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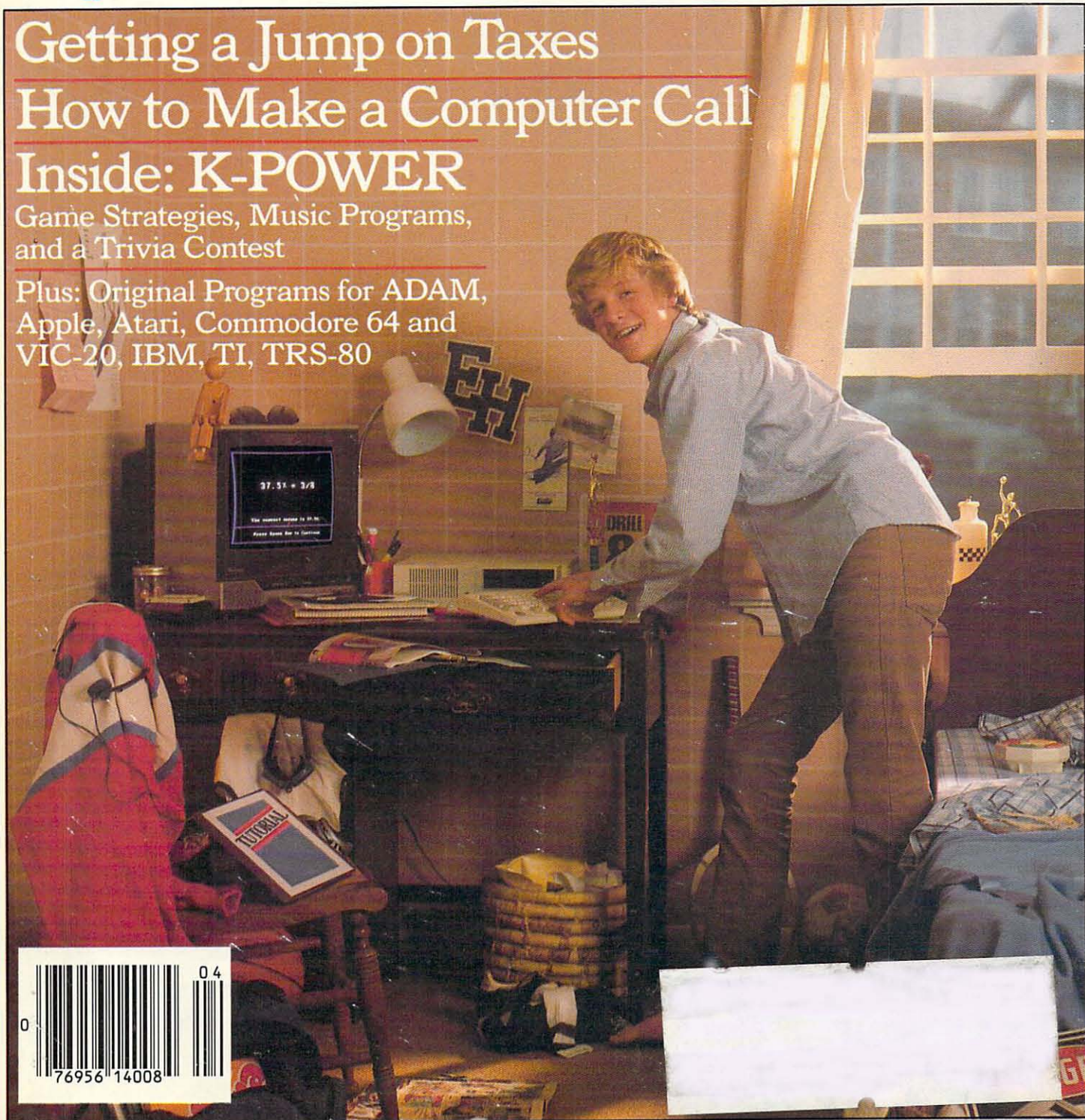
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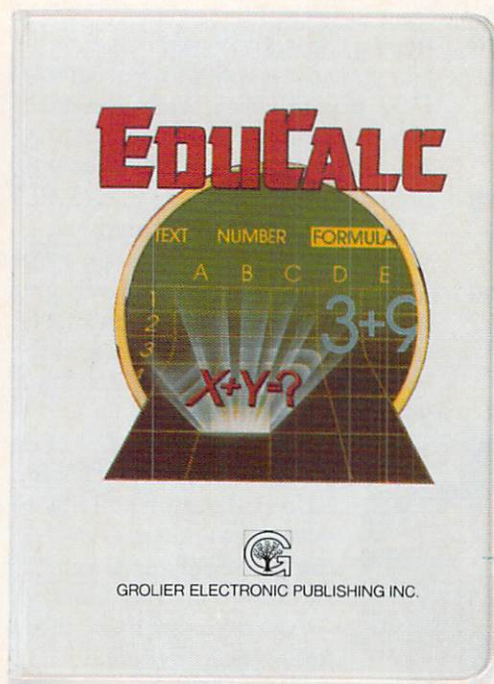
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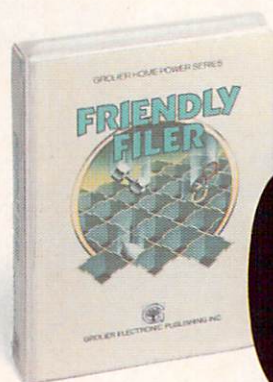
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FAMILY COMPUTING

APRIL
1985

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PLUS: STEPS TO FOLLOW AND WHAT TO LOOK FOR

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Looking for a color printer? Inside you'll find a roundup of the price/performance leaders, and a few panoramic printouts.

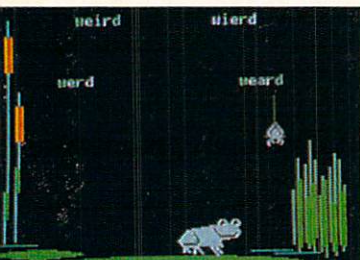
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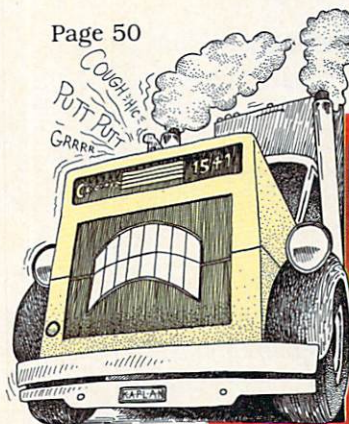
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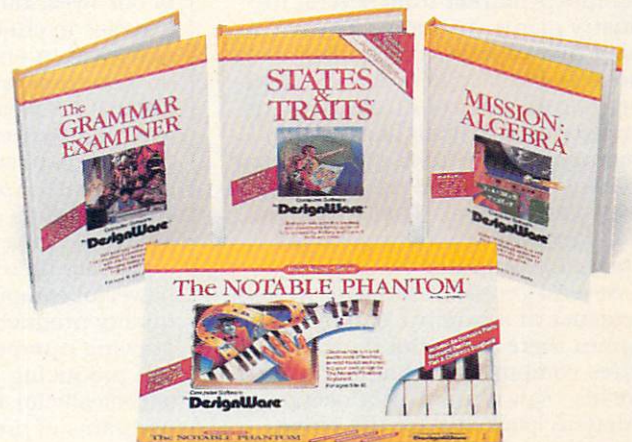
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HELP IS AT HAND

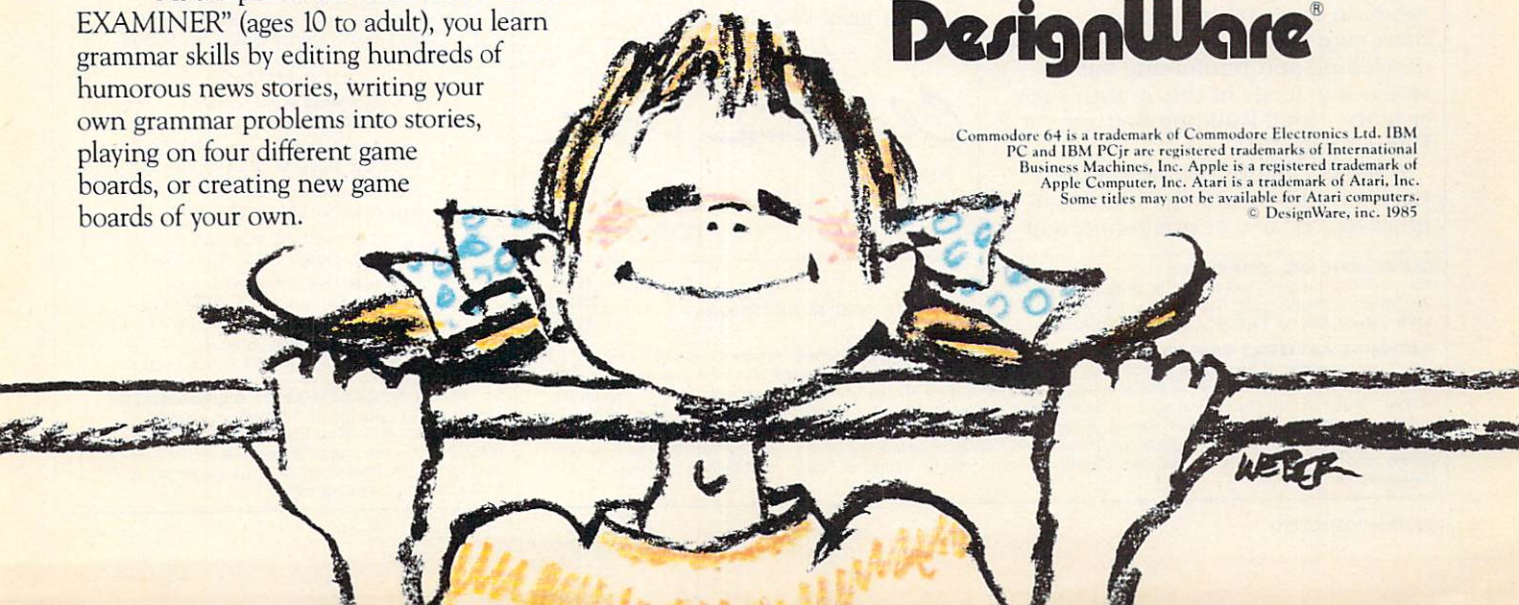
DesignWare family learning games are available at all major software retailers, and run on Apple II family, IBM PC, PCjr, Commodore 64, Atari and other popular microcomputers with disk drives. We provide a 90-day warranty against defects and free telephone support.

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EDITOR'S NOTE

WHERE ARE WE GOING?

Twice a year the computer industry meets as part of the Consumer Electronics Show (CES). It's one of the things that FAMILY COMPUTING devotes minimal space to, primarily because so many of the products unveiled at the show turn out to be merely test balloons that never reach the production line. We try, instead, to concentrate on your real options and to report on such shows only in terms of major trends or big news.

Well, the 1985 Winter CES is now behind us, and there are several things worth noting that could affect the future nature of computing. New computers announced by both Atari and Commodore, and promised for spring, are described in New Hardware, page 81. In peripherals, low-cost color printers got lots of attention and are the subject of this month's Buyer's Guide (page 43).

We got the Japanese view of the computer market from several industry giants, including Sony. They hold that in today's technology-laden household, filled with a VCR, laser-discs, complete sound system, and an extensive playing library, the computer is the final, ultimate component—the controller of a totally hi-tech environment. That's the way the Japanese see a dramatic increase in computer ownership.

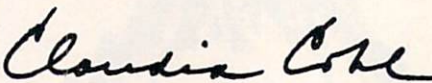
Several genres of software were in evidence at a number of booths. In games there were a lot more adventures combining text and graphics. We also saw a number of new productivity packages for the home, some of which are reviewed in this issue. In educational software, there's an even greater emphasis on developing and reinforcing basic skills—the focus of this month's cover story, "Skill-Building Software at Home," page 39.

A panel I chaired on new directions in software for the home emphasized the recent proliferation of

how-to packages. It's been interesting to note the evolution of computer use and software. When personal computers first came out, the hackers, including the inventors of the machines, understood that the computer was a tool that could be used for just about anything. And they programmed their own computers to extend into all aspects of their lives. The hobbyists who followed also understood what computers could do and chased after obscure programs to assist them—the plastic-bagged, home-grown software created in basements and garages.

Now there's us, just regular, not especially technical-minded folks by the thousands who are beginning to discover the power of the machines we often use on a very limited basis. Innovative new programs are appearing that promise to put the computer to work in ever-expanding aspects of our lives, ranging from diet and exercise to child-rearing. Judgment is not yet in on the value and quality of these programs. And we still don't know if we creatures of habit will welcome technology as a helpmate in our efforts to accomplish major personal goals. We'll be reviewing these new programs and evaluating their ability to deliver on their promises.

Overall, there's movement. More powerful computers. Variety. Higher quality products at lower cost. A growing number of companies are at last producing software designed specifically for the home consumer—programs of great practical use that are easy to understand. We'll do our best to keep you moving, too.



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LETTERS

WHICH APPLE?

I would like to compliment you on the quality of your magazine. I own a Macintosh computer and depend on your software reviews to keep up with any new programs. I have a question and a request, though. What do you mean by Apple when you list the computers a particular program runs on? Does it run on the Mac? The IIe? the II? Would you consider including a Microsoft BASIC version in your program section? After all, MS-BASIC is the most commonly used version of the language.

GABE SCHAFTLEIN

West Chester, Pennsylvania

EDITOR'S NOTE: *The programs we publish under the Apple heading are written in Applesoft BASIC, and will run on the Apple II (with Applesoft BASIC in RAM or on a language card), II plus, IIe, and IIc. They will not run on the Macintosh without some modification.*

We will not be including a Microsoft BASIC version in our programming section because although many machines have Microsoft BASIC in common, differences still exist between them. However, you will be happy to know that with a little ingenuity, you can modify most of the text-only programs we publish for TRS-80 Models III and 4 (and in some cases, the IBM PC) to run on your Mac under its version of Microsoft BASIC.

A BIT OF PLEASURE

I just picked up a copy of FAMILY COMPUTING on the newsstand and was delighted to find the little programs in BASIC that I can use with my TRS-80 Model III. Hopefully, you will continue with this feature, and if I find that you are, I am a potential subscriber.

