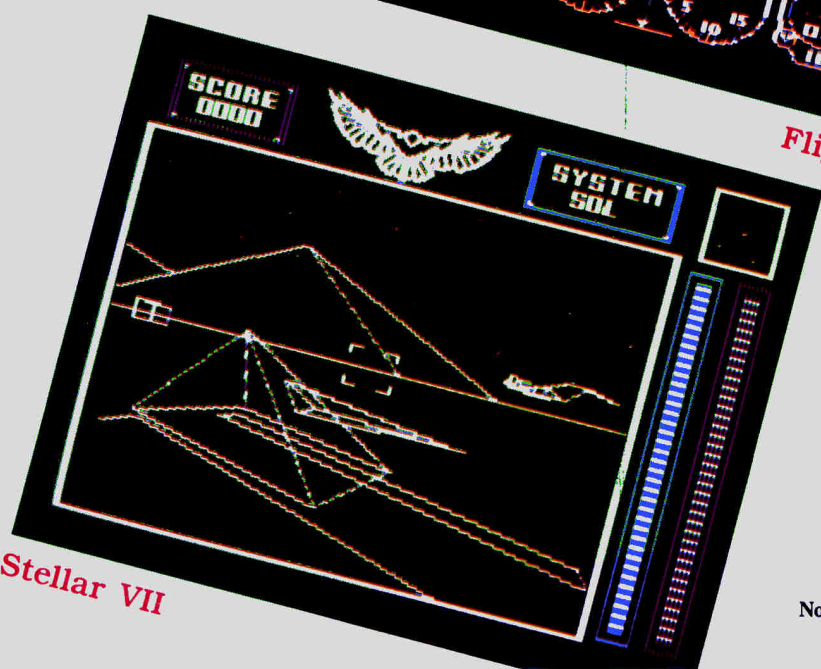
Wizardry II



David's Midnight Magic



Flight Simulator



Stellar VII

A Gamer's Guide

Adventure Games

Adventure games are giant riddles. At the start of an adventure, you are given a task to accomplish, and very little else. You must figure out how to get the treasure, save the princess, or pursue whatever goal is set up for you. Adventures come in three flavors: Fantasy/Role-playing, Illustrated, and Text—all described below.

Arcade Games

When you think of computer games, you usually think of an arcade-style game. These games feature colorful, hi-res graphics, lots of sound, and a frenzied pace bound to keep you on edge. Included in this category are all Apple action games including shoot-'em-ups, maze games, and pinball games. Arcade games require intense concentration, split-second timing, and good hand-eye coordination. They may also require a joystick or paddles.

Fantasy/Role-playing Adventures

Aptly subtitled "Dungeons & Dragons on a computer," this type of adventure game casts you as a specific character whose attributes change as he or she acquires more experience. Most of these games allow for multiple characters, so you can "go adventuring" with your boon companions.

Illustrated Adventures

The intensive use of graphics sets illustrated (or hi-res) adventures apart from other adventure games. As you move around in the world of the adventure, the picture on screen changes to reflect your new surroundings. Visible clues and surprises are the attractions of the illustrated adventures.

Simulations

All games that simulate real-world activities, with the exception of war games, fall into this category. Simulation games let you play the stock market, manage a major-league baseball team, or fly an airplane. The object of these games is usually less fantastical than slaying a dragon or shooting down invading aliens.

Strategy Games

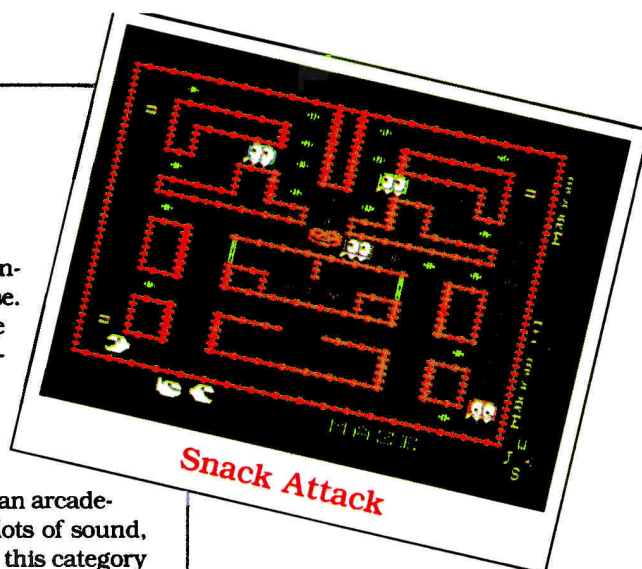
Although all games involve strategy, the term "strategy game" is reserved for those games with an abstract goal, such as checkmating your opponent's king, as in chess, or flipping your opponent's tiles, as in Othello. Among the most challenging games produced for Apple computers, they require a high level of logic and include few random events.

Text Adventures

Perhaps the most complex of computer games, text adventures provide game-hungry Apple owners months of puzzling activity. Best exemplified by the Zork series from Infocom, these games use a narrative text, rather than graphics, to create worlds of fantasy and imagination. Riddles, puzzles, problems in logic, and mazes in these games challenge your gray matter.

War Games

War games are a special type of simulation. You assume command of a historical military force and try to improve your troops' past performance. Battles and campaigns may appear to be strange subjects for "games," but there's a definite satisfaction in developing and implementing a strategy that Napoleon overlooked.



inCider's Top 40

Alien Rain

Tony Suzuki
Broderbund Software
\$24.95
Arcade

The Apple version of the Galaxian coin-op arcade game offers beautiful graphics, smooth animation, and nonstop action, with hordes of alien ships attacking your one lone fighter. It is one of the most addictive games ever written for the Apple.—W.S.

Apple Panic

Ben Serki
Broderbund Software
\$29.95
Arcade

Save the world from poison apples and rabid butterflies by climbing ladders and digging ditches. Just when one floor is safe, you get a new screen of dangers. Panic gives you an excellent combination of hi-res action and game challenge.—K.L.

Apventure to Atlantis

Robert Clardy
Synergistic Software
\$40
Illustrated Adventure

One of the early full-color adventures, Apventure mixes Greek myth with fantasy in a challenging game taking you to many isles of mystery.—W.S.



Olympic Decathlon

Beer Run

Mark Turmiel
Sirius Software
\$29.95
Arcade

Watch out for the guzzlers as you climb ladders and elevators through many hi-res floors. The object is to reach the elusive Artesians, rumored to live with the pink elephants. Easy to learn, yet hard to master, try Beer when you're playing more than one.—K.L.

Beneath Apple Manor

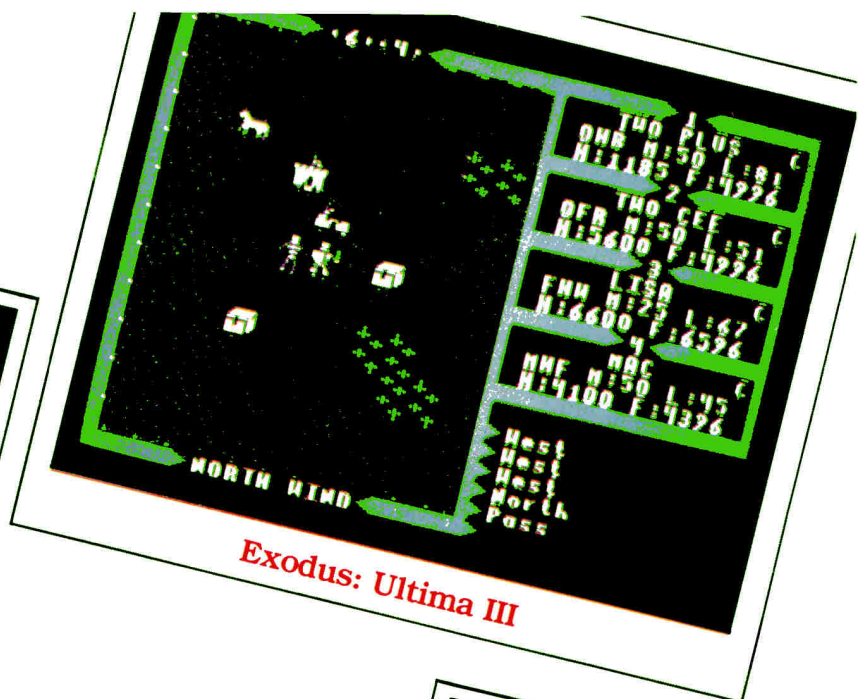
Don Worth
Quality Software
\$29.95
Fantasy/Role-playing

This is probably the ideal introductory fantasy/role-playing game. Your character searches deeper and deeper into a complex of dungeons to learn the secret hidden below. It can take an afternoon or a week to solve, depending on the player.—W.S.

Castle Wolfenstein

Silas Warner
Muse Software
\$29.95
Arcade

Wend your way through many enemy-infested rooms and escape from the castle. If you find the War Plans while juggling grenades, bullets, uniforms, and even cannonballs, then you are promoted to a tougher castle. Castle combines action and graphics with an adventure scenario for a great all-around game.—K.L.



Exodus: Ultima III

Choplifter

Dan Gorlin
Broderbund Software
\$34.95
Arcade

Rescue 64 hostages in this spectacular helicopter simulation. Bomb tanks and shoot fighters all you want, but you get points only for rescuing people. Absolutely stunning graphics rank this a masterpiece.—K.L.

Close Assault

National Microcomputer Associates
Avalon Hill
\$34.95
War Game

This is a game of small-unit infantry tactics. You command a small armed company attacking a heavily defended village during World War II. Despite its being an all-text game with an accompanying gameboard and counter, the realism, excitement, and playability rate high.—W.S.

Computer Baseball

Charles Merrow and Jack Avery
Strategic Simulations
\$39.95
Simulation

This is *the* baseball strategy game. You can match any of several World Series Teams or, with an optional data disk, any pennant or division winner of the modern era. So far my 1978 Yankees are beating everyone!—W.S.



Miner 2049er

The Coveted Mirror

Berns and Thompson
Penguin Software
\$34.95
Illustrated Adventure

Great graphics and a tightly spun tale lead you on a quest for pieces of broken mirror. The plot is nonviolent with some arcade surprises. Try everything, no matter how far-fetched.—K.L.

Cranston Manor

Harold DeWitz and Ken Williams
Sierra On-Line
\$29.95
Illustrated Adventure

The estate lies abandoned just north of town. You are a rather mercenary adventurer who must extract plunder from Cranston Manor. Longer and more complex adventures are available, but Cranston Manor was the first one I ever played and I recommend it to all but the most experienced adventurers.—R.R.

Crossfire

Jay Sullivan
Sierra On-Line
\$29.95
Arcade

Think of Space Invaders, but with aliens coming at you from all directions. You need both hands going fast to control your motion and your direction of fire. Wait until you see all those objects moving on the screen at once. This is one of the classics. —K.L.

David's Midnight Magic

David Snider
Broderbund Software
\$34.95
Simulation

Excellent graphics, fast action, ease of control, and great challenge are combined in one game. This computer pinball game has two playing fields, and up to three balls at once. It's one of the most addictive games ever produced for the Apple II. —K.L.

Deadline

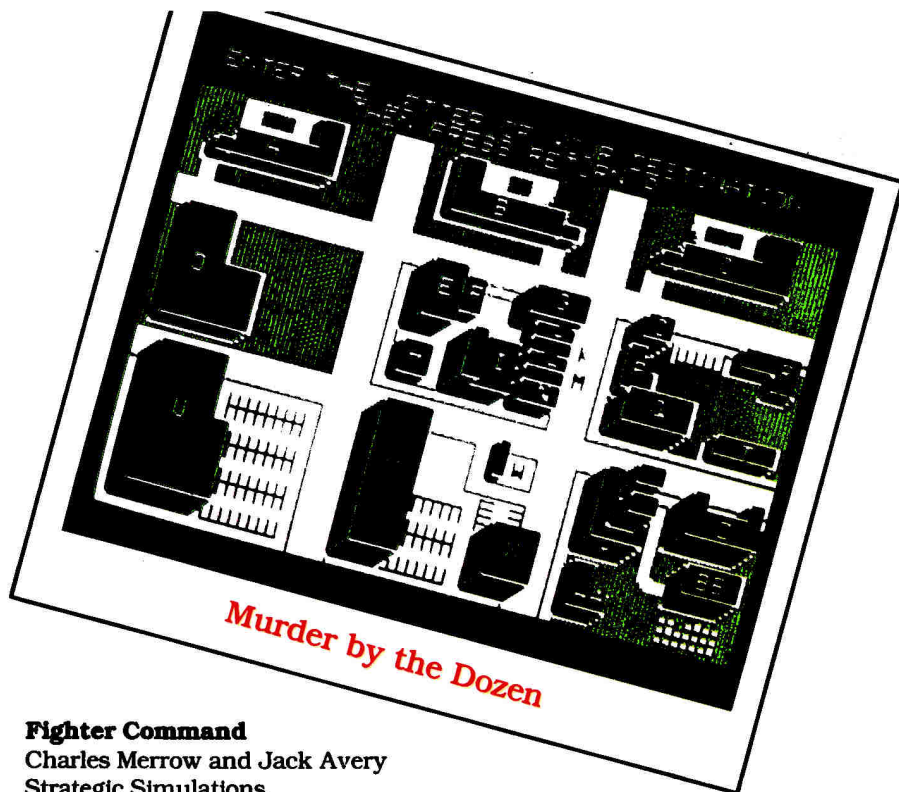
Marc Blanc and Dave Lebling
Infocom
\$49.95
Text Adventure

You have 12 hours to solve a classic "locked door" murder mystery in this all-text adventure. If you're not at the right place at the right time, you fail to get vital clues, making this game a real toughie. A dossier with evidence and documents helps create a realistic feel. —W.S.

Enchanter, Sorcerer

Blanc, Lebling, and Meretzky
Infocom
\$49.95
Text Adventure

These are the first two installments of another trilogy of adventures from Infocom. As a young enchanter, your task in each of these games is to save your happy, magical land from the forces of evil. These are my favorite adventure games. —R.R.

**Fighter Command**

Charles Merrow and Jack Avery
Strategic Simulations
\$59.95
War Game

This is SSI's best war game, placing you in command of the RAF Fighter Command or in charge of the Luftwaffe during the Battle of Britain. Battles can last hours or weeks. The sense of realism is overwhelming. —W.S.

Flight Simulator II

Bruce Artwick
subLOGIC Corp.
\$49.95
Simulation

Currently atop Softsel's Hot List, this game will have you convinced that your Apple is a flying machine. The ever-changing perspective that gives the illusion of flight is a tour de force of graphics programming. As an added bonus, once you've mastered the intricacies of flight, you can take your place over the skies of France, ready to battle the Baron and his cohorts to make the world safe for democracy. Flight Simulator will soon be available with a multiple computer/player option. I can't wait. —R.R.

Gobbler

Sierra On-Line
Arcade

It was the best of the Pac-Man look-alikes (but alas, exists no longer). Having played AtariSoft's authorized version and my old Gobbler disk, I still prefer Gobbler. Ms. Pac-Man comes in a close second. —W.S.

Mask of the Sun

Clark and others
Ultrasoft
\$39.95
Illustrated Adventure

This illustrated adventure breaks new ground by animating the hi-res scenes. You need to find the mysterious Mask to cure a fatal disease. It is a race against the clock and the fates to save your life. —K.L.

Microsoft Decathlon

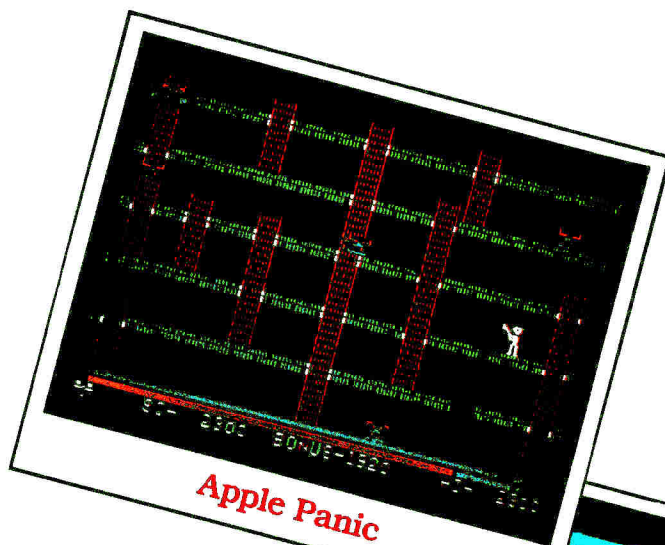
Timothy W. Smith
Microsoft Consumer Products
\$29.95
Arcade

In this multiple-player game, you and your friends compete in the most grueling athletic competition in the world—the decathlon. Using paddles and the keyboard, you must run, throw, and jump your way into the winner's circle. Just beware of the bane of all Microsoft "decathletes," the dreaded finger cramps! —R.R.

Miner 2049er

Hogue and Livesay
Micro Lab
\$39.95
Arcade

Bounty Bob needs your help with ladders, elevators, chutes, and even a cannon. Check every inch of the mine, eating golden apples and exterminating mutants along the way. Graphics are smooth, and challenge is high throughout the widely differing ten screens. —K.L.



Apple Panic

Murder by the Dozen

CBS Software

\$39.95

Text Adventure

Are your deductive faculties developed enough to solve 12 baffling murder mysteries? Anyone who has ever dreamed of becoming another Columbo or Miss Marple must have this game. It is especially fun when played with a lot of people.—R.R.

North Atlantic '86

Strategic Simulations

\$59.95

War Game

The Soviets have overrun the continent and now threaten the U.K., NATO's last bastion in Europe. Hope remains as long as you keep Britain's convoy pipeline intact (and the Soviet navy at bay). This is a realistic and meaty simulation that provides lots of entertainment value.—R.R.

Old Ironsides

Jack Rice and Richard Hefter

Xerox Educational Software

\$39.95

Arcade

Old Ironsides lets two players assume command of sailing frigates and pits them in a ship-to-ship duel, with no quarter given or asked. Some games provide faster action than Old Ironsides; still others, better sound or graphics or more detail and complexity. I have yet, however, to find a computer game more fun to play. And isn't that what it's all about?—R.R.

One-on-One

Eric Hammond,

Larry Bird, and

Julius Erving

Electronic Arts

\$40

Arcade

Electronic Arts brought two basketball greats together with one talented game designer and produced the best computer sports game I've ever played. In the game, you take the part of Larry Bird or Dr. J and, using a joystick, try to launch those high percentage shots that will bring victory. Whether you play against the computer or a human opponent, One-on-One is full of explosive action.—R.R.

Pinball Construction Set

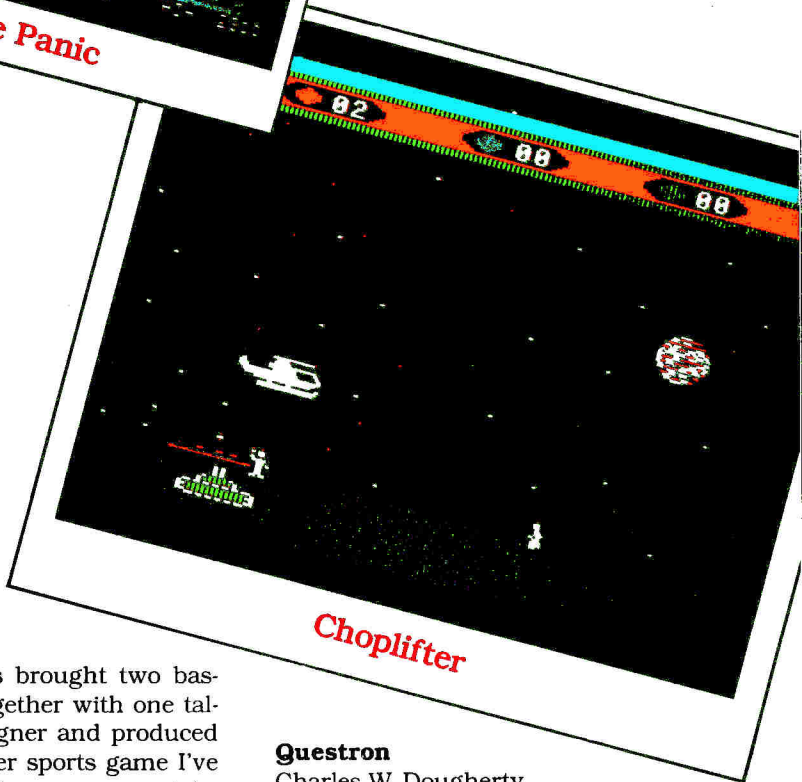
Bill Budge

Electronic Arts

\$39.95

Arcade

Bill Budge has received a lot of well deserved notoriety because of PCS. With this package, you can design your own pinball games by combining bumpers and flippers in any way you want. You can also define the physical properties of the game (action and gravity). You never have to worry about becoming bored with Pinball Construction Set.—R.R.



Choplifter

Questron

Charles W. Dougherty

Strategic Simulations

\$49.95

Fantasy/Role-playing

Molded after Ultima, Questron offers many of the same delights including great graphics, scary dungeons, and sudden, violent action.—W.S.

Sargon III

Dan and Kate Spracklen

Hayden Software

\$49.95

Strategy

Chess is an ancient game of skill that appeals to people everywhere. Sargon III is a program that plays chess extremely well. With a large opening repertoire, a store of classic games, and a faster algorithm than its predecessor Sargon II, this game is everything a chess player could desire.—R.R.

Snack Attack

Dan Illowsky
Datamost
\$29.95
Arcade

Save the whale by skillfully steering it through a Pac Man-style maze. After three different mazes, you start over even faster. The graphics, colors, sounds, and ease of use make it great for all ages. (Good luck trying to find this one.)—K.L.

Star Blazer

Tony Suzuki
Broderbund Software
\$31.95
Arcade

Suzuki's elegant color graphics and an intense level of challenge elevate this game high above its rivals in the shoot-'em-up category. It's almost impossible to bomb the tank, and even more difficult when it shoots air-to-air missiles. You'll spend hours trying to master this game... and fail.—W.S.

Stellar 7

Damon Slye
Penguin Software
\$29.95
Arcade

Stellar 7 straps you into the cockpit of the Raven, a super tank equipped with a deadly biphasal cannon. Your mission is to fight your way across seven hostile planets and destroy the evil galactic emperor. Stellar 7 features super 3-D outline graphics. Your mission briefing alone is worth the price of the game.—R.R.

Tactical Armor Command

Avalon Hill
\$40
War Game

You have all the major tanks and anti-tank guns from World War II plus infantry in this hard-hitting simulation of armored combat. This is the most realistic tank game I've ever seen.—W.S.

Temple of Apshai

Michael Farren and Toni Thompson
Epyx
\$39.95
Fantasy/Role-playing

The graphics are minimal, but the level of challenge is high as you explore the various passages of this temple. I don't remember a role-playing game where it is harder to



advance beyond the opening stages than Temple—unless you consider the second Ultima game.—W.S.

Time Zone

Ken and Roberta Williams
Sierra On-Line
\$99.95
Illustrated Adventure

You crisscross time spans of thousands of years to find objects and perform deeds that will change the outcome of history far into our own future. It'll take a year to solve if you play the game casually. Playing full-time (eight hours a day, five days a week), you'll solve it in about a month.—W.S.

Ultima I, II, III

Richard Garriott
I—California Pacific, \$39.95
II—Sierra On-Line, \$59.95
III—Origin Systems, \$54.95
Fantasy/Role-playing

They get better as they go along: Ultima III, Exodus, is a certified masterpiece of animation, plot, and challenge. Create characters to explore a world of magic, treasure, and treachery. Sharpen your pencils and your wits for many hours of engrossing fun.—K.L.

The Witness

Infocom
\$49.95
Text Adventure

You're a hard-boiled detective in the 1930s investigating a case of blackmail. When the crime turns into murder you have 12 hours to decide which of six suspects is the culprit. As with Deadline, you've got a police case file of evidence, reports, and clues to help you, but this incredibly complex web will not be easy to untangle. If you think you're smarter than Philip Marlowe, give it a try.—W.S.

The Wizard and the Princess

Ken and Roberta Williams
Sierra On-Line
\$29.95
Illustrated Adventure

A classic not because it's unsolvable (a week of evenings in front of the Apple is all it takes), but because it does so much to establish the genre. It's a good intro to adventuring. If the snake gives you trouble, find a rock!—W.S.

Wizardry I, II, III

Greenberg, Woodhead, and others
Sir-Tech Software
I—Proving Grounds, \$49.95
II—Knight of Diamonds, \$34.95

III—Legacy of Llylgamyn, \$39.95
Fantasy/Role-playing

Acclaimed as the best computer game of all time, the Wizardry game system requires Proving Grounds to create characters for the other scenarios. Characters become your alter-egos in exploring mazes, battling foes, casting spells, and finding treasure. The play is the thing, but solving the overall puzzle is a rewarding goal.—K.L.

Zaxxon

John Garcia
Datasoft
\$39.95
Arcade

The Apple version of this arcade classic is a fine achievement in whole-body 3-D graphics. Your mis-

sion is to attack the Space Fortress, beat off enemy interceptors, and destroy Zaxxon, the giant, missile-toting robot. You can't call yourself an arcade game aficionado if you don't own this game.—R.R.

Zork I, II, III

Blanc, Lebling, and others
Infocom
\$39.95 each
Text Adventure

This is the fantasy trilogy by which all other adventure games are measured. Riddles, humor, and lots of nasty surprises (watch out for grues!) await you in the Great Underground Empire. If any games deserve the label "classic," the Zork trilogy wins.—R.R.

The Game Makers

Avalon Hill
4517 Harford Road
Baltimore, MD 21214

Broderbund
Software
17 Paul Drive
San Rafael, CA
94903

CBS Software
One Fawcett Place
Greenwich, CT
06836

Datamost
8943 Fullbright
Avenue
Chatsworth, CA
91311

Datasoft
9421 Winnetka
Avenue
Chatsworth, CA
91311

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403

Epyx
1043 Kiel Court
Sunnyvale, CA
94089

Hayden Software
600 Suffolk Street
Lowell, MA 01853

Infocom
55 Wheeler Street
Cambridge, MA
02138

Micro Lab
2699 Skokie Valley
Road
Highland Park, IL
60035

Microsoft
10700 Northrup Way
Bellevue, WA 98004

Muse Software
347 North Charles
Street
Baltimore, MD 21201

Origin Systems
P.O. Box 99
North Andover, MA
01845

Penguin Software
P.O. Box 311
Geneva, IL 60134

Quality Software
21601 Marilla Street
Chatsworth, CA
91311

Sierra On-Line
36575 Mudge Range
Road
Coarsegold, CA
94306

Sir-Tech Software
6 Main Street
Ogdensburg, NY
13669

Sirius Software
10364 Rockingham
Drive
Sacramento, CA
95827

Strategic Simulations
883 Stierlin Road
Mountain View,
CA 94043

subLOGIC
713 Edgebrook Drive
Champaign, IL
61820

Synergistic Software
830 North Riverside
Drive
#201
Renton, WA 98055

Ultrasoft
13503 Bell-Red Road
#200
Bellevue, WA 98005

Xerox Educational
Software
245 Long Hill Road
Middletown, CT
06457

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Apple Computer, Inc.

Off to See the Wizards

by Kerry J. Lanz, inCider staff

Gargoyles, and ogres, and fleck—oh my!

Such is the motley crew assembled to wreak havoc in Wizardry, the best-selling game that's keeping kids of all ages entangled in mazes with the forces of good and evil. We at *inCider* think so much of Wizardry that we included it on our list of top 40 games appearing in this issue (p. 48).

Wizardry, a top-ten hit since it came out in 1981, has been snapped up by almost one-half million eager players. High honors go to the first game in the series, *Proving Grounds of the Mad Overlord*, with more than 200,000 copies sold. The three-part Wizardry series is soon to be joined by a fourth scenario, *The Return of Werdna*.

Authors Andrew Greenberg and Robert Woodhead are proud of their product. Publisher Sir-Tech Software isn't complaining, either.

"Wizardry was a much wider success than we ever imagined it would

"We're not in Kansas anymore." Enter the Wizardry universe of medieval monsters, wicked wizards, and illuminating incantations in this assemblage of the good, the bad, and the ugly.

be," Greenberg comments. "We knew it was good, but we had no idea if it was marketable."

Wizardry is a role-playing game. You create characters that become your alter egos for the game. Up to six characters at a time explore a multi-level maze and encounter other characters—good and bad. Riddles, traps, and treasure await you.

Genesis of a Game

Wizardry was created by Andrew Greenberg in 1977 at Cornell University. Fostered by boredom rather than by necessity, Wizardry started life

as a simple maze game. Greenberg's friends, tired of his petulance during a study week at semester's end, challenged him to put *Dungeons & Dragons* on his computer.

The modest game grew as Greenberg and his friends perfected it by playing around the clock. Greenberg tinkered with it constantly

and learned the delicate art of balancing the game elements: good and evil, strength and weakness, fact and mystery, simplicity and complexity.

At the same time, Robert Woodhead was playing real-time, multi-player games on Cornell's mainframe and developing business programs for Sir-Tech Software.

"We made a deal with Robert that if we bought this Apple, he would have to program a variety of business-related programs. After 5 p.m., the machine was his to do whatever he wanted with it. He could use it for a boat anchor, for all we cared," says Robert



Sirotek of Sir-Tech.

The stage was set for Greenberg and Woodhead to meet, but a partnership seemed unlikely at first.

"Robert Woodhead was my bane," recalls Greenberg, who, as an undergraduate manager of the Cornell mainframe was responsible for maintaining the system's proper use. (In other words: NO games.) Woodhead, however, skillfully penetrated the barriers in the pursuit of adventure.

Greenberg and Woodhead worked together and Sir-Tech added Greenberg's maze game to its line. In May 1981, the company presented Wizardry at Applefest in Boston and received enthusiastic reviews, but the word-of-mouth testimonials generated even better response. A cult formed with fans who demanded more. Sir-Tech found itself making a shift from business to entertainment software. Woodhead's boat anchor became the corporation's foundation.

Fireworks on the Job

The Greenberg-Woodhead team is productive, dynamic, but far from tranquil. With four scenarios behind them, Woodhead points out, "We're the best of friends, but that doesn't stop us from yelling at each other over technical points."

Woodhead works at the Sir-Tech office in Ogdensburg, New York. Greenberg lives hundreds of miles away in Ithaca. They appreciate the distance between them because proximity sparks belligerence instead of creativity.

Both are skillful writers and capable programmers. Greenberg, philosopher and actor at heart, writes the scenarios. Woodhead, consummate techie, specializes in programming and technology. Their collaboration is a classic confrontation between artistic soul and technical mind.

"It's like watching the results of a Hegelian dialectic," Greenberg says of



Photo 1. Title page from the first scenario, *Proving Grounds of the Mad Overlord*.

the partnership. "There is thesis and antithesis. We clash and there's a small explosion. After the smoke clears, you have this disk."

Where's the Answer?

Wizardry is not easy. It takes months to develop characters, map the maze, and find the objects needed to solve the game. Sometimes you lose months of work when a character dies at the hands of a frost giant.

"There are times when players need something to keep them from throwing the Wizardry disk to the cat," says Mike Nichols of Nichols Services.

Nichols saw the need to help frustrated, frazzled Wizardry players. Nichols Services offers maps, hints, and programs that artificially improve your characters. Calling these help programs "a hedge against disaster," Nichols says: "Every point inappropriately added to a character takes away two points in fun."

His service includes a telephone help-line. "I have gotten phone calls from Australia, Germany, and Japan," Nichols reports. "I got a phone call at 5:30 in the morning. Somebody had played all night and just couldn't stand it." According to Nichols the most common question is, "What is the answer to the riddle on level six of Knight of Diamonds?" (Sir-Tech's hint: The answer is on the screen when you first boot the disk.)

Wizardry's Magic

Wizardry attracts thousands of faithful followers, but its appeal extends past the usual gamer's mentality. Dr. Ronald Levy, a psychiatrist

from Williamsville, New York, uses Wizardry in his practice. Through Wizardry, children and adolescents experience a sense of accomplishment and mastery missing in their lives. He finds that even the shyest speak freely about their characters, which are projections of themselves.

Dr. Betty Smith of Kenneshaw College, Marietta, Georgia, uses Wizardry as a reading-therapy tool. The game requires reading and spelling skills, plus proper visualization of the maze.

For others, the challenge is enough. Says Sirotek, "After you get back from work, you're tired and you just want to do something different. So, you plug in something that will bring you into a new dimension. It puts you into a fantasy world where you can let your mind go. You relax."

Nichols echoes the sentiments of those he deals with. "I've played the game for hundreds of hours. There are still things that surprise me. It's always fresh."

WERDNA: AN INTERVIEW WITH ANDREW GREENBERG

inCider caught up with the Wizard Werdna (alias Andrew Greenberg), crazed Copybara at his side, as he prepared to battle Sir Lancelot in Wizardry's fourth scenario, The Return of Werdna. Greenberg talked to inCider about Wizardry's story line and continuing popularity.

inCider: What are your main contributions to the game?

Greenberg: The fine tuning of the game, the balancing of the game, was my own and my main contribution.

Balance [means] making the game both clear and deep. By clarity, I mean the ability to discern what's going on, so as to be able to make decisions. Tic-tac-toe is a game of exceptional clarity.

Then there are games of great depth and great complexity. Tic-tac-toe has no depth whatsoever. Chess is my archetype of a game that is beautifully balanced. It has both exceptional clarity and exceptional depth.

inCider: What are your favorite games?

Greenberg: My favorite game is bridge. I find it a devastating challenge in creating and developing partnerships and in its amazing complexity. Games that I love for their depth and clarity are games that involve people—the role-playing games.

Shape of Things to Come

inCider: After the fourth scenario, will there be a fifth, sixth, and seventh?

Greenberg: I now know, and I have known for a while, the story of the Wizardry universe from creation myth to ending. It has never been our intention to drop the Wizardry product line at any point. There will be as many scenarios as are necessary to relate the whole tale. Much to the chagrin of my publisher, who just wants to believe that it will go on forever, it will go on as long as is necessary. Then we'll move on to something else.

inCider: What are some of your new projects?

Greenberg: I am now working on a new gaming system that will take this market by storm. I believe it is an entirely new genre of product.

The idea is to create a dynamic, multi-person, role-playing environment with the computer functioning as game master. Rather than have the computer as center, we have the people as the center. It will be a brand new kind of role-playing, and very exciting.

I am working with a bunch of collaborators in Massachusetts who call themselves the Society for Interactive Literature. They are responsible for producing Rekon, a role-playing game which is real-time, real-space, involving hundreds of people. I find it a very vital and exciting collaboration.

The Makings of a Good Game

inCider: What are the key elements of a successful game?

Greenberg: They are the same key elements that make theater succeed. There is no real difference between writing a role-playing game and writing a play, just different techniques.

One thing that makes Wizardry unique is the style of presentation. Some reviewers have criticized us for not having state-of-the-art graphics—the pretty pictures of the hi-res adventures. That was quite intentional. In particular, the maze is not very graphical. It's not a representation of the maze; it is a suggestion of the maze.

You need to get people to believe. You need to get them to identify with the protagonist. If they can't do that, then you're lost. What we tried to do was create a game where the player identifies with the character in the plot. When there is danger to the life of the character, the person feels the fear.

Wizardry is designed so that it can't be won. It's not the winning of the game that is the point. I'm borrowing and perverting the intent of Shakespeare's term, but "the play is the thing." It is playing the game that is fun, not ending it. We tried to create a game that would always have short-term goals and accomplishments, but you would never feel that you are at closure with the Wizardry universe.

inCider: Why are so many people attracted to this game?

Greenberg: Partially because they realize they're going to get more bang for their buck. It costs as much as every other game, but it gives them more hours of pleasure. The other part of it is that there are very few games that tell stories. It does stimulate their imaginations. It keeps a carrot in front of them, and they will always be achieving.

The Ultimate Game

inCider: What is your vision of the ultimate game?

Greenberg: The ultimate game will be honest-to-gosh literature. It will involve a far more detailed story line and far more role-playing.

I would like to create a new medium for relating fiction. I do not think the adventure-game format, the fantasy-game format, or a hybrid of the two is sufficient. We need to figure out ways to have the computer let people do what people do best—be creative and imaginative—and still have them take part in a story.

inCider: What is your best environment for creative thinking?

Greenberg: Wizardry came from the Fall Creek waterfalls in Ithaca, New York. It is an absolutely wonderful place. You can go there, swim up to the waterfalls, let the water beat on you, and talk to the rocks. You would be amazed at how much rocks know



Photo 2. Game screen from *Knight of Diamonds*, the second scenario.

about role-playing.

I need to be in a reasonably quiet and secluded place. It's only when I calm down and quiet down that I can create. On the other hand, it's only when I am driven that I can engineer. And both of these things are necessary for this kind of work.

Pascal Spoken Here

inCider: Why did you choose Pascal for Wizardry?

Greenberg: Wizardry is written in Pascal and machine language. It is a big program—tens of thousands of lines of code. We recognized that two people working on a project of this size had to find a [common] language. Otherwise, it would be impossible. We also recognized that we would need to make large changes to it over time. That's why Pascal was used.

The particular version of Pascal we had allowed us to write huge pieces of code and compress them. Space efficiency, when you're writing a program that is ten times the size of the machine's memory, is necessary.

inCider: Anything else?

Greenberg: We are creating a new artistic medium. Producing these games is far more analogous to producing theater than it is to publishing a book. We take that approach to it. It has worked.

TREBOR: AN INTERVIEW WITH ROBERT WOODHEAD

Andrew Greenberg provides the artistic flair while Robert Woodhead lends technical expertise to Wizardry. Usually found hunched over his Macintosh, Woodhead (Trebor's al-

ternate personality) told inCider his side of the Wizardry series.

inCider: What are the steps you go through in bringing a scenario to life?

Woodhead: First, we have to do the plot design. Next, we redesign the basic Wizardry program and figure out which changes are necessary to allow the plot to work. Then, we program the data base. What most people don't realize is that Wizardry is not a game. It's really a very complex data-base management system, like dBase II. In fact, when you kill monsters, what you're really doing is computing T-bill futures rates.

inCider: That's quite a comparison.

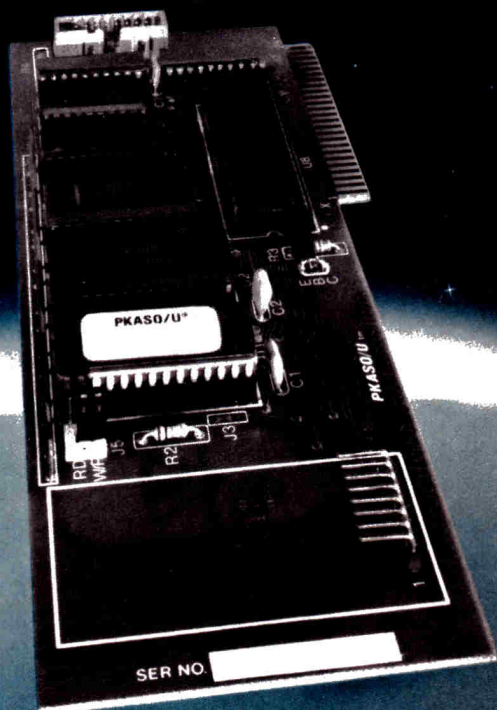
Woodhead: Isn't it? It's true, too. Nobody knows that. All the different monsters are like different stocks. The data base is very complex. There are bits and functions in there that we thought, in the original game, we would use all the time. In fact, we have never used many things that certain items and monsters can do.

inCider: Will you use them in future scenarios?

Woodhead: You never know. There is some strange stuff in that program. Probably about a quarter of that program is lying dormant in any particular scenario.

Once we get through that stage of development, we've got a scenario data base and a program. Then, we go through the testing phase. The first couple of Wizardry scenarios had a couple of buggies in them. Nothing serious, nothing life-threatening, but glitches. Now, we're real paranoid about that. We go through an alpha, beta,

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Wizards' Apprentices

A remarkable number of cottage industries offer aids in playing maze games. You often find them hidden in the classified ads of *inCider* and other magazines. Here is a list of some offering help to souls lost in the Wizardry universe.