D.A. CROSSLEY

Brownsville, Texas

EDITOR'S NOTE: *We plan to continue publishing programs for the TRS-80 Model III.*

A PRACTICAL SUGGESTION

As a subscriber to your magazine, I would like to make some suggestions. Please make sure that you offer sufficient reviews on software, in particular, nongame software and software that the small businessman or individual can use. I am referring to low-priced packages of easy-to-manage programs in accounting, tax preparation, etc., and word process-

Q

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a

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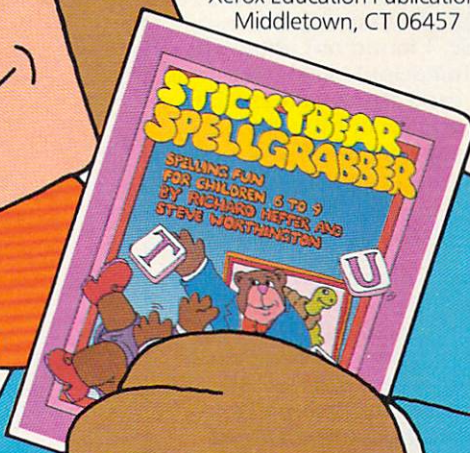
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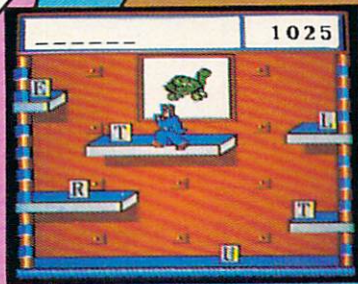
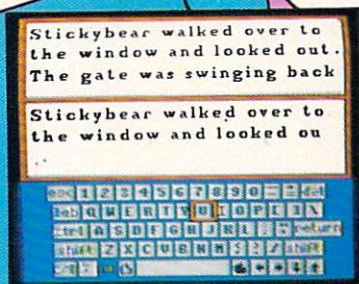
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LETTERS

ing. Useful applications are more important to the majority of your readers.

FRED L. JANSSEN
Columbus, Georgia

A NEW LIFE

Your August 1984 issue changed my life. I, like Jane Unger (Home Business, page 20) have multiple sclerosis. I was reading your magazine at 9:30 p.m. and wasn't able to call anyone.

By the afternoon the next day, I was on the phone with the New Jersey Division of Vocational Rehabilitation. My counselor, Ed Green, bent over backwards to move things along since it was already the end of August and the class started the first week of October. Jeanne Connell of the rehab center set up my testing and interviews quickly. I wanted this program so badly and everyone involved knew that and worked harder to make it happen.

It's now the eighth week of school, and BASIC programming and *Lotus* are coming to an end. Next week, we start COBOL. Thanks to your wonderful article, I found out about the center in Philadelphia and am now a part of it. I can't thank you enough for writing articles of this caliber. I look forward to seeing a follow-up article on the Handicapped Training Center.

CAROL ROSOWSKI
Deptford, New Jersey

EDITOR'S NOTE: *Congratulations! It sounds like your hard work and enthusiasm have paid off. We're glad you found the article so beneficial. We hope that others did too. We are planning another more extensive feature on how the disabled can benefit from computers. Watch for it this summer.*

CORRECTIONS

In December's Games column, Gulf Strike, the strategy game, was erroneously attributed to Strategic Simulations. Avalon Hill is the manufacturer of the game. Apple and Commodore 64 versions are under development.

The software chart accompanying January's cover story, "Putting Your Finances In Order," failed to mention that Scarborough System's Your Personal Net Worth has checkbook and budgeting features as well as financial planning capabilities. The correct price for the Apple version is \$79.95, not \$99.95.

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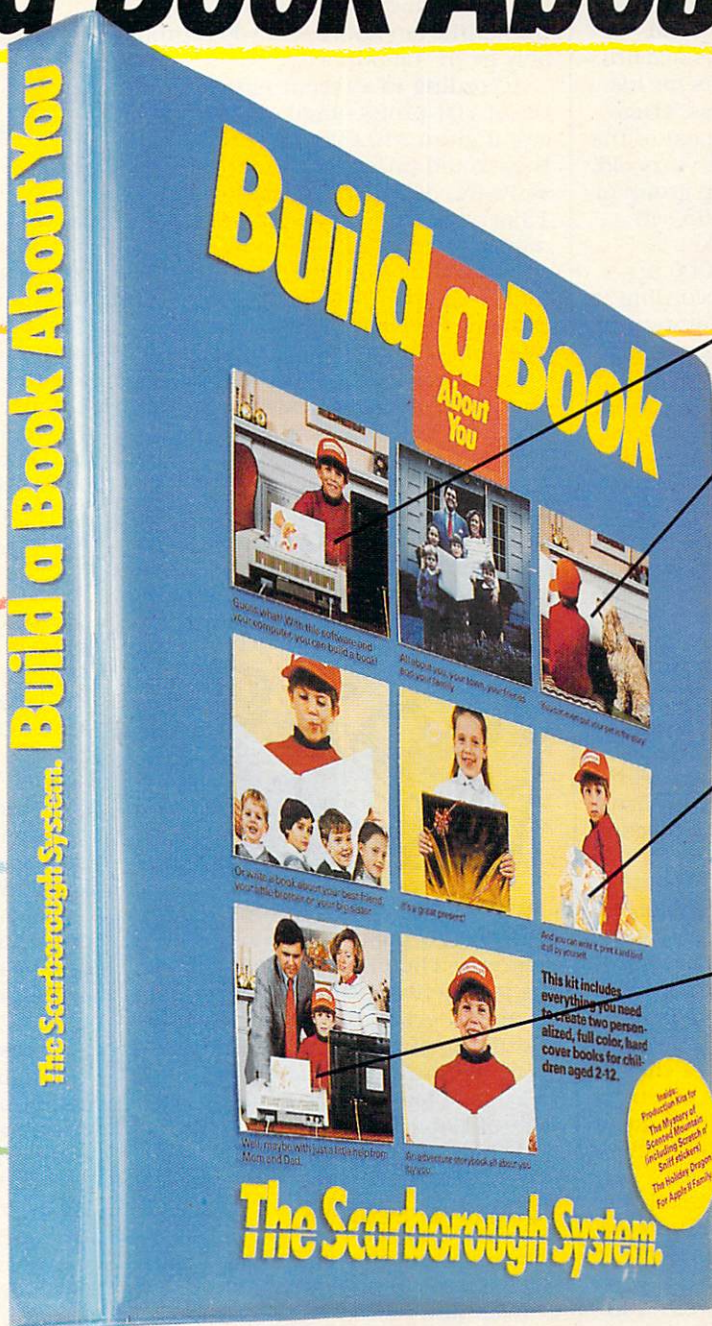
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BEHIND THE SCREENS

PEOPLE, NEWS, AND TRENDS

EDITED BY JUNE ROGOZNICA

The New Computer Generation

Quincy Hall of Nashville, Tennessee, is a computer whiz kid, of sorts. He uses his Commodore 64 and TI-99/4A to brush up on his algebra, to devise financial programs for his church, and to word-process letters. But, he isn't as young as most of the new-age hackers; Hall is 71 years old.

Hall belongs to a growing group of computer users—the over-65 set. This often-overlooked market includes approximately 250,000 personal-computer owners, according to a recent study by Future Computing, a market-research firm. Many retirees have turned to computers as a new leisure-time activity or a way to "relate" to younger family members, but most have found computing an all-consuming lifestyle.

In Nashville, Hall has found dozens of retirees who share his new passion—many of them are his students. Hall teaches a computer-literacy class through the community's Senior Neighbor Outreach program. At \$6 an hour, the classes fill quickly with students anywhere from age 45 to 91. Hall's enthusiasm for the new medium spreads to his students. In fact, several class members joined Hall in starting a club named Comp-U-Virus, for people who "crave" hands-on computer experience.

Clubs such as Comp-U-Virus are no rarity. In Boynton Beach, Florida, owners of the I Like Computers store hold meetings for senior citizens interested in computers. Store owners Charlotte and Peter Dirk, realizing that some 70 percent of their customers were retirees, organized a club (named ROBOTS) so people could meet twice monthly to listen to guest speakers, ask questions, and show off their new-found skills.

The meetings usually attract 10 to 30 people, from age 59 to mid-80. Although members own a variety of computer models for a wide range of uses, they share common ground in the "feeling of 'I'm going to keep up with the modern thing,'" explains Charlotte Dirk. "The main thing they have in common is they like to use computers, and show others how they use them." —LINDA WILLIAMS

Man vs. Machine

If you were given funds to increase your office's productivity, would you purchase a personal computer or add a staff member? Well, if you took the humanitarian approach, you'd probably be in the minority.

According to a recent national survey of 701 professional office workers, if given \$10,000, 65 percent said they would purchase a computer, software, or a word processor; only 13 percent said they would use the money to add staff. The survey was sponsored by Honeywell Technalysis for the company's Office Management Systems Division. It was conducted by Public Attitudes in New York.

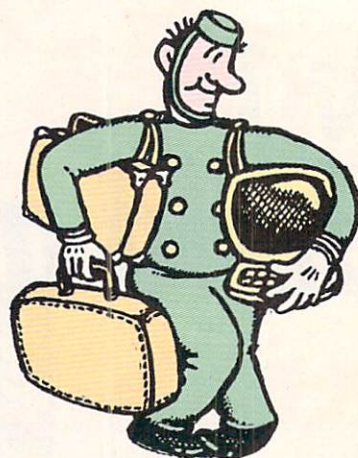
Those surveyed included managers and professionals in categories such as design and analysis, finance, legal, marketing, personnel, purchasing, and operations management. All of the office workers held jobs involving the compilation and evaluation of information or data, and most of them already had word processors and computers available for their use.



Why is office automation becoming increasingly popular with office workers? The proof, it seems, is in the productivity. "They say they can do more work of higher quality in a shorter amount of time than they could without these tools," according to Eugene Manno, group vice president of Honeywell's Small Computer and Office Systems Group.

Rent a ROM

You're visiting the Windy City next week for the annual Moose Head's Convention. As secretary for the Lincoln, Nebraska, chapter you need to produce a report the morning you return home. Since the convention's in Chicago, it's no problem. You can rent a microcomputer workspace and get the job done before you



board your return flight home.

The workspaces, called EasyKeys, are located in four strategic Chicago locations, including the downtown Hyatt Regency Hotel. For a mere \$8 an hour—probably cheaper than the leasing fee for an IBM Selectric—you can use a 3-foot × 4-foot semiprivate cubicle, and an IBM PC computer. Up to two dozen pieces of software are provided, ranging from word-processing programs to spreadsheets, and yes, even a few computer games. If you'd like to send business reports back to the office, or communicate with your family, rent a modem for a \$1-an-hour surcharge.

While businesspeople represent the largest number of EasyKeys customers (70 percent), quite a few others also are making use of the workspaces. Thirty percent of the customers use the computers for personal or home tasks, and 10 percent are students from nearby colleges. "We felt that there should be somewhere someone could go without salespeople hovering over them, or a place for people who don't have access to a computer when they need it," explains Howard J. Weiner, 29, president of the company.

Judging by the numbers, the general public seems to like the concept. EasyKeys has been attracting about 250 customers a month since its first workspace opened in April 1984, and 70 percent of those users are repeat customers.

Weiner has big plans for EasyKeys. He's working on a franchise arrangement, and hopes to have at least a half dozen more centers in other cities by the middle of this year. EasyKeys soon may be the next-best thing to McDonalds, or quite literally, the best thing next door to McDonalds. ☐

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HOME/MONEY MANAGEMENT

GETTING A JUMP ON NEXT YEAR'S TAXES

Plan a Powerful Electronic Tax System to Serve You Year-Round

BY CHARLES GAJEWAY

The neighbors are in a cold sweat. H&R Block is working triple shifts, and so is Duracell, turning out batteries for millions of overheated calculators. But if you've kept up with FAMILY COMPUTING over the past couple of months, April 15 is no big deal. Your home computer and trusty spreadsheet (or calc program, as it's also known) have helped you prepare a neat and accurate return this year.

The Schedule A worksheet in the February issue and last month's 1040 worksheet will handle much of the tax preparation for many people. Those with more sophisticated needs can use the techniques from those examples to create electronic versions of all the tax forms they need, combining them into a powerful personal tax-preparation system.

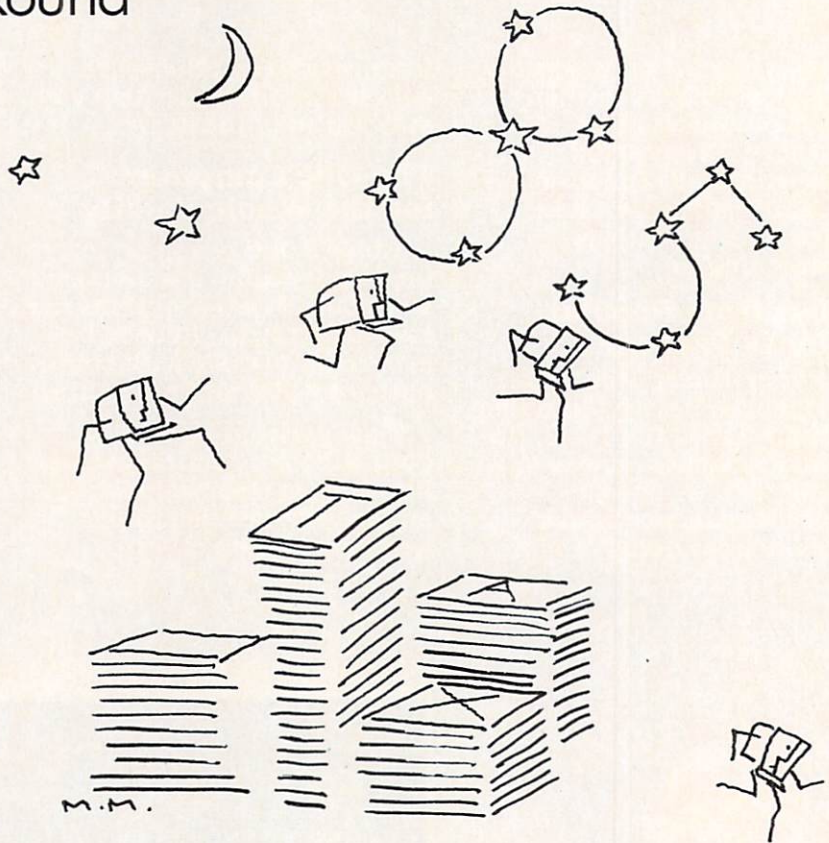
But just because you've finished your tax return early doesn't mean it's time to put your disk away until next year. Take a hint from the big corporations, which keep their tax departments busy all year: Use your tax system to keep your finances up to date and to make daily or monthly financial decisions.

A NEW TAX TOOL

Your spreadsheet is the perfect tool for decision-making. It won't make decisions for you, but it will provide you with options that you hope will lead to more informed decisions. With its number-crunching abilities, the spreadsheet allows you to play "What-if" games, testing the impact of a decision on your tax bill.

For example, consider the Individual Retirement Account option. Should you start an IRA or put your money into a certificate of deposit

CHARLES GAJEWAY is a contributing editor for FAMILY COMPUTING. He wrote "Fine-Tuning Your Tax Preparations," last month's Home/Money Management article.



with higher rates but no tax breaks? Or how about tax-exempt bonds with lower interest rates vs. a certificate of deposit? Of course, your decisions will not be based on numbers alone. There will be other variables to consider. For instance, are you looking for liquidity in your investments? Are you planning any major purchases within the next few years? Unfortunately, your spreadsheet can't answer *these* questions. Nor can it predict whether the inflation rate will go up, or interest rates will drop. But with your personal tax system in place, it will be easy to assess how any one of these situations will affect your taxes.

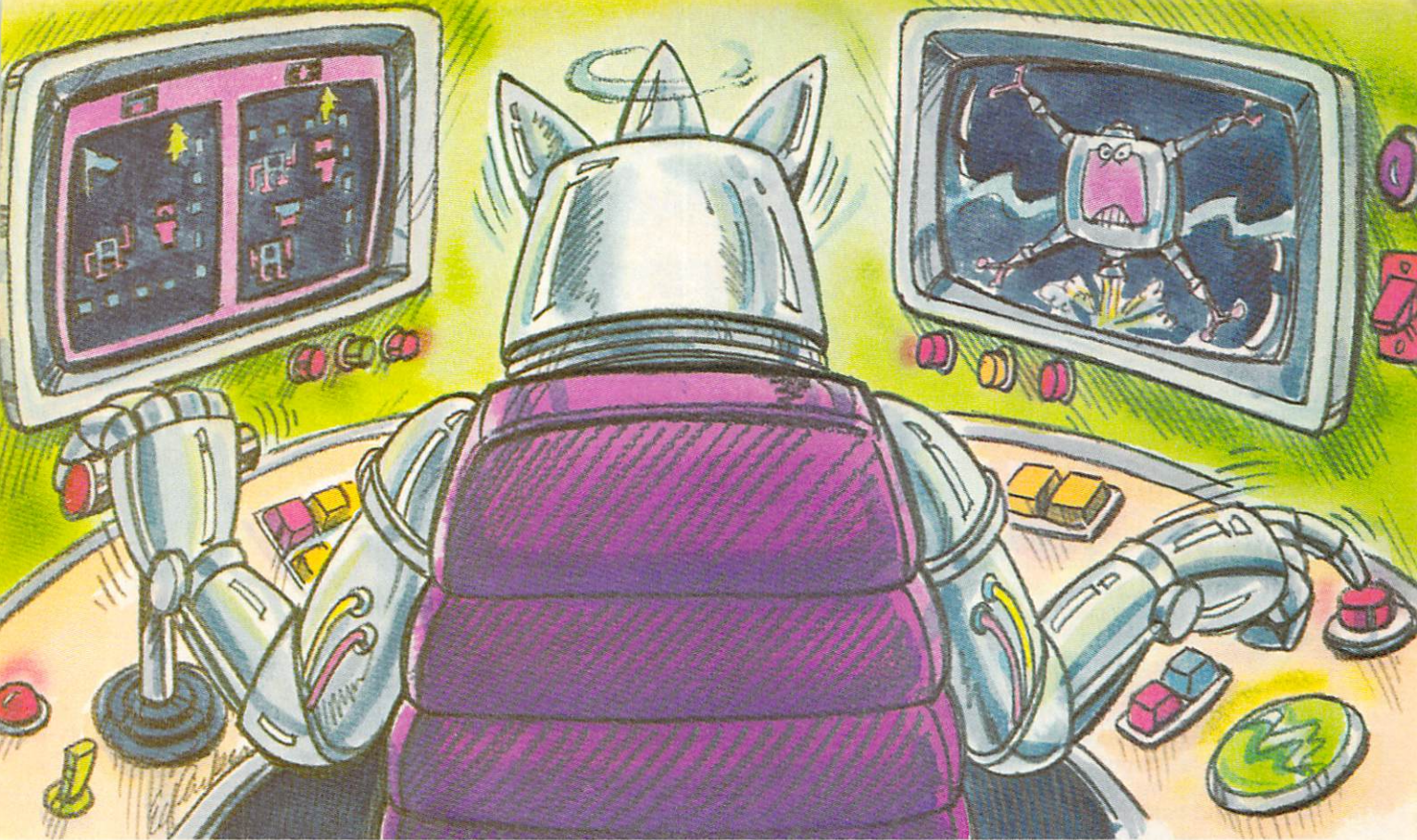
Using your year-to-date information or last year's tax return, estimate your income and deductions for the current year. Then add relevant information (usually interest expense) about the decision you are making, and look at the impact it will have on your tax bill. If you decide to take out a loan, for example, the tax-sheltering effect of your interest payments may make it possi-

ble for you to afford something that might otherwise be outside your reach on a straight cash-payment basis. Conversely, added income from an investment or business opportunity might create additional taxes that make the deal unattractive.

All of us make major personal finance decisions every year that affect our bottom line on April 15. Whether you're buying a house or a car, taking out a home improvement or education loan, making investments, or starting or expanding a business, it's crucial to weigh the effect of your decisions before you implement them. Your computer, as we've already discovered, can help. But before you can put your computer to work for you, you've got to get organized.

GET ORGANIZED

The first step, if you haven't done it already, is to complete your tax system by setting up electronic versions of all the forms you normally use in tax preparation. You can use



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HOME/MONEY MANAGEMENT

the sample spreadsheets set up in the February and March issues as guides. As a rule, you should set up your worksheet so that data appears in groups on the screen. Each form should consist of a number of groups running horizontally across the spreadsheet, with the final computations placed in the column at the far right. This will ensure that all summaries are computed correctly with the most recent information. Each form starts below the previous one to conserve memory and ease modifications. When you've finished setting up your personal tax system, be sure to test it. And once you're satisfied with its accuracy, SAVE it and make a backup copy.

Next, make a list of financial tasks that would be helpful to automate. It's not necessary, or even desirable, to create a spreadsheet for every calculation. For example, if you have no problem keeping your checkbook up to date and balanced, then there is no point computerizing it. Doing so would take more time and effort than using a pencil and calculator. However, if you frequently use several bank accounts, it may save you time to keep track of the movement of your funds and the prevailing interest rates with a set of electronic banking spreadsheets.

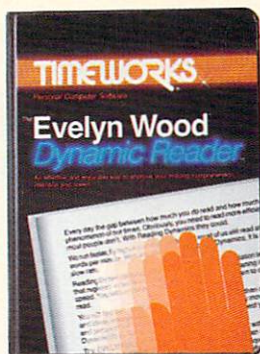
The key in using your computer to keep track of your finances is to use it consistently all year long. For example, update your log of tax-deductible expenses once or twice a month. It should take an hour or less to complete this task, and it will go a long way toward eliminating that confusing shoe-boxful of receipts and cryptic notes. If you are self-employed or incur a lot of business-related expenses, you might even want to consider using a simple data-base program to help manage your records of income and expenses more flexibly than with a straight spreadsheet.

Using a personal computer and spreadsheet, you tend to look more often and more critically at your finances. You tend to weigh your decisions more carefully, to be more aware of your financial standing on a daily basis, and to have a better handle on your monetary limits. Making one good deal, or avoiding a bad one, can easily pay back the cost of your computer system. So, take a tip from the big companies: Once you get organized, stay organized. Work on your finances as you go, and leave the shoe boxes for shoes. **FC**

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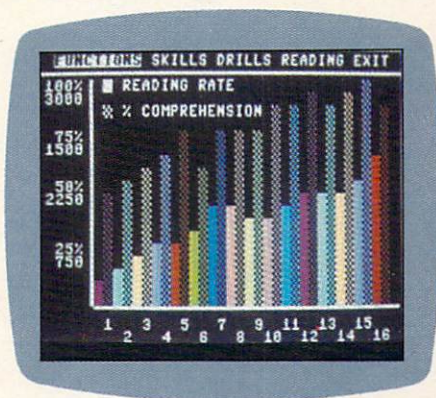
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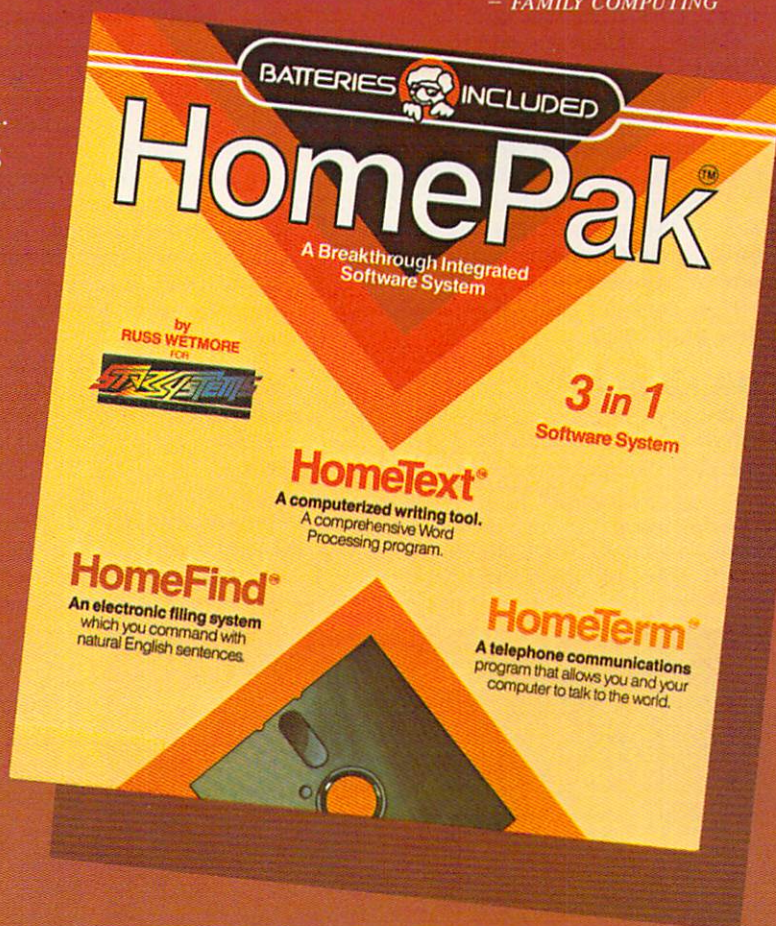
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TELECOMPUTING

TIPS ON MAKING A COMPUTER CALL

BY JOE GELMAN

Imagine a robot that can do everything—except hear and speak. Attaching a modem to your computer is much like adding a pair of eyes and ears to a robot. By allowing you to connect your computer to the phone lines and make calls to other computers, a modem turns your computer into a much more sensitive and sociable machine.

Last month's cover story, "The Great Computer-Phone Link," outlined the necessary ingredients for successful telecomputing. In short, you need a modem and communications software—and don't forget the phone! Here's a quick guide to putting these elements together, with a few tips on how to make the system setup work better for you.

Before you use a modem, the FCC (Federal Communications Commission) requires you to supply your local phone company with the FCC registration number and ringer equivalence number—information that is usually found on the underside of the modem. Also, FCC rules forbid using a modem on a party line or pay phone.

Now, let's get going and make that first phone call.

THE HOOKUP

The style of modem you use (external or internal) affects the type of hookup. The easiest modem to in-

JOE GELMAN is a contributing technical editor for FAMILY COMPUTING. He wrote "The Great Computer-Phone Link" in the March issue, and the Buyer's Guide in this issue.

stall is the self-contained, plug-in type. These modems are available for computers with internal card slots (ADAM, Apple, IBM) or those with special built-in ports (Atari, Commodore, Timex, TRS-80 Color Computer). The beauty of these modems is that you can just plug them in.

External modems connect to a computer through a serial interface of some kind. The modem connects to the interface via a connecting cable. The right cable is key! Your best bet is to obtain the proper cable at the same time you purchase the modem, making sure it's wired specifically for your computer. Anchor Automation sells cables that connect its modems to every popular computer; Apple sells "accessory kits" to connect its modems to computers. Most modems don't come with a cable, but the store where you buy one should be able to provide you with a cable that works.

If you have an external modem and your computer doesn't already have a serial interface, you may have to buy a serial card. Make sure you plug it into the proper slot inside your computer. The manual should mention which slot to use.

There are usually small DIP switches on serial cards. These can be set ON or OFF (up or down) to control certain functions of the card, such as "printing" or "communications." Read through the manual before installing the card, to determine what settings you'll be using. The DIP switches are easier to get at before the card's plugged in.

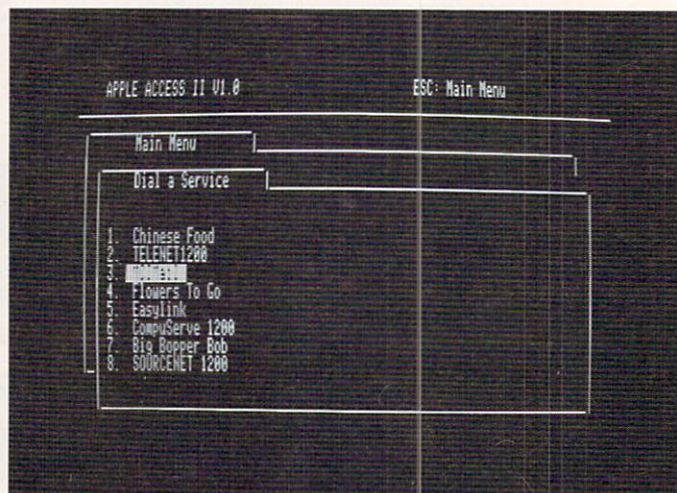
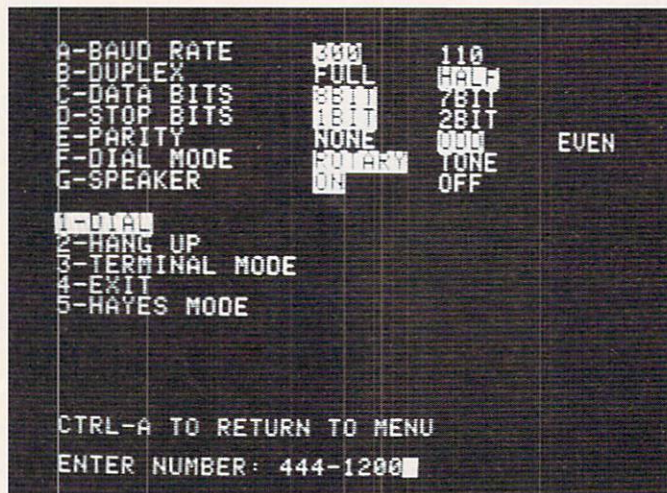
THE PHONE LINK

Once you've connected the modem to the computer, you're ready to hook into the phone system. If you live in a household with an old-fashioned "hard-wired" telephone connector, it's better to switch than fight. All direct-connect modems—and almost all modems today are direct-connect—require the newer "modular," or plug-in style connectors. Unless you've purchased an acoustic-coupled modem, the kind with cups that the phone handset fits into, you'll need to upgrade.

Fortunately, you can buy an inexpensive adapter box at Radio Shack (the Modular Jack/Wiring Block, for \$4), or any store that carries phone supplies. Alternatively, inquire about your local phone company's upgrade policy. They may convert a hard-wired line to a modular line for a nominal charge.

Another handy item is a "duplex jack," which virtually turns one phone jack into two, or, alternatively, can "add" an extra jack to your modem. This is useful if you want to keep both your phone and your modem connected to outside phone lines at the same time. With only one line available, you'd have to unplug the line from your phone and plug it into your modem to make a "computer" call, then reverse the process to make a "voice" call. The duplex jack is available at Radio Shack and other phone-supply stores.

Note: If you're installing a separate telephone line for the modem, and



Left: Software built into the Zoom Modem/IIe (Zoom Telephonics) lets you choose modem settings easily by selecting a letter or number. Right: Apple Access II software (for Apple IIe and IIc) lets you store often-dialed phone numbers. Make your choice (Chinese food?), hit RETURN, and the modem automatically will dial the number.