A-Maze-Ment Grafix

P.O. Box 963
La Mesa, CA 92041
Maps: \$7.95 all three scenarios

Aspen Apple Software

P.O. Box 1962
Boulder, CO 80306
Maps: \$3 each scenario

Datamost

8943 Fullbright Avenue
Chatsworth, CA 91311
WizPlus: \$39.95
(character editor, maps)

Stanley Kaspar

4932 North Ridgeway
Chicago, IL 60625
Maps: \$3 each, \$7 all three

Lost Patrol Software

19240 McGill
Roseville, MI 48066
The Wizardry Roster: \$18
(data base of characters)

Doug MacLean

1655 East 19th Street
Brooklyn, NY 11229
Item Lists, Monster Lists:
\$5 per scenario

MagicSoft

529 Farragut Place
Danville, CA 94526
Wizard's Tool Kit #1:
\$29.99 (edit characters and scenarios)

Master Maze System

1404 South Ocean
Boulevard
Myrtle Beach, SC 29577
(803) 626-7316
Maps and Hints: \$6 each scenario
Master Manual: \$12

Nichols Services

6901 Buckeye Way
Columbus, GA 31904
(404) 323-9227
Wizisystem: \$15 (strategy manual)
Maps: \$5 each scenario
Wizmaster: \$17.50
(character editor)
Wiznews: \$10 for 4 issues
(newsletter)

Quantum

106 East Washington
Coleman, MI 48618
Legacy Breaker: \$20
(character editor)

Spidersoft

P.O. Box 757
Muldraugh, KY 40155
The Spider's Revenge:
\$16.45 (character editor, maps)

Time Awaits

5304 Caminito Velasquez
San Diego, CA 92124
Maps and Hints: \$7.50 all three

gamma, and delta test. Each one lasts two or three weeks. They're done by different people.

The first is done in our office. The second is done by people outside the office. Then, the gamma and delta tests are done mostly in the office under supervision. By that time, assuming the marketing people have done their job, and the packaging and manuals are ready, the scenario comes out.

Why Wizardry?

inCider: Why do you think people are so interested in Wizardry?

Woodhead: Well, it's certainly a different type of game from other games on the market. I guess a synergy between both Andy and myself created this thing that's got a knack to it. Wizardry has been far more successful than either one of us dared to dream in our most megamaniacal dreams.

It's a genre of its own. Why are the Zork games popular? They are the best expression of a particular genre. Maybe Wizardry is that for our genre.

Favorite Games

inCider: What games do you play?

Woodhead: The two games I play are not on home computers. One is called Empire, on the Plato system. Anyone with an IBM PC can hook into Plato. Pretty soon, Apples will be able to hook into it. Plato is like The Source, only it uses a graphics terminal with programmable character sets and shapes. You can put detailed graphics images on the screen very quickly.

It's a beautiful strategy game, a combat game, an action game, and an arcade game. It works on all these levels. It's a wonderfully addictive game.

The other game I play, which I'm going to play this weekend, is not on a computer at all. It's called Rekon. You get about 50 people together and give them a briefing packet that tells what their character's role is, who he or she is, what their goals are, what their capabilities are, and what resources they have. Put these people together in a hotel or at a science fiction convention for three or four days, and let simmer. Let them role-play their characters. It's really tremendous.

Of Maps and Cheats

inCider: Many cottage industries provide Wizardry-related products. How do you feel about them?

Woodhead: Well, some of them are pretty harmless. The people providing maps, for example, I don't think are too much of a problem. I have my problems with people providing "cheat" programs. They don't truly understand what is going on in that data base that they're twiddling in. There is a good potential for them screwing up something very subtle.

I guess there is really nothing I can do about it. The way I have started to look at it is that it is very flattering. We were the first game that they did that to. Now they do it for Ultima and Zork.

Mice in the Maze

inCider: Are you going to expand to other computers?

Woodhead: Yes, when it's technically possible. There are technical problems with moving it to the Commodore and the Atari. The Commodore doesn't support Pascal properly and its disk is way too slow. The Atari's got similar problems and their disk storage isn't enough.

We have, in house, a version for the Texas Instruments Professional. We are probably going to release it. We have a few last things to put into it, but it's up and running in the office. The graphics look identical to the IBM PC version.

Right now, I'm working on the big thing for the fall—the Macintosh version of Wizardry. There's going to be full Mac-style interface: buttons, windows, dragging things around, and icons.

inCider: Is there an Apple //c in your future?

Woodhead: Oh, yes. Right now, we've got a version that uses a mouse or joystick. All three scenarios now have windows like the third one. You can use the mouse, drag a pointer around to the various windows, click on things. Also, it uses the extra 64K as a RAM disk to store the program.

That isn't quite working yet. There are some technical problems with it. It doesn't like the mouse, right now. I can either use the RAM or run the mouse. It's an interaction in the Pascal system, and we're having Apple track it down. We'll probably release everything in a big surge in October.

inCider: You've been surprised then at the success of Wizardry?

Woodhead: I thought a few people would buy it. I didn't write it to make money. I don't do things for that. But when it did, I said, "Hey, this isn't too bad." ■

The Return of Werdna

Just when you thought it was safe to go into your computer store, Sir-Tech Software has released the fourth Wizardry scenario: The Return of Werdna, or as it's sub-titled by insiders, "The Monsters Strike Back."

The Return of Werdna is a complete turn-around from previous stories. In this sequel to the third scenario, Legacy of Llylgamyn, the evil events and unresolved clues lead you back to the malevolent power of the wizard, Werdna. And you thought you had killed Werdna in the first game. Foolish mortal! His treachery lives on. Now you will find out what really happened.

You become the wizard Werdna. On the tenth level of the maze, you and five monster companions fight your way to the castle with vengeance in mind. Along the way you must battle the forces of good that get stronger as you near the surface. Be warned that Hawkwind is a tough opponent, and a totally new kind of character for Wizardry.

This latest scenario is principally written by Roe Adams III with Wizardry's founding fathers, Andrew Greenberg and Robert Woodhead. Woodhead describes the fourth scenario as a three-way collaboration. "Roe is doing the original story and I'm doing the technical modifications to make the story work. Andy [Greenberg] is between

us telling Roe that something can't be done and telling me I've got to do it," Woodhead says.

Robert Sirotek of Sir-Tech Software warns that this is an expert scenario. "You really have to know what you are doing," he says, "to survive in this one." He calls it a mirror scenario, since you are the villain—a role reversal from the other scenarios.

Return is the most technically advanced game in the series. You need the first scenario, Proving Ground of the Mad Overlord, to create characters. Then you move on to Windo-Wizardry, which is similar to Legacy. Game information appears in Macintosh-style windows on top of the original scene.

The new maze consists of ten levels. All the objects, weapons, and shields are new. Although the spells are the same, many are used in novel ways. The game supports the keyboard, joystick, or mouse. It runs on any Apple II, but if you have a //c or //e with 128K, the game automatically uses the extra memory for faster operation.

Woodhead promises, "It's like no other Wizardry scenario." Greenberg hints, "It will lead toward, though it will probably not be in the fourth scenario, a very surprising and somewhat apocalyptic ending." □



Capturing Big Games

by Kerry J. Lanz, inCider staff

Saved screens make excellent trophies: souvenirs of the great battle with Exodus or a captured floor-plan from Championship Lode Runner that helps you develop strategies for the next foray. Frame a photo of the bunker explosion from Beyond Castle Wolfenstein to prove your claim to victory. Spruce up your own graphics with some Wizardry monsters. All these are within your reach with Screen Saver.

The basic problem in saving game scenes is control: You must have control of your Apple and your DOS must be in memory. When you play a game, however, the game's program and DOS have control. Sometimes, a simple reset snatches control. Other times more powerful techniques are neces-

Hear about the one that got away? Now you can capture those stunning graphics and "bring 'em back alive."

sary. The methods outlined here give you a tool to save any screen you want and two ways to wrest control.

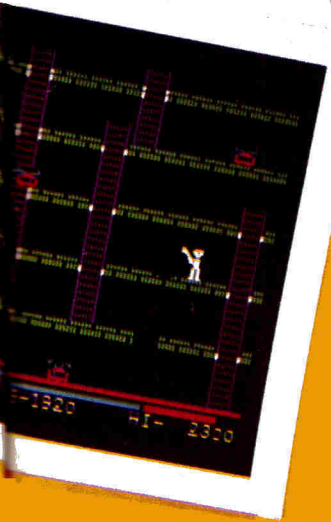
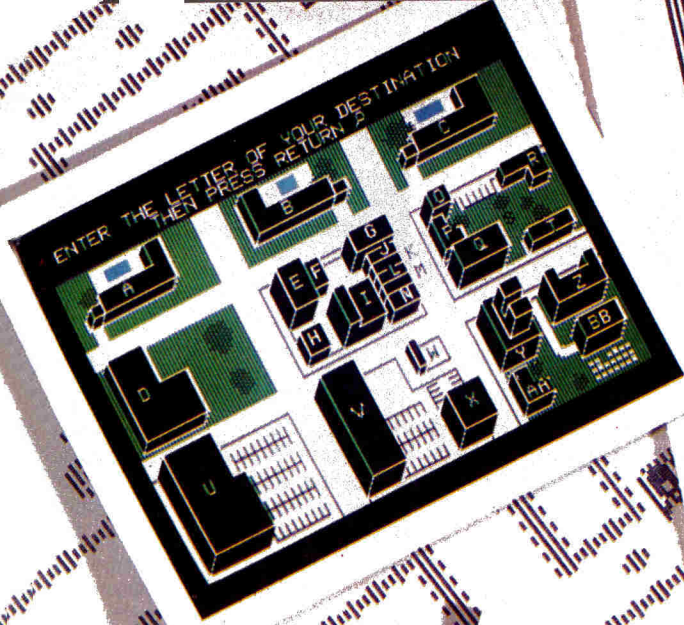
The Screen Saver Disk

Hunting big games requires the right DOS and the right program. These are the two parts of your Screen Saver disk, and the two methods I describe require this disk. Making this disk is simple and requires only a blank disk and half-an-hour.

Two kinds of DOS 3.3 disks exist: slave and master. A master disk fills the hi-res graphics area with garbage

when it boots; a slave disk boots without messing up this area. Other differences are too technical and therefore are not necessary for the game hunt. (Sorry, ProDOS users, I have yet to get ProDOS to boot and respect the hi-res area of memory. Any suggestions?) First boot a DOS 3.3 disk and then put a blank disk in the drive. Type INIT HELLO. Now you have a slave disk with the program Hello in the catalog. This is your weapon for the hunt, now for the ammunition.

Screen Saver is a straightforward program written in Applesoft BASIC.



It runs on the entire Apple II family and controls showing and saving the hi-res graphics screens. There are lots of REMs and no fancy logic. Screen Saver POKes the correct memory locations to show either hi-res page. Then, it will save either screen under the name you give it. A disk catalog shows names already used. You can save the screen as a simple binary file that any screen-dump or graphics program can handle.

You should examine both screens

because games can use either or both. Some games use an animation technique called page-flipping: While you observe one screen, the game draws a new picture on the other screen, then, as you look at the second screen, it redraws the first. By doing this quickly, the game gives the illusion of animation.

I found such a situation in Pooyan, from Datasoft. This game uses page-flipping, and I once had to choose between two very different screens. One page included an arrow approaching its target, a balloon. The other page had no balloon or arrow, just the number "200" showing points awarded for popping the balloon. By looking at both screens, I could choose the more dramatic.

Type in Screen Saver from the **Program listing**. Try it to make sure no typing errors are present. Press 1 and 2 to flip between the screens and com-

pare them; press any other key to return to the menu. You can save either screen, catalog your disk, or exit the program. When you are confident it works, save it as Hello on your slave disk. You are now ready to go on safari in search of the big game.

The Reset Method

About half the games on the market (such as Pooyan, Miner 2049er, Castle Wolfenstein, and The Heist) let you use the reset method. Pressing reset interrupts the game and either reboots the disk or puts you into Applesoft BASIC. If you have exchanged the game disk with your Screen Saver disk, you can take control of the computer without erasing the screens.

The advantage of the reset method is that it is free. The disadvantage of this method is that it works only half the time. Many games disable reset as part of their copy-protection; other games erase the hi-res screens when you hit reset. Consequently, these games require other techniques. I'll give you all the information you need to save screens quickly and efficiently.

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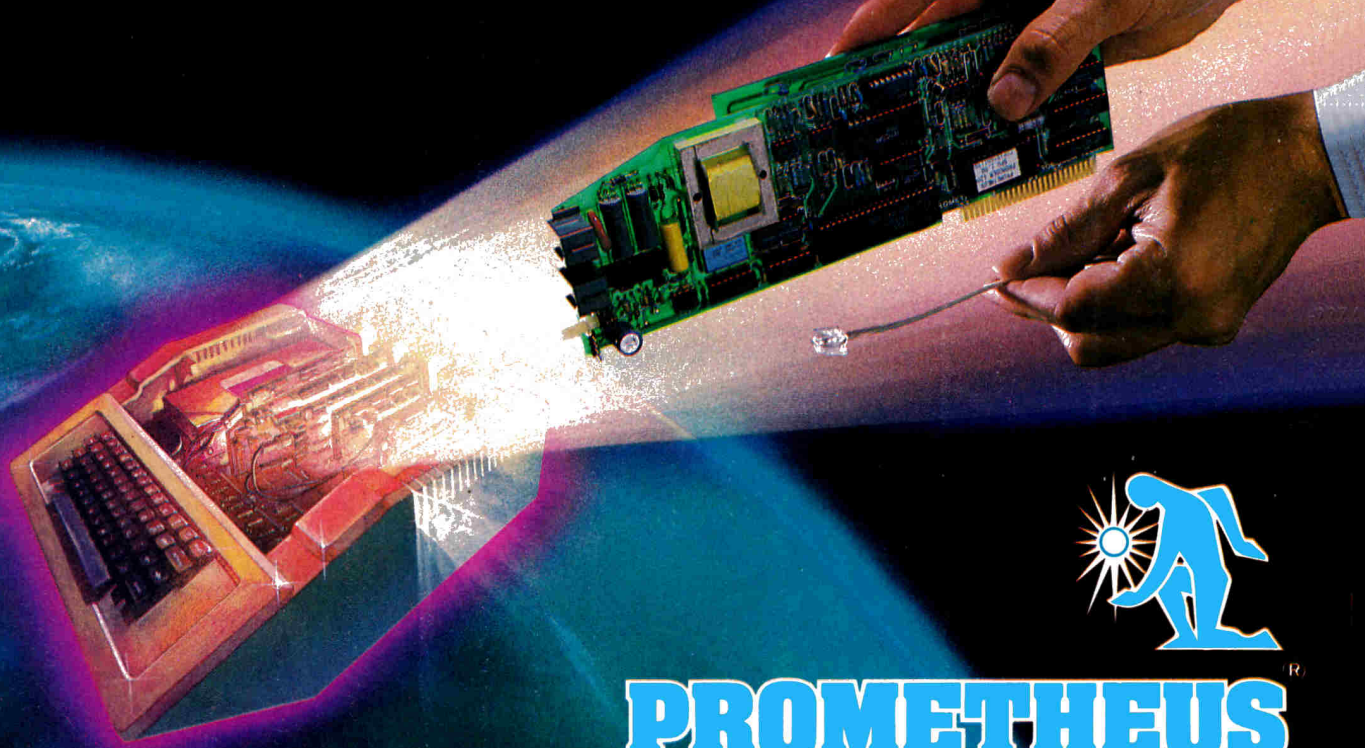
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the reset key soon after you start playing. If you can successfully interrupt it and get the disk to boot, then you have a candidate for the reset method. To capture screens, substitute your Screen Saver disk for the game disk just before you hit the reset key. You will get control of the computer and control of the hi-res screens from the game.

Printer Card Method

Another solution is using a printer interface card, such as FingerPrint or Print-It. These cards let you interrupt a program, print any screen (text or

graphics), and then resume the program. I tried FingerPrint. It's a truly marvelous card. However, all I needed this time was its interrupt ability, rather than its substantial printer uses.

Install the card according to instructions. FingerPrint's external button stops the program and gives you control. Pressing the 6 key sends you to the monitor, which displays the asterisk (*) prompt. Put your Screen Saver slave disk in the drive, type C600G, and press the return key. The disk boots and you can examine and save the screens.

Advantages of this method are reliability (it always works) and simplicity. Everything is done with keyboard commands and only one disk exchange occurs. Another advantage is that the FingerPrint becomes part of your system, so you can find many uses for its printer control. The chief disadvantage is that hardware costs money that I would rather spend on games. Ah, the burdens of a big game hunter!

On with the Hunt

You now have everything required for capturing big game screens. The Screen Saver disk is your weapon; the two techniques, your fortification. Only your imagination will limit your uses of these saved screens. They will become decorations for home and office, valuable tools in planning your way through a maze, and raw materials for your own graphics work. ■

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Program listing. Screen Saver.

```

94 REM *****
95 REM *
96 REM * SCREEN SAVER *
97 REM *
98 REM *****
99 REM
100 TEXT : HOME : NORMAL
105 T = - 16303: REM TEXT
110 G = - 16304: REM GRAPHICS
115 P(1) = - 16300: REM PAGE 1
120 P(2) = - 16299: REM PAGE 2
125 A(1) = 2000: REM HEX PAGE 1
130 A(2) = 4000: REM HEX PAGE 2
135 KB = - 16368: REM KEYBOARD
140 Z = - 16336: REM SPEAKER
145 POKE - 16297,0: REM HI-RES
150 POKE - 16302,0: REM FULL PAGE
197 REM
198 REM TITLE
199 REM
200 INVERSE
205 FOR K = 1 TO 5
210 VTAB K: HTAB 14
215 PRINT SPC(14): NEXT
220 VTAB 3: HTAB 15
225 SPEED= 100
230 PRINT "SCREEN SAVER"
235 SPEED= 255: NORMAL
240 POKE 34,6: REM LOWER TOP
297 REM
298 REM MAIN MENU
299 REM
300 HOME
305 PRINT " 1. SHOW PAGE 1": PRINT
310 PRINT " 2. SHOW PAGE 2": PRINT
315 PRINT " 3. SAVE PAGE 1": PRINT
320 PRINT " 4. SAVE PAGE 2": PRINT
325 PRINT " 5. CATALOG DISK": PRINT
330 PRINT " 6. EXIT PROGRAM"
335 VTAB 20: HTAB 20
340 POKE KB,0: GET K$:K = ASC (K$)
345 IF K < 49 OR K > 54 THEN 340
350 K = K - 48: PRINT
355 ON K GOSUB 400,400,500,500,375,390
360 GOTO 300
375 GOSUB 600
380 PRINT CHR$(4)"CATALOG": PRINT
385 HTAB 20: GET K$: GOSUB 600: RETURN
390 TEXT : GOSUB 600: END
397 REM
398 REM SHOW SCREEN
399 REM
400 GOSUB 600
405 POKE P(K),0: POKE G,0
410 POKE KB,0: GET K$
415 IF K$ = "1" THEN K = 1: GOTO 405
420 IF K$ = "2" THEN K = 2: GOTO 405
425 POKE T,0: POKE P(1),0
430 RETURN
497 REM
498 REM SAVE SCREEN
499 REM
500 INPUT "NAME OF SCREEN: ";K$
505 IF K$ = "" THEN RETURN
510 PRINT CHR$(4)"BSAVE";K$;"A$";
515 PRINT A(K - 2);";L$2000"
520 GOSUB 600
525 RETURN
597 REM
598 REM SCREEN WIPE
599 REM
600 FOR W = 1 TO 40
605 POKE 33,W
610 HOME :X = PEEK (Z) + PEEK (Z)
(Z) + PEEK (Z)
615 NEXT : RETURN

```

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FAST TRACKS



by Mark Larsen

Fast Tracks is a hi-res game for two players. Each player moves horizontally or vertically on a field, leaving a trail. Players must avoid crossing the edges of the playing field or either trail. The winner receives two points, and each player receives one point in a tie. After each round the score is given; after the number of rounds entered in the game set-up, the winner is announced.

The BASIC program, FAST TRACKS (**Listing 1**), loads the machine-language program, TRACKS (**Listing 2**), and sets up the game: color, speed, and number of rounds. It also shows which keys on the keyboard each player must press to move in any of the four directions. The machine-language program is the actual game. CALL 24576 calls the machine-language program (BSAVE TRACKS,A\$6000,L\$202) from the BASIC program (SAVE FAST TRACKS).

The listings aren't long, so type them in and make some tracks. ■



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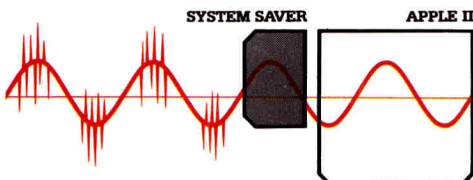
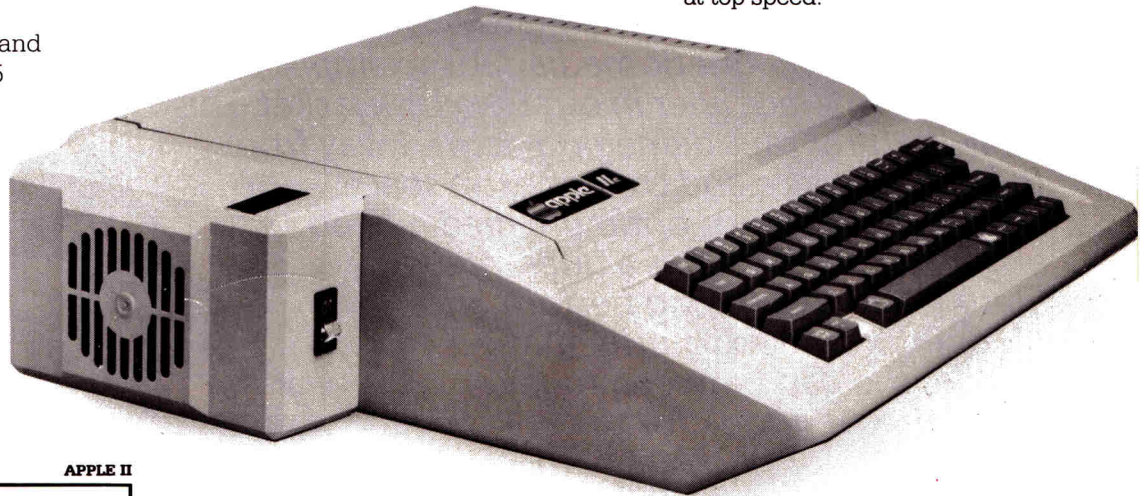
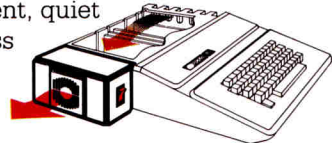
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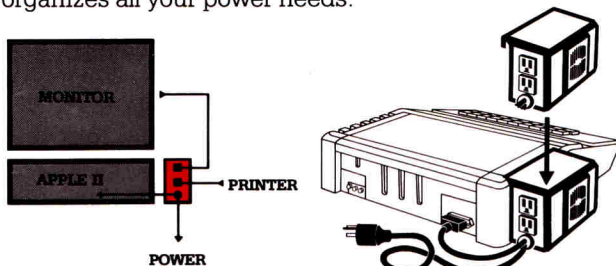
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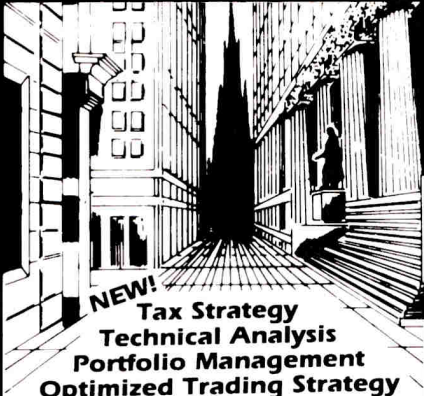
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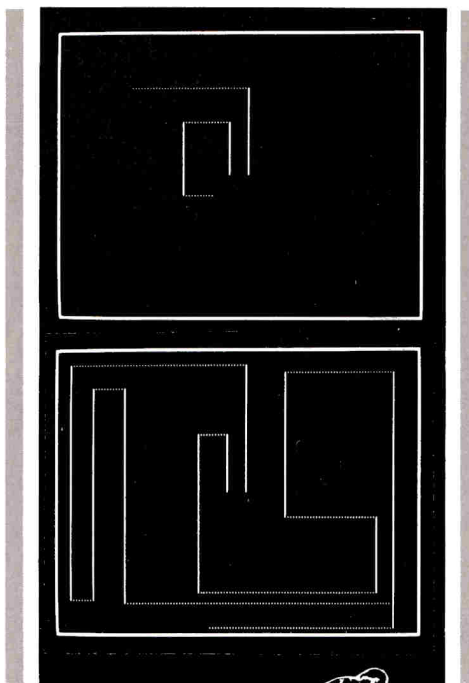
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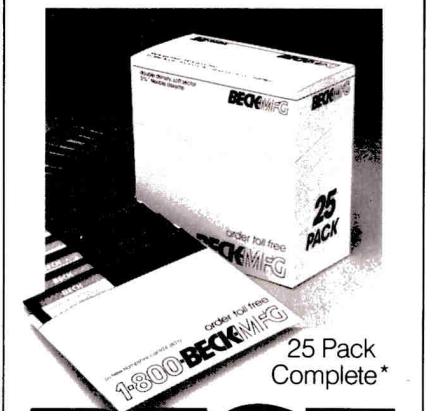
Software for 48K Apple II series computers.
Apple is a registered trademark of
Apple Computer Company.



Listing 1. FAST TRACKS.

```

10 HOME : PRINT "PROGRAM : FAST
   TRACKS": PRINT : PRINT "WRIT
   TEN BY: M.S. LARSEN": PRINT :
   PRINT "CREATED : 1984/10/4
   ": FOR T = 1 TO 3000: NEXT
20 PRINT CHR$(4)"BLOOD TRACKS"
30 HOME : INVERSE : HTAB (15): PRINT
   "FAST TRACKS": NORMAL : PRINT
   : PRINT : PRINT "PLAYER 1": HTAB
   (30): PRINT "PLAYER 2": PRINT
   : PRINT : PRINT
40 PRINT " W": HTAB 33: PRINT
   "P": PRINT : PRINT : PRINT "
   A S": HTAB 16: PRINT "<-KE
   YS->": HTAB 31: PRINT "L "
   ": PRINT : PRINT : PRINT "
   Z": HTAB 33: PRINT ".": PRINT
50 PRINT "DO YOU HAVE COLOUR (Y/N
   )? ": GET T$: IF T$ = "Y" THEN
   POKE 25034,85: GOTO 70
60 POKE 25034,127
70 PRINT T$: PRINT : INPUT "ENTER
   SPEED (1-255) 1=FAST ":S: POKE
   24939,S: PRINT : INPUT "ENTER
   THE AMOUNT OF COMBATS ":C: FOR
   Q = 1 TO C: PRINT : PRINT : PRINT
   "PRESS <SPACE BAR> TO START "
   : GET T$: GET T$
80 CALL 24576: FOR Y = 1 TO 1000:
   NEXT : TEXT : HOME : IF PEEK
   (776) = 0 AND PEEK (777) = 0
   THEN P1 = 2
90 IF PEEK (778) = 0 AND PEEK (
   779) = 0 THEN P2 = 2
100 IF P1 = 0 AND P2 = 0 THEN P1 =
   1:P2 = 1
110 S1 = S1 + P1:S2 = S2 + P2:P1 =
   0:P2 = 0: PRINT "PLAYER 1 = "
   :S1: HTAB 20: PRINT "PLAYER
   2 = ":S2: NEXT : PRINT : PRINT
   : FLASH : IF S1 > S2 THEN PRINT
   "PLAYER 1 WON"
120 IF S1 = S2 THEN PRINT "TIE"
130 IF S2 > S1 THEN PRINT "PLAYE
   R 2 WON"
140 NORMAL : PRINT : PRINT : GET
   T$: INPUT "DO YOU WANT TO PLA
   Y AGAIN (Y/N)":T$: IF T$ = "
   N" THEN END
150 S1 = 0:S2 = 0: GOTO 30
  
```



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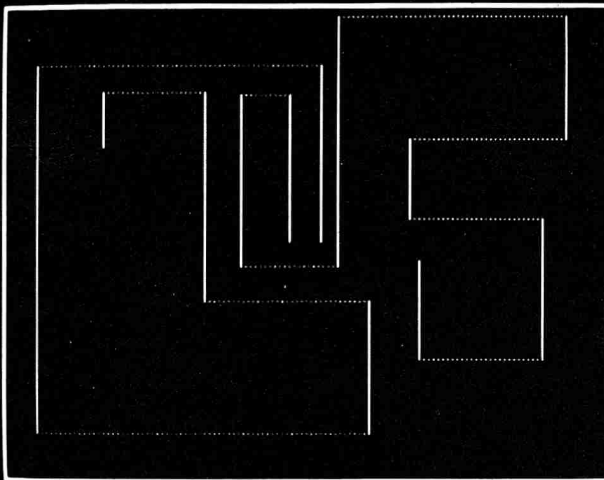
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Listing 2. TRACKS.

6000- AD 57 C0 AD 54 C0 AD 52
6008- C0 AD 50 C0 A9 20 85 E6
6010- 20 F2 F3 A9 78 8D 00 03
6018- A9 84 8D 02 03 A9 60 8D
6020- 01 03 8D 03 03 A9 01 8D
6028- 04 03 8D 06 03 A9 00 8D
6030- 05 03 8D 07 03 8D 08 03
6038- 8D 09 03 8D 0A 03 8D 0B
6040- 03 8D 0C 03 A9 7F 85 E4
6048- A9 00 A2 00 A0 00 20 57
6050- F4 A9 FF A2 00 A0 00 20
6058- 3A F5 A9 FF A2 00 A0 BF
6060- 20 3A F5 A9 00 A2 00 A0
6068- BF 20 3A F5 A9 00 A2 00
6070- A0 01 20 3A F5 A9 FE A2
6078- 00 A0 01 20 3A F5 A9 FE
6080- A2 00 A0 BE 20 3A F5 A9
6088- 01 A2 00 A0 BE 20 3A F5
6090- A9 01 A2 00 A0 02 20 3A
6098- F5 AD 00 03 8D 0D 03 AD
60A0- 01 03 8D 0E 03 AD 02 03
60A8- 8D 0F 03 AD 03 03 8D 10
60B0- 03 20 64 61 C9 D0 D0 09
60B8- A2 01 8E 06 03 CA 8E 07
60C0- 03 20 64 61 C9 AE D0 09
60C8- A2 01 8E 06 03 E8 8E 07
60D0- 03 20 64 61 C9 CC D0 09
60D8- A2 01 8E 07 03 CA 8E 06
60E0- 03 20 64 61 C9 BB D0 09
60E8- A2 01 8E 07 03 E8 8E 06
60F0- 03 20 64 61 C9 D7 D0 09
60F8- A2 01 8E 04 03 CA 8E 05
6100- 03 20 64 61 C9 DA D0 09
6108- A2 01 8E 04 03 E8 8E 05
6110- 03 20 64 61 C9 C1 D0 09
6118- A2 01 8E 05 03 CA 8E 04
6120- 03 20 64 61 C9 D3 D0 09
6128- A2 01 8E 05 03 E8 8E 04
6130- 03 18 AE 04 03 CA 8A 6D
6138- 00 03 8D 00 03 18 AE 05
6140- 03 CA 8A 6D 01 03 8D 01
6148- 03 18 AE 06 03 CA 8A 6D
6150- 02 03 8D 02 03 18 AE 07
6158- 03 CA 8A 6D 03 03 8D 03
6160- 03 4C 70 61 AD 00 C0 8D
6168- 30 C0 A0 FE 88 D0 FD 60
6170- AD 01 03 AE 00 03 A0 00
6178- 20 B5 61 8D 08 03 AD 01
6180- 03 AE 00 03 A0 00 E8 20
6188- B5 61 8D 09 03 AD 03 03
6190- AE 02 03 A0 00 20 B5 61
6198- 8D 0A 03 AD 03 03 AE 02
61A0- 03 A0 00 E8 20 B5 61 8D
61A8- 0B 03 AD 0C 03 C9 01 D0
61B0- 01 60 4C C9 61 20 11 F4
61B8- A5 30 31 26 C9 00 F0 06
61C0- A9 01 8D 0C 03 60 A9 00
61C8- 60 A9 7F 85 E4 AD 0E 03
61D0- AE 0D 03 A0 00 20 57 F4
61D8- AD 0E 03 AE 0D 03 A0 00
61E0- E8 20 57 F4 A9 2A 85 E4
61E8- AD 10 03 AE 0F 03 A0 00
61F0- 20 57 F4 AD 10 03 AE 0F
61F8- 03 A0 00 E8 20 57 F4 4C
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July 4th, 1984

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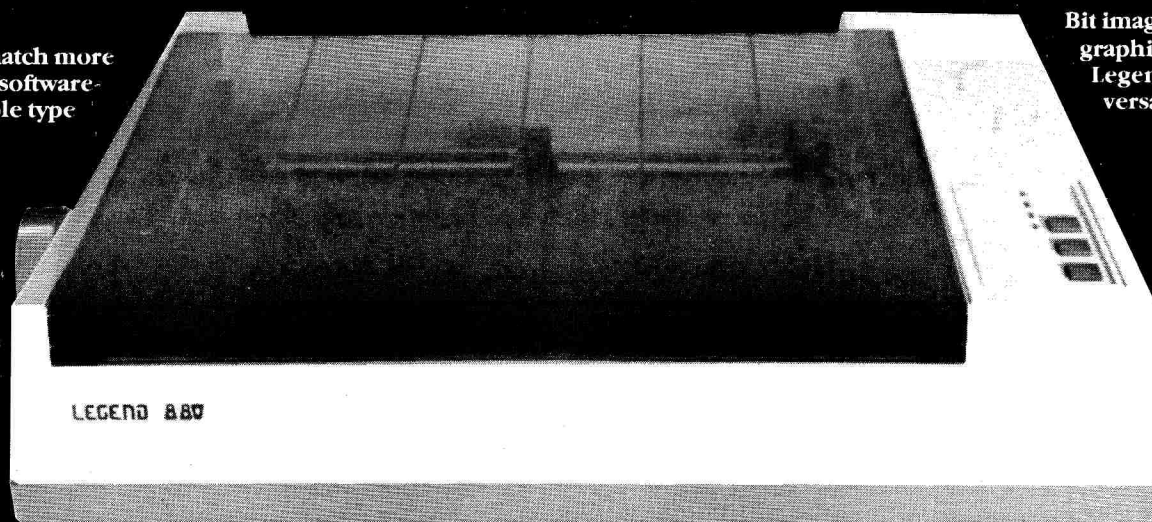
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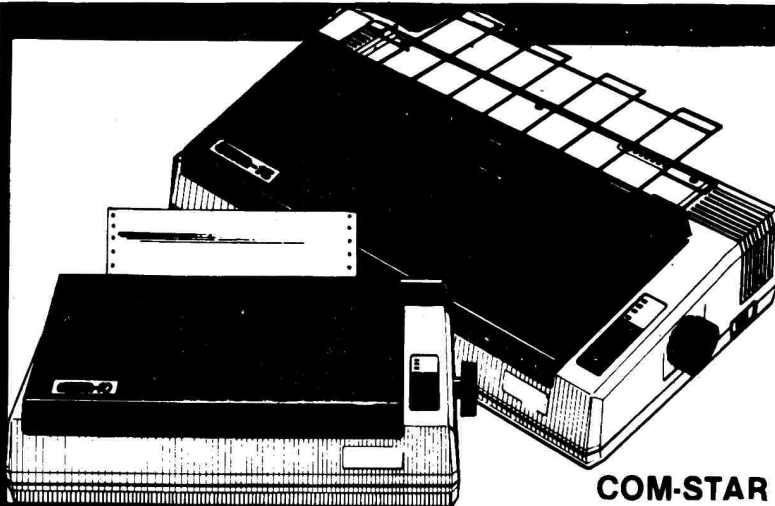
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Priceless Data Bases

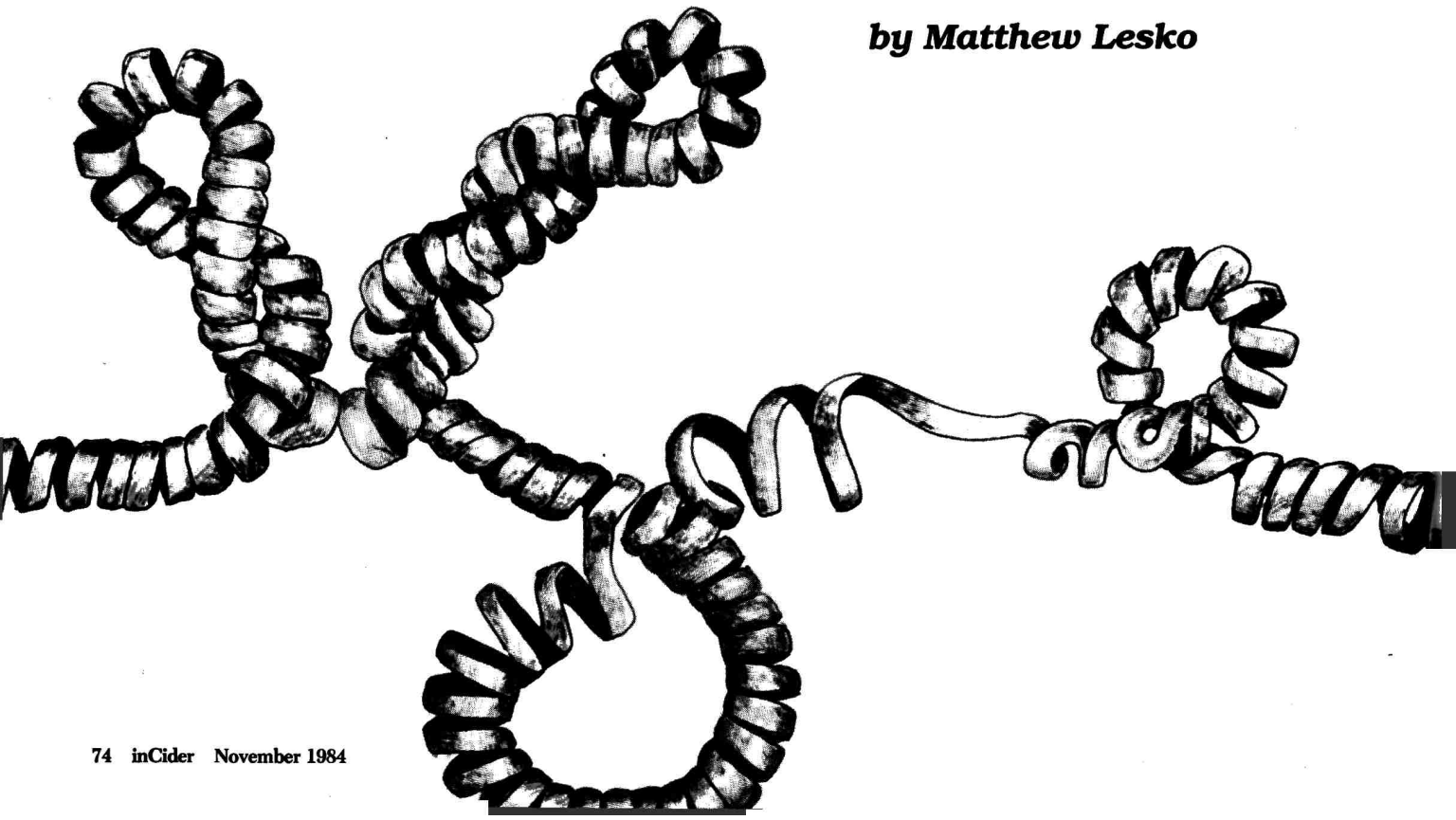
Why pay more for expensive data bases when free and low-cost

CompuServe and The Source are to the telecommunications industry what Coke and Pepsi are to the soft drink market. They're the big names when you're looking for an on-line information service. Granted, they boast extensive subject indexes covering topics from astrology to worldwide exchange. But they can be expensive. Both services charge subscribers a one-time membership fee and bill for the time on the system. Using CompuServe, for instance, costs as much as \$15 per hour—before phone bills.

You don't need to spend a small fortune on services to hook-up to the outside world. A wealth of information lies at your fingertips for nothing—or next to nothing. Free and low-cost data bases are available. Just ask Matthew Lesko. He makes it his business to track down everything your modem can tell you. As president of Information USA, a data service that assists businesses in computer decision making, Lesko shows you where to tap into free and low-cost data bases. Lesko's work led him to establish Washington Researchers in 1975 and to write five information books—two of which reached *The New York Times* bestsellers list.

Lesko has compiled for *inCider* a collection of new, little-known data bases that are at your disposal. Here's a step in the right direction toward declaring your "right to know." ■

by Matthew Lesko



for (Almost) Nothing

information services can keep you and your modem busy—for less.

Career Information

Give your job search a boost with free on-line career information that describes job openings in library automation and related on-line disciplines throughout the United States and Canada. Also on file is a directory of on-line employment sources, job-lines, and hotlines. Job openings remain on-line for 30 days, and there is no charge for listing employment opportunities or for accessing the data base. Contact Information Intelligence, Inc., P.O. Box 31098, Phoenix, AZ 85046, (602) 996-2283.