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Besides Travelshopper, CompuServe offers an ever-growing list of other travel-oriented on-line services.

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TELECOMPUTING

PICK OF THE MONTH

The Netweaver's Sourcebook— A Guide to Micro Networking and Communications

By Dean Gengle
Addison-Wesley, \$14.95

Computers, telecommunications, networks, the Information Age—keeping up with all these new developments and the jargon surrounding them is practically a full-time job. Dean Gengle has done a lot of the work for you.

Gengle addresses the reader as a potential "netweaver"—or creator of a network—and presents all kinds of information that such a person might want. The book's a combination of philosophy, sociology, psychology, and plain talk about modems and micros.

This soup-to-nuts approach covers many topics: goal-setting, privacy, telephone systems, the home-to-office connection. They're all clearly labeled, so the reader can pick and choose. If you use a modem with any frequency, you'll learn something from this book.

the modem has autodial capability (meaning the phone number can be dialed from the computer keyboard), you won't need a duplex jack.

If you subscribe to the "call waiting" service, be aware that incoming calls will interfere with the modem and may break your connection with the computer at the other end. This can be very annoying if you're in the middle of an "electronic" chat, or have finally gotten through to that BBS that's always busy. Solutions? Have "call waiting" disconnected; get a separate phone line for your computer; or buy one of the new and very expensive modems, which override the "call waiting" signals.

MAKING A CALL

Once the hardware is in place, it's time to boot your communications software. We'll assume you've read the manual that came with the software (always a good idea!) and understand the basic operating procedure. Make sure you know how to adjust the baud rate, duplex, and parity settings—you may want to change them in the middle of a call. If these values are set incorrectly, you'll have trouble communicating. It pays to find out what settings the computer you're calling expects before placing the call.

Preliminary testing of your modem is easier if it's "intelligent" (Hayes Smartmodem and compatibles), because it can talk back to you. Typing AT (the "attention" command) will cause the modem to respond OK. If you can get that much to happen, there's a good chance your hookup is correct. Testing "plain vanilla" modems that can't talk back requires calling another system. And, of course, the true acid test for any modem is to call up another system with a modem attached—and actually communicate.

If you have a friend to call, great. If not, check magazine listings or ask a users' group for local BBS (bulletin board system) phone numbers to call.

Even if you have 1200-baud capability, it's a good idea to test the modem at 300-baud. The lower speed is more reliable (it's less sensitive to noise on the phone line), and most BBSs still run at only 300 baud.

Calling a friend: Set your communications program to half-duplex (so you can see your own typing). If the program allows you to adjust parity, set it to NONE. Your friend should use these same settings on the other end. If you make the call, you're the "originator" and your friend is the "answerer." Many modems automatically select the proper mode (ORIGINATE or ANSWER). If yours doesn't, you manually select the appropriate setting. Actually, all that matters is that each modem be set differently, regardless of who originates the call.

Calling a commercial system: The main difference between calling a friend and calling a commercial network such as CompuServe or The Source is the duplex setting. Because commercial systems will "echo" the characters you type back to you, you'll see a doubling of the characters on the screen (e.g. HHEELLPP) if you're set to half-duplex. Set your program to full-duplex before calling a commercial system. When calling some BBSs you'll need to set your computer to full-duplex, as well. Others operate on half-duplex.

When making a call from your computer—either dialing on the keyboard or on the phone—you can tell you've reached another computer when you hear a high-pitched tone. Autodial modems automatically will connect when they hear this tone; on manual modems, you'll have to flick the switch from "voice" to "data," or to "originate."

CALL-MAKING CHECKLIST

1. Connect the modem to the computer.
2. Plug in the modem's power supply or battery (if needed).
3. Autodial modems: Connect the phone line to the modem. Manual-dial: Connect modem and phone to outside-line.
4. Set the modem to "originate" (if needed).
5. Boot your communications software.
6. Check the settings. To call a bulletin board or commercial network, try: 300 baud, full-duplex, no parity. To call a friend, try: 300 baud, half-duplex, no parity.
7. Dial the number you wish to reach, either from the computer keyboard (for autodial modems) or from the phone.
8. If you have a manual-dial modem, wait for the high-pitched tone, then switch from "voice" to "data," or to "originate."
9. Complete the connection. In most cases, pressing ENTER once or twice, or pushing CONTROL-C, will accomplish this.
10. If calling a BBS, follow instructions for log-on (entering ID, password, etc.). If connected to an individual, just start typing (HELLO. CAN YOU READ ME?) and wait for a response. Good luck!

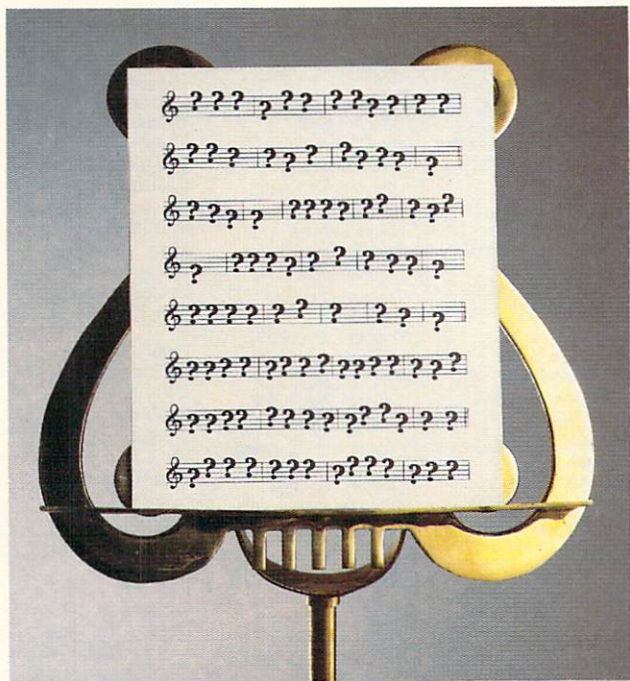
Once you've connected to a distant computer a few times, it's easy as pie. But the first few times you might encounter problems. If one thing's out of place, the modem will not work correctly. Just slow down, follow our "Call-Making Checklist," and start over. In an upcoming issue, we'll run a guide to troubleshooting, giving solutions to common problems. ☐

ELECTRONIC EDITION

FAMILY COMPUTING has started an "electronic edition" on CompuServe. Here, you may read fast-breaking news and reviews, post messages for the editors and other users, attend live conferences, and generally participate in the creation of a new electronic magazine. Type GO FAM at any CompuServe prompt to check it out! You can also leave messages (e-mail) for FAMILY COMPUTING on The Source (account No. T15483).

To operate these electronic services, FAMILY COMPUTING uses modems supplied by Hayes Microcomputer Products, Inc.

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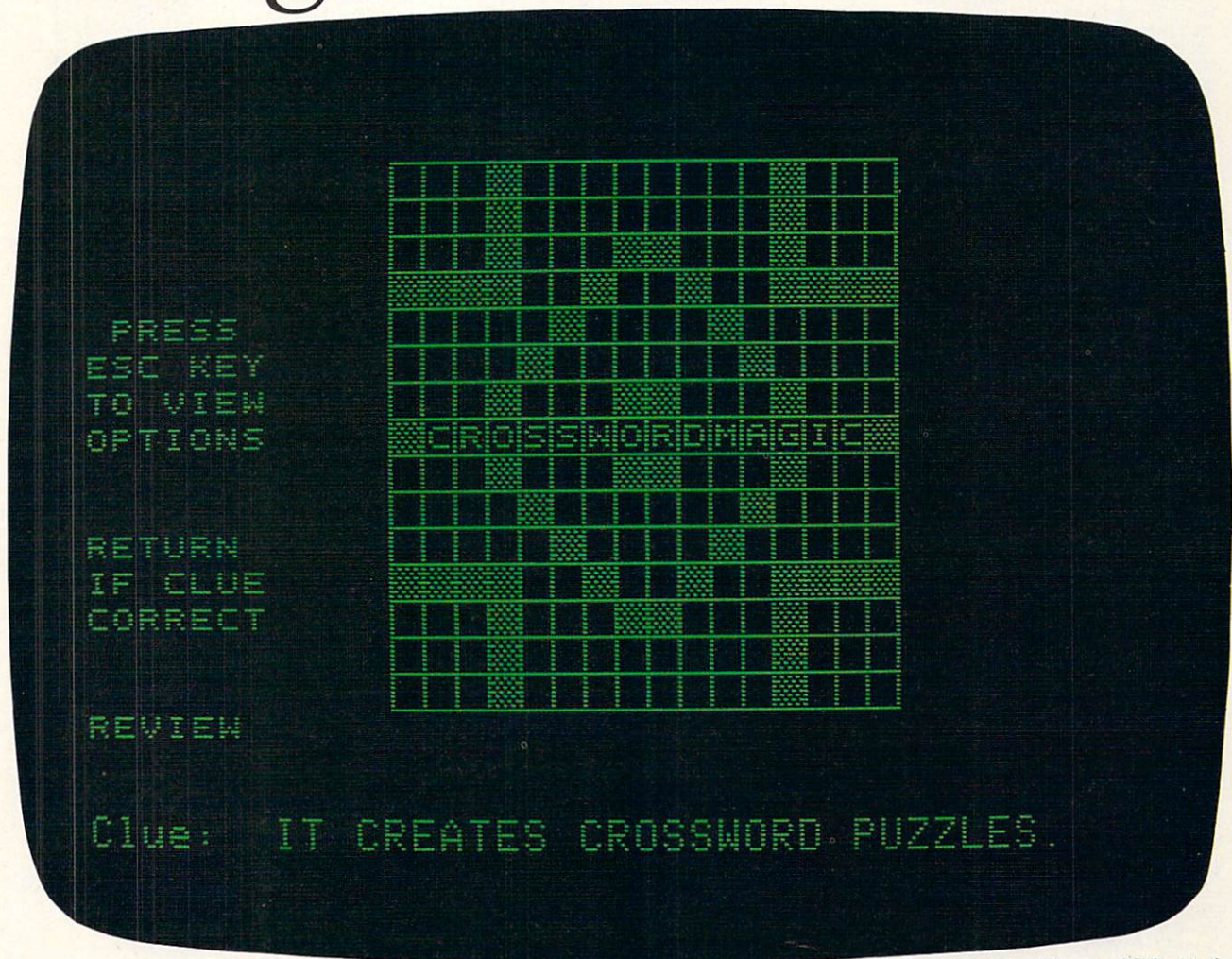
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Crossword Magic from Mindscape



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Choose the SAT program with less manual labor.

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

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GAMES

MAKING THE MOST OF COMPUTER GAMES Supplement Your Game-Playing by Doing a Little "Homework"

BY JAMES DELSON

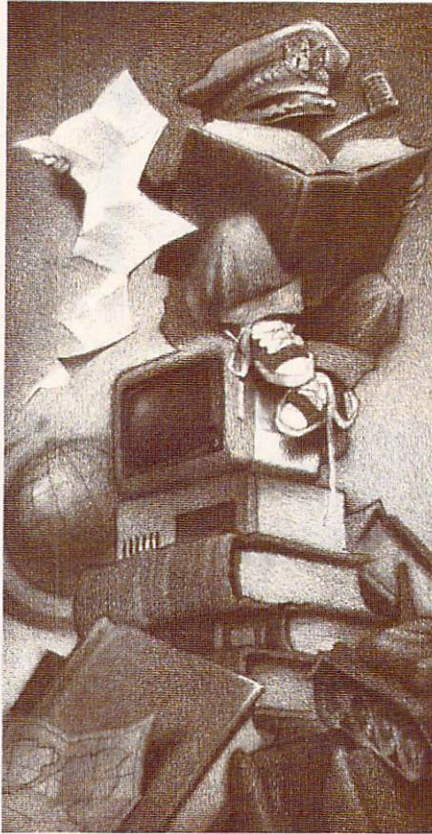
An astounding range of computer games can transport you into historic scenarios, battle sequences, and political campaigns. Playing and testing these games is an around-the-clock affair at my house. Lately, our testing's taken on a new dimension. My gametesters and I have started doing background research for the historical games we play. Learning more about the period and the subject gives us a better understanding of the game and adds immeasurably to the fun.

BEYOND THE CALL OF DUTY?

Certainly not all games rate "extra-curricular" work. But an afternoon's related reading can make a world of difference with many games, particularly war games. For some people, it may seem to be going beyond the call of duty to study 15th- and 16th-century maps in a historical atlas as preparation for playing *The Seven Cities of Gold* (the Electronic Arts game that makes you master of a party of Spanish explorers). But, gaining insight into the location, nature, and cultural habits of the tribes you'll encounter can help you get the most out of the game's historical scenario. Looking through maps and a good text on the exploration and conquest of the Americas can be very illuminating.

Why bother? Well, for one thing, it satisfies our curiosity. We want to know what else was going on during the historical era of the game—what facts and events are being glossed over, which ones are being faithfully reproduced. The basic strategies employed by programmers when writing games are based on reality. When trying to knock the Luftwaffe out of the skies over London in *Fighter Command* by Strategic Simulations (reviewed in the *March* FAMILY COMPUTING), a grasp of German military doctrine, as employed dur-

JAMES DELSON, FAMILY COMPUTING's games critic, is an authority on war games, both computerized and B.C. (before computers).



ing the real battle of Britain, may come in handy, and give you a strategic edge.

THE LONDON BLITZ REVISITED

When we play-tested *Fighter Command*, my living room resembled the headquarters of the British Air Command in World War II London. Maps and charts of actual German and English airfields, showing the units involved in the Battle of Britain, were strewn everywhere.

We borrowed texts and commentaries from friends' libraries, scoured them for descriptions of what really happened, and found out how German might was crushed by British pluck, daring, and radar. The added research heightened the experience of playing the game to a degree we never imagined.

Remember all those World War II movies, where uniformed men and women pushed little blocks of wood (representing enemy and friendly units) across huge map tables to keep track of their positions? Well, computer war-gaming is generally

like that. In *Fighter Command*, however, you can also use a map to follow the progress of the enemy and note where your squadrons are, what fighting condition they're in, whether they've been refueled or not, and how prepared they are for battle. We drew a separate, enlarged map for this purpose, and the results were astounding. The game really came alive. We found ourselves shouting at the computer to hurry and refuel our planes before the Nazis got to London again!

GETTYSBURG AND D DAY

The idea of researching games while playing them first occurred to us while testing Strategic Simulations' Civil War strategy game, *Road to Gettysburg*, last year. In that game, many of the historical commanders had a full personality programmed into the game. We decided that a short study of each officer might help us make wiser moves more consistent with the character. A little reading revealed strengths and weaknesses of both Northern and Southern officers, and we applied this knowledge of their idiosyncracies to the game with varying degrees of success.

On June 6, 1984, we celebrated the 40th anniversary of D day by playing *Battle for Normandy* (Strategic Simulations), a simulation of the "Longest Day" and the campaign that followed it. By analyzing the units that participated, the mistakes they made, and the terrain on which they fought, we formulated a strategy which proved far more successful than the original invasion plans. To top the afternoon off, we ran the W.W.II movies *The Longest Day* and *A Bridge Too Far* on a videotape in the background.