Data-Net

Data-Net's consumer service beats The Source and CompuServe by charging only \$3.90 per hour during off-hours, while The Source charges \$7.75 per hour and CompuServe bills \$6 per hour. Data-Net's prime-time rate, however, is \$25 per hour versus The Source's \$20.75 per hour and CompuServe's \$12.50 per hour. Another benefit of this new service is that there is no initiation fee. The Source charges \$100 up front and CompuServe costs \$39.95 or \$89.95. Data-Net services include user electronic publishing, stock market information, computer newsletters, weather information, an on-line dictionary, electronic shopping, real estate listings, and games and programs. Data-Net, Inc., is located at 4515 Culver Road, Rochester, NY 14622, (716) 323-1141.

GTE Telenet

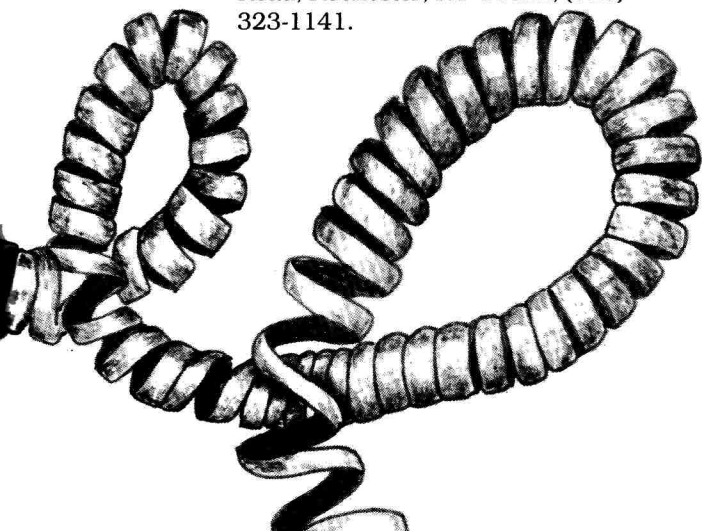
A free data base directory from Telenet describes more than 300 on-line data bases as well as 140 data base vendors and computer service companies that use Telenet services. A separate section identifies dozens of companies that offer business application software in such areas as cash management, data base management, and financial analysis. Contact GTE Telenet, 8229 Boone Boulevard, Vienna, VA 22180, (800) 835-3638 or (703) 442-1000 in Virginia.

Computer Technology Data Bases

Two free computer technology data bases will keep you up to date on conferences, articles, and literature about new standards and technology for computers and software. One data base evaluates computer performance; the other focuses on microprocessors. Contact Shirley Radack, Institute for Computer Sciences and Technology, A209 Administration Building, National Bureau of Standards, Washington, DC 20234, (301) 921-2731.

General Videotex's Delphi Service

The best value in on-line encyclopedias, the *Kussmaul Encyclopedia* on General Videotex's Delphi Service (Cambridge, MA), charges \$6 per hour at night with an initial fee of \$49.95 for using its data bases. Among the more expensive data bases, Grolier's *Academic American* on BRS (Latham, NY), costs \$55 per hour during prime time. CompuServe (Columbus, OH) and Dow Jones (Princeton, NJ) also carry Grolier's; Mead Data Central (Dayton, OH) carries the *Encyclopaedia Britannica*.



"You don't need to spend a small fortune on services to hook up to the outside world."

Searchmart's Software Library

This free software search service offers help in games, education, graphics, programming, communications, general business, home and personal markets, and specific business markets. Each entry provides a program description as well as price and purchasing information. Use your modem to call Searchmart Corporation's On-line Software Library at (305) 845-6466, or contact them at 745 U.S. Highway 1, North Palm Beach, FL 33408, (305) 845-2996.

NASA Awareness Data Base

All you ever wanted to know about NASA space activities is free through a modem call. Dial (713) 483-4115 for a current awareness data base containing the latest on space shuttle activities including crew wake-up and sleep times, communication satellites, and scheduled NASA press conferences. If you want further information about NASA services, call (713) 483-3111.

Plant-Site Selection

A free hook-up to a plant-site selection data base offers demographics, tax information, union and labor profiles, and numerous characteristics of domestic and foreign cities, counties, and states. You can even call at no charge from 500 cities. Contact Conway Data, Inc., 1954 Airport Road NE, Atlanta, GA 30341, (800) 554-5686 or in Georgia, (404) 458-6026.

Matthew Lesko, president of Information USA, Inc., also writes the Money-Gram column for Good Housekeeping. For a free copy of his quarterly newsletter on computer data bases, write to Information USA, Inc., 12400 Beall Mt. Road, Potomac, MD 20854, or call (301) 983-8220.

National Meteorologic Center

A free weather data base helps predict short-term climate conditions throughout the world. Temperature, precipitation, weather indexes, heating and cooling days, energy conditions, climate assessments for crops, and other weather-related information are continually updated with reports from 8000 stations across the world. Commercial data bases charge up to \$90 per hour for the same data. Write or call Mr. Patterson, NOAA, National Meteorologic Center, W353, WBBB, Room 201, Washington, DC 20233, (301) 763-8071.

Alternative Fuels Data Bank

With a free hook-up to the Alternative Fuels Data Bank you can instantly access information about alternative fuels including publications, ongoing research activities, and topical discussions. Get in touch with Russell Simkis or Carol Morrison, National Institute for Petroleum and Energy Research (NIPER), Alternative Fuels Data Bank, Bartelsville Energy Technology Center, P.O. Box 2128, Bartelsville, OK 74005, (918) 336-2400.

Sharp's Financial and Economic Newsletter

Learn more about financial data bases with a free subscription to I.P. Sharp's *Financial and Economic Newsletter*. A sales tool that describes its new files and services, the newsletter is well done and worth the time for those interested in financial and economic data. For more information about the *Financial and Economic Newsletter*, write to I.P. Sharp Associates, Ltd., 2 First Canadian Place, #1900, Exchange Tower, Toronto, Ontario, M5X 1E3, Canada, (416) 364-5361.

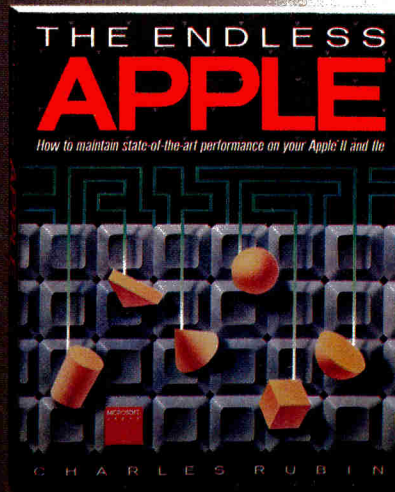
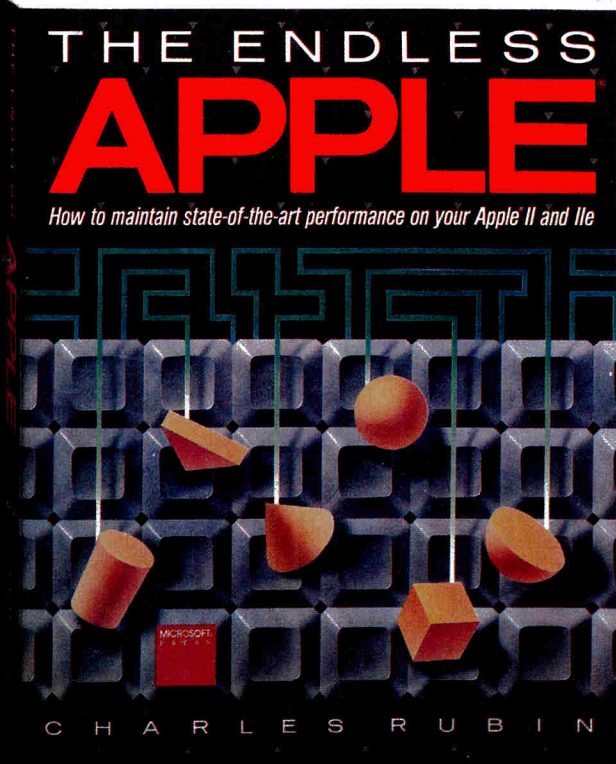
YESTERDAY...TODAY...TOMORROW

Now you can realize the latest in performance and technology on Apple II and IIe computers. *The Endless Apple* offers you detailed information for dozens of cost-effective and convenient hardware and software options that will transform your Apple from a workhorse to a thoroughbred. Charles Rubin, contributing editor to *Personal Computing* magazine, shows you how each enhancement works and how it compares in terms of price and ease of use.

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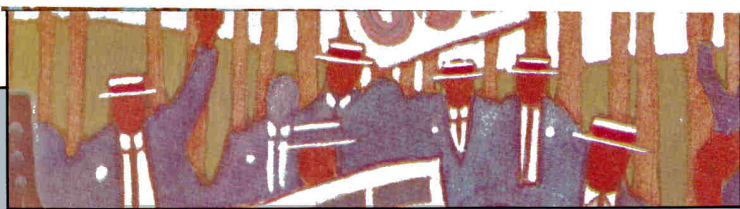
STUMPING *with* MICROS

*In new generation politics
candidates choose Apples
for running mates.*

Real-time presidential power is no simulation game (see *inCider*, March 1984, p. 60). Now more than ever before, Apple users are finding they can influence actual, as well as mock, campaigns and elections through strategies microcomputers have made possible.

Computerized campaigning itself isn't an innovation. The old generation computers accomplished much of what micros do today: routine functions, mass mailings, soliciting funds, and record-keeping. Mainframes have played an important role in major races since 1972 when George McGovern entrusted his fund-raising operation to Montgomery Ward's mail catalogue king, Morris Dees, who used computers to raise millions.

by Rodney N. Smith



“John Sculley, Apple’s president, wants the public to envision the //e as an appliance, not something in the realm of intimidating high technology.”

Mainframes, however, were huge and expensive—unaffordable for most political candidates in the United States. Stanley Foster Reed, publisher of *Campaigns and Elections*, the “how-to” magazine of American politics, says that each election cycle fills about 500,000 positions. He estimates that only one-third of the 750,000 candidates who run for these positions can raise and spend substantial amounts of money. Of the estimated \$5 billion total national campaign budget in 1982, the average campaign spent only about \$20,000.

In this context, micros are important because they can do as much as and perhaps even more for a local campaign than mainframes can do for a presidential campaign. Depending on the hardware and software, a campaign can easily buy its own system for less than \$6000. Since most candidates run for office more than once, that cost can be spread over a number of campaigns.

Many factors have contributed to the proliferation of microcomputers in political campaigns. The low cost, as I’ve just mentioned, is one of the most important. With an Apple //c costing \$1295 and the appropriate software about \$500, the availability of Apples is likely to explode. Of course, this is still a lot of money for most campaigns—too much for some of them. As an alternative, some campaigns, such as Senator Alan Cranston’s (D-CA) bid for the presidential nomination, rent microcomputers.

Market Acceptance

With wide market acceptance even cheaper alternatives exist: Supporters lend their computers to campaigns (sometimes on a part-time basis) or the candidate uses his or her own computer. For example, Patt Watt, a

candidate for Chairman of the Fairfax County, Virginia, Board of Supervisors in 1983, estimated that her campaign used about six hours of computer time daily. Additionally, supporters volunteer their services to type in vital data. All this is done at little cost to the candidate or the campaign.

Ease of Use

Ease of use is also important for political campaigns, so John Sculley, Apple’s president, wants the public to envision the //e as an appliance, not something in the realm of intimidating high technology. Therefore, familiarizing volunteers with computers involves training them quickly and having them spend a few hours every day programming data. The result is that with most universal political software packages, volunteers can produce letters in as little as 15 minutes after an hour on a machine.

This growing universality of Apples in particular makes them ideal candidates for computerizing a campaign. For example, Dave Masselli, Gary Hart’s Director of Technical Operations, incorporated //e’s into campaign operations from the start after finding that many volunteers knew how to perform feats with them.

Security

Another reason campaigns are turning to micros is security. Masselli stored in his computer the names and addresses of and vital information about 4000 delegates to the Democratic National Convention, and kept track of staff and supporters nationwide. All these factors have convinced Reed at *Campaigns and Elections* that 90 percent of all computer-oriented political campaign action will come from micros in the next few years.

Uses of Microcomputers

Several universal political software packages for micros already do exist. Of these, statistical software is useful in merging and analyzing polling results and voter behavior information. This information tells a pollster specific things the campaign needs to know about particular voter groups, and it can alert candidates to problems and districts needing special attention.

This software doesn’t have to be sophisticated to have an impact on local elections. One of the first documented instances of an Apple swinging an election occurred in the tiny mountain town of Bozeman, Montana, in April 1981. When local voters defeated a referendum for building a new elementary school, dermatologist Dr. John Tkach used his Apple to merge a list of all 550 registered voters with a list of parents with school-age children. These targeted voters consequently gave their support for the school and reversed the election results in June.

The telecommunications network also relies on microcomputers. Each campaign designs a schedule format to suit its individual needs. This design includes advance work, special contacts, and background notes, and manages a candidate’s busy schedule to avoid embarrassing foul-ups. Remembering every voter is impossible, but a candidate portrays a better image if he appears to know his audience. Computers help maintain this illusion. In Hart’s campaign, for example, the //e sent dozens of pages of speeches, position papers, and scheduling information to the campaign plane. Normally, ground staff can communicate with the travelling party only when the plane has landed.

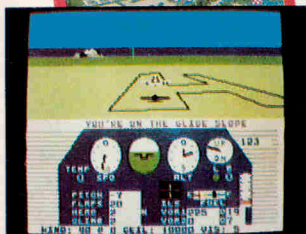
Campaign Manager

One particular political software package, Campaign Manager, is Apple-compatible. John Phillips, head of Aristotle Industries in Rowayton, Connecticut, with the aid of his brother Dean, wrote the program after two unsuccessful congressional campaigns for which he had hired mainframe services. In 1983, Phillips’ system aided Thom Serrani in winning his bid for mayor of Stamford, Connecticut. Serrani’s campaign manager, George Jepsen, claims that “the polling, direct mail, and fund raising . . . paid for the system and we won an upset victory in the primary.”

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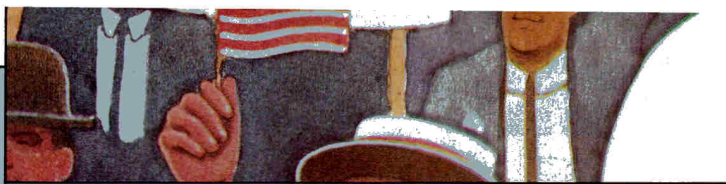
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“Fund raising is crucial in all campaigns. Money cannot buy elections, but it is the cost of admission.”

Raising and Spending Funds

Fund raising is crucial in all campaigns. Money cannot buy elections, but it is the cost of admission. Without it, candidates cannot convey their message to voters. Some ways of raising money are more successful than others. Computers can keep track of which events work best for a candidate, which contributors (for example, personal friends or institutional donors like PACs) give the most, or where the money comes from geographically. The ability to analyze this information instantly helps any campaign increase its funds.

Direct mail is one popular way to raise money. Rob Smith of Craver, Matthews, Smith, the liberal direct mail firm, says that even a very successful direct mail campaign brings in only a 2 percent return and an average contribution of \$20; 50,000 pieces of mail scarcely raise the average campaign budget. With the aid of a computer, direct mail can raise more funds.

Once these funds have been raised, a computer can make campaign spending more effective. A basic spreadsheet program keeps track of how much money each source raises and where it is spent—information the Federal Election Commission requires from all congressional candidates. Most state and local jurisdictions have set up equivalent agencies. Every candidate for any elective position in the United States has to report to the IRS as well. An Apple can track all these reports in a small fraction of the time it takes an accountant, and in many cases can submit the reports to the agency computer.

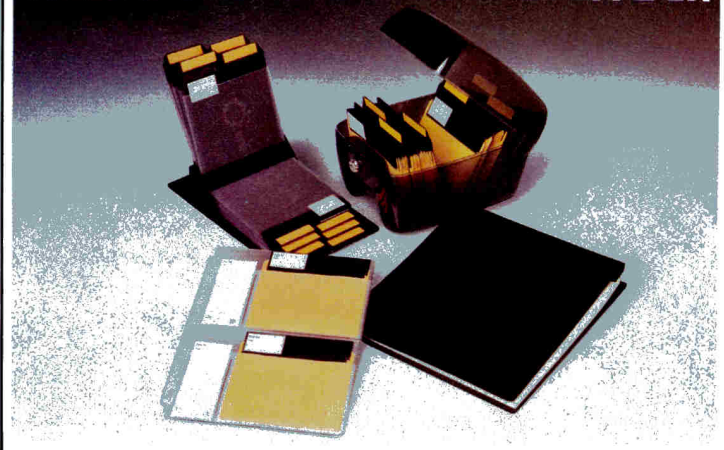
Computerized Democracy

Apple users have a new role to play in local political campaigns. A computer produces letters faster than a typist, thus freeing volunteers to fold, stuff, seal, and stamp letters, as well as do door-to-door and street campaigning and answer phones—all to contact more voters directly.

Computers can give any campaign a competitive edge. Once only the best-heeled campaigns could afford computer time. Now, as more candidates gain access to this technology, public office has the potential to become less a bastion for the rich and powerful, and even more representative of the processes of democratic elections. ■

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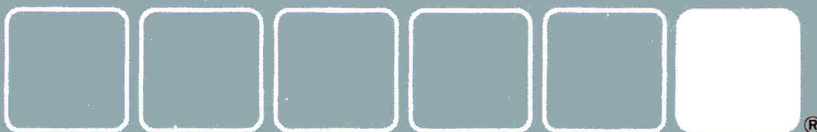
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Press any key on the keyboard and something always happens. Kermit flies a kite. Miss Piggy eats a pretzel. Fozzie puts out a fire.

That's how the fun begins. But soon, your child starts to explore and experiment. How many kites can Kermit fly? In how many colors? What do the other letters mean?

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In-box software by Sunburst Communications. Muppet Learning Keys works with software that is designed or modified for it.

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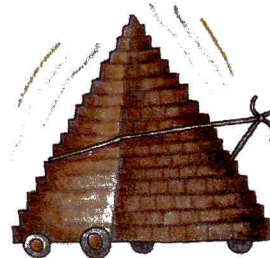
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Three Ways to Improve Your Memory

With Thanksgiving close upon us, the usual plethora of pre-Christmas sales will soon appear. Manufacturers love them, because they bring in the capital needed to maintain Christmas inventories. More memory for your computer is one thing you might want to spend some of your hard-earned money on at this advantageous time.

There are three types of memory that can be added to your Apple today: system memory, RAM disks, and external buffers. The one your machine should have depends on the kinds of work it has to do.

System Memory

All Apple II computers, even the //e and //c, are natural 64K memory machines. It's the most the 6502 microprocessor can handle at one time. When you subtract the 16K needed for Applesoft and the autostart features built into ROM, the 10K that DOS occupies, and the niggling amounts used by screen memory, you actually have about 33K left to work in. Even a first generation program like VisiCalc eats that up without a second thought.

Luckily, the 16K occupied by ROM can be switched out using a bank se-

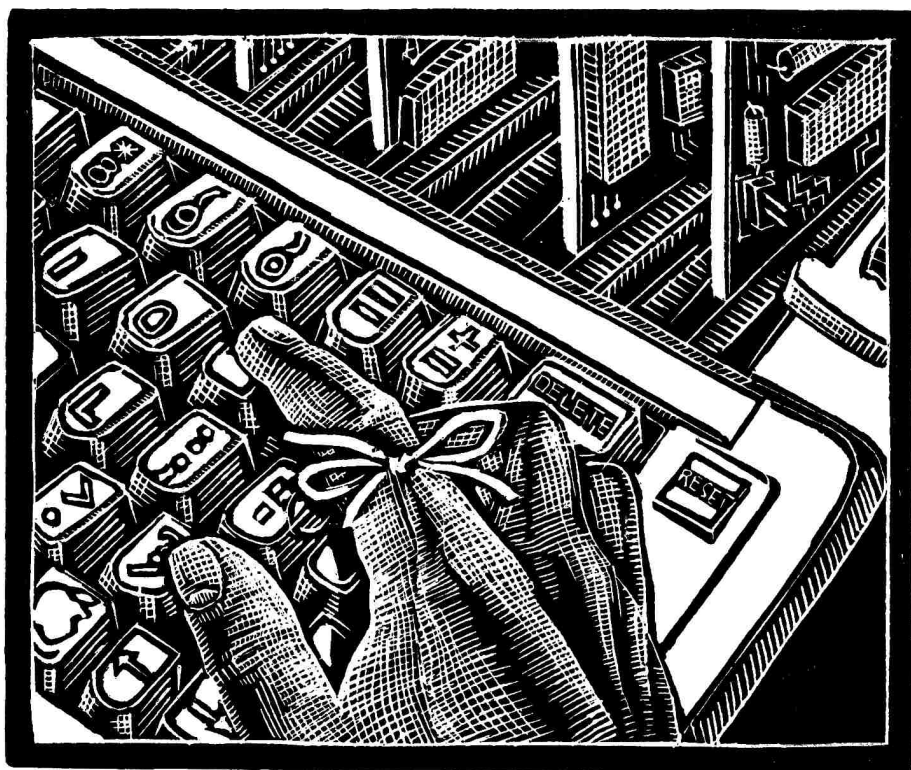


Illustration by Beth Krommes

lect technique and 16K of RAM put in its place. That is the rationale behind the 16K RAM card, the Apple II Language System, and the sacrosanct nature of slot 0.

If you are an Apple II or II Plus owner, you can't expand your system memory past 64K. //e owners, however, have another option. In that machine, slot 0 has been supplanted by the auxiliary slot, which can be used to push beyond 64K.

Apple's offering for the auxiliary slot is a combination 80-column display and 64K memory expansion board. Other companies, like Titan Technologies, provide 80-column expansion and even more RAM. PRODOS, in its early versions, used this extra memory to create a temporary storage area called a RAM disk. With that feature, it made sense to have as

There are various approaches to augmenting your Apple's storage capacity, depending on the machine and the application.

by Bill O'Brien

much RAM on the expansion card as possible.

Then Apple threw everybody a curve. They changed ProDOS when they introduced the //c (which has 128K of RAM built in) so it no longer uses the auxiliary bank of memory as a RAM disk. Apple is now using the additional memory in //e's and //c's to enhance the computer's graphics capability, pushing high-resolution up to 560-by-192 addressable dots.

Only //e's with a Rev B or later motherboard can upgrade to this capability by adding an extended 80-column card. If you have a Rev A motherboard, I'm sorry to say you're out of luck.

So, the current situation for the various Apples is the following, with a graphic depiction in the **Figure**. Apple II Plus owners can upgrade to 64K RAM and thus can use ProDOS, but that's the limit to their expansion. Apple //e owners who don't upgrade to ProDOS 1.02 can add 64K of additional memory and enjoy ProDOS 1.0's RAM disk features. If you own an Apple //e with a Rev B or higher motherboard, you can use double hi-res graphics if you'll forego the RAM disk.

On the other hand, you can buy an Apple //c outright and get 128K without worrying about changing jumpers on expansion cards and revisions of the motherboard. As the //c's operating system, ProDOS 1.02, becomes available for the //e, the RAM disk capability embodied in ProDOS 1.0 will become a thing of memory (pun intended). You might want to think ahead.

RAM Disks

A RAM disk is the electronic equivalent of a disk drive. As I mentioned, Apple's first official foray into the field was with ProDOS 1.0 on the //e.

With an extended 80-column card in the auxiliary slot, ProDOS created a "disk drive" out of the extra memory and assigned it the volume name /RAM.

The size of any RAM disk depends on the amount of memory available to it. Syntex markets one called the Flashcard in two versions, one that emulates a 143K Apple drive and one that's equivalent to two drives.

RAM disks are incredibly fast, if for no other reason than they have no moving parts. Depending on the application, you can realize up to a 60 percent increase in access speed over a conventional disk drive. For the Apple, which has always been a little slow in the disk department, that's a significant improvement.

WordStar, in my estimation the best word processing program in the world, scrolls your text on and off the disk. If you use WordStar with a RAM disk, you can jump from page 1 to 55 in about 12 seconds—a phenomenal display of speed.

But Apple has discontinued its RAM disk support. To use a RAM disk now, you've got to alter the way the operating system (ProDOS, Pascal, or CP/M) perceives a disk drive. This means adding patches to the disk operating system, either permanently or prior to using any other software.

Problems arise, however, from the fact that the Apple is afflicted with so much copy-protected software. For the most part, copy protection precludes the preliminary massaging the operating system needs in order to use a RAM disk. Consequently, a lot of commercial software that could benefit from a RAM disk can't use one. It doesn't make a lot of sense.

You might derive the greatest benefit from a RAM disk when using CP/M on your Apple. I can't think of

any CP/M program that is copy protected. Also, with the CP/M Submit program (an equivalent to DOS' EXEC function) you can autoload the RAM disk drivers as you boot the disk.

There are other problems inherent in RAM disks. For one, unless you're willing to spend quite a lot of money for a fix, the information you place in the RAM area is extremely volatile. If you suddenly lose electrical power, if you accidentally shut off your computer, if you get a burst of static, or if your Apple locks up, you're out of luck—your information will be lost.

Also, a RAM disk set-up is a manual system. The drivers and patches must be loaded, you must transfer the information from a floppy disk to the RAM disk area, and when you're done you've got to remember to transfer the RAM contents back to disk before you shut down.

Finally, if you have a RAM disk that can hold more information than the physical disk, you'll need some way of segmenting the data into smaller chunks that will fit on one disk, and there's very little software around to help you do that.

Those are the realities of the RAM disk situation and possibly some of the reasons Apple discontinued their version of it.

Printer Buffers

I once had a supervisor who claimed that the weakest link in any computer system was the printer. Not only is it the most mechanical of all the devices, but it is also the slowest. The fastest printer I own communicates with my Macintosh at 960 characters per second (data transfer speed) and prints at a more realistic 120 cps (data throughput speed). All the while, the 16/32-bit marvel of a

Figure.
Memory configurations for the various Apple II computers.

	MAXIMUM MEMORY ON MOTHERBOARD	MEMORY EXPANSION BOARDS	PRIMARY OPERATING SYSTEM	ProDOS COMPATIBLE ?	DOUBLE HIRES ?
APPLE II PLUS	48K	16K	DOS	with 16K	NO
APPLE //e	64K	64K	DOS	YES	with second 64K
APPLE //c	128K	N/A	ProDOS	YES	YES

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"These little gadgets are chock full of memory, and their only function is to gather it in bunches from your computer."

computer is waiting, twiddling its electronic thumbs.

There is no way to cure a printer's slowness by dealing with the printer directly. You could double the printer's supply voltage to 240 volts, and it would probably run faster for about two minutes before it gave up the ghost. A more realistic procedure

would be to insert a device in your system between the computer and the printer that accepts information as fast as the computer can send it, then waits around for the printer to catch up while you and your computer go on to better things.

That's the concept behind a *printer buffer*. These little gadgets

are chock full of memory, and their only function is to gather it in bunches from your computer. The buffer acts very much like an external RAM disk, except it's unidirectional—your computer can't read what's inside.

The difficult part is choosing a buffer suited to your needs. If your typical printer output is 60 or so pages, a buffer with 128K of memory is the optimum size. If you usually print less than that, you can get by with less memory. More pages will, of course, require a larger memory in the buffer.

To give you an idea how nicely a buffer works, 60 pages of text take about seven minutes to reach my Quadram Microfazer, which then spends the better part of the next hour actually sending the material to my NEC 2050 letter-quality printer. Fifty-three minutes of computer time are thus released for other uses.

There are quite a few printer buffers on the market. My Quadram Microfazer is somewhat featureless, needing a manual press of a switch to produce another copy of the buffer's contents. Interactive Structures markets one that automatically does almost everything but change the ribbon in the printer. Other companies sell comparable units.

Be warned that, as with a RAM disk, the information in a printer buffer is volatile, and you may want to take precautions against the inconvenience of a loss. It's not as critical an issue here, though. If you have a power outage, you only lose the information in the buffer; the original is still safe and sound on your floppy disk.

Adding It All Together

Those are the primary ways you can add memory to your system and the numbers can get impressive. My Apple //e has a full 128K, a 286K RAM disk, and a 128K printer buffer. That's a little over one-half million bytes of memory in the system—probably all a little computer could ever want. ■

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

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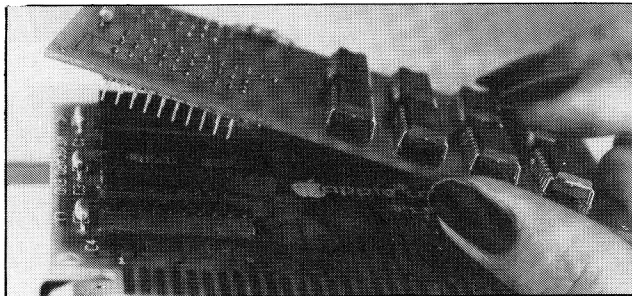
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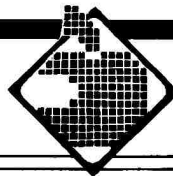
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Mystery Code

This month, for a change, my column will present a graphics application that's just for fun, although there's a chance for those interested to do a little programming, too. The fun is playing a game I've written called *Mystery Code*. Let me warn you at the beginning, though, that game paddles or a joystick are needed.

The idea is to guess the characters in a randomly-chosen five-character code as quickly as possible, with scoring based on time elapsed until you solve the code. As play begins you have 10,000 points, but the counter starts docking them immediately, so you really have to be on the ball to score more than 9800.

The code characters can be any of the ten numerals, 0-9, or the 26 letters, A-Z. The game board (**Figure 1**) is an array of 209 adjacent squares, each containing a numeral or letter. To guess a character, move the marker to a square containing that character with your paddles or joystick. Then hit G for guess. If the result is silence, or one, two, or three little "putt" sounds, your guess was not one of the code characters. If your guess was right, you'll hear a volley of four laser-like blasts. A buzz means you hit an invalid key.

After pinpointing a correct character, you need to guess which position(s) it holds in the mystery code. Hit the numbers 1 through 5 until you hear a "boing" sound and the character slips into position in the code boxes in the lower right corner of the game board. A hiss means a wrong position guess.

If the laser volley sounds twice, it means the character you guessed right occupies two positions in the code. In that case, hit 1-5 as usual to find where the first is, then, once you've got it, hit G again and 1-5 again to locate the second position. Theoretically, all five characters could be the same, but the odds against it are great.

The Clues

The "putt" sounds in one's, two's, or three's are clues to the whereabouts of correct characters on the game board. One single-putt means that one correct character lies within one square of the marker—one square horizontally, vertically, or diagonally. A double-putt indicates a correct

character within two squares of your marker, and a triple-putt one within three squares of your marker. If more than one correct character is within one, two, or three squares of your marker, you'll get that many more single-, double-, or triple-putts. However, you'll hear putts only for the "ring" of squares closest to your marker that contains code characters. In other words, the computer tells you only about the closest correct characters, whether they are one, two, or three squares away.

For instance, let's say you mark a K square, because you think K may be in the code. Let's further say that K is wrong, but 6 is correct and there are four 6's in the ring two squares from the K. You'll hear four double-putts—

4	A	A	0	U	L	O	Q	U	G	3	Y	T	L	B	G	N	0	Y
A	Q	2	E	J	W	M	N	O	K	E	C	2	Z	3	C	C	2	W
A	D	O	T	D	X	6	R	4	9	I	G	9	3	L	S	R	9	N
C	6	W	F	T	V	D	I	5	O	O	S	C	N	X	Z	S	V	A
7	G	W	6	P	Q	I	W	D	0	Z	M	L	0	O	8	3	C	W
4	S	4	8	U	M	S	2	7	C	J	7	6	I	H	R	N	O	P
T	8	C	J	O	W	D	W	G	9	G	H	8	0	A	Y	U	K	3
T	F	E	W	C	A	A	I	3	3	9	B	S	0	0	U	I	I	K
I	Z	6	M	Z	V	2	I	U	R	Z	O	S	6	S	Z	L	N	T
E	7	7	U	A	H	K	Z	Z	F	3	R	0	3	N	Q	N	C	0
V	U	Q	C	I	I	2	E	Z	P	X	9	H	I	P	I	E	D	O
SCORE: 9824														I	2	B	4	U

Figure 1. A representation of the *Mystery Code* game board. Note the marker, and the five squares in a row by themselves on the lower right. The latter hold the code characters you have correctly identified.

by Don Fudge

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but only if there are no correct characters in the ring one square from the K. If there were a C within one square, and C happened to be in the code, you'd hear one single-putt. (A word of caution: Two single-putts can sound like one double-putt, if you're not paying attention.)

If hitting G produces no sound, it's probably because your marker is close to an edge. With fewer squares within "reporting" range, there's less chance you'll find a correct character.

Once you've guessed a character's position in the code correctly, you have to, as I mentioned, hit G and then 1-5 again to locate any other positions that it occupies. However, by

listening carefully you can tell whether to even bother. You'll hear two or more laser volleys-of-four if the marked character occupies more than one position in the code. There is no reason to check for other positions unless you hear a multiple volley.

The Strategies

There are various strategies you can adopt for playing Mystery Code:

Listing 1. The HELLO program.

```
5 POKE 104,64 : POKE 16384,0
10 PRINT CHR$(4) "RUN MYSTERY CODE"
```

Listing 2. Mystery Code.

```
0 REM MYSTERY CODE
1 GOTO 101
7 A% = 12:B% = 12:C% = 117: GOSUB 60: RETURN
27 A% = 104:D% = 82:C% = 116: GOSUB 62: RETURN
33 A% = 74:D% = 124:C% = 2: GOSUB 62: RETURN
34 A% = 127:D% = 193:C% = 28: GOSUB 62: RETURN
36 A% = 10:D% = 36:C% = 45: GOSUB 62: RETURN
60 POKE 252,A%: POKE 253,B%: POKE 254,C%: POKE 249,D%: CALL 5625: RETURN
62 POKE 252,A%: POKE 253,B%: POKE 254,C%: POKE 249,D%: CALL 5690: RETURN
70 ROT= 0: HCOLOR= 3:YY= 184:T$= STR$(TK):XX= 49: FOR XA= 1 TO LEN
(T$):CH= ASC ( MID$(T$,XA,1)) - 31: DRAW CH AT XX,YY:XX= XX + 7: NEXT
: RETURN
72 FG= 0: GOSUB 27: ROT= 0: XDRAW RG - 31 AT ( PEEK (36) + 1) * 7 - 6,183
: GOSUB 900: RETURN
90 RETURN
101 HIMEM= 37474
102 TK= 10000
103 PRINT CHR$(4) "BLOADALLCHAR,A$800"
104 DIM B(20,12)
105 HOME : GOSUB 39000: HOME
106 D$= CHR$(4)
107 PRINT D$"BLOADSOUND EFFECTS"
120 POKE 233,8: POKE 232,0
125 HGR: POKE - 16302,0: HCOLOR= 3: ROT= 64: SCALE= 1
126 FOR X= 1 TO 19: FOR Y= 1 TO 11: VTAB (2 * Y): HTAB (2 * X): GOSUB 3
7000: NEXT : NEXT
127 FOR QW= 4 TO 270 STEP 14: HPLLOT QW,4 TO QW,180: NEXT : FOR QW= 4 TO
180 STEP 16: HPLLOT 4,QW TO 270,QW: NEXT
128 X% = ( INT ( PDL (0) / 14.1) + 1) * 2:Y% = ( INT ( PDL (1) / 25.5) + 1
) * 2
130 VTAB Y%: HTAB X%: XDRAW 96 AT X% * 7 - 8,Y% * 8 - 8
140 FOR QW= 200 TO 270 STEP 14: HPLLOT QW,191 TO QW,180: NEXT : HPLLOT 200
,191 TO 270,191
200 YY= 184: DRAW 52 AT 7,YY: DRAW 36 AT 14,YY: DRAW 48 AT 21,YY: DRAW 51
AT 28,YY: DRAW 38 AT 35,YY: DRAW 27 AT 42,YY
205 HCOLOR= 0: FOR YY= 184 TO 190: HPLLOT 49,YY TO 85,YY: NEXT
206 ROT= 0
210 TK= TK - 1: IF TK= 0 THEN FOR QW= 1 TO 10: GOSUB 62000: NEXT : GOTO
58000
215 PP= PEEK ( - 16336)
220 GOSUB 70
225 VTAB Y%: HTAB X%: XDRAW 96 AT X% * 7 - 8,Y% * 8 - 8:FA= 0:X% = ( INT
( PDL (0) / 14.1) + 1) * 2:Y% = ( INT ( PDL (1) / 25.5) + 1) * 2
230 HTAB X%: VTAB Y%: XDRAW 96 AT X% * 7 - 8,Y% * 8 - 8
300 B1= PEEK ( - 16384): IF B1 > 127 THEN POKE - 16368,0: GOSUB 30000
301 GOTO 205
900 IF GG= 1 AND R1 < 2 THEN PL= PL + 1
910 IF GG= 2 AND R2 < 2 THEN PL= PL + 1
920 IF GG= 3 AND R3 < 2 THEN PL= PL + 1
930 IF GG= 4 AND R4 < 2 THEN PL= PL + 1
940 IF GG= 5 AND R5 < 2 THEN PL= PL + 1
950 IF PL= 5 THEN 58000
989 GG= 0
999 RETURN
30000 IF B1= 199 THEN 30020
30001 IF B1 > 181 OR B1 < 177 THEN 30999
30002 IF FG < > 1 THEN GOSUB 62000: GOSUB 62000: RETURN
30009 ON B1 - 176 GOTO 30010,30012,30014,30016,30018
30010 IF R(1)= RG THEN R1= R1 + 1:GG= 1: HTAB 30: GOSUB 72: RETURN
30011 GOSUB 7: RETURN
30012 IF R(2)= RG THEN R2= R2 + 1:GG= 2: HTAB 32: GOSUB 72: RETURN
```


Listing continued.

```

30013 GOSUB 7: RETURN
30014 IF R(3) = RG THEN R3 = R3 + 1:GG = 3: HTAB 34: GOSUB 72: RETURN
30015 GOSUB 7: RETURN
30016 IF R(4) = RG THEN R4 = R4 + 1:GG = 4: HTAB 36: GOSUB 72: RETURN
30017 GOSUB 7: RETURN
30018 IF R(5) = RG THEN R5 = R5 + 1:GG = 5: HTAB 38: GOSUB 72: RETURN
30019 GOSUB 7: RETURN
30020 FL = 0: FOR QW = 1 TO 5
30030 IF B(X% / 2, Y% / 2) = R(QW) THEN FL = 1: GOSUB 34: FG = 1: RG = R(QW)
30040 NEXT
30050 IF FL = 1 THEN FL = 0: RETURN
30060 IF ((X% / 2 + 1) > 19 OR (X% / 2 - 1) < 1) OR ((Y% / 2 + 1) > 11 OR
(Y% / 2 - 1) < 1) THEN RETURN
30070 FOR V = X% / 2 - 1 TO X% / 2 + 1
30080 FOR W = Y% / 2 - 1 TO Y% / 2 + 1
30090 FOR QW = 1 TO 5
30100 IF B(V,W) = R(QW) THEN FL = 1: GOSUB 36
30110 NEXT: NEXT: NEXT
30120 IF FL = 1 THEN FL = 0: RETURN
30160 IF ((X% / 2 + 2) > 19 OR (X% / 2 - 2) < 1) OR ((Y% / 2 + 2) > 11 OR
(Y% / 2 - 2) < 1) THEN RETURN
30170 FOR V = X% / 2 - 2 TO X% / 2 + 2
30180 FOR W = Y% / 2 - 2 TO Y% / 2 + 2
30190 FOR QW = 1 TO 5
30200 IF B(V,W) = R(QW) THEN FL = 1: GOSUB 36: GOSUB 36
30210 NEXT: NEXT: NEXT
30220 IF FL = 1 THEN FL = 0: RETURN
30260 IF ((X% / 2 + 3) > 19 OR (X% / 2 - 3) < 1) OR ((Y% / 2 + 3) > 11 OR
(Y% / 2 - 3) < 1) THEN RETURN
30270 FOR V = X% / 2 - 3 TO X% / 2 + 3
30280 FOR W = Y% / 2 - 3 TO Y% / 2 + 3
30290 FOR QW = 1 TO 5
30300 IF B(V,W) = R(QW) THEN FL = 1: GOSUB 36: GOSUB 36: GOSUB 36
30310 NEXT: NEXT: NEXT
30320 IF FL = 1 THEN FL = 0: GOSUB 62000: GOSUB 62000
30330 RETURN
30999 IF B1 < > 199 THEN GOSUB 33: RETURN
37000 XDRAW B(X,Y) - 31 AT X * 14 - 7, Y * 16 - 8: RETURN
39000 VTAB 10: HTAB 8: FLASH: PRINT "FILLING ARRAYS": NORMAL
39005 DIM R(6)
39010 R = INT (43 * RND (1)) + 48: IF R < 65 AND R > 57 THEN 39010
39020 TI = TI + 1
39025 R(TI) = R
39030 IF TI = 5 THEN TI = 0: GOTO 39050
39040 GOTO 39010
39050 FOR X = 1 TO 19: FOR Y = 1 TO 11
39060 R = INT (43 * RND (1)) + 48: IF R < 65 AND R > 57 THEN 39060
39070 B(X,Y) = R: NEXT: NEXT
39080 FOR QW = 1 TO 5
39090 X = INT (19 * RND (1)) + 1: Y = INT (11 * RND (1)) + 1: B(X,Y) = R
(QW): NEXT
39100 RETURN
45000 IF TK < 5000 THEN 45990
45001 IF TK < 5500 THEN 45101
45002 IF TK < 6000 THEN 45102
45003 IF TK < 6500 THEN 45103
45004 IF TK < 7000 THEN 45104
45005 IF TK < 7500 THEN 45105
45006 IF TK < 8000 THEN 45106
45007 IF TK < 8500 THEN 45107
45008 IF TK < 9000 THEN 45108
45009 IF TK < 9300 THEN 45109
45010 IF TK < 9600 THEN 45110
45011 IF TK < 9800 THEN 45111
45012 IF TK < 9900 THEN 45112
45013 IF TK < 9999 THEN 45113
45101 PRINT "YOU DID MISERABLE!": RETURN
45102 PRINT "YOU DID LOUSY!": RETURN
45103 PRINT "YOU DID BAD!": RETURN
45104 PRINT "YOU DID PRETTY BAD!": RETURN
45105 PRINT "YOU DID FAIR---": RETURN
45106 PRINT "YOU DID NOT BAD---": RETURN
45107 PRINT "YOU DID PRETTY GOOD!": RETURN
45108 PRINT "YOU DID GOOD!": RETURN
45109 PRINT "YOU DID FINE!": RETURN
45110 PRINT "YOU DID GREAT!": RETURN
45111 PRINT "YOU DID OUTSTANDING!": RETURN
45112 PRINT "YOU DID BEAUTIFUL!": RETURN
45113 PRINT "YOU WERE ABSOLUTELY MIRACULOUS!": RETURN
45990 PRINT "YOU DID HORRIBLE!": RETURN
58000 TEXT: HOME: PRINT "THE GAME IS OVER.": PRINT: PRINT "SCORE: "TK:
PRINT: PRINT: GOSUB 45000: PRINT
58010 PRINT "WOULD YOU LIKE TO PLAY AGAIN, GO TO ANOTHER PROGRAM, OR
QUIT & GO TO BED?": PRINT
58020 PRINT "(1)PLAY AGAIN (2)GO TO ANOTHER PRO
GRAM (3)QUIT & GO TO BED": PRINT
58030 INPUT "(TYPE 1,2, OR 3):",RR
58040 IF RR = 3 THEN HOME: INVERSE: PRINT "GOOD NIGHT!!!": END
58050 IF RR = 2 THEN 58070
58055 IF RR = 1 THEN CLEAR: CALL 54915: GOTO 101
58060 GOTO 58010
58070 PRINT "WELL, GO RUN IT!": END
62000 FOR VV = 1 TO 8: PP = PEEK (- 16336): NEXT: RETURN
63000 PRINT: PRINT "(HIT ANY KEY TO CONTINUE)": PRINT
63010 PP = PEEK (- 16384): IF PP > 127 THEN POKE - 16368,0: RETURN
63020 GOTO 63010

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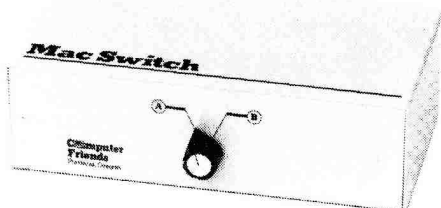
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1) *Bull in a China Shop*. Randomly plunge around with your joystick or paddles, hitting G every time the marker lands on a new square. Eventually you'll luck out and find the five code characters.

2) *Slow but Sure*. Start at the top left and proceed across the board, hitting G on every square. When you reach the right side of the board, move down a row and continue back the other way, plodding along, hitting G.

3) *Memory Maniac*. Scoot around hitting G on various squares, but *remember* which numbers and letters you've tried and *don't repeat any*, to save time. You could list the 36 possible characters on a piece of paper and check them off as you go, but this is definitely cheating.

4) *Clues and Intuition* (my favorite). Zip around hitting G, but pay close attention to the putt-putt clues. When you hear putts, immediately eyeball all the squares in the first, second, or third (depending on whether the putts are single, double, or triple) ring around the square you're on. Notice how many of these characters you already know to be in the code. Is it the same number as the number of putts, or series-of-putts, you heard? If not, there are one or more *unknown* code characters in that ring. Test out these squares (avoiding the known characters) to find the new one(s).

As I suggested before, don't go too close to the edges of the board unless absolutely necessary, since you'll get few clues that way. However, if you haven't found the last character, you

feel it must be an X, and the only X is on an edge, then go for it.

The Listings

You need to key in and save four files to play Mystery Code. The first is the booting program, HELLO (**Listing 1**).

Listing 2 is Mystery Code itself. The HELLO program makes sure Mystery Code loads and runs at memory address \$4000, out of the way of the hi-res page.

You may already have **Listing 3**, ALLCHAR, from my July or October 1984 column. Never mind that the BSAVE address from either of those columns doesn't match the BLOAD address in line 103 of Mystery Code. It doesn't matter where ALLCHAR is BSAVED, as long as it is loaded at \$800 (2048 decimal) for Mystery Code.

Incidentally, ALLCHAR is a vector shape table with shape 1 as the space and shape 65 as the block cursor. I use shape numbers that equal a character's ASCII number minus 31. All upper- and lowercase letters and all symbols are included in ALLCHAR. BSAVE ALLCHAR at \$800 with a length of 1272 bytes, if you do type it in.

Listing 4 is a simple sound maker I call Sound Effects. It's located at memory address \$15F9 and is 114 bytes long. Don't forget to use CALL-151 before keying it in, because it's a binary file. And do a *return* after *each* line of code, unless you're experienced enough to know

Figure 2. Lines containing HTAB and VTAB commands from the original hi-res character generator version of Mystery Code. You may find these helpful, as examples, in adapting Mystery Code to your generator.

```
123 POKE 54,0 : POKE 55,28 : VTAB 24 : PRINT " " : POKE
972,24 : CALL 1002
129 POKE 973,1
130 VTAB Y% : HTAB X% : PRINT "*"
220 VTAB 24 : HTAB 9 : PRINT TK
225 POKE 973,1 : VTAB Y% : HTAB X% : PRINT "*" : FA = 0 : X%
= (INT (PDL (0) / 14.1) + 1) * 2 : Y% = (INT (PDL (1) /
25.5) + 1) * 2
230 VTAB Y% : HTAB X% : PRINT "*" : POKE 973,0
30010 IF R (1) = RG THEN R1 = R1 + 1 : GG = 1 : FG = 0 :
GOSUB 27 : HTAB 30 : VTAB 24 : PRINT CHR$(RG) : GOSUB
900 : RETURN
37000 PRINT CHR$(B(X,Y)) : RETURN
```


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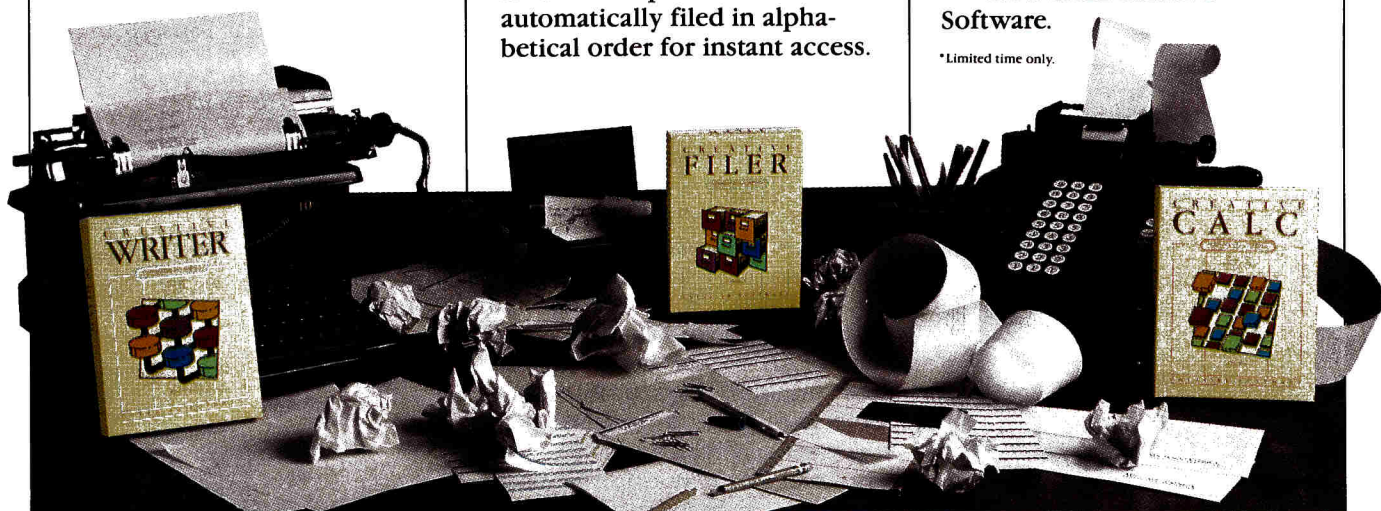
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Listing 3. ALLCHAR,A\$800,L1272.

```

0800- 7E 00 FE 00 00 01 06 01 0940- 24 20 04 00 49 36 06 00 0A80- 2D B5 1A 3F 04 18 36 36 0BC0- 0E 2D 2D 00 49 09 36 36
0808- 0C 01 1D 01 2B 01 37 01 0948- 49 1E 1E 3E 0E 0E 05 00 0A88- 36 00 09 2D F5 DB 36 36 0BC8- 36 1C 1E E7 24 0C 75 06
0810- 44 01 48 01 50 01 58 01 0950- 49 0E 0E 36 1E 1E 1E 00 0A90- 0E 2D 25 3C 07 00 31 36 0BD0- 00 91 29 75 3E 3F 1C 36
0818- 66 01 6E 01 75 01 7A 01 0958- 49 36 36 0D 0E 04 60 0A98- 36 6E 09 24 3C 3F 4C 21 0BD8- 0E 2D 05 00 49 75 DF F6
0820- 7F 01 87 01 96 01 9E 01 0960- DF 73 16 1E 1E 00 49 32 0AA0- 24 00 09 2D 1E 36 36 0E 0BE0- 2D 1E 36 06 00 91 29 D0
0828- A9 01 B4 01 C1 01 CE 01 0968- 3E 2E 40 FF 3F 09 49 92 0AAB- 3F 07 00 49 09 36 36 F6 0BE8- 1E F5 35 F6 3F 04 08 E7
0830- DB 01 E4 01 F2 01 00 02 0970- 12 F6 06 00 2D 91 2A 2D 0AB8- 3F 1C 04 00 31 36 36 6E 0BF0- 24 00 31 36 36 2E 80 80
0838- 05 02 0C 02 15 02 1D 02 0978- 2D 00 49 92 02 06 00 91 0AB0- 09 1C 1C 1C 0C 0C 0C 0C 0BF8- 60 75 36 36 00 49 16 77
0840- 26 02 2F 02 3D 02 4C 02 0980- 92 0C 0C 0C 0C 05 00 09 0AC0- 00 31 36 36 2E 2D 2D 00 0C00- 36 1E 2D 05 00 49 16 77
0848- 5A 02 66 02 72 02 7F 02 0988- 2D 0E 36 36 1E 3F 1C 24 0AC8- 31 36 36 6E 09 24 24 24 0C08- 36 F6 1C 04 00 31 36 36
0850- 8A 02 96 02 A2 02 AB 02 0990- 24 4E F1 1E 06 00 49 1E 0AD0- 1E 1E 1C 04 00 31 36 36 0C10- 6E E1 1C 0C 0C 04 00 09
0858- B4 02 C1 02 C8 02 D5 02 0998- 35 36 76 3F 07 00 11 0C 0AD8- 6E 09 24 24 24 9F 13 0E 0C18- 35 36 36 1E 2D 05 00 91
0860- E3 02 EF 02 FB 02 08 03 09A0- 2D 0E F6 F7 1E 2E 2D 2D 0AE0- 0E 06 00 09 2D 0E 36 36 0C20- 36 36 0D 24 E4 0D 0E 36
0868- 17 03 24 03 2C 03 36 03 09A8- 00 29 2D 35 1E 1E 75 F6 0AE8- 1E 3F 1C 24 24 04 00 31 0C28- 36 00 91 36 36 0D 18 80
0870- 40 03 4C 03 58 03 64 03 09B0- 3F 1C 04 00 49 31 36 0E 0AF0- 36 36 2E 80 80 28 65 E4 0C30- 80 0C 75 36 36 00 91 29
0878- 6F 03 7C 03 83 03 90 03 09B8- 37 3E 80 80 3F 64 0C 04 0AF8- 3F 04 00 09 2D 0E 36 FE 0C38- 75 36 1E 3F 1C 24 04 00
0880- 98 03 9F 03 A4 03 AF 03 09C0- 00 29 2D B5 3B 3F B4 49 0AB0- 0E 0E 1F E7 24 24 04 00 0C40- 91 36 36 2E 80 80 2D 0C
0888- BA 03 CA 03 D1 03 DC 03 09C8- 31 F6 3F 1C 04 00 49 09 0B08- 29 2D 0E F6 3F 04 18 36 0C48- E4 3F 07 00 91 29 35 36
0890- E5 03 F2 03 FD 03 05 04 09D0- 3F 1E 1E 36 76 2D 0C 0E 0B10- 36 6E 09 1C 1C 05 00 09 0C50- 36 F5 03 80 80 38 1C 24
0898- 0D 04 17 04 1F 04 2A 04 09D8- 3F 07 00 29 2D 35 1E 1E 0B18- 2D 0E DF 33 0E 2D 0E F6 0C58- 00 91 36 36 0D 18 80 80
08A0- 36 04 40 04 4C 04 59 04 09E0- 1E 36 06 00 09 2D 0E F6 0B20- 3F 1C 04 00 29 2D F5 33 0C60- 0C 75 06 00 49 89 3A 3F
08A8- 64 04 70 04 77 04 7F 04 09E8- 3F 1E 76 2D 0C 24 D8 1E 0B28- 36 36 06 00 31 36 36 0E 0C68- 1E 0E 2D 0E 1E 3F 3F 00
08B0- 88 04 92 04 9D 04 A9 04 09F0- 24 00 09 2D 0E 36 F6 1E 0B30- 2D 0C 24 24 24 00 31 36 0C70- 49 F6 2D 1E 36 36 00 91
08B8- B4 04 BF 04 C8 04 D2 04 09F8- 3F 04 40 2D DC 23 04 00 0B38- 76 0E 0C 0C 24 24 04 00 0C78- 36 76 2D 0C 24 24 00 91
08C0- D9 04 2D 25 2D 25 2D 2D 0A00- 49 12 16 06 00 49 92 1E 0B40- 31 36 36 66 0C AC 72 24 0C80- 36 0E 0E 0C 0C 24 04 00
08C8- 14 65 2B 27 FD 0E 22 E7 0A08- F6 06 00 49 49 F1 1E 1E 0B48- 24 24 04 00 31 0E 16 1E 0C88- 91 36 76 0C 24 95 62 24
08D0- 24 1E ED 1E 2A 75 12 1C 0A10- 0E 0E 0E 05 00 91 2D 2D 0B50- 6E 09 E4 1C 0C 0C 24 00 0C90- 24 00 91 0E 16 1E 4D E1
08D8- 6D 0E 6B 0E 6B E6 12 E7 0A18- 16 3F 3F 07 00 09 0E 0E 0B58- 31 0E 0E 36 2E 80 80 80 0C98- 1C 0C 0C 0C 00 91 36 0E
08E0- 24 3F 22 66 6B 65 45 1C 0A20- 0E 1E 1E 07 00 11 0C 0B60- 80 0C 24 00 29 2D 35 1E 0CA0- 2D 25 24 95 D2 1E 3F 07
08E8- 14 1E 2A 0C 12 2E 12 0E 0A28- 2D 0E 1E 1E B6 06 00 09 0B68- 1E 1E 1E 2E 2D 2D 00 31 0CA8- 00 91 2D 2D 1E 1E 1E 1E
08F0- 14 E7 24 1E 24 1E 24 1E 0A30- 2D 0E 36 96 3F E7 24 24 0B70- 36 36 2E 2D E5 1B 24 24 0CB0- 2D 2D 05 00 49 2D 0E 73
08F8- 6A 1C 07 75 0A 00 01 00 0A38- 8D 36 25 04 00 91 36 36 0B78- 2C 2D 05 00 11 0E 0E 0E 0CB8- 1E 77 F1 0E 2D 05 00 09
0900- 49 36 36 16 06 00 09 36 0A40- 4D 21 3C 3F 04 80 80 0C 0B80- 0E 05 00 29 2D 35 36 36 0CC0- 0E 0E 0E 1E 1E 1E 00
0908- 0D 24 04 00 09 36 36 36 0A48- 0E 36 00 29 2D 0E F6 0B88- 3E 3F 67 09 24 24 07 00 0CC8- 29 75 0E F5 73 1E 3F
0910- 0D 24 24 24 8D 13 16 1F 0A50- 3F 04 18 36 36 2E 2D 0C 0B90- 91 12 0C 0C 0E 0E 05 00 0CD0- 07 00 11 0C 0E 0E 0C 05
0918- 04 F8 16 06 00 49 2E B5 0A58- 24 00 49 89 1C 3F 1E 36 0B98- 91 92 12 2D 2D 05 00 09 0CD8- 00 29 2D 2D 35 3F 3F 3F
0920- F2 37 1C 67 61 3F 1C 0C 0A60- 36 0E 2D 0C 04 00 29 2D 0BA0- 0E 0E 06 00 91 29 35 36 0CE0- 2E 2D 2D 35 3F 3F 3F 2E
0928- 0E 05 00 31 25 4D F2 1E 0A68- 0E 36 36 1E 3F 27 24 24 0BA8- 2E DE 38 1C 0C 2D 00 31 0CE8- 2D 2D 35 3F 3F 3F 2E
0930- 1E 1E 4E 29 3C 07 00 09 0A70- 04 00 29 2D B5 1A 3F 04 0BB0- 36 36 2E 70 65 24 1C F7 0CF0- 2D 35 3F 3F 3F 07 00 00
0938- 0E F6 0E 0D 1E 0E 1F E7 0A78- 18 36 36 2E 2D 2D 00 29 0BB8- 06 00 91 49 39 3F 1E 36

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how to enter in six lines of numbers at once. Remember to include a colon after the address where you want Sound Effects stored, and then start right in typing. As an example, if the line is 1600 - 26 FA 8A F0 01 CA D0 07 (the second line), you should type 1600:26 FA 8A F0 01 CA D0 07 and hit return.

If You're a Programmer

Notice the lines, like 225-230 and 30010-30018, in Mystery Code that include HTAB and/or VTAB commands. I originally wrote this game to work with a hi-res character generator (which changes input hooks and prints 1-by-8-byte block shapes on the hi-res screen). Then I translated it into a vector shape table version compatible with ALLCHAR.

The hi-res character generator version, of course, eliminates the need for ALLCHAR. If you prefer this route, you'll need to use the HTAB and VTAB statements to position your printing. **Figure 2** contains some lines from the original hi-res character generator version of Mystery Code that may help you, as examples, in adapting the program to your generator.

The generator I use with Mystery Code is based on the one in the Apple Software Bank, Contributed Programs, volumes 3-5, pages 20-28. With a few minor POKE changes, however, other generators should work as well.

See you next time! ■

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Listing 4. Sound Effects,A5625,L114.

```

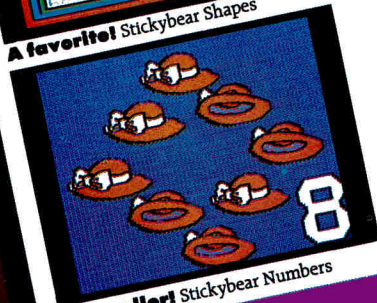
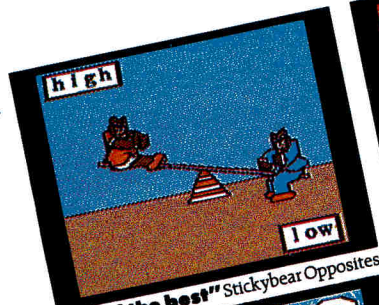
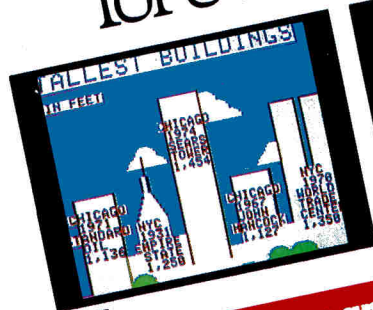
15F9- 38 E6 FC A6 FD 26 F9
1600- 26 FA 8A F0 01 CA D0 07
1608- 90 05 AD 30 C0 A6 FD 6A
1610- 6A 6A 45 FA 0A 0A 0A 08
1618- A5 FE F0 14 88 D0 11 A8
1620- 30 09 A5 FD F0 0A C6 FD
1628- 98 D0 05 E6 FD 29 7F A8
1630- 28 C6 FB D0 C9 C6 FC D0
1638- C5 60 A5 FE 29 7F A6 26
1640- F9 AD 30 C0 CA D0 05 A6
1648- F9 AD 30 C0 CA 05 FE F0 10
1650- 88 D0 0D A8 30 05 C6 F9
1658- 98 D0 05 E6 F9 29 7F A8
1660- C6 FB D0 E0 C6 FC 10 DC
1668- 60 00 00

```



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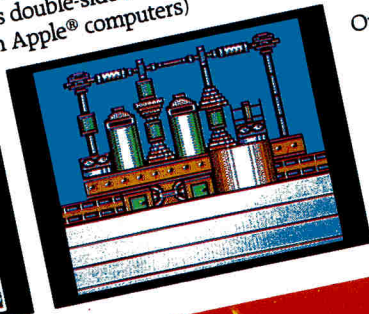


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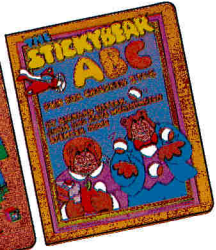
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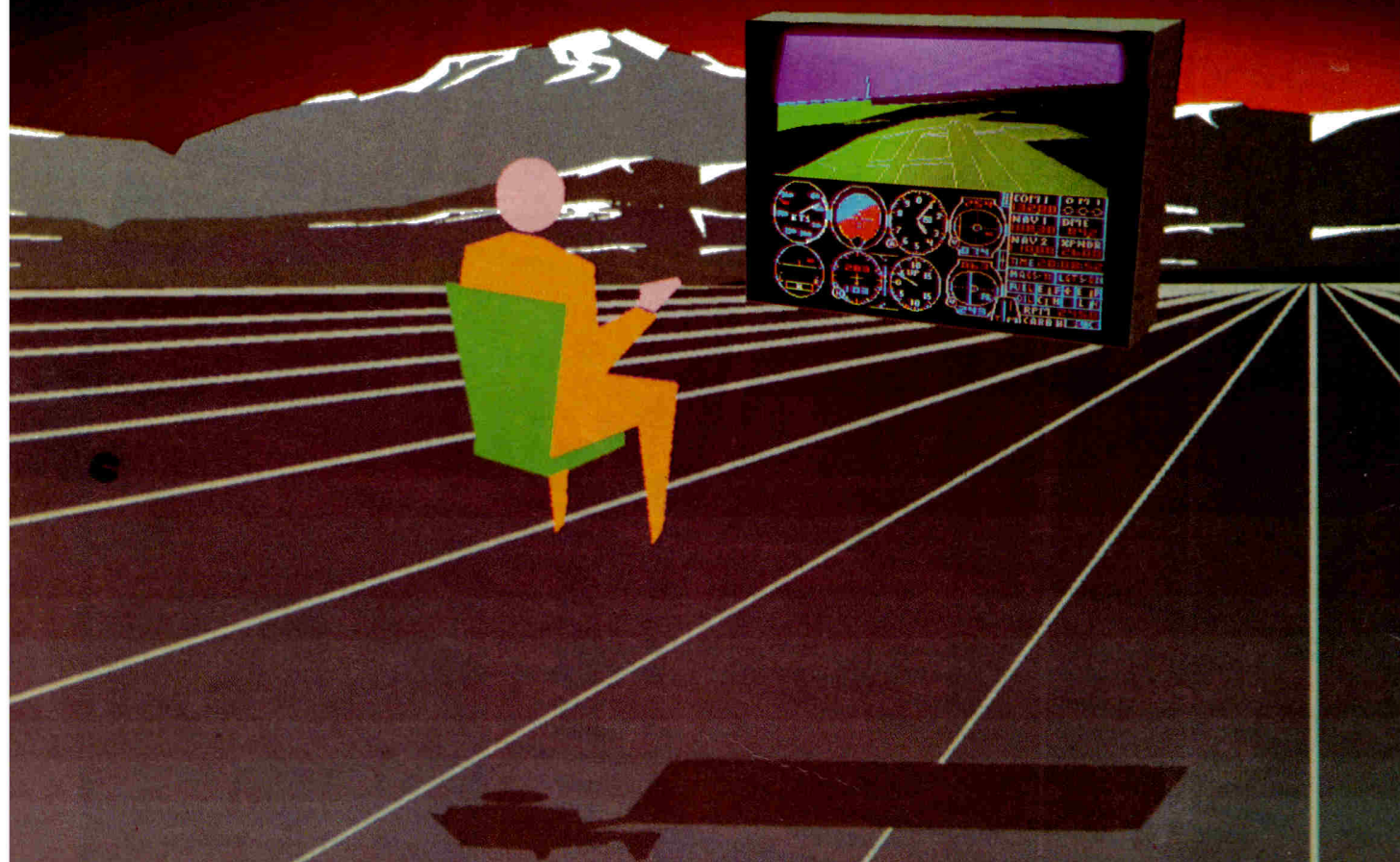


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Never has an inSoluble produced so much mail as "The Wayward Timer" (*inCider*, July 1984, p. 51). To Joyce and John and Dale (you know who you are) and a few others who offered suggestions, improvements, and even better programs, remember: An inSoluble demonstrates a peculiar aspect of Applesoft and may not, or probably isn't, the only way, or best way, to approach a problem. I did enjoy your letters and thank you for taking the time to write.

An *inCider* inSoluble is not a contest—at least, not one that produces prizes or trophies. It may challenge your BASIC programming abilities and provide a few hours of fun, but, sorry, no Cadillacs or dream houses. On the other hand, should you submit an original inSoluble that is selected for publication, your intrepid postal servant will deliver a check for \$20 to your doorstep—not a bad way to turn bugs into bucks. Most of our submissions are from readers whose programs developed the same problems their puzzles display.

If you're new to our inSidious programs and want some inSights, remember that an inSoluble is an Applesoft BASIC program with one or more submerged problems. Key in the listing and type RUN. Run it will, or may, but helter-skelter, willy-nilly, hither and yon. Trite but true, we learn from our mistakes, and improving your BASIC skills is no exception. Our inSufferable programs have always at least one intentional mistake—and maybe more. Just follow the simple rules to solve or submit an inSoluble.

Rules for inSidious inSolubles

1. An inSoluble is a BASIC Applesoft program. Any POKEd machine-language subroutine and CALLs to that subroutine are correct.

2. The program must accomplish something. In other words, when it's run it should produce some kind of a result.

3. The program should not generate an error message. If it does, check your typing.

4. A short explanation describes what the program is supposed to do and may contain clues to the problem.

5. The program may make use of common peripherals such as disk, printer, or modem. DOS 3.3 or ProDOS commands are acceptable.

6. The program may have more than one error.

When submitting your puzzles, remember to provide the solution, and please include an SASE if you would like a reply to your entry before it appears within these pages. The shorter the inSoluble, the better—but we like programs that do something useful.

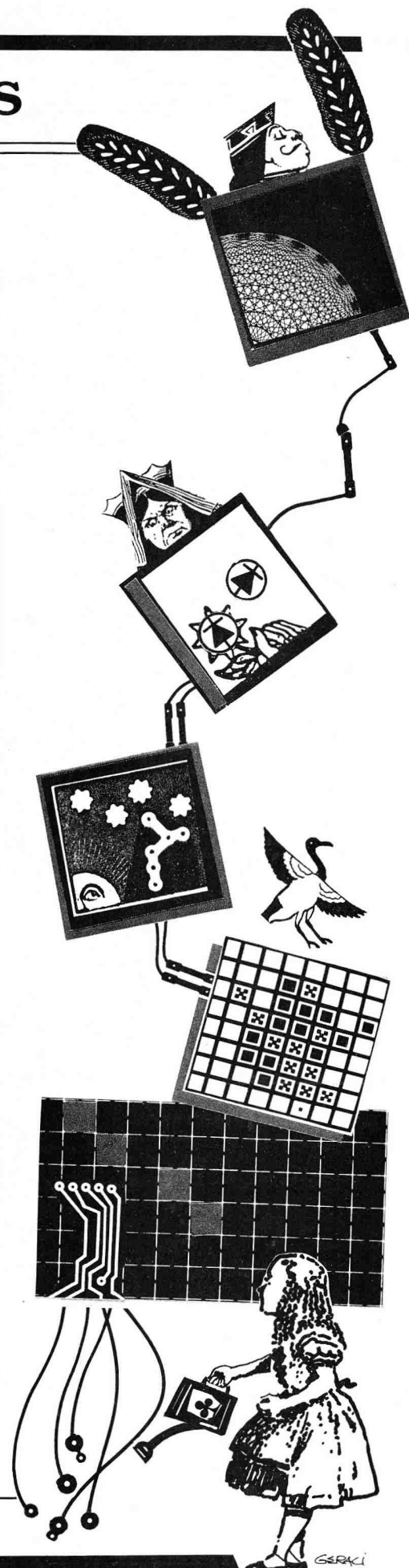
Solutions on page 108.

Listing 1. Pythagoras.

```
10 REM PYTHAGORAS
20 TEXT : HOME
30 INPUT "ENTER ONE SIDE OF A RI
   GHT TRIANGLE ";LEG1
40 INPUT "ENTER THE OTHER SIDE "
   ;LEG2
50 HYPOTENUSE = SQR (LEG1 ^ 2 +
   LEG2 ^ 2)
60 PRINT : PRINT "THE HYPOTENUSE
   IS ";HYPOTENUSE
70 END
```

Pythagoras

We again have a duplicate submission idea, this time from Chris Greenwood of Norwood, New York, and Joseph Reynolds of Marshallton, Iowa. Pythagoras, you remember, was that clever Greek mathematician whose theorem states that the square of the hypotenuse of a right triangle is equal to the sum of the



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squares of the other two sides. This inSoluble will use Pythagoras' advice and, given the length of the two sides, find the hypotenuse. AppleSoft, however, can throw us some curves, even for things as square as right triangles and old Greeks.

Listing 2. The Text File Maker.

```

10 REM TEXT FILE MAKER
20 D$ = CHR$(4): REM CTRL D
30 PRINT D$;"OPEN TFILE"
40 PRINT D$;"WRITE TFILE"
50 POKE 33,30
60 PRINT D$;"MON C,O"
70 LIST 100 -
80 PRINT D$;"CLOSE"
90 TEXT : END
100 REM REST OF PROGRAM
110 REM
120 REM
130 REM SOLUTION
140 REM IS EASY
150 REM

```

The Text File Maker

Would you like to list a BASIC program to a text file so it can be read and edited by a word processor such as Applewriter II or PIE Writer? These few lines of code in The Text File Maker, our second inSoluble, from F. Kuechmann of Vancouver, Washington, will do just that. The program lines will be listed to your screen as they are stored in the disk file called TFILE. Before running this program, make sure the disk does not already have a file with that name; the new file will destroy it. When these lines are attached at the beginning of your program, all lines starting at 100 will be listed to the file.

After the file is written to disk it may be read back with this simple five-line program. (This program is correct.)

```

10 D$ = CHR$(4)
20 PRINT D$;"OPEN TFILE"
30 PRINT D$;"READ TFILE"
40 GET A$: PRINT
50 PRINT A$:: GOTO 40

```

Did all work as expected? Ha, I thought not. InSidious, isn't it? ■

Send your inSolubles to Art Ude c/o inCider, 80 Pine Street, Peterborough, NH 03458.



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BASIC Looping Structures

In the first column of this series, I included a diagram representing the five basic functions that a computer can perform (*inCider*, July 1984, page 42). This month I will discuss the function referred to there as loop processing, starting with primitive loops and working up to the FOR...NEXT loop structure that is built into the BASIC language.

The importance of loop processing cannot be overstated. In fact, it was the need to perform the same types of mathematical calculations repeatedly that prompted Charles Babbage, often called the father of the computer age, to design his mechanical "difference engine." As a business machine, a computer would be useless without the ability to cycle through the same set of operations over and over again. A payroll program, for example, runs through a series of instructions to calculate the withholding and take-home pay for a given employee. When done, the program loops back to the beginning to perform the same instruction set on the next employee's data. And so it goes, until the employee list is exhausted.

Inventory and general bookkeeping functions must be handled in the same way. Imagine what an inventory program would be like that treated each of several thousand items with an individual set of instructions. The program would be too large to fit into most microcomputers and would probably be too complicated to maintain.

The programmer's task is to gen-

eralize the handling of individual items in such a way that a single set of instructions will handle the lot. The resulting instructions are then placed within a loop that is repeated continuously, each time for a different item, until all items have been processed.

The Primitive Loop

The most primitive loop of all can be constructed with nothing more than a GOTO command that sends the computer back to a previously executed instruction. The trivial program in **Listing 1** illustrates this.

If you run this program on your Apple, you will, of course, find that it never ends. No criterion has been specified within the loop for bringing it to a halt. The "infinite loop" has struck again!

Any practical program must provide an appropriate escape from each loop. One common approach is to specify the exact number of times for loop execution. For example, suppose you want the word "HELLO" to appear exactly 32 times on your video screen. You will need to add a counter to the above program and then test the value of the counter after each pass through the loop. Three general steps are involved:

- 1) Select a variable name to represent the counter, and initialize the counter (assign it a starting value) before entering the loop.
- 2) At the end of the loop, increment the counter—that is, add a value (usually one) to it, thus increasing its value.
- 3) Test the counter's new value to

determine if it's greater than some previously determined maximum. If not, then circle back to repeat the loop instructions; otherwise, continue with the rest of the program.

Applying these three steps to the program in **Listing 1** produces **Listing 2**, which is depicted in the flowcharts in **Figure 1**. As you can see, line 10, which initializes the counter, lies outside of the loop.

Note that in the test in line 40, CT, the loop counter, has a value 1 greater than the number of times the loop has been executed. Thus, the test checks to be sure the value of CT has not yet exceeded 32 before returning for another cycle.

Of course, the counter could have been initialized to 0 instead of 1, in which case the test in line 40 would have been for CT < 32. For a primitive loop, either approach is equally valid. However, I chose to use the approach that duplicates the BASIC automatic function described below.

The FOR...NEXT Command

BASIC provides a way to initialize the counter automatically, increment the counter, and test its value, all through one simple FOR statement at the beginning of a loop. Of course, a marker is needed to indicate where the loop ends, and BASIC accomplishes this with a NEXT statement. Using the FOR...NEXT combination in our trivial example produces the program in **Listing 3**.

In spite of their different appearance, the flowcharts for **Listing 3** will be the same as those for the pre-

by Dan Bishop

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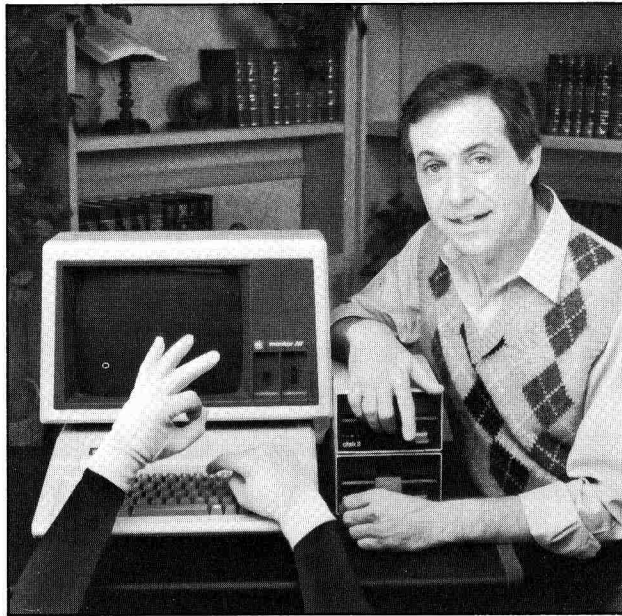
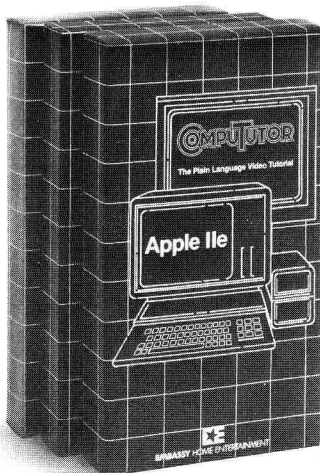
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Listing 1. A trivial program that demonstrates a primitive continuous loop based on a GOTO statement.

```

9 REM ** A TRIVIAL LOOP **
10 PRINT "HELLO ";:REM FIVE BLANKS
20 GOTO 10

```

Listing 2. Our trivial program enhanced so looping ends when a loop counter reaches a specified number.

```

9 REM ** A PRIMITIVE LOOP **
10 CT = 1:REM INITIALIZE COUNTER
20 PRINT "HELLO ";:REM FIVE BLANKS
30 CT = CT + 1:REM INCREMENT COUNTER
40 IF CT <= 32 THEN GOTO 20
50 END

```

Listing 3. Our trivial program enhanced to use a FOR...NEXT statement to terminate looping.

```

9 REM ** A FOR/NEXT LOOP **
10 FOR CT = 1 TO 32 :REM START OF LOOP
20 PRINT "HELLO ";:REM FIVE BLANKS
30 NEXT CT :REM END OF LOOP
40 END

```

vious version. The FOR statement at the beginning of the loop will always include the word FOR followed by the counter variable name, then an equal sign followed by the initial value you wish the counter to have, and finally the word TO followed by the final value for the counter.

If the FOR statement supplies no other information, the computer will automatically increment the value of the counter by 1 each time through the loop. This is sufficient if the counter value should reflect the number of cycles. However, sometimes a loop counter is used to provide specific values for calculations or indexing. In such cases you may want the counter to increment by an amount other than 1. This can be done with a STEP function (the word STEP and the value of the desired increment) added to the end of the

FOR statement. For example:

```
10 FOR CT = 1 TO 32 STEP 2
```

in **Listing 3** would instruct the computer to increment CT by 2 rather than 1 on each pass through the loop. CT would be assigned the following values as a result: 1, 3, 5, 7, 9, ... 31. The loop, however, would occur only 16 times.

You can also give a loop counter successively smaller values by using a negative increment. The following statement is perfectly valid:

```
10 FOR K = 100 TO -50 STEP -7
```

Here, K is assigned an initial value of 100 for the first trip through the loop. Then, since the step function is negative, 7 is subtracted from K, leaving 93, which is compared to -50. If it were less, the loop processing would end. In this example, the values of K will successively be 100, 93, 86, 79, 72, ... -40, -47. At this point, 7 is subtracted from K, leaving -54, and since -54 is indeed less than -50, the computer will jump down to the program statement following the NEXT K command.