"Outside study" doesn't have to be limited to historical research. Many of Infocom's text adventures, for instance, are modeled after classic detective fiction. *Deadline* fans may find the great detective novels of Raymond Chandler or Dashiell Hammett worth a read.

GAMES

Spinnaker's new line of text/graphics adventures, the Telarium series, is authored by an impressive lineup of writers who've left their mark in the field of science fiction. Michael Crichton's graphics/text adventure, *Amazon* (reviewed in the March issue), is only the most recent effort of a prolific and talented author whose works include *The Andromeda Strain* and *The Terminal Man*. Going to these authors' books won't necessarily help you solve any puzzles.

But they will add to your understanding of the forces behind a game's creation.

OUR OWN WORLD- CHESS CHAMP

We were trying Datamost's *Mychess II* for review when one of the playtesters mentioned that he recently had been puzzled by a game that ended in a draw in the World Chess Championship between Karpov and Kasparov. He felt that the

game could have been played out to victory and proved his point using the chess program.

Using *Mychess's* built-in game set-up option, the playtester was able to reproduce the game board at the time the match was called a draw. He then continued to play the game out to the conclusion he'd imagined, beating the computer. This is a perfect example of how the computer is at once a superb recreational and educational tool. **FC**

HOW TO TAKE AN ACTIVE ROLE

In many games, you won't get very far unless you use your smarts. That's a given with ones such as *Monty Plays Scrabble* (Epyx, Ritam) and *Diplomacy* (Avalon Hill). But some games lend themselves to a little extra effort. Try to take a more active role in a game next time you sit down for an afternoon's play. With some outside work, you'll find the experience can be enriched and elevated to another plane altogether. Here are a few suggestions for some extra snooping to supplement your game-playing:

1. When playing the historical scenario of Electronic Arts' *Seven Cities of Gold*, instead of playing for treasure, use the game as a discovery machine. Explore the continents of North and South America and keep a "journal" and maps of your expedition. Then, compare it to a map of the known world at the turn of the 16th century (use a historical atlas from the library and a good text on the subject) to compare the game's adventures with those of the real explorers and conquerors of the era.

2. In Avalon Hill's *Diplomacy*, set the computer to all-manual play and re-enact World War I according to a book from your library. By using the maps from a W.W.I atlas, you can show how the Germans almost won, and explain why so many mistakes led to such high casualties.

When playing the game, use a brief history of W.W.I to help guide your tactics and strategy and see how the computer players react. If they begin to change their historical tactics, you can adjust yours as well.

3. The *Shattered Alliance* (Strategic Simulations, see review this issue), features a selection of historical and fantasy armies. One player can take on the computer, or two players can face off using their hordes as they see fit. But, if you take the time to

read about the tactics of one or more of the armies included (the forces of Alexander the Great, Imperial Rome, the Mongols, etc. . . .), you can utilize your troops far better than if you just boot up the game and play. The armies are historically accurate, so use your local library to make the game more worthwhile.

4. Many of the best games around re-create or simulate historical scenarios and/or works of literature. Almost any simulation or tactical/strategy game benefits from a few hours' worth of boning up. Here's a list of some games and the books you might track down to enhance your playing. Some may be out of print, although a large library probably will carry them.

For *Rails West!*, Strategic Simulations' re-creation of the race to lay down this country's rail system, refer to Stewart Holbrook's *The Story of American Railroads* (Crown, 1981) or *The Robber Barons*, by Matthew Josephson (Harcourt, Brace, and Jovanovich, 1962).

For *Broadsides* (Strategic Simulations) or *Old Ironsides* (Weekly Reader Family Software), try these: Alexander Kent's series about the adventures of sea captain Richard Bolitho in the Napoleonic Wars (*Sloop of War* [Jove, 1979], *A Tradition of Victory* [Putnam, 1983], etc.) and the Horatio Hornblower series (*Mister Horatio Hornblower*, and *Captain Horatio Hornblower* [Little Brown, 1939]) among others. They'll help re-create a sense of the period's mood, what it was like to live on and steer those immense ships.

Naval Gun, by Ian Hogg and John Batchelor (Blandford Press, 1978) is an outstanding reference that includes color plates and descriptions of warships through the ages. Use this to build authentic ships in *Broadsides*, *Old Ironsides*, or *RAM*,

(Avalon Hill) the last a simulation of classical Roman naval campaigns.

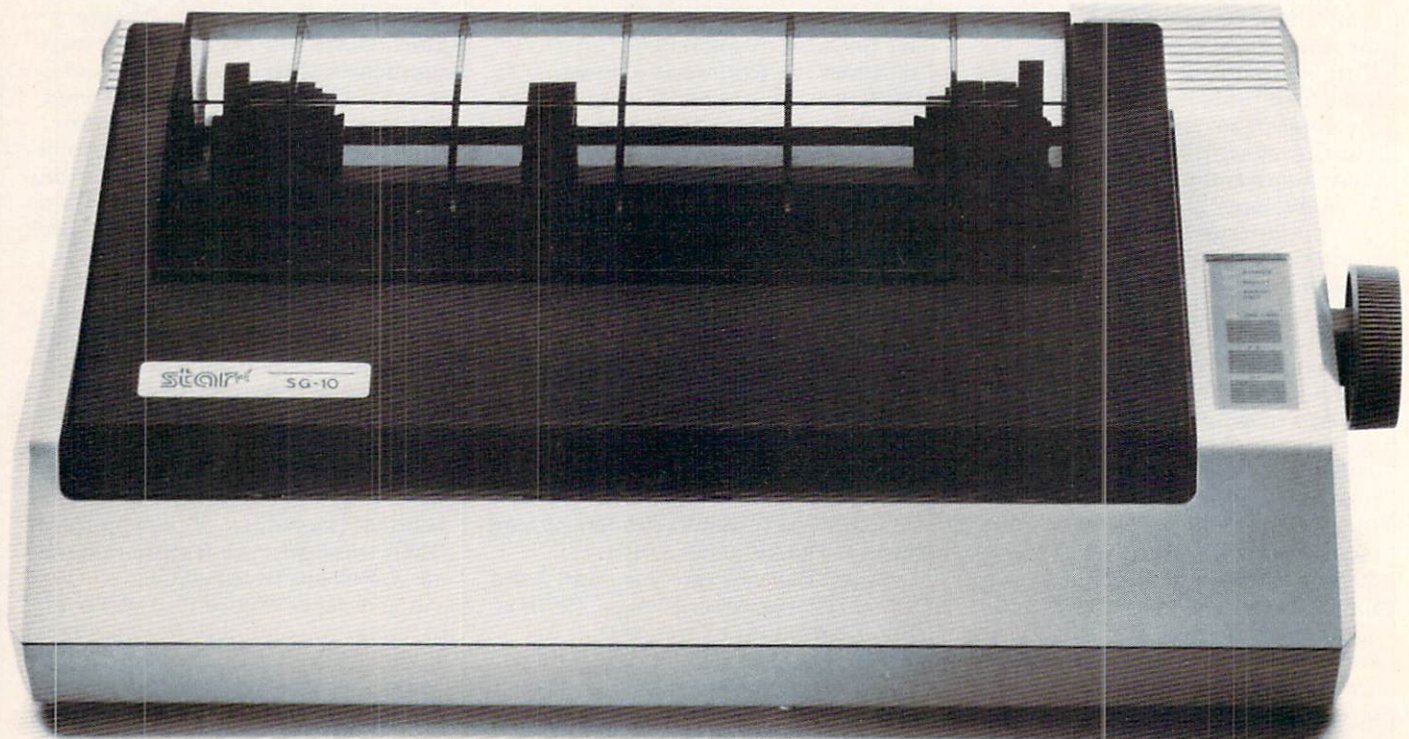
For *The Road to Gettysburg*, Strategic Simulations' game based on the pivotal Civil War encounter, we used *The Killer Angels*, Michael Shaara's Pulitzer-Prize winning fictionalized account of the commanders, tactics, and strategies involved in the confrontation at Gettysburg (McKay, 1974); and the *Military History & Atlas of the Civil War* (Praeger Publishers), which features a map-by-map account of 40 battles in the Civil War. Bruce Catton's acclaimed histories are also recommended for an overall feel for the period: his Pulitzer-Prize-winning *A Stillness at Appomattox* (Doubleday, 1953), *Gettysburg: The Final Fury* (Doubleday, 1974), and *Reflections on the Civil War* (Doubleday, 1981).

Strategic Simulations' *President Elect* allows you to create your own candidates with their own sets of characteristics. Almost any general American history book would provide you with information to supplement a campaign between say, Abraham Lincoln and Thomas Jefferson. Theodore White's *America in Search of Itself: The Making of the President, 1956-1980* (Harper and Row, 1982) furnishes some interesting insights into recent races. Or, try any one of the many biographies that have been written on the presidents—Gore Vidal's *Lincoln* (Random House, 1984), for instance.

Or, refer to your newspaper's editorial pages and accounts of various political campaigns or personalities. Often these sources feature material for you to use in the game.

A general reference that will come in handy in conjunction with almost any map-based strategy game is *The Times Atlas of World History*, edited by Geoffrey Barraclough (Hammond Inc., 1979).

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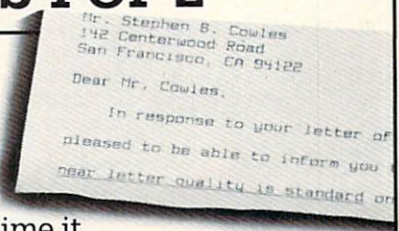
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COMPUTING CLINIC

BY JEFFREY BAIRSTOW

Can you recommend a source of information about VIC-20 multi-color custom characters?

YEE CHANG LEE

Yonkers, New York

Yes. *The VIC-20 User Guide*, written by John Heilborn and Ran Talbott (Osborne/McGraw Hill, \$15.95), has a whole section on custom characters. It's part of the chapter on graphics. Another book on graphics for the VIC-20 is *Animation, Games & Sound for the VIC-20*, by Toni Fabbri (Prentice-Hall; \$14.95 in paperback, \$29.95 with a disk containing the programs mentioned in the book).

Do you know of a club for Commodore 64 users?

LANCE BERRY

Arab, Alabama

The biggest Commodore users' group, or at least the one everyone calls the biggest, is the Toronto PET Users Group. The group publishes the *TPUG Magazine* for its members. The membership fee is \$35 U.S. Write or call: 1912A Avenue Road, Suite 1, Toronto, Ontario M5M 4A1; (416) 782-1861.

To find a group in your area, contact Pete Baczor, a users' group coordinator at Commodore: 1200 Wilson Drive, West Chester, PA 19380; (213) 431-9100.

Where can I obtain software on real estate financial management for the Apple IIc?

CARL KENEPASKE

Kansas City, Missouri

There are many real estate programs on the market. I suggest you investigate the *Real Estate Analyzer*, from Howardsoft, which includes income, property and tax calculations. It costs \$295 for the IBM PC, PCjr, and PCXT, and \$250 for the Apple II series. The package should be available either by mail order or at a local Apple dealer. Howardsoft's address is: 8008 Girard Ave., La Jolla, CA 92037.

If you have *VisiCalc*, take a look at *The Power of VisiCalc Real Estate*, by Patricia Hughes and Kaz Ochi (Prentice-Hall, \$14.95). It contains *VisiCalc* templates for a wide range of real estate financial analyses. →

Davidson Products are available at the following dealers:

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Flagstaff, The Computer Room
Phoenix, Resources for the Gifted
Sierra Vista, Eclectic Computers
Yuma, Data IV Computer Store

California

El Cerrito, Software Solutions
Goleta, Personal Electronics
Huntington Beach, Egghead Software
Lawndale, Egghead Software
Los Altos, EISI
Los Angeles, I-M.E.D.
Modesto, ComputerWare, Inc.
Northridge, The Learning Lab
Pleasanton, Keys for Learning
San Diego, Computerland, Egghead Software
Seal Beach, Tools That Teach
Sun Valley, Comsoft
Torrance, Children's Books and Software
Vallejo, The Cat
Westminster, Computer Wave

Colorado

Denver, Colborns School Supplies

Connecticut

Avon, Computer Ease
East Hartford, Computer Ease

Delaware

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West Palm Beach, Discount Software of America

Georgia

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Idaho

Lewiston, B and I Computer Store

Illinois

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Niles, Software Centre Intl.
Winnetka, The Software Tree

Indiana

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Wichita, Learning Arts, Wichita Software

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Paducah, Computer Source, Inc.

Louisiana

Baton Rouge, The Computer Place
Metairie, Computer Shoppe

Maryland

Baltimore, The Educational Software Co.
Waldorf, Waldorf Computers

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New Mexico

Alamogordo, Computer World
Albuquerque, Computer Circle
Ruidoso, Computerworld

North Carolina

Pineville, Computer-South
Rocky Mountain, Computer Displays

Ohio

Akron, Basic Computer
Columbus, The Book Source

Oklahoma

Oklahoma City, Myriad Computer
Muskogee, The Computer Place

Oregon

Beaverton, Egghead Software
Bend, The Learning Store
Grants Pass, Discovery Software Sales

Pennsylvania

Bloomsburg, Computer Clinic
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Greensburg, The Program Store
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Tennessee

Bristol, Grace Microvisuals
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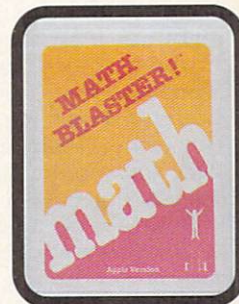


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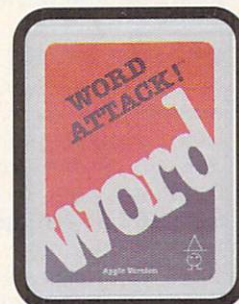


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COMPUTING CLINIC

When I bought my Commodore Plus/4, I was told that I could use any Commodore 64 software and peripherals. Now your Plus/4 preview (November 1984) claims I can't do so. Who is right?

JOSEPH W. NOLAN
Oregon City, Oregon

Sorry to say so, but we are. The Commodore Plus/4 will not run C 64 software, except for very simple BASIC programs that don't use sound or graphics. Commodore seems to have admitted this oversight was a mistake, as it recently introduced the Commodore 128, which can run C 64 software (see *New Hardware Announcements*, in this issue). Right now, there is very little software for the Plus/4 except for the four built-in programs.

However, most of the C 64 peripherals will work with the Plus/4. This means you can use the Commodore disk drive (1541), monitor (1702), joysticks, and printers.

READER INPUT

In the Computing Clinic of the November 1984 issue, Sarah Jones asked a question about the use of I, J, K, . . . in FOR statements. Mr. Bairstow's answer was correct and explicit, but perhaps Sarah wanted to know not *how* a variable name could be chosen—but *why* I, J, and K were so commonly used.

Historically, variable names in FORTRAN (one of the oldest high-level computer languages) beginning with I, J, K, . . . N were, by default, integers. Those beginning with the rest of the alphabet were not restricted to integers. This convention has affected many programmers' styles, by influencing them to use I . . . N as variables when an integer is required, such as for counters in FOR statements.