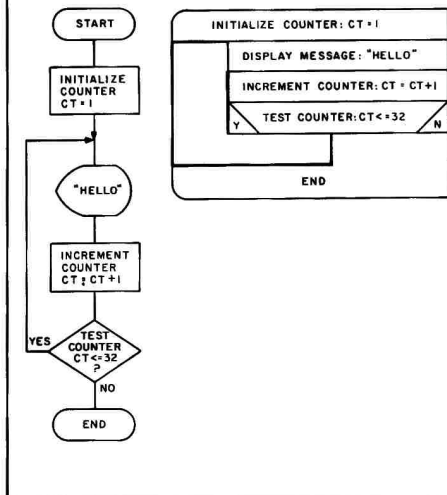
The FOR...NEXT loop is an extremely versatile function in BASIC. While each of the above examples uses constants for the initial, final, and increment values, in many cases you might not know from one moment to the next just what these values will be. Suppose you were using a loop to search through a list of names. Today there might be 250 names, tomorrow 311. If the variable N represented the number of names currently in the list, you could use N for the final value in the FOR statement. Variables may also be used for the initial and incrementing values. You could have a FOR...NEXT statement that looked like this:

```
10 FOR FL = MN TO MX STEP Z
```

This statement would be perfectly valid as long as MN, MX, and Z had values appropriate to the application.

You should be aware of one peculiarity of Applesoft BASIC (and several other BASIC's as well): A FOR...NEXT loop will always be executed at least once, regardless of the initial, final, and increment values. This is because the test to see

Figure 1. Two flowchart representations of the simple loop-with-counter program in Listing 2.



if the counter has gone out of range occurs after execution of the loop instructions. So, if $MN = 10$, $MX = 2$, and $Z = +1$ in line 10 above, the loop instructions would still be carried out once, even though FL (with an initial value of 10) is already greater than MX.

Don't Jump Without a Parachute!

In many applications you will want a loop to occur repetitively until some specific criterion is met that is unrelated to the value of the loop counter. In a mailing list you may be searching for a specific name. You will want the computer to go through the list, comparing its names with the desired name until a match is found, then stop the looping process and continue with the rest of the program.

You will no doubt be tempted to set up your loop in the following fashion:

```
100 FOR FL=MN TO MX STEP Z
...
140 IF A$=B$ THEN GOTO 200
...
190 NEXT FL
200 ...
```

This example calls for stopping the repetitive looping process if the values for A\$ and B\$ are equal. Unfortunately, this trick is like jumping out of a plane without a parachute. Though you may get by with it for short programs, you will someday find yourself with an unexplainable "out of memory" error.

To understand why you should never jump out of a FOR...NEXT loop with a GOTO command, keep in mind that the computer must do a considerable amount of bookkeeping in memory every time a FOR...NEXT loop is executed. The maximum and step values for the loop must be stored, along with the current value of the loop counter. The two memory addresses marking the start and end of the loop instructions must also be stored. A small section of memory (called the "stack") is reserved for this information. Once these values are stored in the stack, they remain there until the loop has successfully run to completion. Then the values are removed to

Listing 4. Prime Number Tester. This program accepts any number between 2 and 1,000,000 and determines if the number is prime. If it is not, the program displays the smallest prime that divides evenly into it.

```
1 REM THIS PROGRAM WILL TEST NUMBERS BETWEEN 1 AND
2 REM 1 MILLION TO SEE IF THEY ARE PRIME NUMBERS.
3 REM TO SPEED UP THE PROGRAM, A QUICK CHECK IS MADE
4 REM FOR DIVISIBILITY BY 2, 3, 5, AND 7. THEN
5 REM DIVISIBILITY BY ANY ODD NUMBER GREATER THAN 10
6 REM IS DETERMINED, STARTING WITH 11 AND GOING UP TO
7 REM 1/10TH OF THE VALUE OF THE NUMBER BEING TESTED.
8 REM PF IS A FLAG VARIABLE. IF 1, THE # IS NOT PRIME.
9 REM *** MAIN PROGRAM ***
10 PF = 0: HOME: GOSUB 100: REM OBTAIN NUMBER TO BE
    TESTED
20 GOSUB 200: REM TEST DIVISIBILITY BY 2, 3, 5, 7
30 IF PF = 1 THEN GOTO 60
40 GOSUB 500: REM TEST DIVISIBILITY BY HIGHER #'S
50 IF PF = 0 THEN PRINT X" IS A PRIME NUMBER.": GOTO
    90
60 PRINT X" IS NOT A PRIME NUMBER."
70 PRINT "IT IS DIVISIBLE BY "Y"."
80 PRINT
90 END
99 REM ***** INPUT SUBROUTINE *****
100 PRINT "THIS PROGRAM TESTS A NUMBER"
110 PRINT "TO SEE IF IT IS A PRIME."
120 PRINT
130 PRINT "ENTER THE NUMBER TO BE TESTED."
140 INPUT X
150 IF X < 2 THEN PRINT "POSITIVE NUMBER > 1, PLEASE
    .": GOTO 120
160 IF INT(X) < X THEN PRINT "USE AN INTEGER, PLEASE.": GOTO 120
170 IF X > 1000000 THEN PRINT "SMALLER NUMBER, PLEASE.": PRINT "THIS ISN'T A CRAY, YOU KNOW.": GOTO 120
180 RETURN
199 REM ***** DIVISIBILITY CHECK FOR 2, 3, 5, 7 *****
200 IF ABS(X / 2 - INT(X / 2)) < .0000001 THEN Y = 2: PF = 1: GOTO 240
210 IF ABS(X / 3 - INT(X / 3)) < .0000001 THEN Y = 3: PF = 1: GOTO 240
220 IF ABS(X / 5 - INT(X / 5)) < .0000001 THEN Y = 5: PF = 1: GOTO 240
230 IF ABS(X / 7 - INT(X / 7)) < .0000001 THEN Y = 7: PF = 1: GOTO 240
240 RETURN
499 REM ***** DIVISIBILITY CHECK FOR HIGHER NUMBERS *****
500 FOR J = 11 TO X / 10 STEP 2
510 IF ABS(X / J - INT(X / J)) < .0000001 THEN Y = J: PF = 1: J = X / 10: GOTO 520
520 NEXT J
530 RETURN
```

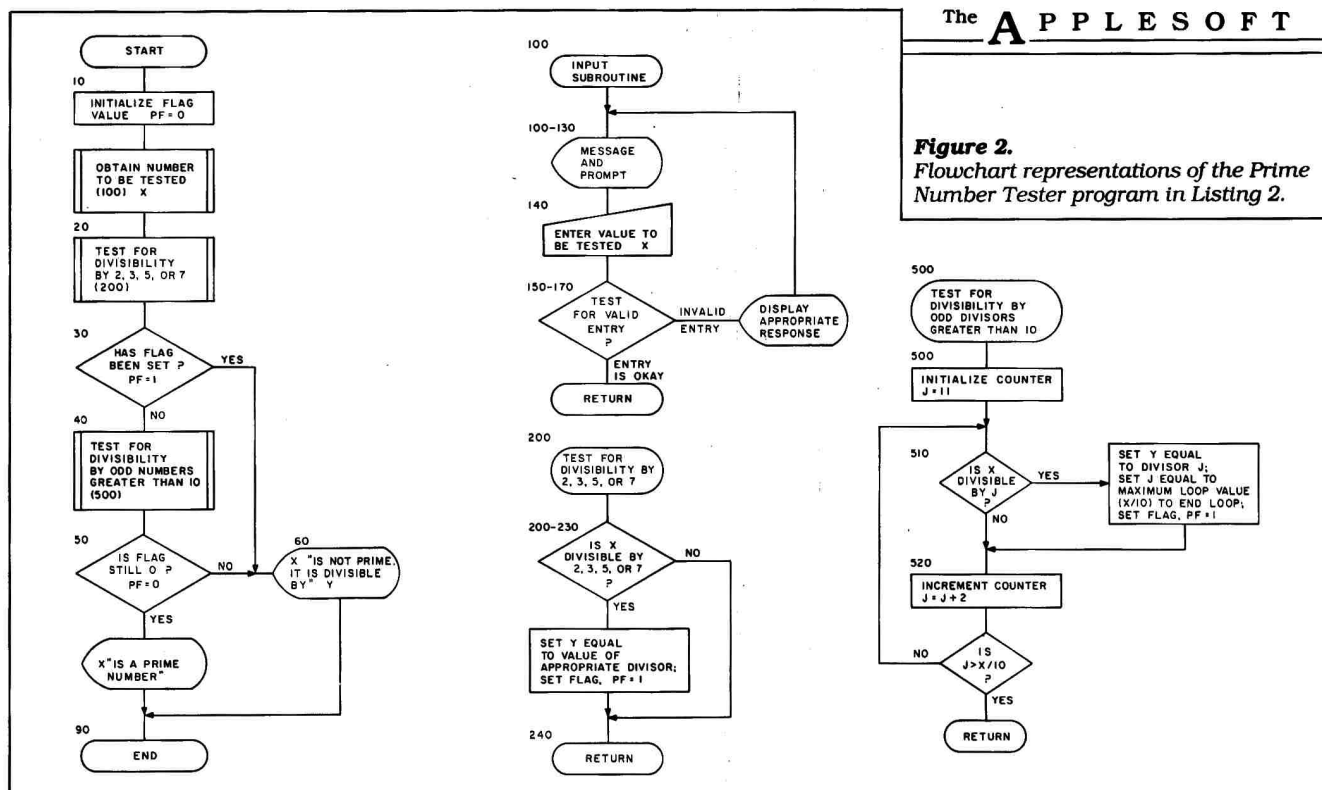
make room for other FOR...NEXT loop values.

When you use a GOTO to jump out of a loop, you thwart this process, and those values remain in the stack. Since the computer allocates only a limited amount of memory for the stack, it takes only a few such unauthorized jumps before the stack is full of useless information. Then,

the next time the computer encounters a FOR...NEXT loop or a subroutine call, the program will crash with an "out of memory" message.

Does this mean that you must cycle through the FOR...NEXT loop process to the bitter end, even if you have what you need long before the specified number of cycles? Some

Figure 2.
Flowchart representations of the Prime Number Tester program in Listing 2.



authors of BASIC texts would have you think so and suggest that you must resort to primitive loops for any application that might entail ending the looping process at less than a set number of cycles. In fact, there is a perfectly valid way to handle this problem. Consider these two amended versions of the above example:

```

100 FOR FL= MN TO MX STEP Z
...
140 IF A$=B$ THEN FL=MX:GOTO 190
190 NEXT FL
200 ...
and
100 FT=0:FOR FL= MN TO MX STEP Z
...
140 IF A$=B$ THEN FT=FL:FL=MX:
    GOTO 190
...
190 NEXT FL
200 ...
  
```

The common feature in these two examples occurs in line 140 where the loop counter, FL, is artificially reset to MX, the ending value as indicated by the FOR statement. Then the computer is commanded to GOTO the line number that contains the NEXT statement. In effect, you are not jumping out of the loop at all; you are making the loop end prematurely, but in a completely natural

way. When the computer does its next automatic comparison between FL and MX, it will find that FL is larger (assuming Z to be positive) because the step value Z will have been added to FL. Then the loop will end immediately. Since it is terminating "naturally," the bookkeeping values held in the stack for this loop will be cleared, making room for later FOR...NEXT and GOSUB data. This approach is my so-called "parachute."

The second of these two examples has one additional feature. Sometimes you need to know whether the loop was ended prematurely and, if so, how many cycles were completed beforehand. The simplest way is to define a variable (FT in this example) and initialize it to an appropriate value before entering the FOR...NEXT loop. Then, when the criterion for prematurely ending the looping process has been met, assign to this variable the current value of the loop counter before resetting the counter to MX.

Prime Number Tester

Listing 4 is a simple program that allows the operator to enter any number between 2 and 1,000,000 and see if that number is prime or not. (A prime number is an integer

divisible only by 1 and itself.) **Figure 2** shows the flowcharts for this program.

The algorithm for determining divisibility is simple enough. If one number is evenly divisible by another, then there will be no decimal fraction in the quotient—that is, the quotient will be an integer. So, if a number, N, is divisible by 23, then $N/23$ will be an integer. BASIC's INT() function takes any number and eliminates the decimal fraction. Consequently, if $N/23$ and $\text{INT}(N/23)$ are equal, then N must be evenly divisible by 23, since neither expression will have a decimal fraction.

Of course, when the computer divides N by 23, it may not come out to an exact integer due to internal rounding errors. For example, if N is 46, then $N/23$ might come out 1.999999 or 2.000001, and $N/23$ and $\text{INT}(N/23)$ would not quite be equal. So, instead of comparing $N/23$ and $\text{INT}(N/23)$ for equality, the difference between these two values is determined, converted to a positive number by the ABS() function, and compared with some very small number to see if the difference between the two is negligible. If so, $N/23$ and $\text{INT}(N/23)$ are taken to be equal and even divisibility is assumed. An expression such as:

Send your questions about Apples or Apple computing to Ask inCider, 80 Pine Street, Peterborough, NH 03458.

Lingua Apple

Dear inCider:

I've been using an Apple IIe for about eight months, and programming in BASIC for nearly as long. I'm now interested in learning other high level languages such as Pascal and FORTRAN. As I understand it, in order to use these languages on my Apple, I must have either an operating system software package called UCSD or a CP/M card.

I don't know much about UCSD or CP/M. I would appreciate any information you can provide about them. In particular, I'd like to know where I can acquire a UCSD system. Thank you.

Roger R. Charest
208 Mast Road Apt. 1
Manchester, NH 03102

Dear Roger:

The version of the UCSD (University of California, San Diego) operating system that works on 64K Apple computers is included as part of the Apple Pascal package, and is available from any Apple dealer. As a full-blown operating system, the UCSD p-System performs basic I/O and memory management functions and includes a text editor, p-System interpreter, file handler, linker, assembler, library functions, and system utilities. You can also buy a FORTRAN compiler for the p-System from Apple or buy other language compilers from other sources. The UCSD p-System is an excellent way to run high-level languages on an Apple.

CP/M is an 8-bit, industry-standard operating system that runs on 8080, 8085, and Z-80 based microcomputer systems. Since your Apple is built around the 6502, you

can't run CP/M in native mode. You have to add a coprocessor board that uses one of the previously mentioned microprocessors. With such a board in place, you can run CP/M software, including Pascal, FORTRAN, and many other languages available for Apple CP/M.

The UCSD p-System is less expensive than most CP/M systems for the Apple because it doesn't require special hardware, just 64K RAM. CP/M lets you run additional software on your Apple, but this may be superfluous if all you want to do is program in a high-level language.

Accumulation Blues

Dear inCider:

I'm new at this computer game. I've programmed a special grading system with extra-credit options for a science class. I need to know where I can find a random access and file system, so I can add grades after each week and have full data banks at the end of nine weeks. Can you recommend a book or program that will do this?

Phyllis Law
P.O. Box 405
Shivton, WI 54170

Dear Phyllis:

Storing and retrieving information from a disk data file is one of the most powerful and important features of a computer system. In fact, without this ability, computers would be quite useless. If I read you correctly, you want to manipulate data files using Applesoft BASIC. The best book I have read on the subject is Apple BASIC: Data File Programming by Leroy Finkel and Jerald R. Brown (New York: John Wiley & Sons, Inc., 1982, \$12.95). This book is the next best thing to having a private tutor guide you through the intricacies of programming sequential and random access data files.

Double Play

Dear inCider:

I have two questions to ask you. First, what is the procedure for contributing pieces to your magazine? I notice that you encourage people to send programs in, but I've never seen an explanation of how to do this.

Second, in the interview with Steve Wozniak (July 1984, p. 52), I read about a double hi-res graphics mode and extra colors on the IIe and IIc. Being a IIe owner, I found this exciting. Upon further examination, I learned that 128K RAM is needed to access this mode. Is there a way to get the extra resolution without the extra 64K of memory? If not, can I still access the extra colors?

Steve Rogers
432 Ridgmont Drive
Rochester, NY 14626

Dear Steve:

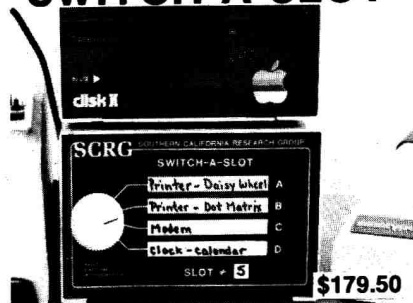
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Concerning your second question, you cannot increase the resolution or number of colors on your IIe without an extended 80-column card. One half of the double hi-res graphics page is in the memory located on the card, and you can't take advantage of any double hi-res features without it.

I'm ambivalent about double hi-res graphics. I like the extra features but I wish that Apple had gone further and upgraded the

by Bob Ryan, inCider staff

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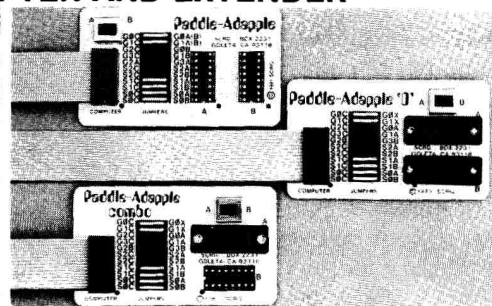
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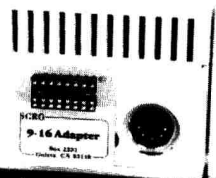
The **Paddle-Adapple Combo** has one 16 pin socket and one subminiature D connector.

NEW 9-16 Adapter

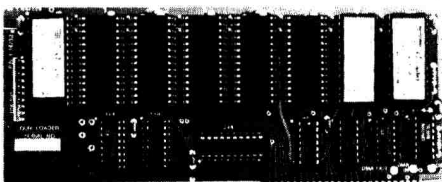
For Apple //e and //c

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

\$14.95



quikLoader™



FAST AND CONVENIENT

The quikLoader is the fastest way to load programs. **BAR NONE!** Programs can be loaded in fractions of a second. More importantly, DOS is instantly loaded every time the computer is turned on. Integer is even loaded in the language card. This process takes less than a second, saving valuable time. Frequently used programs are available instantly when you need them, without having to look for the disk, or hoping that the lengthy disk loading procedure goes smoothly.

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

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

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

PROGRAMMING EPROMS

Putting your own programs on the quikLoader is easily done, using a separate EPROM programmer such as the **PROMGRAMER**. For APPLESOFT, INTEGER, or single machine language files, no programming knowledge is necessary. You will need experience if you want to save copy-protected or complex programs. The amount of experience necessary depends on the complexity of the program.

COMMERCIAL PROGRAMS

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

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

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

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

MEMORY CAPACITY

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

INCREASED DISK CAPACITY

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

ABOUT THE DESIGNER

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

SYSTEM REQUIREMENTS

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

DOS, INTEGER, BASIC, FID, and COPYA are copyrighted programs of APPLE COMPUTER, INC. licensed to Southern California Research Group to distribute for use only in combination with quikLoader.

\$179.50

PROMGRAMER™

The **PROMGRAMER** will read or program any of the standard single-volt EPROMs from the 2708 to the 27512. Features include:

- Slot independent operation for the APPLE // family of computers.
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graphics to state of the art. After all, if you're going to introduce incompatible features, you may as well do it up right.

Archival Action

Dear inCider:

I'm seriously considering purchasing a back-up program for my Apple //e. In your opinion, which program is the best for my purposes?

Greg Stevens

8005 Westdumfries Court
Bakersfield, CA 93309

Dear Greg:

Some good back-up programs on the market include Locksmith, Nibbles Away II, and Copy II Plus. I use Essential Data Duplicator by Utilico Software, 3377 Solano Avenue, Suite 352, Napa, CA 94558. I don't have enough experience with the other packages listed above to say which one is the best. I'm sure any one will do the job for you.

Current Events

Dear inCider:

We are writing you to ask a general

question: Why are no standard home computers specifically designed for 12-volt DC operation?

In North America, power is supplied primarily at 60Hz/110V AC. 12V DC is a secondary standard. Two groups, however, depend on 12V DC as their primary power supply. The first group is permanent residents of recreational vehicles: usually retirees, reporters like Charles Kuralt, and "gypsies" financially able to enjoy a permanent "wanderjahr" about the North American land mass.

The second group is commonly labeled homesteaders/survivalists/self-sufficients. These people yearn for a simpler life or wish to "ride out the impending chaos" in isolated retreats. They get their power from wind generation, photo-voltaics, and mini-hydroelectric plants. The output from these devices is fed into 12V DC deep discharge batteries.

Both groups depend upon 12V DC power. To operate a home computer, however, they must first invert the 12V DC to 110V AC/60Hz. This sig-

nal is then reconverted to direct current by the computer's internal power supply. Have manufacturers completely overlooked the needs of people who are not wedded to AC power supplies?

Jeremy and Maria Michele

The Black Powder Report

23 Doty Avenue

Staten Island, NY 10305

Dear Jeremy and Maria:

To quote from a draft copy of the Apple //c reference manual: "The internal converter in the Apple //c operates on from 9 to 20 volts DC as provided by the external power supply or its equivalent." The //c can be powered from a car battery or any other 9 to 20 volt DC power supply.

The IBM PCjr also accepts a purely DC input from an external power supply, although this signal must be split into three different DC voltages before the jr can use it (the //c splits the signal internally). A growing number of portable computers that are entirely battery operated are also available.

inCider ran an article, "The Alternative Apple," in its February 1984 issue, page 58, about operating pre-//c Apples off a DC source.

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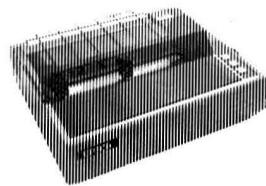
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ALL OTHER CABLES	CALL

from page 97

Solutions to inSidious inSolubles

Solution to Pythagoras

In Applesoft, only the first two characters of a variable name are used (are significant). LEG1 and LEG2 are treated as the same variable because Applesoft recognizes only "LE". Substitute L1 and L2 in their places and all should be OK.

Solution to The Text File Maker

The program as written will create the file on the disk, but it will be empty. The program lines will be listed only to the screen. The solution is to renumber line 60 to line 25. This will put it in place before the file is opened and all will work as expected. This is a handy routine that could be saved to disk with smaller line numbers (1-9) and then appended to your BASIC programs. Just change the line that starts the listing to the first line number of your program.

ELEK-TEK, inc. 6557 N. Lincoln Ave., Chicago, IL 60645
(312) 631-7800 (312) 677-7660

A Bug in AppleWorks

The Apple //e and //c version of AppleWorks contains a bug in the program's word processor section. The problem occurs when you underline with the Epson MX-80 printer with Grafrax+. (The program's documentation lists this printer as one to which AppleWorks sends the appropriate printer codes.)

According to the manual, the word processor uses two methods to start and stop underlining. One method involves pressing the letter O while holding down the open-apple key to activate the print options mode. Then, typing UB starts the underlining process; UE stops it.

The second method—pressing control-L to begin and end underlining—toggles directly from the typing mode. Even if you don't specify the ending position, underlining *should* stop at the end of the paragraph. Unfortunately, once you start underlining, neither method will stop it, not even at the end of a paragraph.

I suspected that the problem was related only to the Epson MX-80 printer with Grafrax+. So I tested other printer set-ups—Epson's MX-, RX-, and FX-series—by indicating to AppleWorks that the printer was one of these, while still using the MX-80 printer with Grafrax+. When I specified the MX-series (not with Grafrax+ though), the printer did not provide true underlining, but a series of dashes under the text to be underlined. The dashes did stop, though, when I indicated the end of underlining. (This may be the correct procedure for underlining in this series.) The result of specifying the RX- or FX-series was identical to that of the

MX with Grafrax+—once underlining is started, it can't be stopped.

A Temporary Fix

You can, however, set up printer codes that make the present version operate exactly as the manual indicates. The trick is to convince AppleWorks that you don't have an Epson MX-80 with Grafrax+ by supplying more information than just that necessary to fix the underlining problem.

To make the fix, follow the clear step-by-step procedure outlined in the AppleWorks reference manual, Appendix B, "Preparing AppleWorks for a Custom Printer." Since it's somewhat difficult to find the exact form of the responses needed to customize the printer for the Epson MX-80 with Grafrax+, I've provided

ed the proper responses.


At step 7, page 282, change the default response of option 2 from No to Yes. At step 8 first select 5, the printer codes option, and then press 4 for underlining. This displays a menu with four options regarding your printer's underlining capabilities. Select 2 for start/stop underline commands, and provide the following codes: escape, control-A to begin underlining and escape, control-@ to end underlining. (See the **Table** for other codes necessary to customize AppleWorks for your printer.) Now, as you successively press the escape key to return to the main menu, these codes are saved to the program disk and the bug is gone. ■

Contact W.M. Miller, Jr., at 6744 Ransome Drive, Baltimore, MD 21207.

Table. Control codes.

Option	Item	Response
1	Condensed print on (17 cpi)	Control-O
1	Condensed print off (10 cpi)	Control-R
3	Begin boldface	Escape, E
3	End boldface	Escape, F
3	Begin subscript	Escape, S, control-A
3	End subscript	Escape, T
3	Begin superscript	Escape, S, control-@
3	End superscript	Escape, T

by W.M. Miller, Jr.



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HINTS 'N' TECHNIQUES

Serpent on a Stick

by Edward R. Verdelotti

Dennis Marks' "Serpent" (in *Cider*, February 1984, page 76) is entertaining and educational. I modified it to work with a joystick on my Apple IIe. The line changes in **Listing 1** eliminate the need for the keyboard.

I added the remaining line changes (**Listing 2**) to award bonus points

for reaching scores of 150 and 300. For each bonus point you get one free crash. A final addition is a trap door that opens so you can exercise your snake in the back yard. ■

Write to Edward Verdelotti at 216 Missimer Lane, Vinton, VA 24179.

Listing 1. Line changes eliminating the need for the keyboard.

```

210 V = PDL (0)
220 P% = V * 40 / 256 + 1
225 H = PDL (1)
230 Q% = H * 40 / 256 + 1
240 IF P% < 10 THEN DI = 4
250 IF P% > 30 THEN DI = 2
260 IF Q% < 10 THEN DI = 1
270 IF Q% > 30 THEN DI = 3
440 VTAB 23: HTAB 1: PRINT "YOU CRASHED !!!"; CHR$(7); CHR$(7); CHR$(7)
    : PRINT "AGAIN? YES= BUTTON #0 OR OPEN APPLE:
445 PRINT "          NO=BUTTON #1 OR CLOSED APPLE"
450 IF PEEK ( - 1628) > 128 THEN RUN
460 IF PEEK ( - 16286) > 128 THEN TEXT : HOME : END

```

Listing 2. Line changes to award bonus points.

```

69 REM EXPANDED BOX
70 FOR X = 4 TO 275 STEP 4: DRAW 1 AT X,2: NEXT
80 FOR X = 52 TO 204 STEP 4: DRAW 1 AT X,146: NEXT
85 FOR X = 4 TO 275 STEP 4: DRAW 1 AT X,155: NEXT
90 FOR Y = 3 TO 146 STEP 3: DRAW 1 AT 52,Y: NEXT
95 FOR Y = 2 TO 156 STEP 3: DRAW 1 AT 4,Y: NEXT
100 FOR Y = 3 TO 146 STEP 3: DRAW 1 AT 204,Y: NEXT
105 FOR Y = 2 TO 156 STEP 3: DRAW 1 AT 272,Y: NEXT
150 IF CL = 0 THEN GOSUB 432
160 IF CL < > 12 THEN PRINT CHR$(7);XC = 1:LL = LL + 5:C = C + 5: VTAB
    22: HTAB 8: PRINT "SCORE: ";LL;"          BONUS POINTS: ";B;" "
165 IF LL = 150 AND D = 0 THEN GOSUB 560
166 IF LL = 300 AND D = 1 THEN GOSUB 578
170 GOSUB 330
175 IF S = 1 THEN S = 0: GOTO 120
380 YY = INT ( RND (1) * 143) + 3
431 REM RECOVERY AFTER CRASH
432 N = N - 1:XC = 1: DRAW 2 AT XX,YY: IF LL = 0 GOTO 440
433 FOR T = 0 TO 1
434 N = N - 1:X = ST%(N,0):Y = ST%(N,1): XDRAW 1 AT X,Y: NEXT T
436 DI = DI + 1: IF DI > 4 THEN DI = 1
438 IF B > 0 THEN B = B - 1:S = 1:LL = LL - 5: RETURN
500 REM TRAP DOORS
560 D = 1:B = B + 1
570 FOR M = 131 TO 137 STEP 3: XDRAW 1 AT 52,M: NEXT
572 RETURN
578 D = 2:B = B + 1
580 FOR M = 131 TO 137 STEP 3: XDRAW 1 AT 204,M: NEXT
630 RETURN
650 END

```


APPLE EXTRACT

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

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

Software

Access II

★★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Communications, August '84.
A sophisticated yet easy to use terminal package. ProDOS based. \$75.

Accounts Receivable

★★★★

BPI Systems, 3423 Guadalupe, Austin, TX 78705
Business, June '84.
Get a handle on your business. This package does what an AR package should. \$395.

Alphabet Beasts and Company

★★

Reader's Digest Software, Microcomputer Software Division, Pleasantville, NY 10570
Education, July '84.
Beautiful graphics help youngsters learn how to draw numbers, letters, and strange creatures. \$34.95.

Apple Logo II

★★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Language, September '84.
More powerful and complete than its predecessor. Requires a //c or a 128K //e. \$100.

AppleWorks

★★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Business, July '84.
A superb integrated package featuring a word processor, a spreadsheet, and a data base manager. An excellent value. \$249.

BASIC Tutor

★★

Supersoft, Inc., 1713 S. Neil Street, Champaign, IL 61820
Education, August '84.
A solid instructional package for people interested in learning Applesoft BASIC. Schools can take advantage of a multiple copy policy. \$99.95.

Break the Bank Blackjack

★★

Gentry Software, 9411 Winnetka Avenue, Chatsworth, CA 91311
Entertainment, July '84.
This program teaches you how to count cards when playing blackjack. \$24.95.

Carrier Force

★★★

Strategic Simulations, Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043
Strategy game, August '84.
A war game that simulates a number of famous air-sea battles of the Pacific Theater in World War II. A super challenge. \$59.95.

Caverns of Callisto

★★

Origin Systems, Inc., P.O. Box 58009, Houston, TX 77258
Arcade game, June '84.
It's a long walk (400 million miles) back to Earth if you don't find the parts stolen from your spaceship. \$34.95.

Certified Personal Accountant

★★

Sundex Software, 3000 Pearl Street, Boulder, CO 80301
Home accounting, October '84.
CPA tracks your personal financial information in an easy and understandable way. \$99.95.

Chivalry

★★★

Weekly Reader Software, 245 Long Hill Road, Middletown, CT 06457
Arcade game, June '84.
Beautiful graphics enhance this game set in days of yore. A great game for kids. \$49.95.

Circascript

★★★

Circadian Software, Inc., Box 1208, Melbourne, FL 32902
Word processor, May '84.
A low cost WP with a lot of professional features. Ideal for students and small businesses. \$39.95.

CodeWriter

★★★

CodeWriter Corp., 7847 North Caldwell Avenue, Niles, IL 60648
Utility, October '84.
CodeWriter is a data-base generation program that lets you create tailor-made data bases. \$199.

The Coveted Mirror

★★

Penguin Software, 830 4th Avenue, Geneva, IL 60134
Adventure game, August '84.
An adventure game with some arcade features included. Be careful—King Voar is watching! \$34.95.

Create-A-Test

★★

Create-A-Test Company, 80 Tilley Drive, Scarborough, Ontario, Canada M1C 2G4
Education, September '84.
Teachers can save a lot of time with this test authoring system. Question disks are also available. \$89.95.

Cubit

★★

Micromax, 6868 Nancy Ridge Drive, San Diego, CA 92121
Arcade game, May '84.
An Apple clone of Q-Bert. Explore the mysteries of pyramid power. \$39.95.

Cut & Paste

★★

Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403
Word processor, May '84.
A lot of features for a little money. A good value for computer novices. \$49.95.

Disk Quick

★★★

Beagle Bros, Inc., 4315 Sierra Vista, San Diego, CA 92103
Utility, June '84.
Turn the extended 80-column card in your //e into a RAM disk. \$29.50.

Dow Jones Spreadsheet Link

★★★

Dow Jones & Company, Inc., P.O. Box 300, Princeton, NJ 08540
Communications, October '84.
Automatically dials up the Dow Jones data base, downloads information on selected stocks, and writes the data to a file for reading by your spreadsheet program. \$249.

The Eating Machine

★★★

Muse Software, 347 North Charles Street, Baltimore, MD 21201
Home, July '84.
A cut above the average self-improvement program, helps plan a healthy diet. \$49.95.

Edu-Ware Fractions

★★★

Edu-Ware Services, Inc., P.O. Box 22222, Agoura Hills, CA 91301
Education, September '84.
Everything you always wanted to know about fractions and decimals. \$49.

Electronic Playground

★ ★

Software Entertainment Company, 537 Willamette Street, Eugene, OR 97401

Education, August '84.
Games for three- to eight-year-olds, including a kaleidoscope, a matching game, and a drawing program. \$24.95.

The Factory

★ ★

Sunburst Communications, Inc., 39 Washington Avenue, Pleasantville, NY 10570

Education, July '84.
Designed for fourth through ninth graders, The Factory teaches real problem solving skills in a challenging way. \$24.95.

Fraction Factory

★ ★ ★

Counterpoint Software, 7807 Creekridge Circle, Minneapolis, MN 55435

Education, September '84.
An excellent introduction to fractions for young learners. \$29.95.

Fraction Fever

★

Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139

Education, September '84.
An arcade game that teaches fraction equivalents. Poor documentation limits the usefulness of the software. \$34.95.

Fractions

★ ★ ★ ★

Quality Educational Designs, P.O. Box 12486, Portland, OR 97212

Education, September '84.
A package containing six disks that makes learning about fractions fun. An excellent buy for schools. \$175.

The Graphics Magician

★ ★ ★

Penguin Software, P.O. Box 311, Geneva, IL 60134

Graphics, June '84.
A great graphics utility for the Apple. No wonder so many professional game designers use it. \$59.95.

Gruds in Space

★ ★

Sirius Software, Inc., 10364 Rockingham Drive, Sacramento, CA 95827

Adventure game, June '84.
Saving the universe can be a chore. A game where all is not what it seems. \$39.95.

Gutenberg Jr.

★ ★

Micromation Limited, 1 Yorkdale Road, STE 406, Toronto, Ontario, Canada M6A 3A1

Word processor, June '84.
A powerful and inexpensive program for combining text and graphics. Limited in the hardware it supports. \$85.

The Heist

★ ★ ★ ★

Micro Lab, 2699 Skokie Valley Road, Highland Park, IL 60035

Arcade game, October '84.
Great animation is the high point of this game in the vein of Miner 2049'er and Donkey Kong. \$40.

Homeword

★ ★

Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614

Word processor, July '84.
The use of icons makes this inexpensive package easy for beginners to understand. \$69.95.

In Search of the Most Amazing Thing

★ ★ ★

Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139

Education, June '84.
An adventure game for children that helps develop reasoning skills and which emphasizes violence. \$39.95.

In-The-Mail

★ ★

el Dorado Software, 350 7th Avenue, Suite 324, San Francisco, CA 94118

Business, July '84.
In-The-Mail gives you 99 different letters for all those times when you can't think of what to write. From sympathy notes to letters of resignation, this package has them all. \$60.

IQ Baseball

★ ★

Davka Corporation, 845 North Michigan Avenue, Chicago, IL 60611

Strategy game, May '84.
Baseball trivia fans will eat this one up. So who was the only pitcher to appear in 1000 games? \$24.95.

Jeepers Creatures

★ ★

Kangaroo, Inc., 332 S. Michigan Avenue, Suite 700, Chicago, IL 60604

Education, July '84.
A program for preschoolers that lets kids be creative while practicing word recognition and association. \$34.95.

Jenny of the Prairie

★ ★

Addison-Wesley Publishing Company, Jacob Way, Reading, MA 01867

Adventure game, August '84.
You take the part of the "plucky pioneer girl" and try to survive the harsh prairie winter. \$39.95.

Kids on Keys

★ ★

Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139

Education, September '84.
A game for young children that teaches how to use the Apple keyboard. \$29.95.

Kidwriter

★ ★ ★

Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139

Education, July '84.
A good reason why Spinnaker has a reputation for excellence. This program lets young kids create pictures and then write short stories to accompany them. \$34.95.

Kinder Concepts

★ ★

Midwest Software, Box 214, Farmington, MI 48024

Education, September '84.
Six disks containing 30 programs that teach math and reading skills to young children. \$175 or \$39.50 per disk.

Letters and Words

★ ★

Learning Well/Methods and Solutions, Inc., 200 S. Service Road, Roslyn Heights, NY 11577

Education, July '84.
Games for preschoolers that teach alphabet sequencing, upper/lowercase association, and word/object association. \$49.95.

Magicalc

★ ★ ★

Artsci, Inc., 5547 Satsuma Avenue, North Hollywood, CA 91601

Spreadsheet, September '84.
Powerful, flexible, and economical, this spreadsheet is the answer to a VisiCalc user's dreams. \$149.

Magic Memory

★ ★

Artsci, Inc., 5547 Satsuma Avenue, North Hollywood, CA 91601

Data base, June '84.
Put your address book on your computer with this easy to use package. Although not very powerful, it does its job well. \$99.95.

Masquerade

★ ★ ★

Phoenix Software, Inc., 64 Lake Zurich Drive, Lake Zurich, IL 60047

Adventure game, July '84.
This hi-res game features a wonderful collection of characters and a bewildering array of puzzles that you must solve before you can unmask that arch-criminal, Mr. Topp. \$34.95.

Mastering the SAT

★ ★

CBS Software, One Fawcett Place, Greenwich, CT 06836

Education, September '84.
A good preparation for the Scholastic Aptitude Test. \$150.

Microzine

★ ★

Scholastic Wizware, 730 Broadway, New York, NY 10003

Education, June '84.
A disk magazine from the publishers of Scholastic. More fun than flipping pages. \$39.95.

Murder by the Dozen

★★★

CBS Software, One Fawcett Place, Greenwich, CT 06836
Strategy game, August '84.
A great game for Agatha Christie fans and anyone else who likes a tough problem to crack. \$34.95.

Number Commander

★★

ComputerEase, Inc., 1312 W. Cedar Street, Appleton, WI 54914
Statistics, August '84.
A good package for those who store and manipulate a lot of numeric data. \$125.

One-on-One

★★★

Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403
Game, July '84.
The best sports game available for the Apple. When Larry Bird and Julius Erving go one-on-one, it's almost as much fun as a Celtics-Sixers playoff game at the Garden. If only they had included a parquet floor. \$40.

OPVAL

★★

Calcsapp, Inc., Box 1231, West Caldwell, NJ 07007
Personal finance, May '84.
Make a killing in the market with this option analysis program. \$250.

Paper Graphics

★★★

Penguin Software, P.O. Box 311, Geneva, IL 60134
Graphics, July '84.
This package lets you print the contents of the Apple hi-res screens. As an added bonus, you can edit the pictures before you print them. \$49.95.

Planetfall

★★

Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138
Adventure game, August '84.
With Floyd as your boon companion, you'll set out to unravel the mysteries of the lost civilization. Success depends upon your wits and imagination. \$49.95.

Plato Fractions

★★

Control Data Publishing, 4455 Eastgate Mall, San Diego, CA 92121
Education, September '84.
A dart game with a difference. This one teaches youngsters about fractions. \$49.95.

Plato Whole Numbers

★★

Control Data Publishing, 4455 Eastgate Mall, San Diego, CA 92121
Education, September '84.
An arithmetic drill that takes the form of a pinball game. \$49.95

Portfolio

★★

Flexible Software, 134-10 Ivy Drive, Charlottesville, VA 22901
Strategy game, May '84.
So you don't have the money to invest in the market? The thrill of investing without the risk. \$64.95.

Practicalc II

★★★

PractiCorp, 44 Oak Street, Newton Upper Falls, MA 02164
Spreadsheet, October '84.
PractiCalc offers the features of spreadsheets costing more than twice as much. As a bonus, it also has limited data-handling and text-handling capabilities. \$69.

The Print Shop

★★

Broderbund Software, 17 Paul Drive, San Rafael, CA 94903
Graphics, September '84.
The Print Shop lets you combine graphics and text and print the results on a dot-matrix printer. An excellent program and a lot of fun. \$49.95.

Report Card

★★★

Sensible Software, Inc., 24011 Seneca, Oak Park, MI 48237
Education, October '84.
For teachers only. Report Card eliminates the tedium of calculating student grades. \$59.95.

Sargon III

★★★

Hayden Software, 600 Suffolk Street, Lowell, MA 01853
Strategy game, August '84.
A worthy successor to Sargon II. Its enhanced features make it a great buy. \$49.95.

Simply Perfect

★★★

LJK, Inc., 7852 Big Bend Boulevard, St. Louis, MO 63119
Business, October '84.
An integrated package that features a word processor, a spelling checker, and a data manager. Requires a 128K Apple II. \$189.95.

Speed Reader II

★★

Davidson & Associates, 6069 Groveoak Place, #12, Rancho Palos Verdes, CA 90274
Education, June '84.
Increased productivity is the goal of this software. A good alternative to expensive speed reading courses. \$69.95.

Stickybear Opposites

★★

Weekly Reader Family Software, 245 Long Hill Road, Middletown, CT 06457
Education, August '84.
Colorful graphics teach kids word opposites. For three- to six-year-olds. \$39.95.

Stock-Folio

★★

Micro Program Designs, 5440 Crestline Road, Wilmington, DE 19808
Investment analysis, October '84.
With Stock-Folio, you can plot the activities of different stocks. It doesn't support downloading data from Dow Jones. \$79.50.

Term Exec 1.2

★★★

Exec Software, 201 Waltham Street, Lexington, MA 02173
Communications, June '84.
A sophisticated yet low cost communications package for the Apple. Sometimes hard to use, but worth the bother. \$79.95.

Tournament Golf

★★★

Microcomputer Games, Inc., 4517 Hartford Road, Baltimore, MD 21214
Simulation game, August '84.
An excellent sports simulation. Have fun making chip shots with your computer! \$30.

VODAC—The Alpine Encounter

★★

Ibidinc, 179 Allyn Street, Suite 607, Hartford, CT 06103
Adventure game, July '84.
A hi-res game of intrigue set in the Swiss Alps. Robert Ludlum would love this game. \$39.95.

Winning on Wall Street

★★★★

Summa Software, P.O. Box 2046, Beaverton, OR 97075
Investment analysis, October '84.
A decision support system for stock traders and investors. Winning on Wall Street consists of three separate packages. \$700.

Word Blaster

★★

Random House, 201 East 50th Street, New York, NY 10022
Education, July '84.
Students in grades two through six will enjoy this reading and comprehension program. You don't have to tell them they can learn from it. \$150.

Work Force II

★★

Core Concepts, P.O. Box 24157, Tempe, AZ 85282
Home, June '84.
Six programs that help you manage your budget. Includes a checkbook program, a loan analyzer, and a savings analyzer. \$29.95.

The Writer

★★

Hayden Software, 600 Suffolk Street, Lowell, MA 01853
Word processor, July '84.
A solid, low-cost word processor. The Writer is a scaled down version of the popular Pie Writer by Hayden. \$49.95.

Hardware

Amdisk-I Microfloppy

★★★

Amdek Corporation, 2201 Lively Boulevard, Elk Grove Village, IL 60007
Disk drive, May '84.

An excellent second drive for the Apple. Won't take a lot of room on your desk. \$299.

AppleModem 300/1200

★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

Modem, August '84.

An external modem with 300 and 1200 baud operation. Lots of nice features. \$495.

Color Plotter

★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

Plotter, May '84.

A four-pen plotter for making charts and graphs. Lack of software support. \$799.

CP/M Gold Card

★★★

Digital Research, P.O. Box 579, Pacific Grove, CA 93950
Coprocessor, October '84.

The makers of CP/M offer an excellent Z-80 board to run their industry-standard, 8-bit operating system. \$350.

Drum-Key

★★★

PVI, 1 Great Valley Parkway

East, Malvern, PA 19335
Sound synthesizer, October '84.

Create some impressive percussion lines with this peripheral card from PVI. External amplifier and speakers needed. \$139.95.

EXP 500

★★

Silver-Reed America, Inc., 19600 S. Vermont Avenue, Torrance, CA 90502

Printer, June '84.

A daisy-wheel printer with 12 cps and a low price. \$599

FingerPrint

★★★★

Precision Software, Inc., 4747 N.W. 72nd Avenue, Miami, FL 33166

Printer interface, October '84.

This intelligent interface card can dump both the text and graphics screens to your printer. It works with a wide variety of printers. \$149.

Graphics Tablet

★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

Graphics, September '84.

A sophisticated input device for producing high-quality graphics on the Apple II. Not for the casual user. \$795.

Juki 6100

★★★

Juki Industries of America,

Inc., 299 Market Street, Saddle Brook, NJ 07662
Printer, June '84.

Low-cost daisy-wheel printer with 18 cps operation. \$699.

Koala Pad

★★

Koala Technologies, 4962 El Camino Real, Suite 125, Los Altos, CA 94022

Graphics, May '84.

Low-cost alternative to expensive graphics tablets, with software to help create your own graphics. \$125.

L-1000

★★

Smith-Corona Consumer Products, 65 Locust Street, New Canaan, CT 06840

Printer, June '84.

This inexpensive daisy-wheel printer features 12 cps operation. \$595.

Password Modem

★★★

U.S. Robotics, Inc., 1123 W. Washington Boulevard, Chicago, IL 60607

Modem, August '84.

A 300/1200 baud external modem suited especially for advanced home and business communications. \$449.

PowerPad and Leonardo's Library

★★

Chalkboard, Inc., 3772 Pleasantdale Road, Atlanta,

GA 30340

Education, September '84.

A combination hardware and software product that eliminates the need for keyboard input. Ideal for young learners. Pad—\$149.95; software—\$39.95 per package.

Riteman Printer

★★

Inforunner, 1621 Stanford Street, Santa Monica, CA 90404

Printer, May '84.

A low-cost dot-matrix printer. Without all the features of a more expensive printer, but also no big price. \$399.

RP1200N

★★★

Ricoh of America, Inc., 5 Dedrick Place, West Caldwell, NJ 07006
Printer, October '84.

At 18–20 cps, faster than less expensive letter-quality printers, and cheaper than faster ones. \$895.

Voice-Based Learning System

★★

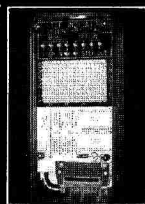
Scott Instruments Corporation, 1111 Willow Springs Drive, Denton, TX 76205
Education, June '84.

A hardware-software package. It lets you create interactive tutorials that recognize speech input. A system with a lot of potential. \$895.

Circle 41 on Reader Service card.

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① THE NEW HARD TOOL FOR USERS OF "NIBBLES COPY" PROGRAMS. ② USED FOR DISPLAYING DISK II HEAD POSITION, READ OR WRITE TRACKS, IMPULSE POSITION, AND HEAD MOVEMENT IN SLOW MOTION. ③ THIS TOOL HAS 170 ULTRA-BRIGHT LED'S. ④ DISPLAYED IN "ULTRA"-BRIGHTNESS, HALF BRIGHTNESS, HALF-BRIGHTNESS AND FLASHING, OFF. ⑤ DESIGNED IN 1984 ESPECIALLY FOR SUPPORTING 1/4 TRACKS. IF YOU ARE INTERESTED IN KNOWING MORE ABOUT THIS EFFICIENT TOOL, PLEASE SEND \$12.00 FOR THE MANUAL TO : ORIENT DIGITAL.



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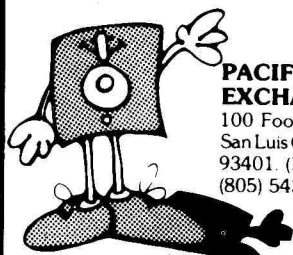
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Code conversion available. TRS-80 package soon. ADDMASTER CORP. 416 Junipero Serra Dr., San Gabriel, CA 91776 * 213/285-1121.

Why settle for one
graphic "artist"
when you can
have the
complete



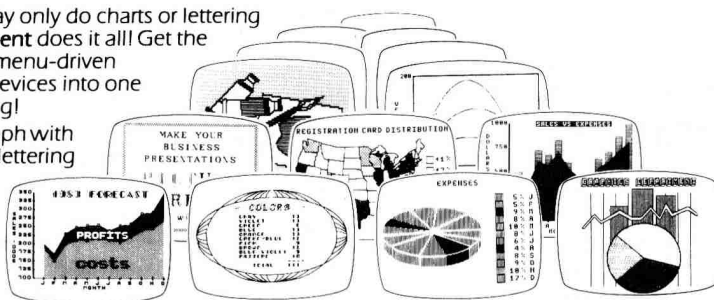
GRAPHICS DEPARTMENT™

Why handicap yourself with software that may only do charts or lettering or "slide" showing, when **Graphics Department** does it all! Get the most impact with the **Graphics Department** menu-driven program which combines the most graphic devices into one friendly package. It has modules for everything!

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All you need to do all this is an Apple II or Apple-compatible computer (//e, //c, Plus, ///, Franklin, Basis, etc.) with 48K of memory, ROM version of Applesoft...and **Graphics Department**. Available for \$124.95 from your dealer or by mail (add \$1.25 for shipping.) Visa/MasterCard/Check/COD welcome!

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This unique software program, a virtual electronic dictionary, catches spelling mistakes in your writings. It actually displays misspelled words in context, suggests the correct spelling, and allows immediate replacement of misspelled words with correct ones. It derives its huge, 80,000-word vocabulary...which is all on disk...directly from the official Random House Dictionary.

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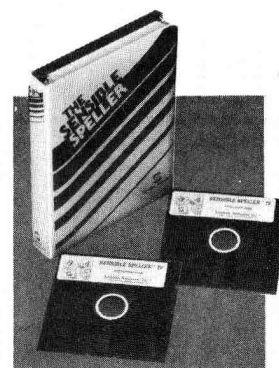
programs* and runs on all Apple //c, //e, II+, and Apple-compatible computers. Yes, **Sensible Speller** is the "best of its kind," as stated by Softalk Magazine in its March, 1984 issue.

Sensible Speller is available for \$125 in either the "IV" or ProDOS version at your dealer or you may order it direct, enclosing \$1.25 for shipping. Visa/MasterCard/Check/COD welcome! And...send for a free brochure on all Sensible Software products.



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

SOFTWARE REVIEWS



inCider's Ratings

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

Beyond Castle Wolfenstein

Muse Software

347 N. Charles Street
Baltimore, MD 21201

Arcade and strategy game
\$34.95

★★★

Spring, 1941: All of Europe feels the malevolent fury of Adolf Hitler. Careening through half of Europe, his awesome armored machine has subjugated nine nations.

The immense human and material resources under Nazi exploitation and the apparent invincibility of German arms threaten the survival of democracy everywhere.

Allied high command recognized your operative ability in escaping from the Nazi prison camp in Castle Wolfenstein, Muse Software's acclaimed Apple action adventure game. Now, in the sequel, Beyond Castle Wolfenstein, your mission as an Allied spy is to penetrate the Fuehrer's heavily guarded Berlin bunker and detonate a briefcase explosive in his conference chamber.

You enter the bunker from the courtyard and then proceed underground to the conference chamber on the third level. As you advance, you discover closets containing a variety of useful items—a first aid or tool kit, keys, a dagger, passes, or the bomb previously planted by a confederate within the complex.

The guards are usually grouped

two per screen and found either sitting behind desks or patrolling the room. They maintain security by demanding authorization from every soldier passing through their rooms and corridors. You must present upon request one of your falsified passes. If one guard accepts your pass, all other guards on that level will also accept it.

To avoid rejection of a pass, you can bribe the guards beforehand. The seated guards then divulge helpful information. Shooting a guard is another option. However, this may cause the second guard, who hears his comrade's scream, to trigger a wall-mounted alarm switch and alert the entire bunker of your presence. The guards then fire at you on sight. A more subtle approach is to stab the guard silently and drag his body out of sight.

A welcome improvement in Beyond Castle Wolfenstein is that you can take a few gunshot wounds be-

Title page from Muse's Beyond Castle Wolfenstein.

Complete the mission and destroy Hitler's bunker.



fore dying. Slower movement reflects the severity of your wounds. Using the first aid kit raises your condition from wounded to healthy or from severely wounded to wounded.

Beyond Castle Wolfenstein encounters great expectations because it has the same ingredients as its predecessor: arcade quality graphics, quick response, challenge, and suspense. In addition, every aspect of the game has been improved. The graphics are so detailed that you can discern Hitler's moustache as he paces before his generals in the conference chamber. The voice synthesis is also outstanding considering only the software and the Apple speaker produce it.

Other improvements include the following: The alarm system can end the game even for a master saboteur; the bomb must be reset periodically; and a dagger provides a baser level of killing than a firearm. Additional commands and concerns force the player to make more decisions than before, and the game assumes a more realistic form.

Beyond Castle Wolfenstein is superior to the vast majority of action adventure games for the Apple. Certainly one of the most absorbing games produced this year, it will remain one of my favorites for a long time. Beyond Castle Wolfenstein can be played with joystick, paddles, or the Apple keyboard, and is available on Apple II Plus and //e disks. ■

Steven Williams
Chester, NJ

Time Tunnels

Reston Publishing Company

11480 Sunset Hills Road
Reston, VA 22090

Arcade game
\$25

★★★

Deep space nuclear fusion testing has yielded unforeseen consequences: Numerous tunnels have opened in space. Now your superiors want you to plug them up. What the top brass neglected to mention was that these celestial worm holes are infested with mutant creatures. Created during the testing, these freaks have grown accustomed to their new abodes and will do anything to prevent you from sealing the tunnels.

Such is your mission in Time Tunnels, an arcade-type game written by Paul Coletta and produced by Reston Software. It's a galaxy of fun designed for the Apple II Plus or //e. Time Tunnels consists of a disk and an instruction card. It requires 48K and a joystick (Apple or Atari with Wico adapter).

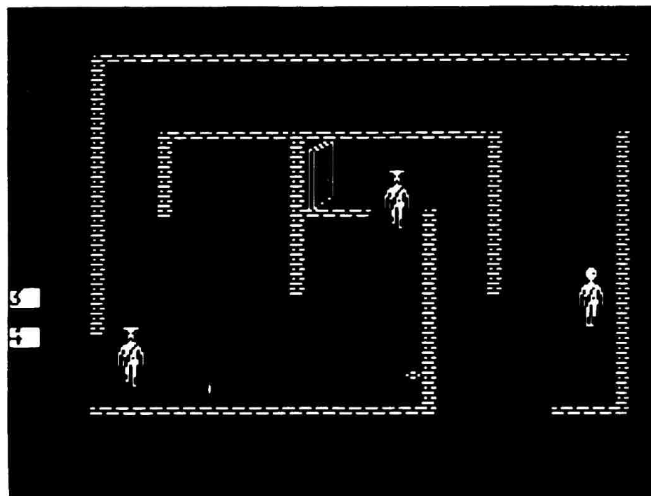
You start at the bottom center of the screen, just outside the tunnel rim. Moving the joystick to the left moves your ship clockwise, joystick right moves you counterclockwise. With the joystick forward (or with button 1 or the space bar), you "warp" across to the opposite side of the tunnel. Button 0 fires your ship's photons.

Things heat up quickly when the beasts appear at the center of the screen and migrate to the rim. In the first of 20 tunnels you'll run into a dozen or so mutant rotifera and a few frogs. Vaporize all the rotifera and jellyfish to move to the next tunnel. The mutants' movements are initially predictable, but when you reach the higher-level tunnels, you encounter the heavyweights: sonar-equipped bats, two-headed laser-breathing dragons, and vicious octopi.

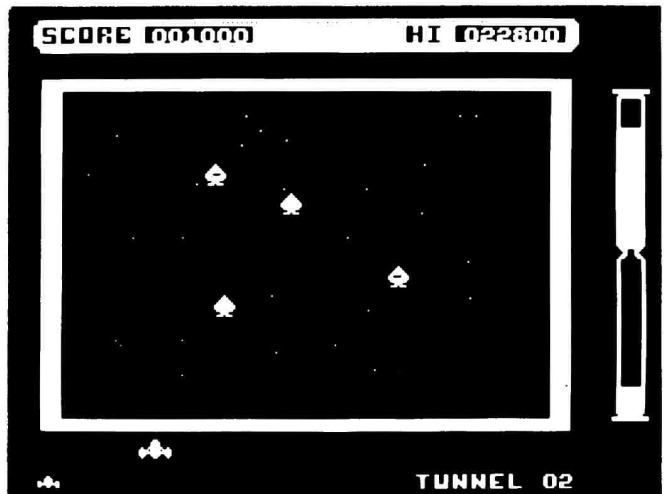
Manage to stay cool as you warp across the rim to avoid a sonar blast. Keep an eye on your warp energy level, and hit a firefly to replenish your supply. Your best strategy against the creatures is to do battle at the tunnel openings as each mutant wave swarms out to stop your advance.

Some of the optional functions required a little experimentation before they would work. To restart the game, for example, the instruction card says to hit escape (the pause toggle) and then control, but that doesn't work on the //e. Escape followed by control-R does the trick. Similarly, the instructions say control resets all scores to zero on the high score display, but you have to hit control-R to do so. The command sequence that changes the tunnel levels so you can practice is also inoperative on the //e. You are instructed to hit escape before firing any photons, control to advance the tunnel level indicator to the desired number, and return to play that level. What you have to do is press

Typical room from Beyond Castle Wolfenstein.



Time Tunnels delivers fast arcade thrills.



**"Stay cool
as you warp
across the rim."**

escape, control-R, and return.

Moving your ship requires too much concentration for this sort of game. As long as you are on the bottom edge of the rim, the joystick movements correspond to the screen action: stick left means ship left; stick right means ship right. But when you're on the top edge, position and direction are reversed. The problem is compounded when you are on the sides of the rim. Stick left moves you up the left side and down the right side; stick right moves you up the right side and down the left side. It's confusing and takes time to master.

Despite the befuddled travel directions, Time Tunnels is a winner with its good graphics, splendid color and sound, and high-speed arcade action. ■

**Wayne J. Sassano
Wethersfield, CT**

SOFTWARE REVIEWS

The Return of Heracles

Quality Software

21601 Marilla Street
Chatsworth, CA 91311

Fantasy role-playing game
\$32.95

★★★

Have you scaled the topless towers of Ilium, sailed the green Aegean, battled the Minotaur, or absconded with the Golden Fleece lately? If you haven't, fear not! The spirit of mighty Heracles lives on in The Return of Heracles, by Stuart Smith.

This is a terrific game. It mixes the best adventure elements of Quality Software's classic, Beneath Apple Manor, with the spirit of Ultima.

As Heracles, you must explore the three regions in ancient, mythological Greece: northern Greece, southern Greece, and the Peloponnesus to

complete the 12 great labors Zeus has assigned you.

A panoply of Greek heroes undertakes these quests on your behalf. Each one has strengths and weaknesses suited to specific quests. Some characters possess great strength but no armor or weapons; some have weapons but little skill; others have both. These traits are detailed in a character table familiar to fantasy game players.

You'll have plenty of opportunities to improve your heroes' characteristics by enrolling them in training schools, buying armor and weapons, and encountering benign gods who graciously favor characters with improved fighting skills. Of course, your hero may run into a god who's having a bad day and wind up as a land crab or a stag.

Also consider the little matter of monsters, villains, and beasts. The Nemian Lion, the immortal dragon, the Serpent of Ares, the Erymantian Boar, the Sphinx, the Minotaur, boars, stags, centaurs, thieves, and

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- The entire system is on one standard size plug in card that fits neatly inside the Apple.
- System includes sample programs on disk.

PRICE \$319

A few applications may include the monitoring of
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and many more.

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- Accuracy; 0.3%
- Input Resistance: 20K Ohms Typ

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Our 8 channel signal conditioner is designed for use with both our A/D converters. This board incorporates 8 F.E.T. op-amps, which allow almost any gain or offset. For example: an input signal that varies from 2.00 to 2.15 volts or a signal that varies from 0 to 50 mV can easily be converted to 0-10V output for the A/D.

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

FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to 1/2 mile away from the A/D.
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- Large bread board area.
- Full detailed schematic included.

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- Now, on one card, you can have 8 digital outputs and 8 digital inputs each with its own connector. The super input/output board is your best choice for any control application.

The SUPER INPUT/OUTPUT board manual includes many programs for inputs and outputs. A detailed schematic is included.

Some applications include:

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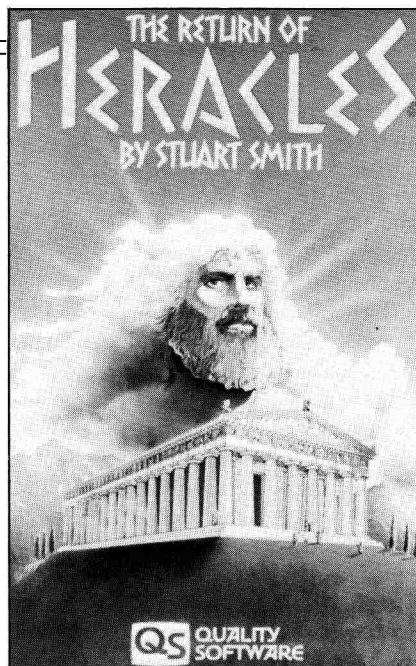
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warriors impede your exploration of the mythic Mediterranean. Your heroes can do combat with these monsters.

Winning is another matter. If your hero prevails, you will be rewarded by treasure that you can exchange for weapons, poisons, training, or spells. If your character loses, he becomes food for worms and you must select from the remaining roster of heroes to continue.

By hitting the space bar you can add a character to the game who will help an existing hero or force a useless hero to desert. The deserting hero reverts to computer control and may turn against you or escape the area.

The Return of Heracles captures the atmosphere of ancient Greece. The stylized Grecian lettering, the excellent high-resolution maps, and the location screens sustain the appropriate ambience for one of the more realistic fantasy role-playing games around. At a moderate challenge level, it won't put off the first-



Return with Heracles to role-playing adventure.

time player and is entertaining enough for experienced gamers. ■

Brian J. Murphy
Fairfield, CT

Word Challenge

Hayden Software

600 Suffolk Street
Lowell, MA 01853

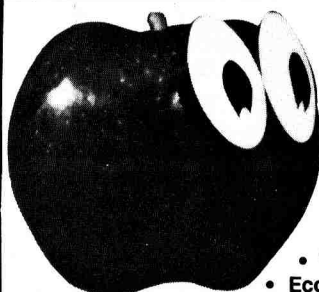
Word game
\$39.95

★ ★ ★

Although Word Challenge may not be the ultimate in word games—that distinction still belongs to the *London Times* crossword—it's as challenging a word game as will ever be produced for the Apple II series.

The game is simple. Sixteen random letters arranged in a 4 by 4 grid appear on screen. Within three minutes you must form as many words of three or more letters as possible from these letters. The letters must be contiguous horizontally, vertically, or diagonally. To make the word LEE from the letters in the square, you would have to connect the L to

Circle 204 on Reader Service card.



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- **High Resolution** — a 256 × 256 picture element scan
- **Precision** — 64 levels of grey scale
- **Versatility** — Accepts either NTSC or industrial video input
- **Economy** — A professional tool priced for the hobbyist

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

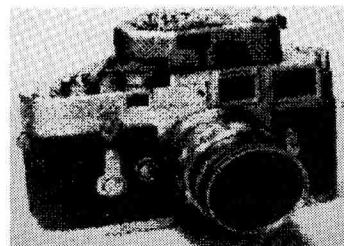
- Full screen scans directly to Apple Hi-Res screen
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Use the DS-65 for precision security systems; computer portraiture; robotics; fast to slow scan conversion; moving target indicators; reading UPC codes, musical scores and paper tape and more! **GIVE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

ADDITIONAL SOFTWARE FOR THE DS-65

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

— **Superscan:** Enables you to enhance the DS-65's Hi-Res pictures with colors! Choose from 21 different colors and assign them to grey scale values, modify pictures, zoom, enhance contrast, etc. Includes print routines for Anadex 9500 or 9501; Epson MX-80GFT and MX-100; and IDS 460 Paper Tiger*. Written for The Micro Works by Magna Soft. Price: \$79.95



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

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THE **MICRO
WORKS**

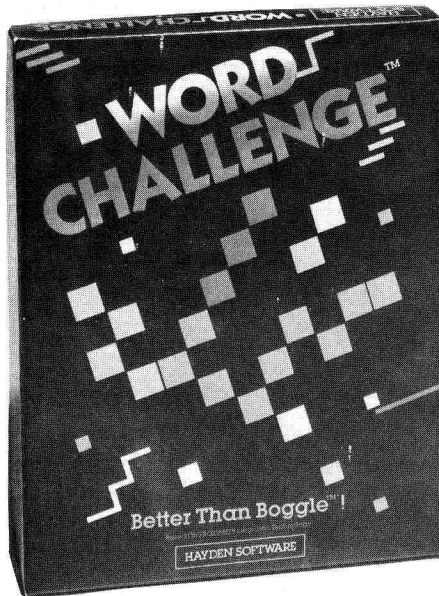
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the first E, and the first E to the second E.

While you're building your list, your Apple sorts through the words and makes its own choices at one of 26 optional speeds. At seven or eight of these speeds you are almost assured of beating the machine. Otherwise, the machine has anything from a marginal chance of beating you to the certainty of discovering every possible word regardless of your performance. For a truly humbling experience, set the difficulty level at one of those higher settings and watch as the computer offers a series of perfectly acceptable five-, six-, and seven-letter words to match your pitiful and painfully compiled pittance of three- and four-letter words.

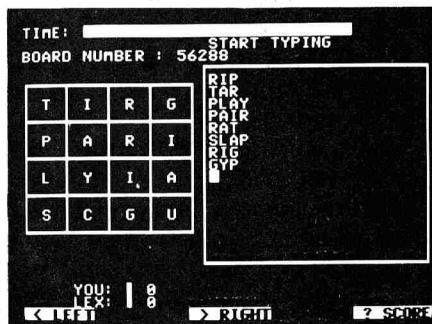
Scoring is based on the unique formation of words. A word discovered by you or by the computer alone is credited in the appropriate column. Words both you and the computer discover are ruled ties and aren't credited. Extra credit is awarded for a word of more than four letters. A score of 100 wins the game.

A 90,000-word lexicon on disk judges word selection. But even 90,000 words don't cover all the possibilities, so at the end of each round, you can credit words you make that don't appear in the lexicon.

You can change the size of the letter selection from 16 to 25 or nine letters and the time of selection from zero to 999 seconds. You can select your own letters to put in the squares and count embedded words like the OIL in COIL or BOIL, or the RAIN in TRAIN and STRAIN.

A manual details useful playing strategies. For example, plurals

Make as many words as possible in Word Challenge.



count as separate words. You can use suffixes to construct new words. A one-point word like EAT becomes a three-pointer in the standard game when changed to EATING and a two-pointer if it becomes EATEN. Spend as little time as necessary attempting to find words that use exotic letters like X, Z, and QU (treated as one letter) since you get no extra points for words using these uncommon letters.

Word Challenge is the most stimulating word game ever devised for the Apple II. It will run on any 48K Apple II or II Plus as well as on the //e and //c. ■

Brian J. Murphy
Fairfield, CT

Person-to-Person

Trutec Software
1700 Solano Avenue
Berkeley, CA 94707
Telecommunications
\$69.95

★★★

Person-to-Person is a communication and data-base program that combines an address and phone-number data base with a simple-to-use terminal program. If your data base is simple and your records are not numerous, Person-to-Person is worth considering if only for its record-keeping abilities.

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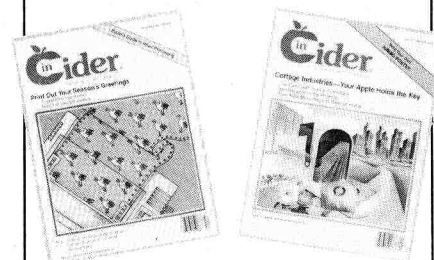
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Person-to-Person comes with two disks, the program disk and a backup disk with an established sample file; an 80-page indexed manual; and a quick reference card. The disks are DOS 3.3 formatted, so you can easily manipulate files you create or download, though the Person-to-Person program itself is protected. The demo file provides examples to format telephone listings for auto-dial and sign on to services such as CompuServe and The Source.

You form the data base by short records (128 characters) or long records (256 characters). A dual-drive system has a capacity for 768 long records or 1536 short records. The data base stores names and phone numbers, remembers addresses, selects codes, and makes memos for each record.

Because the program reads the entire data base of only names and phone numbers into memory, you can search one or more characters quickly. All other information remains on disk, but this doesn't slow down disk access time.

When the program finds the record, it requires only a single keystroke to dial your number, auto-answer the phone, or automatically go into data mode and log you on the information service. It then saves and appends calls to a text file. There is complete control of standard communication parameters such as data and stop bits, parity, and line feeds.

"The integration of the data base and the terminal program is excellent."

The printing options are numerous. Use a single mailing label or the select code to maintain and print a complete mailing list or to address individual envelopes, with the option of placing your return address in the upper left corner. Person-to-Person also inserts names and addresses on form letters created by your word processor and prints your filing cards.

Although it doesn't contain the bells and whistles of some communication programs, Person-to-Person provides the options necessary to classify it as an excellent terminal program. It supports modems such as Hayes, Novation, and standard serial card communications. Numerous options allow for tone or pulse dialing, and MCI, Sprint, and All-Net carrier usage. Person-to-Person provides the usual options for half/full duplex, originate/answer, upload/download, and voice and data communications switches.

The capacity of the download/upload buffer (External File) depends on the size of your data base. Load-

ing is generally fast and efficient. You may send text and binary files to the screen, printer, or disk, but binary files look strange on the screen and incorrectly convey that something is amiss.

The integration of the data base and the terminal program is excellent: It's easy to use, fast, and forgiving of incorrect keystrokes. Its error-trapping routine is excellent. It's simple to find an entry, make a note, print an envelope, call a number, sign on to a system, or go to voice communications. However, an option to access the catalog of the disk from within the program was omitted from the manual's external file. This command is control-C, and you should include it on page 25 of the manual.

Person-to-Person reads only one data base, so having several data-base files is possible but impractical, involving disk-swapping and name-changing. An option is Trutech's PTP-MF (\$89.95), which allows multiple files, but requires a two-drive system. Trutech is also developing a ProDOS version with mouse commands.

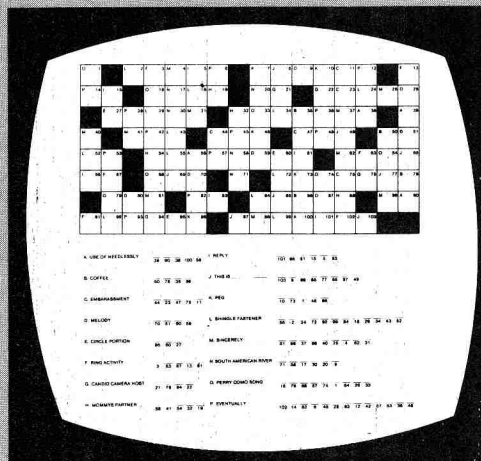
In all, Person-to-Person is well designed, practical, and appropriately priced at \$69.95. I have used four or five different terminal programs on the Apple II and //e, but I prefer Person-to-Person for quick and easy communications. ■

**Art Ude
Stoddard, NH**

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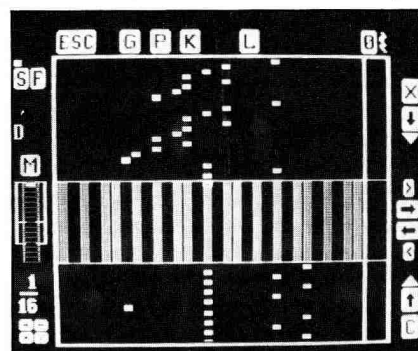
★★★

Songwriter enables people five years old and older who have no formal knowledge of music to enter and play melodies on the computer. You can use this enticing package with a computer alone or attach it to a stereo system with the cable provided—a useful feature for listening to the music through headphones rather than broadcasting it throughout a room.

As the computer plays a melody, the screen image resembles a moving player-piano scroll. Underneath the scroll is a keyboard image and a cursor you can move to indicate the notes you wish to enter or play. The keyboard actually represents a series of whole and half steps of pitch. You can modify this image to represent different types of scales, limiting the music you enter to notes included in a particular scale.

There is no formal staff. As the cursor moves to the right side of the screen, the notes go up in pitch. You move the cursor with the keyboard arrows, and the space bar enters the note in memory. You can erase or play the notes at any time, and even listen to the melody backwards. An on-screen metronome marks the beat, and flexible commands can

Songwriter from Scarborough.



Become composer and musician with Songwriter.

change the tempo of the song being played (capital F makes a greater change of tempo than small f).

While note names can be shown, in the normal mode they don't appear on screen. The authors feel that "listening to the sounds and seeing the patterns are more important." This also affects printouts of songs. When you print a melody, you get a chart that states each note in the sequence, its pitch, and length.

"Ideas" can be saved and called. These are fragments of melodies you might want to use later in compositions, changing the pitch or the meter. You can call forth the entire "idea" with a single keystroke. The commands used in the program resemble standard BASIC commands. For example, to retrieve a piece of music, press the G key for Get and then call up the file by name.

The program has been carefully crafted. All the necessary commands appear on the screen in icon form, and you move from one to another with single-key commands. If you forget to initialize a disk on which to record your songs, you can do this through the program without losing the song you have composed and want to save. By initializing through the program, you also add the "player" program to this disk. This program lets you play the music you record, and use the music in other programs.

The documentation consists of 63 pages of explanations and activities. Everything is explained, even the amount of memory used for storage of notes and the program's method of sound production. The Quick Reference Chart is handy once you learn the program.

Possible errors are noted and explained, as are musical terms. Each topic covered in the instruction book is first presented as step-by-step instructions followed by questions and answers. Then, several activities illustrating the concept are suggested. For "note lengths," for example, one activity is to "set the note length to two-sixteenths and record three notes. Using different number keys, write all the different ways you can record three notes so that the numbers add up to 6/16ths." The relationships between music and mathematics are amply illustrated and opened for exploration.

Songwriter limits storage to 48 songs and nine sets of musical ideas on a disk. This is ample for most purposes, and the pieces recorded on the disk give you a good idea of the program's possibilities. ■

**Janet Meizel
Davis, CA**

El-Ixir

Isoft

P.O. Box 10762
Stanford, CA 94305

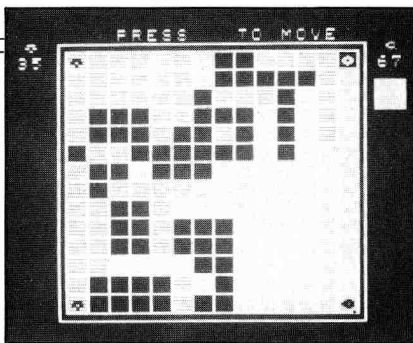
Strategy game
\$29.95

★★★★★

Rarely have I seen a game catch on like El-Ixir. It is a sure winner that combines the strategy of go, the luck of backgammon, and the pressure of chess. I've seen committed arcade fans pass up Crossfire and Choplifter for a round of El-Ixir.

Designed for two players, El-Ixir is played on a 14-by-14 grid. There are no monsters, aliens, or glowing swords. It is a refreshingly innovative board game perfect for family gatherings and school vacations.

After the opening credits of the game, you can choose to watch a demonstration game. This is an effective tutorial on the rules of the game and shows you some of the basic strategy. You can also change a few aspects of game play. An optional clock can time individual moves or the whole game. You can turn off the plentiful sound effects, or play the game in black and white.



Game board from El-Ixir shows final stage of play.

As you start your turn, the computer randomly selects four squares as candidates for your move. By pressing a key or a controller button, you choose one of the four. Then you pick a direction: up, down, right, or left. El-Ixir randomly gives you from one to four squares of territory in that direction. Turn after turn, players alternately claim squares on the grid. With planning, you can connect these squares to form chains and walls.

Another way to claim territory is to surround it. If you surround empty squares or your opponent's squares, they become yours. But be careful. You yourself could be surrounded and engulfed.

The best properties are the four corners, the El-Ixir squares. When you win a corner, it is yours for the game and becomes your base of power. All squares that you connect to your corners are secure and cannot be taken away. You get one point for each square secured to your corners. The winner is the player with the most squares.

The board is drawn in attractive hi-res graphics. A medley of fanfares and themes provides an entertaining sound track. For added competitive pressure, the optional timer gives only ten seconds for each choice. The game is fast-paced, demanding, and rewarding.

The disk runs on the entire Apple II family, including the //c. It comes in an attractive, brightly drawn folder that describes many of the game rules. A 14-page player's manual fully documents game play and is filled with full-color examples.

El-Ixir is easy to learn, yet thrilling to play, a game I can recommend highly. ■

**Kerry J. Lanz
inCider staff**

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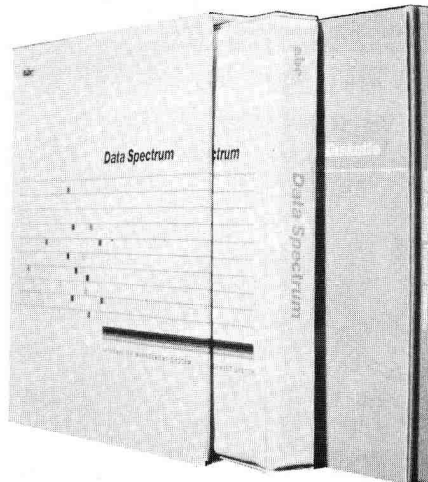
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you've been discouraged by the protracted training time traditional data-base management systems require, Data Spectrum is for you.

Data Spectrum manages business information with up to 60 fields per file and up to 255 characters per field. It adds and deletes fields to and from existing files, does global search and replace, and fully sorts up to 60 fields simultaneously. Data reporting can include text, mathematical calculations, sub- and grand totals, and a wide variety of format ranges to suit most applications. Once you've created formats, you can use pre-printed forms—checks, purchase orders, 3-by-5 file cards, or invoices. Various printing functions such as condensed print and mailing labels (up to four across) are also possible.

Repetitive entries take only a key-stroke or two. Fields may be generated mathematically from other fields by using a wide variety of functions. For instance, a data field for "Net Inventory" can be automatically

derived from the field entries for "Beginning Inventory" minus "Monthly Usage." Various reports can be generated, too. For example, you can print a reorder list of all inventory items that fall below a preset minimum quantity, then, with this information, design a form to generate purchase orders for all of the low-inventory items.

Your reports and forms can use the actual field names or you can select new headings. For example, your data record for the street entry may be kept as "St." but be printed out in your form or report as "Street." Totals and sub-totals are easy. Transfer data between files either as individual records or by choosing certain criteria to transfer groups of records. File merging is simple, too.

For file processing, a built-in "automatic transmission" shifts the style and speed of searching and sorting depending on the size of the file. Small files are processed very quickly; larger files use a different

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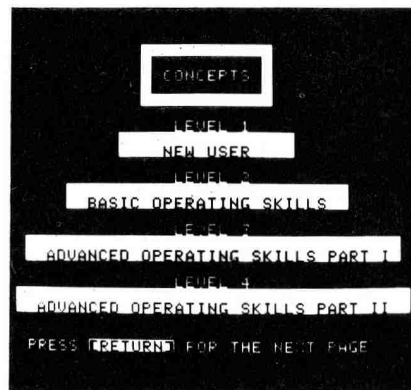



search and sort method best adapted for large volumes of data.

Using four disk sides, the Data Spectrum tutorials are easy to follow, very thorough, and rather free of jargon. They do lapse into too much simple-minded humor, but on the whole, bring you through in a logical, step-by-step fashion. The final part is a hands-on simulation to let you build your skills in using the program functions. The examples used are simple but useful, taken from the business records of the ABC Cookie Company, and include inventory records, customer lists, and a delivery route list.

The tutorials are a bit slow at times, especially if you are using them to brush up on finer points of using Data Spectrum. But you can go to various sections of the tutorials without having to plod all the way through from the beginning. Novices to the workings of data-base programs and new employees will appreciate these helpful guides. A comprehensive manual is included.

Advanced Business Computing has established a toll-free hot line for technical help should you need it. They allow potential users to evaluate Data Spectrum for three weeks free of charge. This is a generous trial period and certainly enough for the businessperson to determine the program's value. For \$30 a year, they'll send annually updated and enhanced versions of the software.



Data Spectrum data base includes tutorials.

While not as sophisticated as other data-base managers, Data Spectrum lets you customize data organization to your own needs. Then you can search, sort, edit, analyze, evaluate, and merge files to generate forms, reports, letters, and labels. Overall, Data Spectrum's functional features fall somewhere between PFS:File and dBase II.

Data Spectrum is an excellent program for the small- to medium-sized business. Invoices, payment request letters, inactive customer follow-up letters, and inventory records are just a few of the uses that you'll find for it. Other programs are probably as easy to use, but this is certainly the easiest to learn.