The designers of FORTRAN established this convention in an attempt to suit the language to the needs of the computer users of the day, when most programming was used to solve mathematical equations. Mathematics has long-established conventions regarding the meaning of various symbols, including the use of i, j, k, l, m, and n to represent integer values.

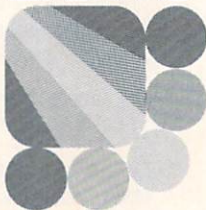
I hope you print this letter so that Sarah Jones can stop wondering what is so special about I, J, and K.

DAVID J. CAMP
St. Louis, Missouri

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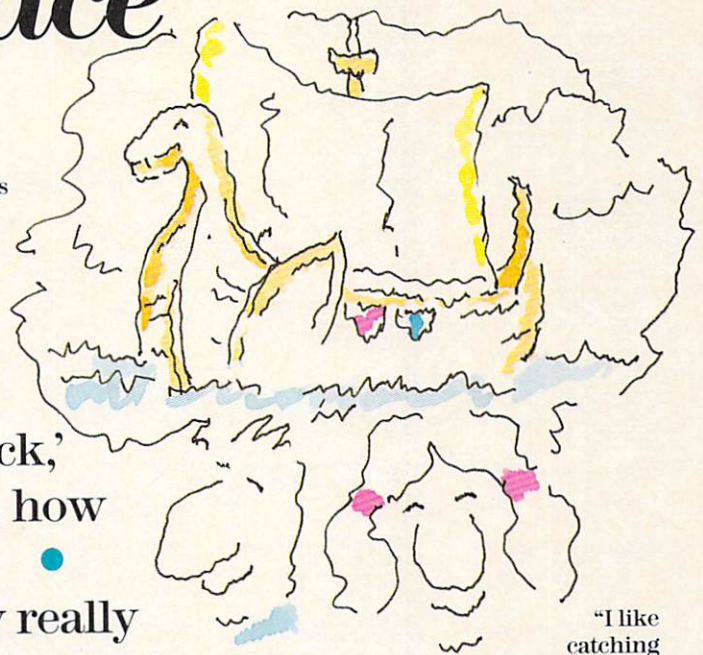
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These games are different. They really take you to the land of Narnia. I've read the books by C.S. Lewis (you get one free with each game), but these games make it really come alive! ● In *DawnTreader*, for example, I get to captain a ship through uncharted waters, navigating around cyclones and sea serpents. Then I land on magical islands and chase dufflepuds! ● Sure, this voyage is loaded with action. But it's an interface™ game, so I use cards and dice in subadventures. I even let my sister play with me. Sometimes. ● I've got nothing but nice things to say about *Narnia* and *DawnTreader*. So I recommend you take your own trip to Narnia—soon. It's the best place I've ever been!"

Tom Nice

11 year-old son of Bill and Janet Nice, happy purchasers of Adventures in Narnia interface games.

Narnia and *DawnTreader* are available at computer specialty stores and all fine bookstores, and they're compatible with Apple II Series® and Commodore 64™ home computers.



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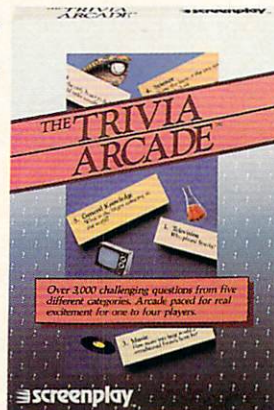
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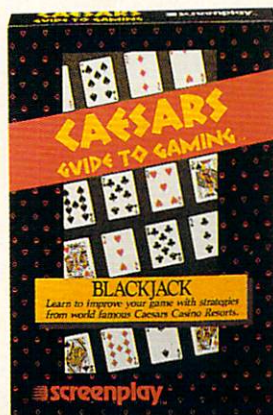


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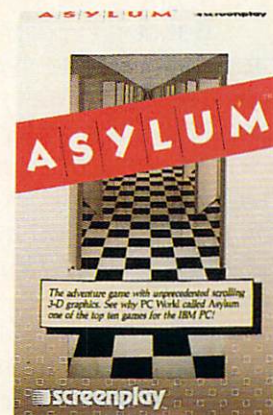
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Available on diskette for Atari, Commodore 64, Macintosh and IBM PC.



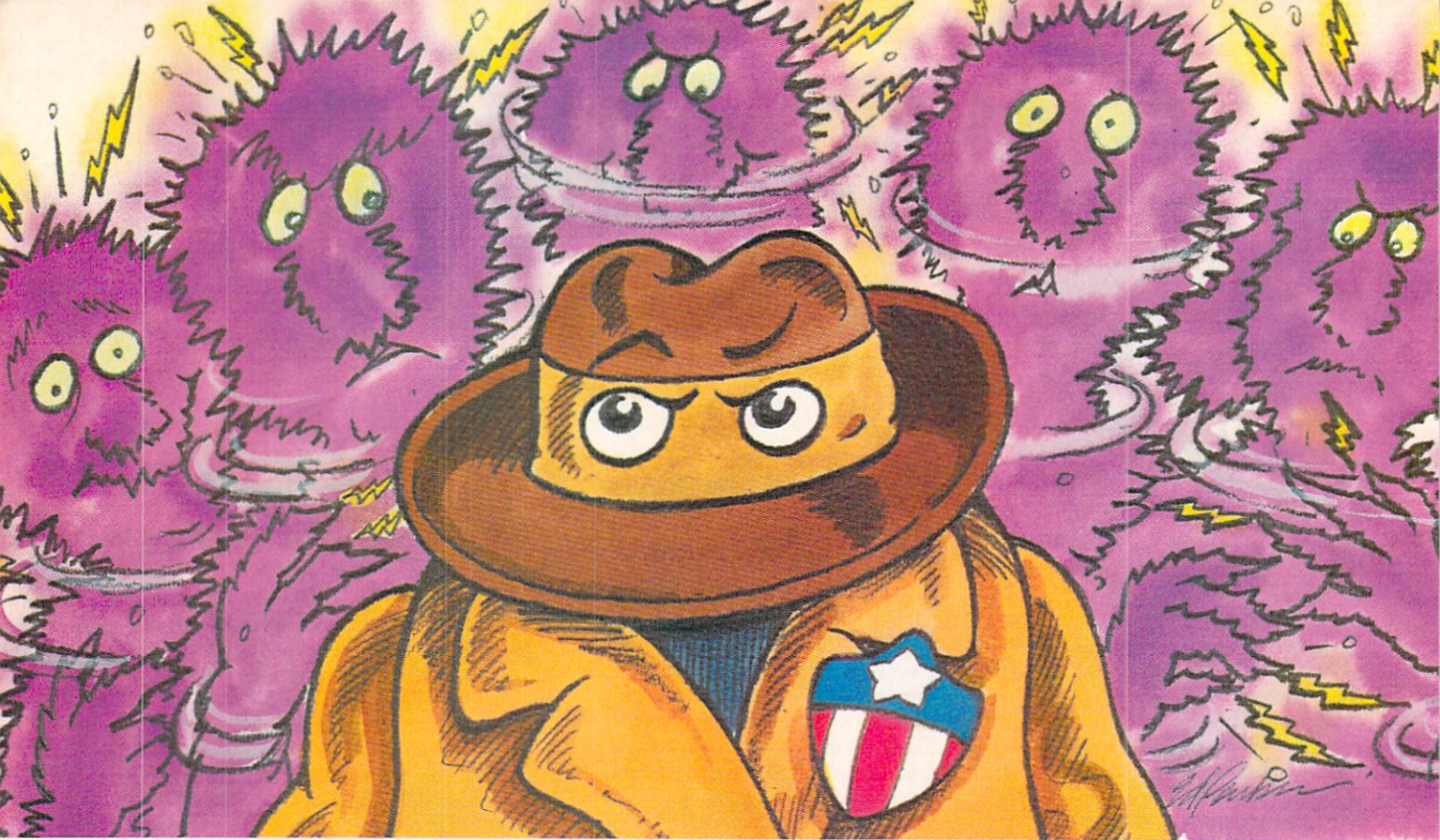
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Help Agent U.S.A. stop the fuzz plague. And you can win a trip to Washington, D.C.

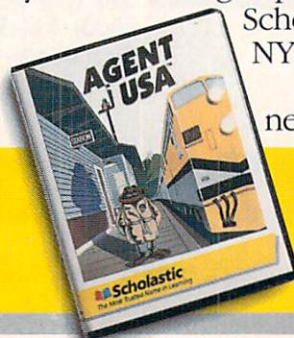
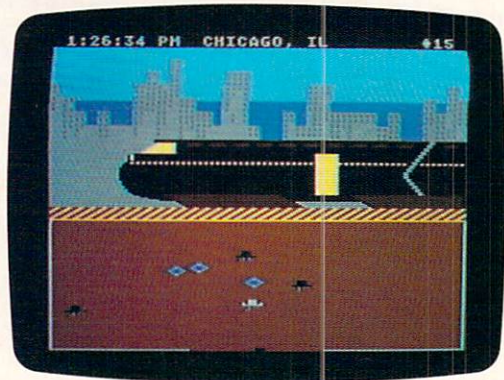
The FuzzBomb is turning millions of men, women and children into mindless fuzzbodies. And Agent U.S.A. can't stop the devious plague spreader without your help.

But don't accept the assignment unless you're really prepared to stretch your mind. Because sharp eyes and quick reflexes aren't enough to stop the fuzz plague. You'll have to outthink and outplan the FuzzBomb as you pursue him around the country in super-fast rocket trains. And you'll have to remember state capitals, learn the time zones and figure out the quickest routes across the nation. If you don't, the fuzzbodies will turn you into one of them.

Become one of the few super-agents to defeat the FuzzBomb and you may win a trip to intelligence headquarters in Washington, D.C. What's more, even if you never catch the evil one, tell us what you like about the game and you can become an instant winner of an Agent U.S.A. knapsack (see package for contest details).

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Do it before the fuzz plague comes to your neighborhood!



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Skill-Building Software at Home: Getting Back to the Basics

**FAMILY
COMPUTING**



PHOTOGRAPH BY JOEL WHITE

FIRST IN A FOUR-PART SERIES ON SOFTWARE
TO HELP YOUR CHILD MASTER THE THREE R_s

BY MINDY PANTIEL AND BECKY PETERSEN

Many families purchase a computer with their child's education in mind. But when it actually comes to putting the computer to use, they're often stymied. First, they must define what is effective educational computing. Finding the "right" software is the key to the process. Some programs take a "fun-learning" approach toward the teaching of skills and concepts. Others are more formal, rigorous programs dedicated to the acquisition and reinforcement of basic skills. It is this category of software, devoted to formal basic skill-building, to which this and the next three Home-School Connection articles are devoted.

Here, FAMILY COMPUTING contributing editors Becky Petersen and

SKILL-BUILDING SOFTWARE REINFORCES NEWLY-LEARNED MATERIAL.

Mindy Pantiel present ways to use software to work on the three "Rs." In addition to establishing some guidelines for a home-study program, they tapped classroom teachers and computer-curriculum specialists to uncover several software packages found to be most effective in reading-, writing-, and arithmetic-skill development. Finally, they provide a "report card" for you to use in tracking down software.

Greg Vigil, age 9, likes to learn. He's an inquisitive, motivated fourth-grader whose Dad, Lyle, takes an active part in making sure he stays interested. Lyle tries to foster a positive learning environment at home, and he's always on hand to help out with homework when the going gets rough.

A year and a half ago, looking for ways to further enhance his son's learning at home, Lyle enlisted one of the family's two computers—an IBM PCjr. He met with Greg's teachers to establish the goals and objectives for his son's grade level, and then set out on a search for software.

With the help of some of Greg's teachers, Lyle tracked down a number of programs to augment his son's schoolwork. "I was surprised and pleased to find several educational software packages that Greg could use with little or no assistance," he reports. His educational-software library is primarily composed of simulations and skill-building programs.

EDUCATIONAL SOFTWARE SIFTING

The search took some sifting: Educational software is a vast category that encompasses a variety of programs with a host of learning objectives, and an even broader range of methods for reaching those goals.

Simulations encourage exploration by authentically re-creating situations such as flying an airplane (see *Home-School Connection in the March* FAMILY COMPUTING). There are arcade-style games that call upon math or reading skills to help players voyage through caverns or shoot down oncoming aliens. Other challenges focus on strengthening abilities such as logical thinking and problem-solving. Activities such as painting, music, and designing invite kids to experiment and introduce wholly new applications of the computer.

And then there's skill-building software: drill-and-practice programs and tutorials that stress the basics. These rely not on flashy

graphics or an elaborate story line, but on a serious approach towards teaching and reinforcing skills essential for success in school and in the world at large.

For students like Greg, skill-building software offers a perfect way to reinforce newly learned material. For those in need of remedial help, "using computers for basic skill work may be the only way left for some children to learn a concept they've been unable to learn before," reports Ann Dana, microcomputer consultant in Hinsdale, Illinois.

WHAT'S DRILL-AND-PRACTICE?

The spelling lists and worksheets, a part of all of our school days, have a computerized counterpart in drill-and-practice programs. Based on the premise that "practice makes perfect," drill-and-practice programs strengthen students' math, spelling, reading, and language skills through repetition.

The computer presents questions or problems—sentences with words missing, or equations that must be solved—and children type in correct answers from a multitude of possible choices.

Usually, correct answers result in a reward—an upbeat tune, a hopping frog, progress toward a tougher level. If the question is answered incorrectly, the child sometimes gets another try, or alternatively, is presented with the proper answer, which in the best of circumstances does not make the user feel ashamed.

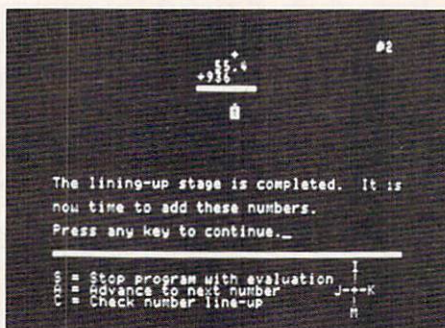
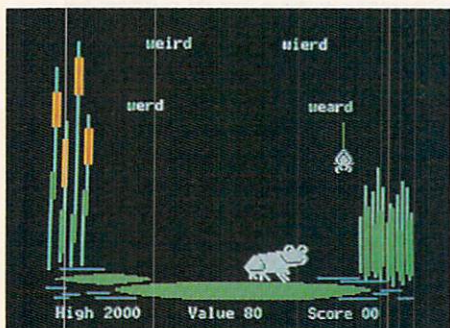
Take *Math Blaster* (Davidson & Associates), a program that Greg Vigil found useful and enjoyable. Available for Apple, Commodore, and IBM computers, the package builds math skills by helping the child memorize essential math facts, and improve accuracy and speed.

Children or parents first select a subject and one of five difficulty levels. At each of these levels, kids may perform one of four activities, including an arcade-type game. Within each level, the child progresses as he or she masters skills introduced earlier.

Math Blaster is a good value for a number of reasons: Like all good drill-and-practice programs, it randomizes the problems presented to the child. No chance of your young user remembering the answers by the sequence in which they're presented—problems appear in a different order each time.

Once you've exhausted the prepared sets of

Skill-building software takes a variety of different approaches to teaching the basics: from left to right—Davidson & Associates' Spell It includes an arcade-type game to drill newly learned words. CBS' Success with Math series helps students learn to solve problems step by step. American Educational Computing's Spelling series uses visual memory to reinforce spelling skills.



problems, you can add your own. The programs let parents (or teachers) tailor the problems specifically to areas that children may be stumbling through—a feature that improves the mileage of any drill-and-practice program.

TUTORIAL PROGRAMS

Tutorials are another form of skill-building software. Use them to help your child learn a new subject or review a topic he or she is having trouble with at school. They start out by introducing basic concepts and information and follow up with questions, usually of a multiple-choice nature, on the material.

As the student advances through the tutorial, a good program will automatically add to the body of information presented. Take the *Analogies Tutorial* (Hartley Courseware), a package that introduces 10 types of comparisons. After each is introduced, it is followed by practice problems that use various examples of the different analogies. Practice sets prepare kids to use their knowledge of analogies with more difficult vocabularies.

More complex tutorials match your children's progress, or lack of it, by sending them back to previously learned sections of the tutorial if a problem arises at any stage. Once children master a problem area, the program returns them to their place in the tutorial, where they can continue the lesson.

A good tutorial is tough to find. They must be tremendously powerful to deal with the various problems that a user might encounter with the material. In future issues we'll cover some that you might consider.

INVOLVED PARENTS

Lyle Vigil typifies the parents who refuse to take a back seat in their child's education. Ever since the U.S. Department of Education-sponsored National Commission on Excellence in Education presented its 1983 findings published in a now famous report, *A Nation at Risk: The Imperative for Educational Reform*, parents have voiced increasing concern over whether their children are being adequately prepared in reading, writing, and arithmetic essentials.

Here are just a few of the report's findings:

- 13 percent of all 17-year-olds are functionally illiterate.
- Between 1962 and 1980, average verbal Scholastic Aptitude Test scores declined more than 50 points. Math scores went down 36 points.
- Almost 40 percent of today's 17-year-olds can't draw inferences from written material.
- Only a third can solve a math problem involving several steps.

To reverse this decline, educational specialists and policy-makers recommend that more time be spent on the basics. This is where parents like Lyle, allied with home computers, really can make a difference.

STEPS TO FOLLOW

Here are a few steps to follow when enlisting the aid of the family computer and software to build basic skills at home.

1. Talk to your child's teachers. Find out:
 - Which subject areas your child needs to work on. For children in higher grades, speak to the instructors for each subject.
 - Which skills need to be worked on within each subject area.
 - Whether or not the at-home work will be remedial or reinforcing.
 - If any specific skill-building software packages are being used at school, and whether or not they'd be appropriate for home use.
2. Talk to your child. Make sure he or she is eager, or at least willing, to use the computer to help reinforce or catch up in the necessary skills.
3. Select a package or packages using the guidelines in the accompanying box. If possible, "test-drive" the package with your child before you purchase.
4. Go through the package yourself before you introduce it to your child. Think about how to apply the program. Do you want to take it skill level by skill level? Or should you set a time limit? Getting to know the program before you give it to your child will give you a better idea of what frustrations and accomplishments you can expect.
5. Although you shouldn't have to hover over your child when she or he uses the program, it's a good idea to be on hand to help through tough parts, should a problem arise.
6. Don't push it. You don't want your child viewing the computer the way piano lessons made so many of us view the piano. And be sure to have other types of software available for relaxation and pleasure.
7. Get involved. No matter how good the software is, it's not a substitute or a surrogate for parent or teacher attention. Try to gauge how big a role you should play. Don't hover, but remember children who fall behind need reinforcement. Children who prosper through school are probably doing so because, somewhere along the line, they got a lot of positive, *human* feedback.

—JOHN WALLACE

DRILL-AND-PRACTICE PROGRAMS AND TUTORIALS STRESS THE BASICS.

NEW IMPERATIVES, NEW CHALLENGES

There's nothing new about moms and dads lending a helping hand with homework. But the arrival of the computer on the home front presents some new challenges for concerned parents. To use the computer effectively, parents must join forces with teachers to determine the best course of home study.

Contributing Editors BECKY PETERSEN and MINDY PANTIEL, of Boulder, Colorado have written extensively about computers, kids, and learning. Their last series in FAMILY COMPUTING was a six-part introduction to Logo.

SKILL-BUILDING SOFTWARE IS JUDGMENT-FREE.

WHAT TO LOOK FOR

When selecting skill-building software, keep the following points in mind.

1. The more help furnished in the documentation, the better. Look for suggestions for applications and use. Word or problem lists help you see the kinds of tasks your child will be encountering in the program.
2. Just as every teacher has his or her own teaching method, various programs use different approaches to learning. In upcoming articles we'll be alerting you to different approaches to teaching math, spelling, grammar, etc. Be aware of these differences when selecting software to best complement your child's schoolwork.
3. Look for programs that can be used for short stretches at a time. The more flexibility a program allows, the greater the chances of your fitting it into your child's busy schedule.
4. Too much waiting time between questions or lessons can distract the user. For a child who may need some encouragement to sit down and use a program to begin with, excessive waiting may just hurt the cause.
5. Beware of programs that employ excessive "bells and whistles" in response to questions answered incorrectly. Kids like to "see what happens" if they give wrong answers. Such distractions will cut into the effectiveness of time spent with skill-building software.
6. Programs that randomize questions, so that problems occur in a different order each time you use them, tend to be more useful and of longer lasting value than those that don't. Beware, however, of programs that present alternate choices as possible correct answers in randomized fashion since they can inhibit the user from distinguishing between close, but incorrect alternatives.

7. Some programs tally up your score and report it at the end of a lesson or quiz. This helpful feature lets you see your progress. Occasionally, programs provide some direction as to areas you need to work on, based on your performance.

8. The option to add your own problems and lists greatly increases the value of a program. You can actually tailor the program to fit your child's homework lessons. —J.W.

For skill-building software to be effective, parents must get involved. Tutorials and drill-and-practice programs don't substitute for homework. They're not surrogate teachers. Many parents will find it takes a bit of coaxing to get their children out of the entertaining

dungeons of *Wizardry* and onto the math tables.

The Vigil software library provides Greg with a number of distracting alternatives. Lyle finds that he must gently encourage use of drill-and-practice programs. But he's careful not to impose too much.

Don't expect your children to spend any more time practicing a skill with a computer than you would want to spend drilling them yourself. "Children should never practice more than 30 minutes, and up to third grade, 20 minutes is plenty," suggests Ann Dana. "We don't want children to be bored or to think of computer work as drudgery."

THE BENEFITS OF USING THE COMPUTER

By its very nature, basic skill work can be drudgery. As anyone knows who has ever tried to help a frustrated child learn the multiplication tables, it's not an easy task. The computer can diminish the tedium. When kids work with drill-and-practice and tutorial software, they can see the results immediately. No more waiting around until the teacher grades the work.

Skill-building software also is judgement-free. As Dana reports, "A [good] prepared piece of software gives instant gratification and has absolutely no tone of voice."


Moreover, good software will help give parents some direction and structure for helping kids with their school performance. It's a vehicle that parent and child can use together to either supplement what is being taught or provide remedial help.

Good tutorials and drill-and-practice programs provide plenty of documentation or instructions to give you an idea of how best to apply a program. Davidson & Associates, for instance, includes word lists and clear examples of the problems presented with its documentation, so you can be sure you know which areas each program covers.

WHAT ABOUT GRADES?

Does skill-building software improve your children's grades? The jury's still out on that one. Skill-building software is not a panacea. Certainly, it takes commitment and time on your part as a parent and use does not insure effortless entry into the Ivy League.

What we do know is that time spent practicing in a subject plays a big part in learning. We also know that you can't separate children's performances in school from their level of self-esteem, confidence, and preparedness in other subject areas—factors that many educators are convinced the computer augments.

"If children have trouble in school, they take pride in having practiced on the computer at home," notes Dianne Hyer, computer curriculum coordinator in Los Alamos, New Mexico. "They're anxious to show the teacher the results [of their extra efforts]. And, if the attitude improves, so does the child." 

In the Next Three Issues:

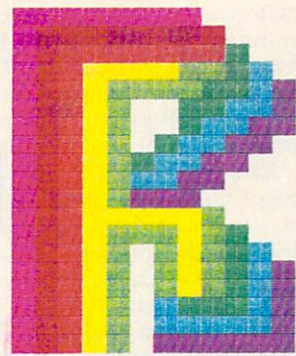
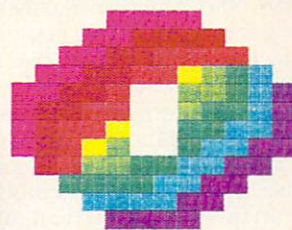
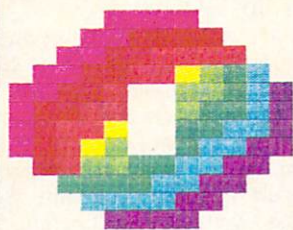
Look for our coverage of skill-building software in the *Home-School Connection*;

MAY: *Software for Reading Skills*

JUNE: *Software for Writing Skills*

JULY: *Software for Math Skills*

BUYER'S GUIDE TO



PRINTERS

ARE YOU IN THE MARKET FOR A PRINTER? LOOK AT THIS PANORAMA AND THINK IT OVER!

BY JOE GELMAN

It's time to put some color into your printouts! Now you can take those amazing color-graphic images from your computer's screen and transfer them to a sheet of paper. And, you can dress up your letters and reports with the colors of the rainbow. Quality color printers finally are available at an affordable price for many personal computer owners. A year ago, you had to pay more than \$2,000 to get a color printer with any versatility. Now, you can find color printers priced from about \$200 on up. We'll look at the price/performance leaders, and outline the pros and cons of the different technologies they use.

A printer's price, speed, print quality, and graphics capability were once the main criteria used to make a buying decision. Does the new wrinkle of color capability confuse the picture? In the case of Epson's JX-80 and C. Itoh's 8510SCP, color simply is an added feature that makes those dot-matrix printers more powerful. When you're not using color, they perform just like their "monochrome" cousins, the popular Epson FX-80 and C. Itoh 8510 (aka Prowriter). In evaluating some other color printers, however, you should realize that you may be trading speed and quality of text output for color.

Also, the proper software is an important component of color printing. You shouldn't automatically assume that a color printer will print out in color anything you see or produce on the computer screen. Normal "graphics-dump" software will not handle the special requirements of the color printer. While some printers listed in the chart come with free software for printing graphics (such as the Okimate), others do not (such as the Epson). As color printers become popular, more software supporting them will appear. Already, the Apple Scribe is supported by a number of packages, including Broderbund's *Dazzle Draw* (see review in this issue), Koala's *KoalaPainter* and *Graphics Exhibitor*, and Scholastic's *Story Maker*. C. Itoh Digital Products has a program for the IBM PC and PCjr, *PC Itoh Utilities* (\$55), that lets its 8510SCP print graphic screens from many programs (including *Lotus 1-2-3* and *IBM Graphing Assistant*). Legend Products markets a similar program that works with *Lotus 1-2-3* and *Symphony*. Before deciding on a particular color printer, make sure the software you'll want and need is available for it.

There are a variety of color-printing technologies in use. Impact dot-matrix, thermal transfer, ink jet, and pen plotters are the more popular methods. Pen plotters, which are designed primarily for printing business charts and

graphs, will be considered in a future Buyer's Guide. For general home use, we think dot-matrix and thermal transfer color printers offer the best price/performance ratio.

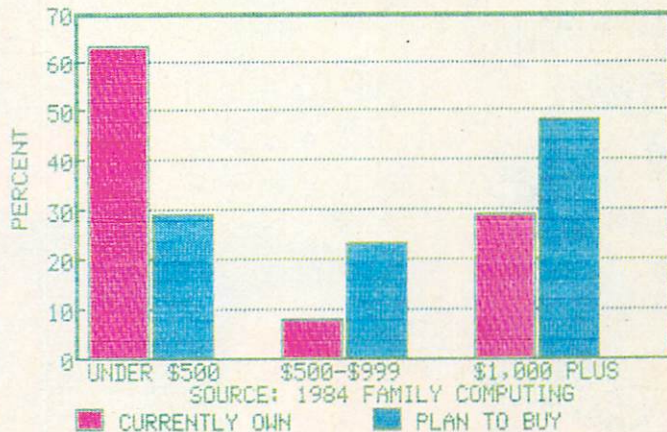
IMPACT DOT-MATRIX

Impact dot-matrix printers work by striking small pins against a ribbon, transferring ink to the paper. In our survey, this type is represented by the Epson, C. Itoh, Legend, Transtar, and Axiom printers. (The Transtar and Axiom use an unusual "four-hammer" system, not pins, to strike the ribbon.) Printing in black, all these models perform as standard dot-matrix printers. But, unleash the color capability, and they really shine.

Color ribbons contain stripes of the three primary colors: yellow, magenta (red), and cyan (blue). On impact dot-matrix printers, the colors on the ribbon alternate, as on suspenders, one alongside the other. Operating on the same principle as typewriters with two-color ribbons, the ribbon cartridge is lifted up and down, so that the correct color is positioned over the printhead. Printing in one of the three primary colors is easy: the printer simply moves the selected color into position and prints. Obtaining the other colors is a little trickier. To produce violet, orange, green, or black, the printer automatically mixes the colors by overstriking.

Using printer-control codes, you can command the printer to produce the seven basic colors. For additional

CONSUMERS ARE UPGRADING THEIR COMPUTERS



The chart above was created with *IBM Graphing Assistant* software, on the *IBM PCjr*. It was printed on the *C. Itoh 8510SCP*, using the *PC Itoh Utilities* package.

JOE GELMAN is a contributing technical editor for *FAMILY COMPUTING*. He wrote a custom program to design the "Color" headline above; it was printed out on the *Epson JX-80*.

CHART BY JOE GELMAN

colors and special "textured" effects, additional programming or special software is needed. The number of possible colors is virtually limitless, and depends mostly on the programmer's imagination. For instance, you could strike the red ribbon 10 times and the yellow ribbon five times, or use any such combination to create new colors.

The Epson and C. Itoh color printers are alike in most respects. They're both fast, have graphics capability (that is, they can print images as well as text), and produce high-quality output. Because the Epson color ribbon has three colors plus a black strip, the JX-80 can do fast printing of text with color highlighting. Unfortunately, the C. Itoh ribbon is designed without a black strip. Black is produced by overstriking three times, once with each color. If you're printing graphic images or business charts, this isn't a major drawback. But, if you want to print text in black and add color just for highlights, it's a slow process. Of course, text with no color is produced briskly (180 characters per second) by using a black ribbon.

THERMAL TRANSFER

Okidata's Okimate series and Apple's Scribe printer use a print method called thermal transfer (see *Dr. Cursor's Clinic*, in the January 1985 issue, page 103). Not to be confused with standard thermal printers, thermal-transfer printers actually "melt" a waxy ink onto the paper. They are less expensive (less than \$300) and quieter during operation than the impact dot-matrix types. Best results are usually obtained by using a smooth-surfaced paper, such as Hammermill Thermal Transfer, but regular paper works fine. The coarser the paper (such as heavy bond), the less impressive the results.