Data Spectrum requires an Apple II, II Plus, IIe, IIc, or III (in emulation mode) with 64K, one disk drive, and a printer. If you do serious business work, two disk drives are recommended. ■

Roger Hart
Merrimack, NH

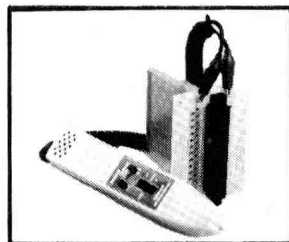
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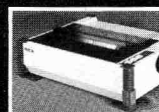
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AMPERGRAPH

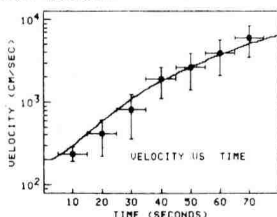
AMPERGRAPH is a powerful, easy-to-use relocatable graphics utility for the Apple II +/e/c. AMPERGRAPH adds twenty-two Applesoft commands that allow effortless generation of professional-looking plots of scientific or financial data. All of the necessary scaling and screen formatting is accomplished with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

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

\$45.00

SAMPLE AMPERGRAPH PROGRAM LISTING:

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



AMPERDUMP

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

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

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

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

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SOFTWARE

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PictureWriter

Scarborough System

25 N. Broadway
Tarrytown, NY 10591

Graphics program

\$39.95

★★

PictureWriter, a low-cost art production system for children aged 4-14, falls somewhat short of its designer's goals. While a number of its features—coloring book and music, for example—are appropriate for young children, the patience and hand-eye coordination of a much older child are needed to produce recognizable drawings.

Children can draw their own pictures using lines, rays, ellipses, circles, and boxes. In addition, the program disk contains 11 sample pictures (five without color) and uses a rich, 21-color palette, thus providing an appealing coloring book exercise for children. But PictureWriter would retain their interest longer if the manual had included more picture choices instead of merely suggesting games that run on the program.

With PictureWriter, anyone can produce interesting and colorful abstract designs easily, but the creation of elaborate, recognizable pictures is more difficult. This program requires controlling the joystick's location while simultaneously depressing keys, and joystick-created images are difficult to control and are seldom accurate.

PictureWriter also has a music feature that plays tones while the program draws pictures. The term

PictureWriter, a graphics system for children.

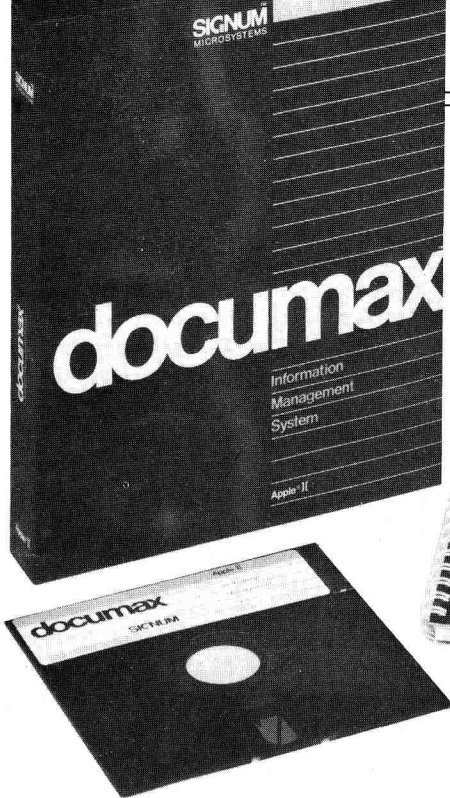
"music," however, is used loosely since the program actually produces tones that correspond with the cursor's height on the screen at the time, resulting in a Brownian noise effect. One demonstration is sufficient, and you may choose to switch off this feature.

Although this product provides a fine opportunity for children to be creative, PictureWriter has several shortcomings. It does not provide an option to add text other than as a brief title to pictures. When a drawing is complete, it is difficult to change colors and impossible to remove the color palette from the screen. PictureWriter has no default capability for color selection, no pen size control, and no magnify mode permitting close editing of pictures. Booting time is unusually slow, requiring about 65 seconds. Two bugs are present in the pre-release review copy that may also be in subsequent copies: The tutorial's color selection hung the system once, and the lack of a write-enable slot that the manual calls for caused the save-to-disk tutorial to hang.

PictureWriter is KoalaPad compatible as is Island Graphics' Micro Illustrator, another graphics system. A brief comparison follows: PictureWriter, though less costly, is generally more difficult to use, less flexible, and slower. Its color choices are brighter, though, and it has features for young children. Still, if you already own Micro Illustrator, you probably don't need PictureWriter.

PictureWriter works on the II Plus and IIe and requires 64K, one disk drive, and either a joystick or KoalaPad. To fully enjoy the system, you can use a color monitor and a Grappler printer interface card to print the pictures on a dot-matrix printer. The program's single disk comes well-packaged with a 27-page wire-bound manual, command reference card, and sturdy plastic easel box. ■

Daniel W. Umberger, Jr.
Reynoldsburg, OH



Documax text file management system.

Documax

Signum Microsystems

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\$99.95

★★★

While some software authors are trying to write the next VisiCalc or Lotus 1-2-3, most new microcomputer products fit into an existing mold. Occasionally, a new idea surfaces. Documax is one. Unlike any program I have seen to date, Documax takes aim at important problems in word processing: how to organize and examine a disk full of text files needing revision and how to quickly search through several files for key words or phrases.

Documax's main menu has the following options: compression of a disk into a special high density format and its subsequent conversion back to a standard text or binary format; inspection, review, and search of files; or a directory sort.

The purpose of the compress option is to create a special file format that doubles the storage capacity of text on a disk. Examination of the compressed disk reveals that data encryption accomplishes this task. However, to use this data outside of Documax, you must first convert the

file to its original format. Because the compressed disk is in DOS 3.3 format, it can be copied with any standard back-up program (including the utilities provided on the Documax disk).

The second major function of Documax is the examination of text, binary, or compressed files. You can inspect the first several lines of a selection of up to 12 files, or you can examine the entire contents of a selected file line by line. Optionally, you can jump to the beginning or end of the file or print it out. A powerful option allows you to specify a single phrase or several phrases (which can be ANDed or ORed together) to use as search strings. The examination feature is quite handy in locating an appropriate document since it displays the search phrase in context when found.

A third handy option provides alphabetical and subgroup sorting. Combined with Documax's compression capability and a well organized directory, the sort option significantly decreases search time.

A 50-page manual that accompanies the program is more than adequate to teach the straightforward program operation and to answer questions. The manual has a table of contents, an index, and a fold-out "quick guide," which provides you with an operation overview without reading the manual.

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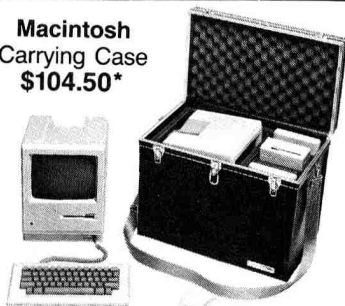


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SOFTWARE REVIEWS

One possible point of confusion deals with DOS 3.3 file directory display. You must indicate on a set-up screen the form—binary or text—of the files you are looking for. If you improperly indicate the type of file, the directory will show only the indicated type and not the desired type.

Documax runs on the Apple II and II Plus (with 48K of memory), the //e and //c, and the /// (in Apple II emulation mode). ■

David Morganstein
Germantown, MD

Learning with Fuzzywomp

Sierra On-Line

36575 Mudge Range Road
Coarsegold, CA 94306

Learning games
\$29.95

★★

Although it is simple enough for a four-year-old to operate, Learning with Fuzzywomp won't keep all four-year-olds interested enough to sit through the four quantitative skill drills without adult encouragement. Designed for children ages three to six, these animated learning games were written for the Apple II family and require a color monitor, a single disk drive, and a joystick.

In Learning with Fuzzywomp, the child views a simple menu of four small, 2-inch square pictures, which represent the matching skill games. Using the joystick, the child selects the picture and corresponding game: Juggling Clown, Bubble Up, Domino Match, or Make-A-Monster.

In the Juggling Clown, the child releases gumballs from a gumball machine until the number matches the numeral shown inside a clown figure. To release one gumball, the child moves the joystick horizontally to make Fuzzywomp (an animated fuzzball) collide with the plunger on the gumball machine. When the child thinks the number of gumballs matches the numeral shown in the clown, he or she presses either but-

ton on the joystick for feedback. For incorrect answers, the computer counts out the number of gumballs the child released, as compared with the correct answer, and then continues with a different counting problem. Correct responses trigger an animated juggling sequence with background circus music.

Bubble Up requires that the child select numeral "bubbles" from one to ten in ascending or descending order by "popping" them with a hair dryer. Beeping noises and an automatic prompting feature alert a child to incorrect responses. The animated number sequence and frenetic sounds greet correct choices.

The third game, Domino Match, has the child use the joystick to select one of eight dominos that matches the one on screen. If the child makes an incorrect match, the correct answer is displayed. Blinking, flashing, and honking reward correct matches.

Similar to other games on the market, Make-A-Monster assembles a monster from the sets of heads, torsos, and legs. After constructing the monster, the child joins forces with it to shoot Fuzzywomp. Fuzzywomp exits the screen and returns the child to the menu.

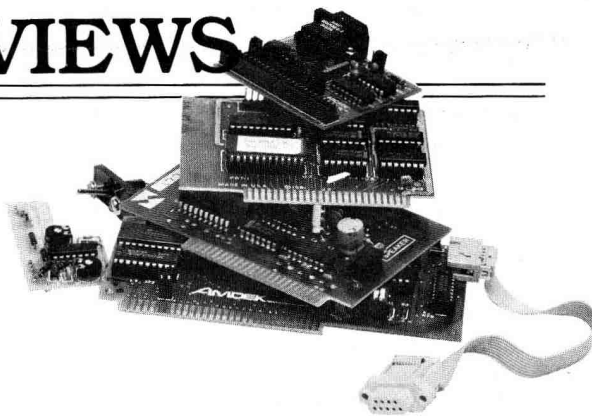
The feedback sounds in these games are a bit nerve-racking, but the programmers designed a Stop/Start sound option—control-S. Also, I was disappointed that the documentation mentioned no simple way to quit the four games. By repeatedly pressing escape, I was eventually able to exit all of the games except Make-A-Monster, where I was forced to either "kill" Fuzzywomp three times or "kill" the power to my Apple.

The Learning with Fuzzywomp disk is copy-protected, but a back-up disk isn't included. The manufacturer does offer a 90-day limited warranty that covers disk failures, and replaces defective disks for a reasonable \$5. ■

Michael Leonard Waugh
Statesboro, GA



HARDWARE REVIEWS



inCider's Ratings

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

Soundmaster II

Kearsarge Industries

12310 Pinecrest Road
Reston, VA 22091

Sound synthesizer

\$119.95

★★

Despite the Apple's outstanding graphics capabilities used in games, there is little or no provision for sound effects. Those offering sound are limited by the Apple's tiny, built-in speaker. To bring the audio performance of your computer system in line with its visual abilities, take a look at Soundmaster II from Kearsarge Industries, Inc., 12310 Pinecrest Road, Reston, VA 22091.

Soundmaster II is a moderately priced (\$119.95 retail) hardware device which can produce arcade quality sound effects when added to your computer. The device is a small circuit board that plugs into slot 2 of the Apple's main circuit board. Two external loudspeakers (not included) provide the actual sound. These are connected to terminals on the board through wires leading out the back. Also on the board are RCA-type jacks which can send the Sound-

master's output into an external amplifier or tape recorder.

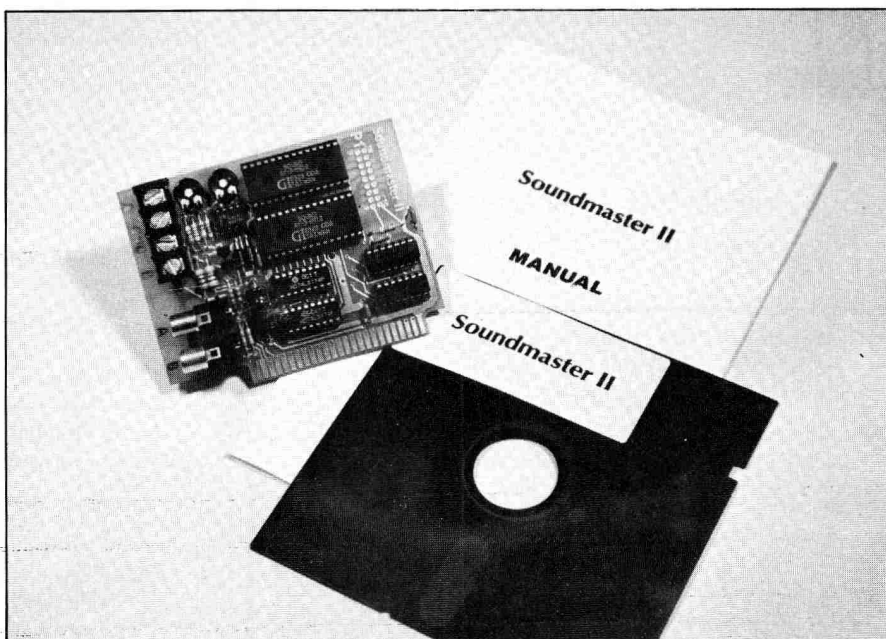
Soundmaster II's construction looks impressive. The circuit board consists of a high-grade material and the overall appearance is that of a quality product. Even the terminal blocks where the speaker wires connect are built to last.

Soundmaster II uses a pair (one for each of its channels) of sound producing integrated circuits manufactured by General Instruments, a leader in the electronic sound field. This circuit requires little attention from the Apple's main processor. With the sound specified and the board triggered, the Apple is free to go about its business. Soundmaster takes care of the rest. In games, this is a big advantage; devoting too much of the processor's time to other tasks can slow the action down. With the Soundmaster, Kearsarge

provides a disk of demo sounds and utility programs for creating your own. The sounds on the disk are familiar: ray gun-style space sounds, helicopters, gunshots.

The amplitude of the signal, the shape of the envelope, the duration, and other parameters contribute to the final sound. These values may be given to the board directly from a BASIC or machine language program. A much easier way to create sounds is by using one of Soundmaster's utility programs: Sound Maker. This program allows you to create sounds and store them to disk, creating a library of sounds for use in other programs. Sounds may also be loaded from disk, changed, and sent back to disk as a different sound. As you work with the sound, you may listen to it and make whatever necessary changes to obtain the desired result.

Soundmaster II synthesizer system.



One of the commands in Sound Maker displays the various shapes available for waveform envelopes, along with the values used to select them. Experimenting with these shapes, and listening to how the sound changed with each, helps to get the feel of the system.

Another utility program uses the Soundmaster efficiently from a BASIC program. Appropriately named Basic Helper, this routine merges ready-to-use machine language sub-routines to BASIC for increased speed without the hassle of machine code programming.

Although Soundmaster II can produce impressive audio, you'll have to work to get things going. The sound is distinctly electronic; for laser beams in a cosmic shoot-out that may be fine, but in some applications you may not find the sound you want.

If you purchase Soundmaster and expect your arcade games to be enhanced by great sound, you will be

"You must do your share if you want spectacular sound."

disappointed. For the time being, there are no off-the-shelf programs or games which take advantage of Soundmaster II, according to the manufacturer. For a fairly proficient programmer, however, Soundmaster II can be a valuable tool. The product is well made, thoroughly documented, and meets its claims. Nonetheless, you must do your share if you want spectacular sound. It is not a product that can be plugged in and forgotten. ■

Chuck Doherty
S. Dartmouth, MA

Pro 100 Keyboard

Amkey

220 Ballardvale Street
Wilmington, MA 01887

Programmable keyboard
\$295

★ ★

If your Apple keyboard layout disappoints you, the Pro 100 keyboard may be your solution. It is an intelligent, capacitance keyboard for the Apple II and II Plus that comes in its own case with a six-foot cable.

Some keys are not always where you expect to find them, but you soon become acquainted with their locations; new keys are present and the functions of others have changed. The overall effect is a pleasing and more operable device.

The escape key has been moved to the left of the 1 (one) key, out of easy reach to avoid accidental usage, and a tab key replaces it. The reset key is

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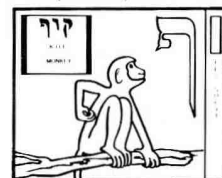
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Amkey's Pro 100 programmable keyboard.

to the left above the main keyboard, also out of the way of an accidental keypress. The repeat key is unnecessary; holding down any of the normal keys now activates this function.

A shift key is on both sides of the keyboard, and on the left is the addition of a caps-lock key. The Pro 100

supports full upper- and lowercase, and the installation of a lowercase chip enables your monitor to display lowercase characters.

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HARDWARE REVIEWS

keys have been added and appear immediately to the left of the space bar, while the left- and right-arrow keys are to the right of the space bar. The two new arrow keys replace the escape-D and escape-C commands, the up-arrow moving the cursor up one line and the down-arrow moving it down one line.

To the right of the main keyboard you now find a numeric keypad containing the numbers zero through nine, a period, a minus sign, and an enter key. At the left side of the keyboard are two mode keys. Small red lights on these keys turn on to indicate which mode is active. Also at the left are seven "fixed" function keys (see the **Photo**); the first four wait for additional input and the last three generate a carriage return and execute the instruction immediately.

Across the top of the keyboard are 18 "variable" function keys (F1-F18). A chart above these keys clearly indicates their respective functions (see the **Photo**). Used in conjunction with the mode keys, they produce

preprogrammed functions with a single keypress. Mode 1 puts you in the BASIC mode and mode 2 gives you VisiCalc functions.

The function keys used without the mode keys give you mode 0 or the programmable mode. This mode outputs the following control characters: @, A, E, F, I, K, L, N, O, P, Q, R, T, V, W, Y, Z, and ^ (caret). By using the keyboard intercept hooks (KSW) at memory locations \$38 and \$39, you can write machine-language programs to reprogram the functions generated by the function keys. (This is not necessary if your program already uses control characters.)

Although the Pro 100 keyboard is workable, I recommend a few changes. The mode keys would be more efficient near the function keys, the PR#1 key should output PR#3 (for my Videx 80-column display), and the PR#0 key should output control-Z, 1, control-X to turn off the Videx 80-column display and return to the normal 40-column display. Also, the

caps-lock key should have an indicator light.

The Pro 100 sells for \$295. It has an optional upper/lowercase chip and a pre-boot disk containing BASIC disk utilities and a graphics program that demonstrates the programming flexibility of the function keys. ■

Jerry F. Mahaffey
Haverhill, MA

Gibson Light Pen

Koala Technologies

3100 Patrick Henry Drive
Santa Clara, CA 95052

Complete graphics package
\$249

★★

The Gibson Light Pen System is notable for the novelty and variety of its functions rather than for the sophistication of any particular one. Like a Whitman's candy sampler,

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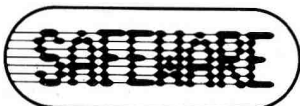
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AFIX LABEL

it's not intended for the person who craves only chocolate-covered cherries. There are better drawing, animation, and musical notation systems for the Apple, but this system is a unique introduction to all three in a single package.

The Gibson Light Pen System, available for \$249 from Koala Technologies Corporation, is a graphics design tool rather than a graphics production tool. The light pen is attached by a wire to a circuit card that plugs into your 64K Apple II. Two disks contain four programs: Pen Painter and Pen Designer create drawings; Pen Animator produces a short animation sequence, while Pen Musician lets you write and play brief musical compositions.

Paint by Pen

Pen Painter features pull-down menus with icons similar to those on Apple's Macintosh and Lisa. Menus are provided for pens, colors, tools, and I/O (input/output). When your pen touches a menu name at the top

of the screen, the menu's options drop down. You then point to an option and press the space bar to confirm its selection.

You can draw in black and white or color, freehand, or with expandable shapes (rectangles, triangles, circles). You can fill enclosed areas with color and place text strings anywhere on a drawing.

When drawings involve parallel, perpendicular, or diagonal lines, an option displays a template grid of dots. Pen movements on the screen then produce lines that automatically connect those dots.

In addition to the Apple's standard solid colors, the software includes a library of 77 pre-defined color patterns. Each pattern is shown as a swatch of 8 by 16 pixels in high-resolution mode and may be selected to fill shapes drawn on the screen. An intriguing feature modifies the appearance of any of the library patterns or creates a new pattern from scratch and adds it to the library.

The second software package, Pen

Designer, is similar to Pen Painter but drawings can be created in black and white only. Pen Designer's unique feature frames any part of the screen image, moves the contents across the screen, and positions it elsewhere. A related feature uses graphics "index cards," that can contain icons previously saved for future drawings. The card images are saved in groups of four as files. Once a set of cards has been loaded into memory, individual cards can be viewed and specific icons dragged across the screen and made part of a new composite image.

A series of card sets contains symbols related to music and math notation, font styles, electronic drawings, floor plans, organization charts, landscape features, and miscellaneous shapes. You can save small images as icons on index cards. Pen Designer images can be saved as image files and printed, and you can load them into the Pen Painter program for color painting by saving the image to disk, loading in Pen Painter, and then loading the Pen Designer image.

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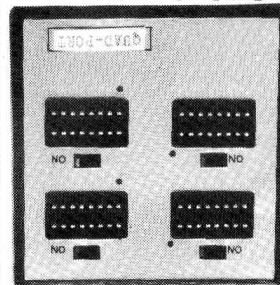


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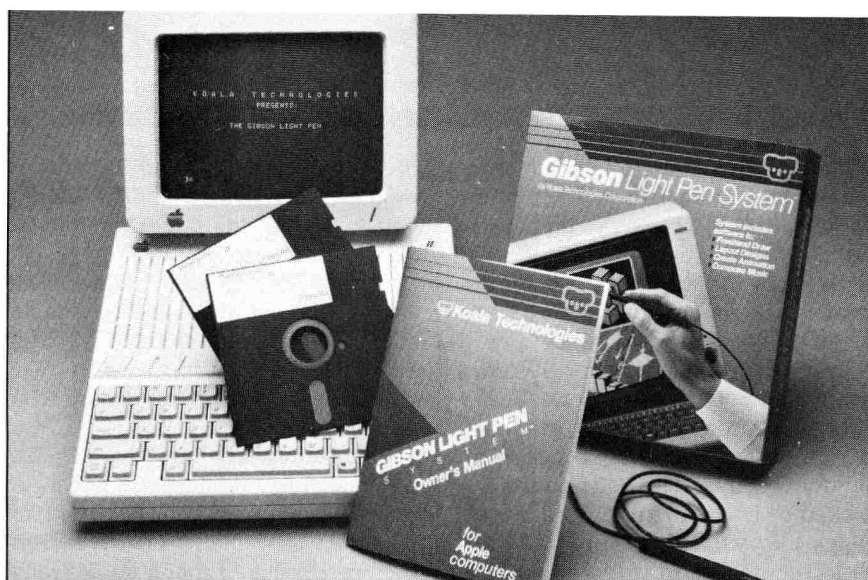
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LANCE HAFFNER GAMES
P.O. Box 100594
Nashville, Tennessee 37210



Gibson Light Pen comes with complete software.

Pen Designer doesn't use pull-down menus. Instead, there is a single menu with icons and the pen selects specific functions. Several of Pen Designer's commands are different from similar functions in Pen Painter. After learning command functions for one program, it is frustrating to learn another set for a related program that performs the same function in a product referred to as a system.

Animated Designs

With Pen Animator, you can create frames for an animated sequence. To construct or modify an image within a frame, select a frame in low-resolution mode as a grid of 40 by 24 large pixels. Place the defined image in any one of the 20 high-resolution frames provided. You can make additional frames by modifying the defined images and putting them into adjacent frames.

You can animate in single steps, forward or backward, in high- or low-resolution mode. Continuous animation is possible in high-resolution mode: 240 frames are displayed at 14 frames per second to produce an image that moves left to right across the top of the screen.

Name that Tune

The fourth software package, Pen Musician, lets you write musical notations on the screen and then play the melody through your Apple's tone generator and speaker. Three full staves of 24 notes each are displayed. Use the light pen to select each note along with rests and sharp, flat, or natural designations.

To hear your composition, point to the beginning and ending bars of the tune and indicate whether you want the music played once or repeatedly. Through the single menu you can insert or delete notes and save or recall your piece. There is no demonstration file, so if you don't know how to write music you need a musically knowledgeable friend to assist you.

Documentation

The owner's manual is the weakest part of the package. In 79 pages, the manual attempts to describe system installation, the four software packages, and 27 Pentrak machine-language commands that incorporate light pen functions into your Apple-soft BASIC program. According to the installation instructions, the system may not work in slot 3 and may need the included green jumper wire attached to an IC pin on the motherboard. The instructions only indirectly suggest that you insert the light pen circuit board in slot 7 where it belongs.

Pen Painter documentation and operation are fairly clear thanks to the pull-down menus. In comparison, you'll have to decipher Pen Designer's cryptic documentation and experiment with the operations. Limited options make Pen Animator and Pen Musician easier to use.

The Gibson Light Pen System does a good job of illustrating the light pen's potential. But inconsistent operation procedures combined with inadequate documentation will complicate the system for many users. ■

Allan H. Schmidt
Concord, MA

HARDWARE REVIEWS

Centronics H80

Centronics Data Computer

1 Wall Street
Hudson, NH 03051

Dot matrix printer
\$699

★★

While Centronics has set the industry standard for parallel interfaces, its printers have failed to compete with versatile, compact machines—until now. Centronics rejoins the race with its H80 printer.

Weighing about 18 pounds and with Epson's square-cut look, the H80 handles cut sheet, pin-feed, or roll paper up to 10 inches wide. The Centronics parallel interface included with the printer has an on-off switch conveniently located just beyond the platen knob on the right side. The front panel houses membrane switches that control form feed, line feed, and on-line status, and has indicator lights for on-line, ready, and alarm.

The H80 prints drafts in a sharp 11 by 9 matrix at 160 characters per second (cps), and produces excellent near letter-quality print in a 23 by 16 matrix at 27 cps. You can set pitch from five to 17 characters per inch (cpi), plus proportional spacing, and

use the half-height character set for superscripts and subscripts.

The H80 produces a multitude of type styles including boldface, italic, enlarged, condensed, elite, emphasized, and doublestrike. Combining them achieves different effects. (See the **Figure** for some examples.) The only limitation I encountered is that the printer doesn't produce letter-quality print in italic (an optional feature).

The printer also offers a wide choice of character fonts and eight international character sets. If you need other characters, you can define them yourself and download them to the printer's internal 8K RAM memory. However, the manual's procedure is difficult to follow.

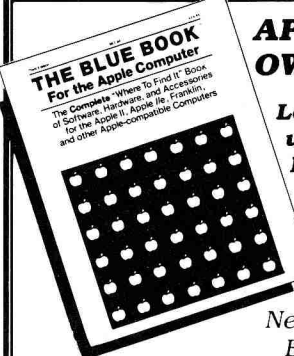
The graphics feature has several densities ranging from 60 dots per inch to 240 dots per inch, and various software codes control the graphics functions. The H80 produced strikingly sharp images of any hi-res screen I tried.

Some important functions are easily implemented. For example, when you turn the computer on, pressing the form-feed and power switches together select the near letter-quality font. An alternative method is to use DIP switches or either of two separate software codes. Many other important functions also offer at least two



Centronics' H80 dot matrix printer.

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Figure. Examples of the H80's type styles.

This is the normal draft print of the H80.
This is near-letter-quality print.
These characters are condensed to 17 cpi.
Here is a sample of the italics character set.
Part of this sentence is in superscript.
These letters are emphasized.
These letters are enlarged.
These characters are in emphasized italics.

alternate techniques. However, using some of the H80's techniques with the Screenwriter II word processing program was frustrating. Without experimentation, I was unable to achieve some features. Other programs may be even less flexible than Screenwriter II. Of course, all printer control techniques should work easily from BASIC programs that you write yourself because you generate the ASCII codes for any control characters from Applesoft, using the CHR\$ function.

The H80 doesn't create excessive noise because of a clear plastic shield covering the printing area. Replacing the cartridge ribbon and switching between cut-sheet feed and tractor

feed are easy. The standard parallel interface communicated with my Apple through an Epson APL card without a hitch.

A printer's documentation is a critical feature, and Centronics' manual, although making a valiant effort, falls short in some respects. The 100-page nonindexed manual contains reasonably well-written technical information describing the functions and presenting sample BASIC programs for every feature. This is a commendable approach and valuable to programmers, but the documentation doesn't explain the significance of features obscure to average users. The ideal manual would also describe how to use the features with well-

HARDWARE REVIEWS

known word processors and other popular programs.

My criticisms are minor. The DIP switches are difficult to reach; you'll probably not need to examine them often, but when you do, the time loss and frustration are considerable. Also, inserting cut-sheet paper with the edges aligned and adjusting it afterwards is difficult. The built-in pin-feed mechanism bunches lines together near the perforation line, possibly because the tractors push the paper up to the print area, rather than pulling the paper from above.

A special concern for Apple users is that a few of the special functions won't operate unless the computer sends 8 data bits to the printer: the Apple II sends only 7. The documentation, however, doesn't say which functions are unavailable.

The Centronics H80 is a strong contender in the printer market. Its quality and versatility far outweigh its few flaws. ■

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Annadale, VA**

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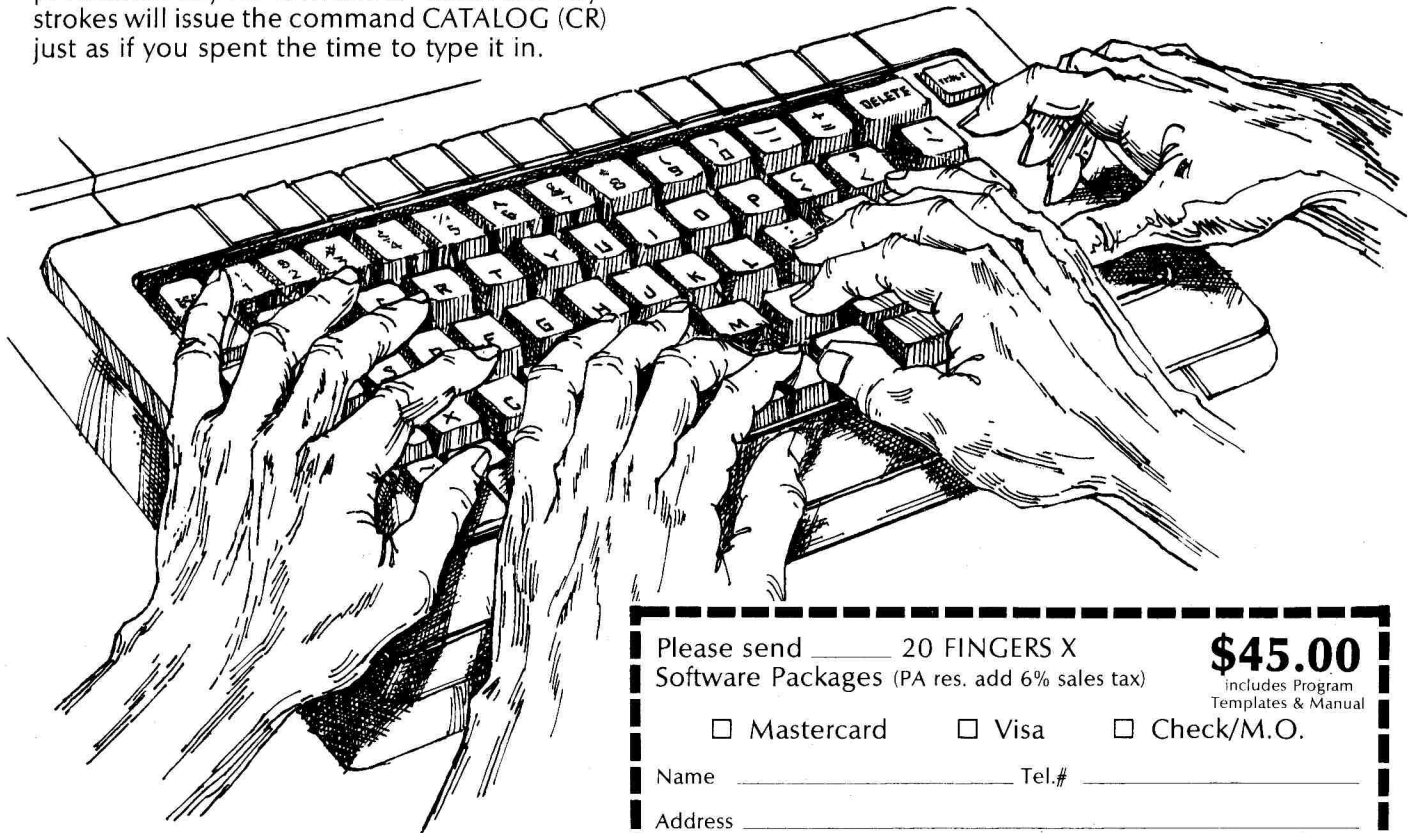
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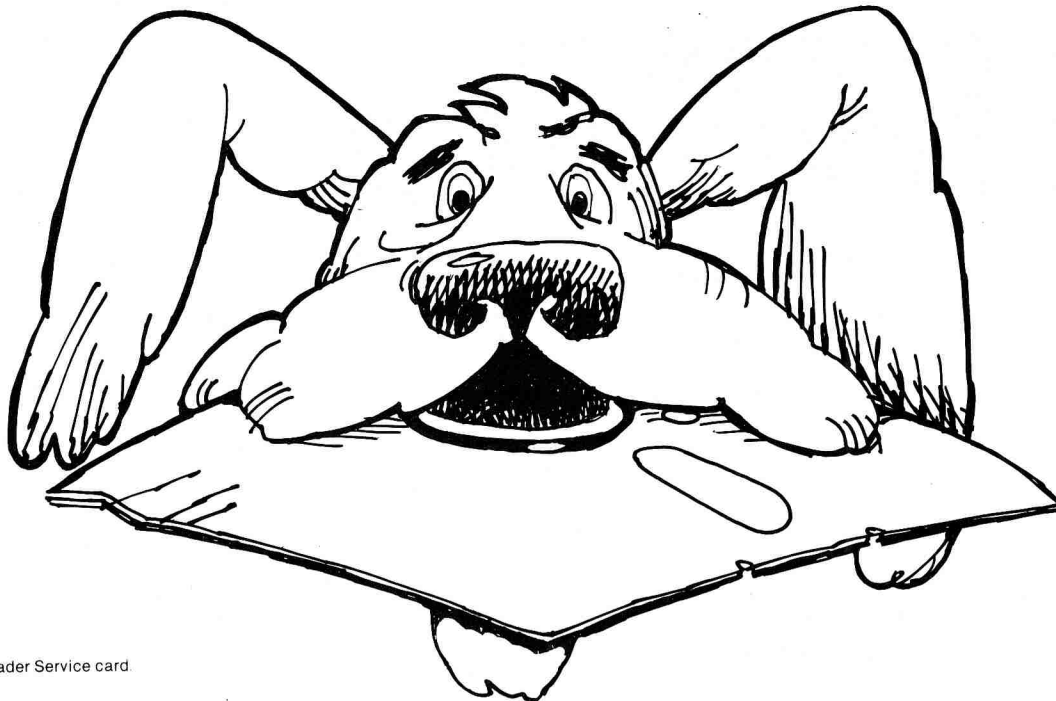
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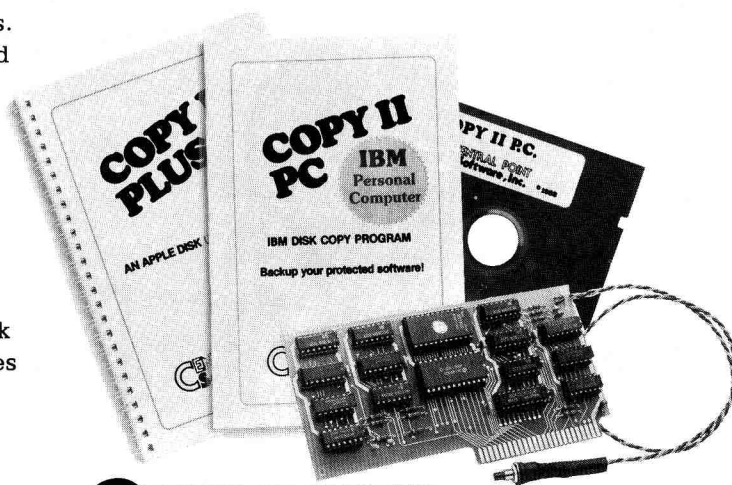
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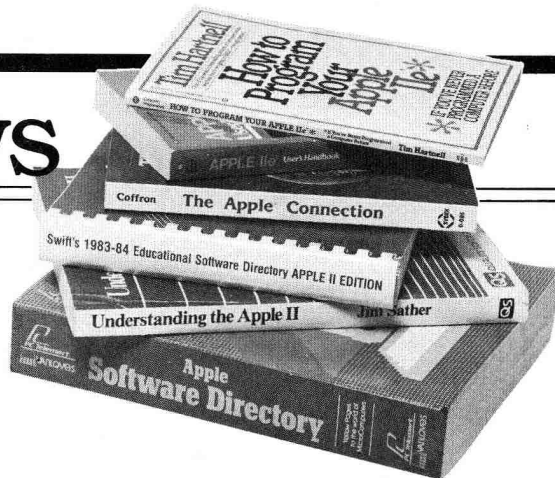


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BOOK REVIEWS



The Book of Adventure Games

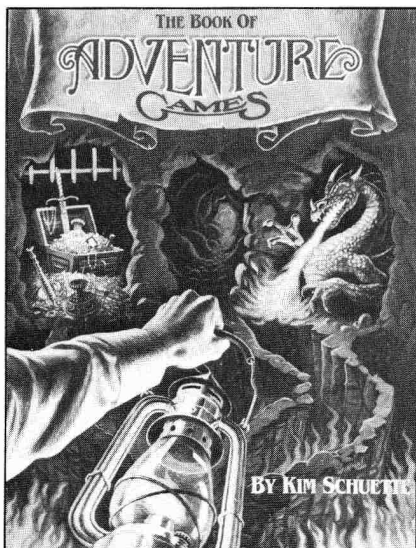
by Kim Schuette

Arrays, Inc.
11223 South Hindry Avenue
Los Angeles, CA 90045
Softcover, \$19.95

Send me your tired, your poor, your lost adventurer yearning to solve the riddle" should be printed boldly on the cover of *The Book of Adventure Games*. This 350-page compendium of hints, maps, and outright solutions is both a must buy and a terrible temptation for all fans of adventure games.

Kim Schuette must have dedicated half a lifetime to solving these games and then writing about them. We are the beneficiaries of this zeal.

The book is an attractive, sturdy 8½-by-11-inch softcover volume that is easy to use. Its colorful cover featuring many of the standard trappings of adventures—gold, lantern, chasm,



dragon, and dimly-lit passage—provides just a glimpse of the stylish contents that lie within.

Opening pages contain well-written summaries of adventure game types, history of adventures, and basic strategies. Though brief, these are concise and accurate, with valuable advice for any intrepid adventurer. In the back is a list of computers that run each game and information on manufacturers.

Most of the book is devoted to games, lots of games, all the best games. There are 77 games from Adventure (Colossal Cave) to Zork III, from classics like Beneath Apple Manor to newcomers like Sorcerer, Exodus, and Legacy of Lylgamyn. There are text adventures, hi-res adventures, and fantasy adventures.

For each game, Schuette gives description, maps, and solution. The description includes the publisher, price, category, and plot summary. The playability report is the honest evaluation of the game by a real adventure addict. Many screen dumps from the actual games used throughout the book suggest the actual look of the games.

Games are mapped in crisp, clear graphics. Rooms are neatly and logically laid out, with all passageways marked. Everything is typeset—no hand drawings here. I checked 11 games that I am familiar with and found that the maps were complete and accurate. However, Exodus has no maps, just text, and a few side rooms are missing from one level of Wizardry. The maps range from one page for Escape from Rungistan to 30 pages for Time Zone. Wherever you find a logical puzzle, a number refers you to the solutions in the back of the book.

Solutions are dangerous. One of the

great thrills of adventures is wrestling with a logical puzzle and then feeling the flash of insight. This is the "Aha" experience, as in: "It's the bird that chases the snake!" In this book, solutions are separate from the maps, so you don't see the answers unless you want them.

Answers to the puzzles are listed in the order in which you're most likely to find them. You use only as much of the list as you need, and can refrain from looking at the rest. The answer is the exact wording you need to get past that part of the game. Some are as straightforward as "Jump" (from The Dark Crystal). Others are more exacting: "Slide micromin card through slot. Type 384" (from Planetfall). Solutions for most Infocom games list the point system for objects. Ultima solutions give pages of game information on weapons, objects, and quotes from characters in the game.

I heartily recommend *The Book of Adventure Games*. It is thorough, complete, and gives you honest value. If you are stuck in any of these classic games, Kim Schuette leads you through gloomy passages to fame, fortune, and sequels. ■

Kerry J. Lanz
inCider staff

The Apple //c Book

by Bill O'Brien

Bantam Books, Inc.
666 Fifth Avenue
New York, NY 10103
Softcover, \$12.95

It's a rare occurrence in the computer industry when a product—machine, program, or book—fulfills the buyer's every expectation. Rarer still is the product that delivers more

than expected. Mr. O'Brien's book is that rarity, delivering all that most potential //c owners might want to know about the machine, as well as a good deal of information on AppleSoft, DOS, ProDOS, graphics, printers, modems and communications, languages, diagnostic problems, spreadsheets, word processing, data bases, games, and other goodies.

Chapter 1 briefly describes the genealogy of the Apple computer systems, explains the components of systems in general, defines some common terminology, and compares the various Apple machines.

Chapter 2 expands upon the above material and goes on to disk formats, modems, paddles, joysticks, mice, and power-line filter devices with an emphasis on the //c. Chapter 3, on the features and ports of the //c, details setting it up and connecting it with its peripherals.

The keyboard, regular character keys, special function keys, key combinations, ASCII's, and the //c's peculiarities as compared with the ex-

pandability of the //e are examined in chapter 4.

Chapters 5, 6, and 7 present an introduction to Applesoft and programming principles in BASIC. Chapter 8 delves into the magic of the low- and high-resolution graphics screens, briefly mentioning the double hi-res mode.

Chapter 9 begins an exploration of operating systems with DOS (3.3) that continues in chapters 10 and 11 and concludes in chapter 12 with a good basic explanation of ProDOS.

Chapter 13 describes various types of printers (impact, thermal, ink-jet, and laser) and explains how to set up the serial port of the //c for different printer parameters. Chapter 14 does likewise for modems.

Chapter 15 covers maintenance of the machine and drive, and chapter 16 lists possible hardware and software problems one might encounter with the //c, suggesting likely causes and solutions.

Chapter 17 briefly describes Pascal and Logo and refers to useful applica-

tions like word processing, data-base management, spreadsheets, communications, and graphics.

Chapter 18 goes into greater detail about the first four of the above applications, naming some of the more popular programs in each category as well as AppleWorks, an integrated program from Apple that combines a word processor with a data-base manager and spreadsheet.

"Graphics, Games, and Goodies . . .," chapter 19, opens with a description of Apple's mouse and MousePaint (a program similar to the Macintosh's MacPaint). A number of the best-selling games for the Apple family are listed with brief comments. The chapter ends with a mention of the as yet unavailable flat-screen display, the still incompatible ProFile hard-disk drive, and Apple's color plotter.

Chapter 20, a listing of user groups, bulletin boards, and magazines, is followed by Appendix A, setting forth the physical features of the //c, and Appendix B, a short reference list of three ways to reset the system and

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what the various escape codes do.

For those already knowledgeable about Apple computers, all there is to say about the //c can be stated in a few pages, but for those new to the field and considering the //c, I recommend this book as being of greater general value than its name implies. ■

Jay Schwarz
Port Chester, NY

Moonlighting with Your Personal Computer

by Robert J. Waxman

World Almanac Publications
200 Park Avenue
New York, NY 10166
Softcover, \$7.95

Countless books and magazine articles suggesting ways to make money with home computer systems have been written, but few contain the practical and informative advice found in *Moonlighting with Your Personal Computer*.

This 160-page book examines six ideas. A chapter on contract programming, for example, covers everything from the proper way to make an initial proposal to the final documentation and training. Waxman discusses typical billing rates and policies and suggests a number of ways to help you find clients.

Freelance writing can also bring in extra income. With an almost inexhaustible supply of computer-related subjects to write about, the field is a natural for many computer owners. To help find a market for your work, this chapter includes a list of potential publishers.

Moonlighting with Your Personal Computer also explores packaged programs, consulting, and the operation of systems houses and service bureaus as potential money-making fields. The view is toward part-time income, but any of these ventures could easily grow into a lucrative full-time endeavor.

In the chapter "Tools of the Trade," Waxman lists the supplies

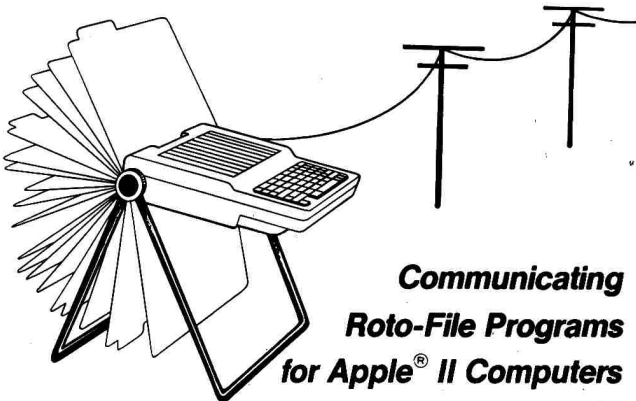
and facilities you should have before attempting any business project. This chapter discusses as well the need for continuing education in this fast-moving field.

One section is devoted to business and legal considerations, such as income tax and copyright procedures. Tax laws change regularly, so you must have an up-to-date guide to keep abreast of the latest regulations. Waxman explores the ways in which depreciation, investment tax credit, and capital purchases can affect your tax liabilities. He outlines the legal requirements for treating a portion of your household expenses as a valid business deduction.

The themes of professionalism and responsibility are repeated throughout this book. Waxman emphasizes the importance of good organization, punctuality, and proper business practices. You cannot take professional commitments lightly, nor should you attempt any business venture without examining the pros and cons.

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BOOK REVIEWS

The book's subtitle, *An Insider's Advice on How You Can Earn Thousands of Extra Dollars*, may read like another get-rich-quick scheme, but Waxman emphasizes that no project can be successful without hard work and dedication. You won't find any "Raise Chinchillas for BIG \$\$\$!" ideas here.

I wish this book had been written a few years ago, before I learned many of these things the hard way. If you're planning on using your system to bring in a few extra dollars, don't make a move without *Moonlighting with Your Personal Computer*. It should be required reading for any aspiring entrepreneur. ■

W. Charles Doherty
South Dartmouth, MA

Golden Flutes and Great Escapes

by **Delton T. Horn**

dillithium Press

Suite 151

8285 S.W. Nimbus

Beaverton, OR 97005

Softcover, \$9.95

With disk, \$29.95

Mars was beautiful. Once a glorious civilization thrived here. But you can't stop to visit the ruins; a grimph, the nastiest monster on the planet, is after you. You must stay alive and fulfill your mission of bringing Martian treasures back to Earth. Suddenly, the sky turns a weird color; strange events are about to take place.

Have you ever imagined an exciting adventure game? Now, you can learn to program your own. *Golden Flutes and Great Escapes* shows you how to write a challenging and exciting adventure. Its 217 pages are packed with theory and examples. It is a simple, practical, and complete manual for creating original adventures.

Delton Horn describes the process of designing and coding a game in BASIC. He has a polished popular style of writing that I found easy to follow, with little jargon and no POKes or machine language. You don't have to be a computer whiz to enjoy the book, but an intermediate under-

standing of BASIC is helpful.

First comes the story. Horn devotes a chapter to setting up the framework of the adventure. He creates a game called Mars, and lets you watch over his shoulder. The game has 100 areas, 12 treasures, many useful and useless objects, and six kinds of monsters. By walking you through the steps, he teaches you the discipline and technique of adventure writing.

Module Programming

In several chapters of actual programming, everything is done in modules accompanied by flowcharts and a thorough discussion. Even a beginner can understand what Horn is doing, learn from his example, and follow his logic. Actual programming is in simple straightforward BASIC.

Slowly, Horn develops his game of Mars. One module checks your health and prints a status report. Another module gives each monster a unique personality. The vocabulary understood by the game grows to handle every situation. Finally, the game is ready to challenge you and your friends.

Mars is the demonstration game. Horn includes the listings of three other games: *The Golden Flute*, *The Great Escape*, and *Treasure Hunt*. You can enter them as listed, or use them as models in writing your own. Countless hints throughout the book help you change these models to fit your plots.

Graphics

Horn discusses graphics and sounds, but the simple graphics used by his games are done by text. Actually, I prefer text adventures since they tap the power of human imagination. In the same chapter, he introduces two other topics: saving a game in progress, and games wherein action continues while you make up your mind.

If you want to learn how to write an adventure game, this is your book. It requires only a little understanding of BASIC, and teaches the steps very clearly. *Golden Flutes and Great Escapes* is available for three computer systems: the Apple II family, Commodore 64, and TRS-80. ■

Kerry J. Lanz
inCider staff

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Gemini 10X	279.00
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P-1351	1399.00

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A2 143K	199.00
A20 154K (New)	399.00
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Micro Sci C2 Controller	65.00
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Elite I	249.00
Elite II	379.00
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AP 100A Full Height	215.00
AP 105A Slim Line	225.00
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Color I Plus	275.00
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CALENDAR



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 The Interface Group
 300 First Avenue
 Needham, MA 02194
 (800) 325-3330
 (617) 449-6600

October 29–November 1
MICRO 17
 New Orleans, LA
 contact:
 Bruce Shriver
 Computer Science Dept.
 USL P.O. Box 44330
 Lafayette, LA 70504
 (318) 231-6606

October 30–November 2
EDUCOM '84
 Cambridge, MA
 contact:
 Kathy Schaible
 EDUCOM '84
 P.O. Box 364
 Princeton, NJ 08540
 (609) 734-1549

October 31–November 2
**Tampa Computer
 Showcase Expo**
 Tampa, FL
 contact:
 Linda Yogel
 The Interface Group
 300 First Avenue
 Needham, MA 02194
 (800) 325-3330
 (617) 449-6600

November 1–4
**Northeast Personal
 and Business
 Computer Show**
 Boston, MA
 contact:
 Northeast Expositions
 822 Boylston Street
 Chestnut Hill, MA 02167
 (617) 739-2000

November 2–4
**Jacksonville Business
 and Office Showcase**
 Jacksonville, FL
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 Computer Shows
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**Regional Educational
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 Nina T. Kurtis
 National Educational
 Software Symposium,
 Inc.
 225 East 57 Street, 17H
 New York, NY 10022
 (212) 688-8904

November 3
**Educational
 Computing Conference**
 Plymouth, NH
 contact:
 Peggie Riley
 Computer Science
 Department
 Plymouth State College
 Plymouth, NH 03264
 (603) 536-1550 ext. 533

November 3–4
Computer Supermarket
 Santa Clara County, CA
 contact:
 Microshows
 P.O. Box 4323
 Foster City, CA 94404
 (415) 340-9113

November 4–7
**Symposium on
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 in Medical Care**
 Washington, DC
 contact:
 Gail Mutnik
 SCAMC—Office of CME
 George Washington
 University Medical Center
 2300 K Street N.W.
 Washington, DC 20037
 (202) 676-8928

November 5–9
COMPSAC '84
 Chicago, IL
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 COMPSAC '84
 P.O. Box 639
 Silver Spring, MD 20901
 (301) 589-8142

November 7–9
**Datacommunications
 and Networking for
 Personal Computers**
 Los Angeles, CA
 contact:
 Software Institute
 of America, Inc.
 8 Windsor Street
 Andover, MA 01810
 (617) 470-3880

November 8–11
**Chicago Computer
 Showcase Expo**
 Chicago, IL
 contact:
 Linda Yogel
 The Interface Group
 300 First Avenue
 Needham, MA 02194
 (800) 325-3330
 (617) 449-6600

November 8–11
**Philadelphia Computer
 Showcase Expo**
 Philadelphia, PA
 contact:
 Linda Yogel
 The Interface Group
 300 First Avenue
 Needham, MA 02194
 (800) 325-3330
 (617) 449-6600

November 11–14
**ACM SIGUCCS User
 Conference XII**
 Reno, NV
 contact:
 Ellen Jacobson
 University of Nevada
 System Computer Center
 P.O. Box 9068
 Reno, NV 89507
 (702) 784-4008

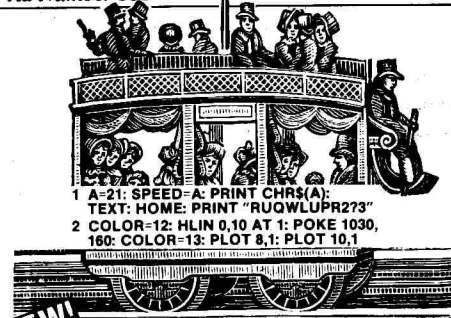
November 14–16
**Computer Literacy
 Conference**
 Stowe, VT
 contact:
 Dr. Vernon Lindquist
 Trinity College
 208 Colchester Avenue
 Burlington, VT 05401
 (802) 658-5036

Beagle Bros Apple Software Report

"All the News That Fits"

Fall/Winter 1984

Ad Number 181



NEW!

BEAGLE GRAPHICS™

16-COLOR DOUBLE HI-RES GRAPHICS
\$59.95 (DOS 3.3 and ProDOS™, requires Apple IIc or 128K IIe)

16 colors and 560x192 resolution on your IIc or 128K IIe! Beagle Graphics is packed with features:

As an Artist, you can draw, FILL and label double hi-res pictures using the AppleMouse™, joystick, Koala Pad™, graphics tablet or keyboard.

Icon-assisted "Cut & Paste" features make graphics manipulation easy. Any section of a picture can be stored, moved, inverted or flopped.

As a Programmer, you get 33 new commands for drawing, filling and manipulating double-res images. New utilities let you convert normal programs & pictures to double-res, save and load any image section, compress picture data to 1/3 disk space, produce double-res "slide shows" and more.

Label your double hi-res pictures with a variety of editable normal-size and double-wide typefaces.



ALPHA PLOT™

STANDARD HI-RES GRAPHICS UTILITY

\$39.50 (DOS 3.3, compatible with any version of Apple II)

Alpha Plot lets you draw in hi-res on both pages using easy keyboard commands. Pre-view lines before plotting. One-keystroke circles, boxes and ellipses, filled (solid/mixed) or not. All pictures are Save-able to disk for access by your programs.

Compress hi-res data to 1/3 disk space, allowing 3 times the number of hi-res pictures per disk.

Superimpose pictures or relocate sections of images anywhere on either hi-res page.

Add variable-size color text to pictures. Type anywhere on the screen, even sideways for graphs.

PRONTO-DOS™

TRIPLE-SPEED DOS 3.3 UTILITY

\$29.50 (DOS 3.3, compatible with any version of Apple II)

ProntoDOS triples the speed of loading and saving pictures and programs. Compare speeds:

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.

(Text files no change)

MOVE DOS 3.3 above main memory to free 10,000 bytes of memory (64K required to move DOS). Get 15 extra free sectors per initialized disk too.

New TYPE command ("TYPE filename") immediately displays your Apple text file contents.

NEW! FATCAT™

DISK LIBRARY ORGANIZER

\$34.95 (compatible with any version of Apple II)

Fatcat reads all of your DOS 3.3 and ProDOS disk catalogs into one or more "Master Catalogs" that can be searched, sorted and printed. Update at any time by simply reading in new or altered disks.

Fatcat also lets you quickly compare any two files and alphabetize file names in your catalogs.

APPLE MECHANIC™

HI-RES SHAPE ANIMATION

\$29.50 (DOS 3.3, compatible with any version of Apple II)

Apple Mechanic lets you draw shapes on the screen which are converted into "shape tables" so your programs can perform animation with Apple's built-in Draw & Xdraw commands.

Easy-to-follow "List & Learn" demos on the disk teach how to program in Hi-Res.

Fancy typefaces are another big part of Apple Mechanic. Six proportionally-spaced fonts are included on the disk, with 26 more on our Apple Mechanic TYPEFACES disk, sold separately.



NEW!

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"PRINT-ANYTHING" PRINTER UTILITY

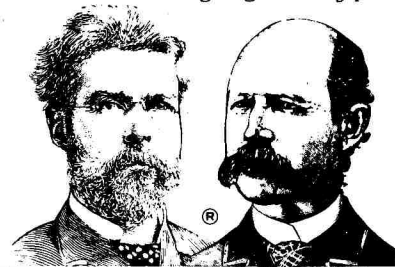
\$39.95 (DOS 3.3 and ProDOS™, compatible with any version of Apple II)

Triple-Dump lets you print any kind of image on your dot matrix (graphics-capable) printer:

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Triple-Dump's print routines can be run directly from the disk, or included in your programs.

Also included is a bonus GIANT BANNER program that makes 8 1/2" high signs on any printer.



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"How can I make my Apple do that?"

You know, you can make your Apple do almost anything you can think of, with just a little help—Beagle Bros software helps make your Apple a more powerful computer, and you a better programmer.

BEAGLE BROS, THE UTILITY LEADERS: Beagle Bros' low-priced unprotected disks dominate the Apple Utility bestseller lists. And Beagle disks were recently voted to FOUR of the TOP-24 spots in Softalk's "Most Popular" poll—that's against all Apple software publishers in all categories.

APPLE'S SECRETS REVEALED: Our authors are always on the lookout for techniques and tips that can be shared with our customers. From our inspectable programs to our informative instructions and Apple Tip Books, you will learn from the experts. And you don't have to be an expert to start. For example, type in this little program, and then type "RUN" **10 HGR: POKE 228,99: HPL0T 0,99 TO 279,99** A-ha! You just drew a dotted line on the hi-res screen. A secret technique? Not any more.

The Beagle Bros Catalog

GRAPHICS

- ☐ ALPHA PLOT (described in this ad) \$39.50
- ☐ APPLE MECHANIC (described in this ad) 29.50
- ☐ APPLE MECHANIC TYPEFACES 20.00
- ☐ BEAGLE GRAPHICS (described in this ad) 59.95
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- Variable-width text (wide/normal/condensed) controllable with normal Applesoft commands. No 80-column card reqd.
- ☐ FRAME-UP (II+, IIe, IIc, DOS 3.3) 29.50
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- ☐ TRIPLE-DUMP (described in this ad) 39.95

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- Acts like half a disk drive in slot 3. Silent and fast as a hard disk. Load/save files in memory with normal commands.
- ☐ FATCAT (described in this ad) 34.95
- ☐ PRONTO-DOS (described in this ad) 29.50

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- ☐ BEAGLE BASIC (IIc or 64K II+, DOS 3.3) 34.95
- Puts Applesoft in RAM so you can change it and add enhancements—new commands like if-then-ELSE, SWAP variables, GOTO/GOSUB-a-variable, TONE, HSCRN, etc.
- ☐ DOS BOSS (II+, IIe, IIc, DOS 3.3) 24.00
- Reword DOS 3.3 commands. Change "Catalog" to "Cat", "Syntax Error" to "Oops" or anything. Includes many meaty tips for altering DOS, including program "save-protection".
- ☐ DOUBLE-TAKE (II+, IIe, IIc, 3.3/Pro) 34.95
- 2-way scroll for Listings & Catalogs. Better List-format, fast variable+line number display, better renumber/append, auto line-numbering, instant hex/dec converter and more.
- ☐ GPLE (II+, IIe, IIc, 3.3/Pro) 49.95
- Edit Applesoft without cursor-tracing. Features insert & delete and fast search & replace. Make all keys be "function keys" to type anything you like (ESC-1 catalogs disk, etc.). Move DOS 3.3 out of main memory to add 10K of space.
- ☐ SILICON SALAD (II+, IIe, IIc, DOS 3.3) 24.95
- Over 100 utilities and tricks—hi-res program splitter, DOS killer, disk scanner, hi-res text imprinter, 2-track catalog...
- ☐ TIP DISK #1 (II+, IIe, IIc, DOS 3.3) 20.00
- 100 tips on disk from Tip Books 1-4. Fascinating Apple programming techniques. Includes Apple Command Chart.
- ☐ UTILITY CITY (II+, IIe, IIc, DOS 3.3) 29.50
- 21 utilities—List-formatter puts each statement on a new line, multi-column catalogs, invisible/trick file names, etc.

GAMES

- ☐ BEAGLE BAG (II+, IIe, IIc) 29.50
- 12 games on one disk. Voted to 1983's MOST POPULAR list in Softalk poll. The best Apple game bargain on the market.

GOTO your favorite software store. If they are out of a particular Beagle Bros disk, get on their case; they can get it for you immediately from any software distributor.

OR buy directly from Beagle Bros by phone or mail. **PHONE:** Visa/MasterCard/COD orders, phone toll free. **MAIL:** Send check or Visa/MC numbers to Beagle Bros. Add \$1.50 shipping +6% if Calif. We ship immediately.



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For product information, phone 619-296-6400.)

CALENDAR (continued)

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 The Interface Group
 300 First Avenue
 Needham, MA 02194
 (800) 325-3330
 (617) 449-6600

November 15
Selecting and
Evaluating
Instructional
Courseware
 Princeton, NJ
 contact:
 Computers in
 Education Seminars
 Educational
 Testing Service
 Princeton, NJ 08541
 (609) 734-5607

November 15-16
Western Educational
Computing Conference
 San Diego, CA
 contact:
 Dr. Virginia S. Lashley
 Glendale Community
 College
 1500 North Verdugo
 Road
 Glendale, CA 91208
 (818) 240-1000

November 16-17
FORTH Convention
 Palo Alto, CA
 contact:
 Linda Kahn
 P.O. Box 1105
 San Carlos, CA 94070
 (213) 478-7398

November 26-28
MECC '84 Conference
 Minneapolis, MN
 contact:
 MECC '84
 3490 Lexington Avenue
 North
 St. Paul, MN 55112
 (612) 481-3658

November 26-28
Application
Development and
Database Management
in a Microcomputer
Environment
 New York, NY
 contact:
 Technology Transfer
 Institute
 741 10th Street
 Santa Monica, CA 90402
 (213) 394-8305

November 26-28
Micro-Mainframe
Strategies
 Boston, MA
 contact:
 Technology Transfer
 Institute
 741 10th Street
 Santa Monica, CA 90402
 (213) 394-8305

November 30-December 2
Bits & Bytes Show
 Anaheim, CA
 contact:
 Doug Mitchell
 87 North Raymond
 Avenue, Suite 305
 Pasadena, CA 91103
 (818) 792-5111

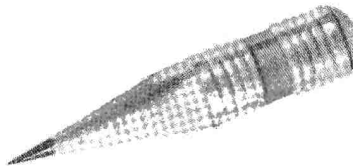
December 6-8
Great Southern
Business and Computer
Shows and Seminars
 Tallahassee, FL
 contact:
 Great Southern
 Computer Shows
 P.O. Box 655
 Jacksonville, FL 32201
 (904) 356-1044

December 10-11
Computer Supermarket
Christmas Show
 San Mateo County, CA
 contact:
 Microshows
 P.O. Box 4323
 Foster City, CA 94404
 (415) 571-8041

December 13-16
Southeast Computer
Show and Software
Exposition
 Atlanta, GA
 contact:
 CompuShows, Inc.
 P.O. Box 3315
 Annapolis, MD 21403
 (800) 368-2066

January 28-30
Office Automation
Conference
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 AFIPS
 1899 Preston White Drive
 Reston, VA 22091
 (703) 620-8900

January 28-31
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 Washington, D.C.
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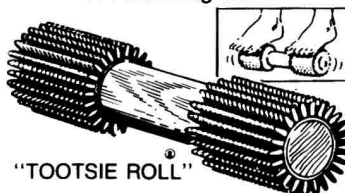
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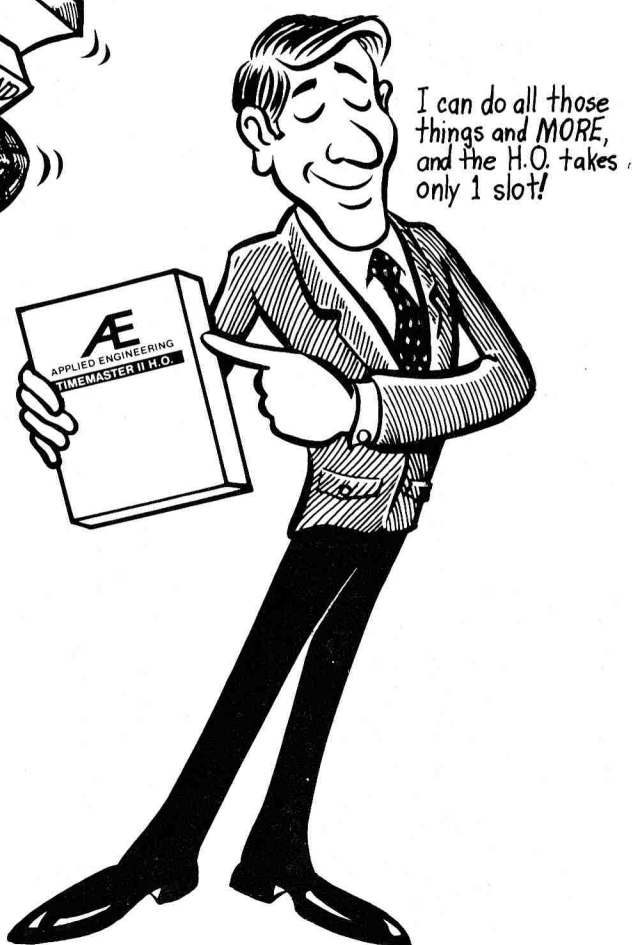
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Tracking Your Mates

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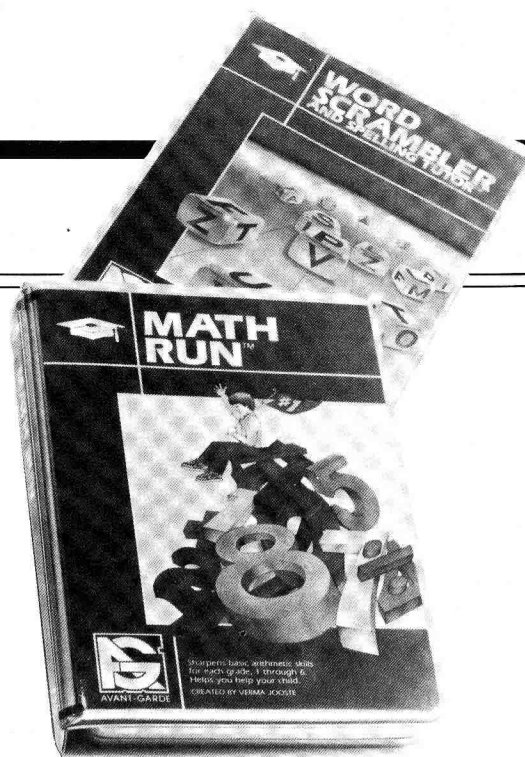
Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute an endorsement by inCider of any given product.

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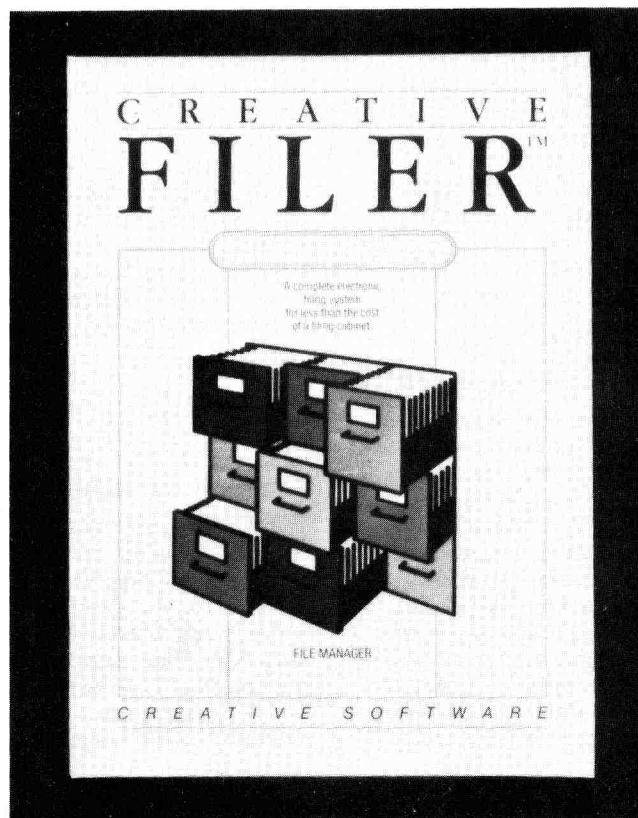
Reading Keys (\$49.95) diagnoses reading problems and prescribes corrective work. Word Scrambler (\$34.95) is a word game that also teaches spelling. Math Run (\$34.95) includes problems and exercises on three skill levels. These new home education products work on all the Apple II's, including the new //c. They come from Avant-Garde, P.O. Box 30160, Eugene, OR 97403. Circle number 472 on the Reader Service card.

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An integrated family of programs shares data and ease of use. Creative Filer and Creative Calc offer file management and spreadsheet operations. Creative Finance guides home budgeting and accounting. Creative Writer has all word-processing functions and uses files from the other programs. Each program is \$49.95 and works on any Apple II. Contact: Creative Software, 230 East Caribbean Drive, Sunnyvale, CA 94089, or mark Reader Service number 491.



Home education from Avant-Garde.



Home management from Creative.

edited by Kerry J. Lanz

Ultimate War Game

Billed as the ultimate, War in Russia covers Hitler's invasion of Russia, 1941-1944. You have an option of playing one year, or the whole campaign. For \$79.95, you get disk, manual, and laminated maps. This eagerly-awaited game is from Strategic Simulations, Inc., 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. Reader Service number is 480.

Spare-Time College

Sorting Techniques II and Computer Science I cost \$29.95 each and cover computer theory. Both the French and Spanish Achievement Series (\$49.95 each) prepare you for College Board language tests. Equations II (\$29.95) tells you everything about linear equations. Information is from Microcomputer Workshops, 225 Westchester Avenue, Port Chester, NY 10573. Use Reader Service number 478.

Fly the Apple Skies

Flight Simulator II was a multi-player version. Two or more //e's and //c's hook together through serial ports for formation flying, mid-air crashes, and crowded airports. One player can simulate many windows of a plane, and there is a modem option for play by phone. Each player needs the game (\$49.95) and one cable (\$10), both provided by SubLOGIC Corp., 713 Edgebrook Drive, Champaign, IL 61820. Mark number 471 on the Reader Service card.

Quilting Bee for Apples

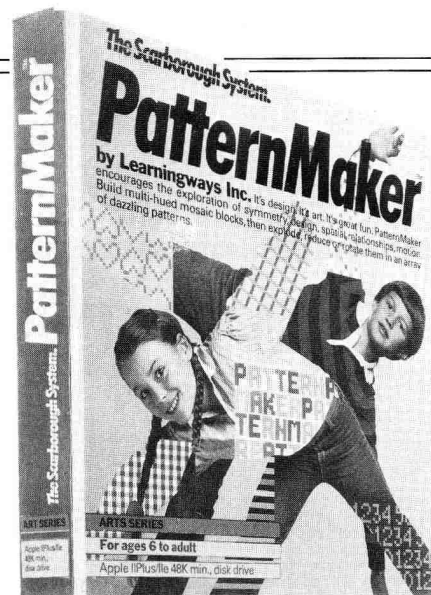
PatternMaker builds hirs tapestries, quilts, and Mondrian-like pictures with a touch of the keys. Combine eight colors into any pattern, then clone, reverse, and invert the pattern into a patchwork of design. Final pattern can be saved and printed. Great for artists, weavers, and needlepointers with any Apple II and \$39.95. Write Scarborough System, 25 North Broadway, Tarrytown, NY 10591. Use Reader Service number 490.

Young-Adult Adventure

Olin in Emerald is a non-violent, non-sexist adventure for children aged 9-14. Search for King Olin while reinforcing skills of logical thinking, map reading, and arithmetic. The game is divided into chapters, so you can't leave an area until finding all the clues. Olin (\$19.95) is from Adventure International, P.O. Box 3435, Longwood, FL 32750. Reader Service number is 484.

Amazing Movements

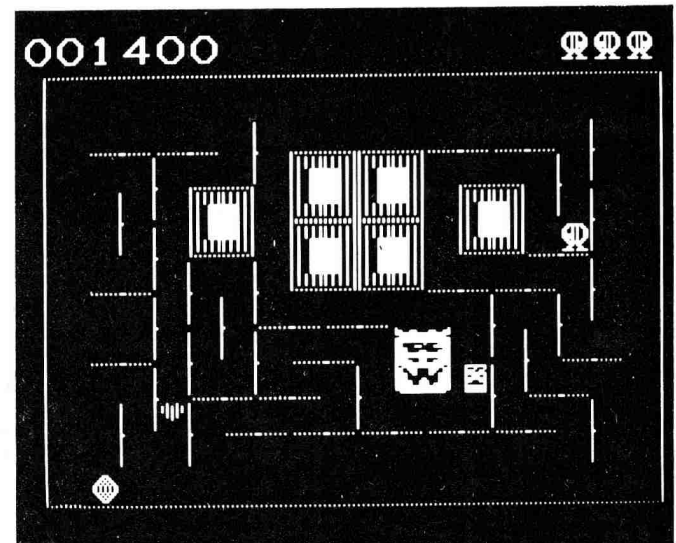
In Drelbs, move maze walls to claim territory and avoid villains. Find the way to two bonus screens, and start over with faster play and more adversaries. This fast-paced arcade game (\$34.95) requires a joystick and works on any Apple II. Contact Synapse Software, 5221 Central Avenue, #200, Richmond, CA 94804, or circle Reader Service number 473.



Intricate designs by PatternMaker.



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This winter, save money by monitoring heat and energy. Home Energy Conservation (\$35) uses spreadsheet techniques to enter variables like house dimensions, climate, and type of fuel. Also, see the effect of home appliances on electric bills. Conserve energy with the help of Educational Materials and Equipment Co., P.O. Box 17, Pelham, NY 10803. Use Reader Service number 475.

Pick a Number

How is your ESP? The ESP Testing Game picks a random number and lets you guess it. Your score is analyzed, displayed, and stored. You can use it for novelty or for ESP research. It runs on all the Apple II's and costs about \$45. Contact: Pegasus Computers, P.O. Box 113, 1068 Homer Street, Vancouver, B.C., Canada V6B 4W9. Check number 483 on the Reader Service card.

Computers Go Condo

Designed for condo associations and managers, Simple Condominium Billing is a complete billing system for the Apple II family. Up to 500 accounts per disk handle maintenance, past dues, late charges, special fees, and utilities. Printouts include bills, reports, and mailing labels. A demo costs \$20, and the system is \$149.95 from Amphel Industries, 2888 Bluff Street, Suite 353, Boulder, CO 80301. Circle number 476 on the Reader Service card.

Greek to You?

The Greek (\$200) is a "transliterator" for Apple II's. Type any English word and see the Greek equivalent (using English letters), the definition, and biblical uses of the word. The Greek includes the King James New Testament, and a dictionary from Strong's Exhaustive Concordance. This research tool is from Bible Research Systems, 9415 Burnet Road, #208, Austin, TX 78758. Reader Service number is 489.

Follow Your Stars

Weekend sailors and backyard astronomers benefit from Navigation Pac Plus. A built-in almanac has data on the sun and 57 stars up to the year 2000. Features include: two-body fix, great circle sailing, star locations, and star identification. Disk and manual work on all Apple II's and cost \$42. Details are from Celestial Software, 3010 Warrington Avenue, Lakeland, FL 33803. Use Reader Service number 482.

Beginners' Graphics Language

Easier than Logo or BASIC, Spellcaster has only 32 commands. Build commands into words, or "spells," for complete graphics and animation. The package (\$39.95) includes language and tutorial on copyable disk, manual, and one issue of the newsletter. The company is spelled: Shenandoah Software, 1111 Mt. Clinton Pike, Harrisonburg, VA 22801, or use Reader Service number 477.

Lock Up Your Software

Market your software on uncopyable disks with the Lock-It-Up system. Protection comes from a coded track written at random on the disk and foils even advanced nibble-copiers. Licensing the system begins at \$495. For more details, contact Double-Gold Software, 3900 Moorpark Avenue, Suite 29, San Jose, CA 95117. Use Reader Service number 474.

Better Spelling

Children and adults become better spellers with Spell It. Manual and two disks cost \$49.95 and work with all Apple II's. This one system comprises 1000 commonly misspelled words, rules of spelling, spelling arcade game, and word scramble game. New words are easily added to the list. Write to Davidson & Associates, 6069 Groveoak Place, #12, Rancho Palos Verdes, CA 90274, or check Reader Service number 485.

ProDOS Spelling Checker

Best-selling Sensible Speller has been updated for ProDOS. Including 80,000 words, Speller works with virtually all popular word processing programs, including AppleWorks. Unfamiliar words are displayed along with correct spelling. Speller is sensibly priced at \$125 by Sensible Software, 24011 Seneca, Oak Park, MI 48237. Use Reader Service number 488.

Apple Writes Better

Version 2.0 of Apple Writer II improves this popular product. Changes include: built-in terminal mode to access information services (CompuServe, Dow Jones, The Source), on-screen page and line count, and ProDOS operating system. This new version, at \$149, and an upgrade for earlier versions, at \$50, are available from Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014. Reader Service number is 486.



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Videodisk Controller

Your computer controls videodisk access with the VAI // interface. The interface is software controlled, connects to the game port of any Apple II, and costs \$125. Laser Write (\$75) lets you create interactive programs using plain English. Laser Mouse gives you mouse control of a videodisk. These come from Video Vision Associates, Ltd., 7 Waverly Place, Madison, NJ 07940. Use Reader Service number 457.

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

Apple's Own Color Monitor

For sharp, precise colors check the 12-inch AppleColor Monitor 100. An 80-column Text/AppleColor card (\$299) is required for a //e. A low-cost RGB adapter is needed for the //c. Styled to match Apple colors and profile, Monitor 100 costs \$599 from Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014. Use Reader Service number 450.

Ricoh's Laser Printer

It won't fit in your stocking, but ask Santa for the Ricoh LP4120 Laser Printer. This tabletop unit prints 12 pages per minute. There are two internal fonts, but other fonts and graphics are available. Santa will have to come up with \$1400 for printer and controller. Contact Ricoh Corp., 5 Dedrick Place, West Caldwell, NJ 07006. Reader Service number is 462.

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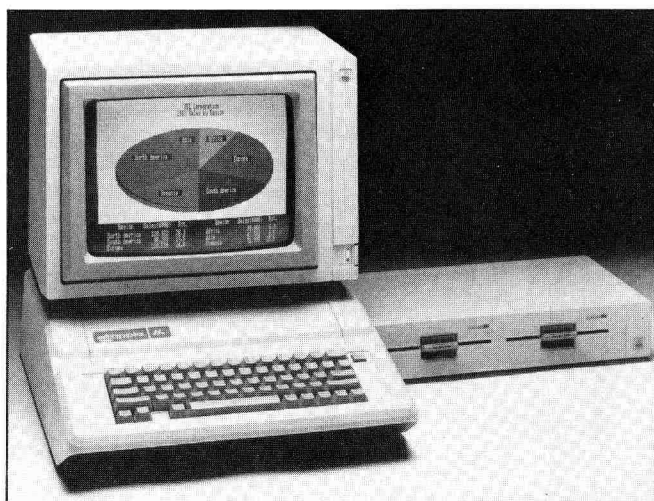
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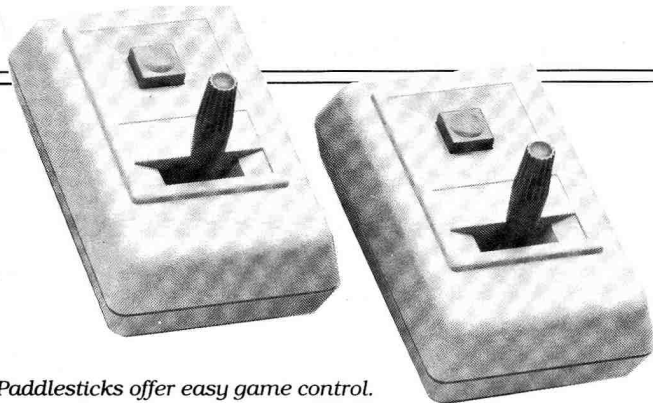


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AppleColor Monitor 100 has high-quality display.

edited by Kerry J. Lanz



Paddlesticks offer easy game control.



Modem security with the dial-back Sleuth.

Getting Control

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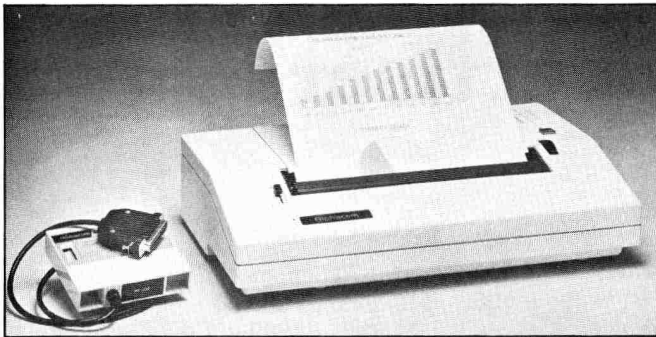
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