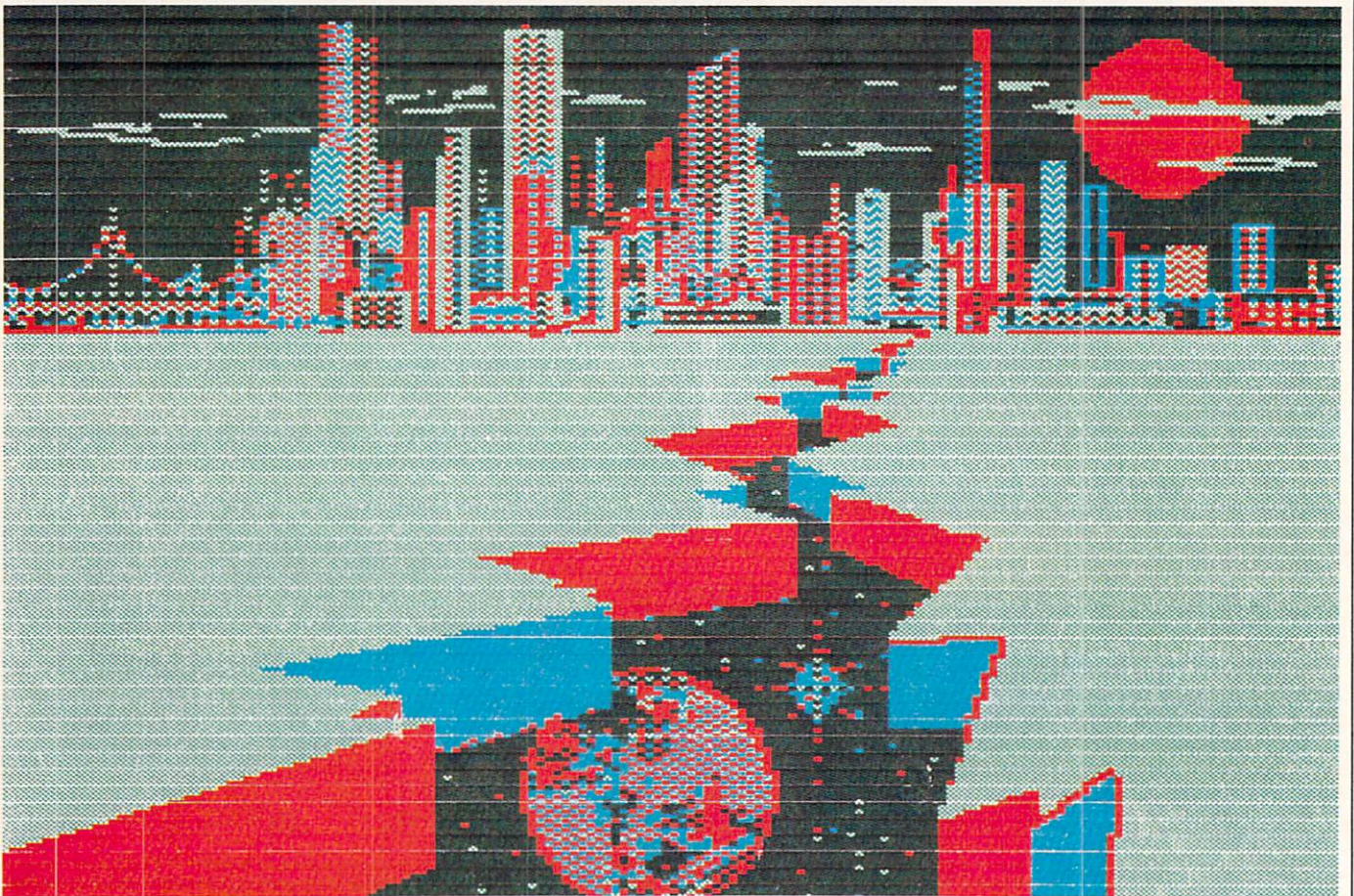
There are, of course, drawbacks to these affordable thermal-transfer printers. They are slow (it takes about 20

minutes to print a full-page graphic image), and the ribbons can be used only once. The black ribbons produce between 40 and 50 pages of text, and the three-color ribbons are good for about seven to 12 pages of color.

Unlike the Epson and C. Itoh ribbons, these thermal-transfer ribbons are single-band, with 8-inch segments of the three primary colors. Thus, for each line of color print-out, 24 inches of ribbon are used, no matter what's printed on the line. Printing a document or picture in color will cost you about 60 cents a page. So, you should balance the initial cost savings of a thermal printer against the future costs of buying new ribbons (about \$7).

The Okimate 10 is available for Atari and Commodore 64 computers (and prints all 16 colors those computers can produce), and the Okimate 20 is designed for the IBM PC and PCjr. The Plug 'N' Print package sold with the printer includes the interface to the computer and graphics software that allows you to dump screen images. You can, for instance, print a Koala drawing with this software. (See "The Crack" drawing on this page.) Apple's Scribe is sold with a cable for the Apple II series computers (a serial interface card is needed for all but the IIc). While it doesn't come with software, a number of commercial software packages are designed to work with the Scribe. In addition, the Print-it! interface card for the Apple IIe will print anything on the screen at any time. (Print-it! costs \$149 to \$199, depending on options, and is available from Texprint: [617] 449-5808.) It will work with the Scribe, the Epson, and a host of other printers, color and monochrome.

Text output from the Scribe is of a slightly higher quality than the Okimate 10, and is very close to letter-quality. Both printers are slow, however, and should not be considered if your primary intent is to print straight text in



"The Crack," by William Kokoni, was drawn with Koala's *Micro Illustrator* software on the Atari 800, and printed on Okidata's Okimate 10.

GUIDE TO COLOR PRINTERS

PRINTER:	JX-80	8510 SCP	LEGEND CP VII
MANUFACTURER:	EPSON INC.	C. ITOH INC.	LEGEND PERIPHERAL PRODUCTS
PHONE NUMBER:	(800) 421-5426	(213) 306-6700	(800) 321-4484
TYPE:	IMPACT DOT-MATRIX	IMPACT DOT-MATRIX	IMPACT DOT-MATRIX
LIST PRICE:	\$799	\$895	\$1,195
SPEED (TEXT):	160 CPS	180 CPS	180 CPS
RIBBON COST:	COLOR \$16	COLOR \$10/BLACK \$7	\$8.95 for each color ink pad
COMPATABILITY:	PARALLEL/SERIAL (optional)	PARALLEL/SERIAL (optional)	PARALLEL/SERIAL (optional)
NOTE CODE:		7	1
PRINTER:	TRANSTAR 315	OKIMATE-10	OKIMATE-20
MANUFACTURER:	VIVITAR	OKIDATA INC.	OKIDATA INC.
PHONE NUMBER:	(206) 454-9250	(609) 235-2600	(609) 235-2600
TYPE:	IMPACT DOT-MATRIX	THERMAL TRANSFER	THERMAL TRANSFER
LIST PRICE:	\$499	\$169+\$59 PLUG 'N PRINT KIT	\$169+\$99 PLUG 'N PRINT KIT
SPEED (TEXT):	50 CPS	60 CPS	80 CPS
RIBBON COST:	COLOR \$19.95	COLOR \$6.69/BLACK \$5.95	COLOR \$6.69/BLACK \$5.95
COMPATABILITY:	PARALLEL/SERIAL (optional)	ATARI, VIC-20, C 64, SX 64	IBM PC/PCjr
NOTE CODE:	4, 6	1, 2, 3, 6	1, 2, 3, 6
PRINTER:	SCRIBE	GP-700AT	CGP-220
MANUFACTURER:	APPLE INC.	AXIOM CORP.	RADIO SHACK
PHONE NUMBER:	(206) 454-9250	(609) 235-2600	(609) 235-2600
TYPE:	THERMAL TRANSFER	IMPACT DOT-MATRIX	INK JET
LIST PRICE:	\$299	\$599	\$399
SPEED (TEXT):	80 CPS	50 CPS	37 CPS
RIBBON COST:	COLOR \$5.99/BLACK \$4.99	COLOR \$19.95	COLOR \$14.95/BLACK \$9.95
COMPATABILITY:	APPLE II SERIES W/SERIAL	ATARI	PARALLEL/COCO SERIAL
NOTE CODE:	3, 6	1, 2, 3, 5, 6	1

NOTE CODE KEY: 1-Includes color graphics software.

2-Includes computer-to-printer interface.

3-Includes printer cable.

4-Apple "PICS" card option (\$119.95), will print any screen image.

5-Apple II series and IBM compatible versions marketed by Hattori Corp. [(213) 603-9550]

6-Actual printing speed will be lower (Unidirectional operation).

7-PC ITOH UTILITY package (\$55 for IBM PC/PCjr) from C. ITOH DIGITAL [(800) 348-1984]

The chart above was created with Synapse's *SynCalc* spreadsheet on an Atari 800XL, and printed on the Epson JX-80.

any kind of volume. They print in only one direction, unlike the typical bidirectional dot-matrix printers. In fact, in our tests both printers performed at less than *half* the speed indicated by the manufacturers' specifications.

PLOTTING A COURSE

Ink jet is a print method of "spraying" ink in a controlled pattern onto paper. The Radio Shack CGP-220 color graphics printer (the price of which has just been cut from \$699 to \$399), uses this method. It's an interesting alternative to the impact and thermal methods. Ink-jet technology combines the quality of dot-matrix output with the quiet operation of thermal transfer.

A plotter draws with a pen, or pens, directly on the paper. Best suited to producing graphs and charts, plotter output is generally sharper than impact or thermal transfer. The new Axiom Penman (\$399) is an unusual combination of plotter and robot. It actually walks around on the surface of the paper, drawing as it travels. It operates much like a physical Logo turtle, and will respond to

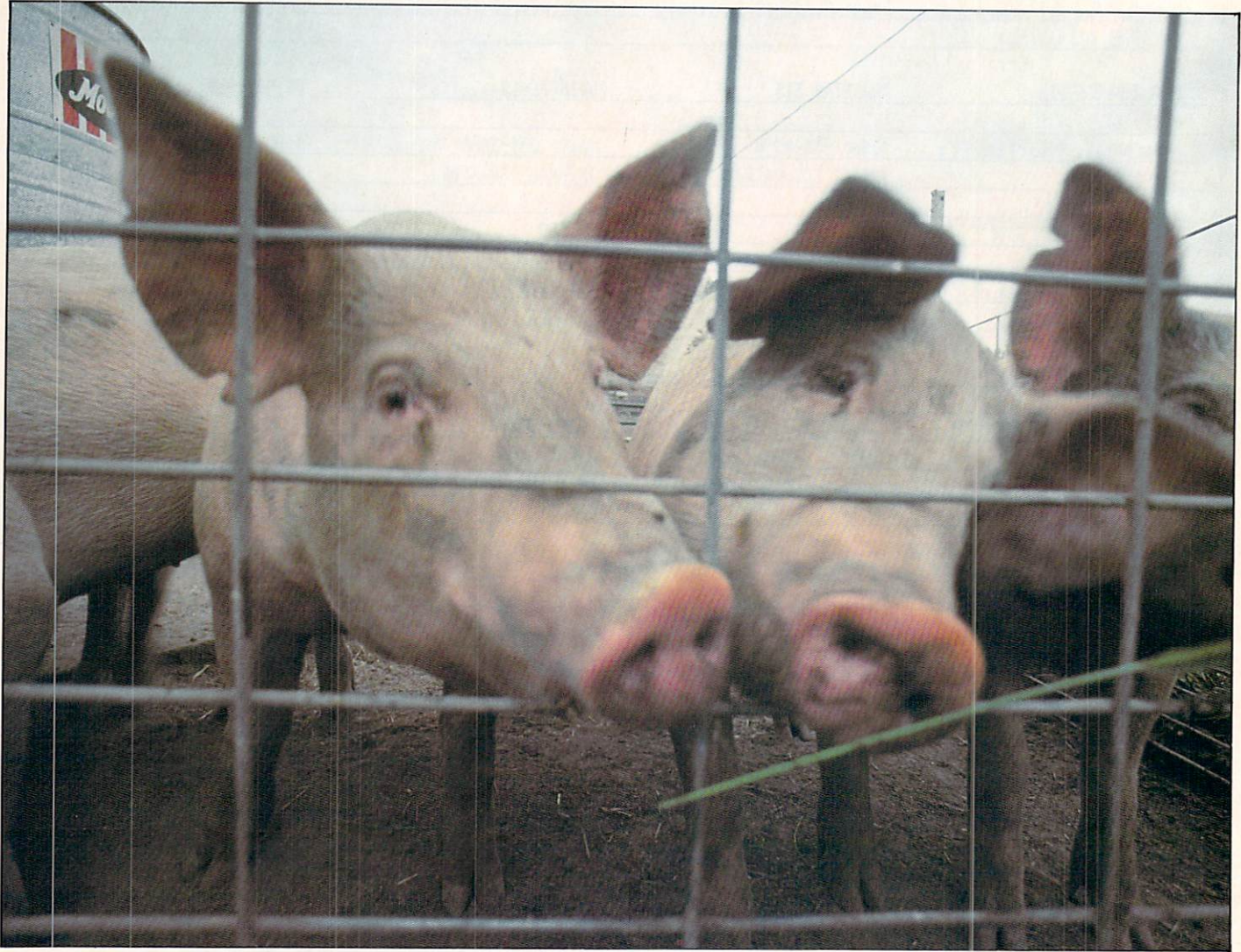
similar Logo-like commands. The Silver-Reed Colour Pen-Graph (\$299), part of the fast-growing typewriter/printer category, can produce graphs on its own, or be connected via parallel interface to a computer. The main drawback to this and other plotters for home use is that the only software configured to work with them is of the business/utility variety.

If you're in the market for your first printer, then a color model definitely is worth your consideration. They're as big an improvement over monochrome printers as color TV was over black-and-white. And now the price is right.

If you now own a printer, should you add one of these beauties? It depends on your application needs. Printing simple letters and reports doesn't *require* color capability. But it sure enhances them. Imagine the impact of sending that past-due bill to a customer with the amount owed highlighted in bright red! And, if you'd like to create a "hard copy" of that masterpiece you've drawn, or give your next resume some extra punch, a color printer may be the answer. ☐

A Tale of Two Farms

COMPUTERS HELP FARMERS FATTEN THIN PROFIT MARGINS



STORY AND PHOTOGRAPHS BY ANDREW SACKS

The
First
Tale
VisiCalc
and
the Pigs

This spring, as the frost melts from the ground and the songbirds once again wake the world, Loren and Gloria Wallwey will start to plant their crops. On an unnamed gravel road that runs for 18 miles straight east and west, where there is only one home for every 300 acres of land, the Wallweys raise pigs—and the crops to feed them. Here, in Emerson, Nebraska, not far from the Iowa state line, Loren's dad, and his father before him, have farmed the silt-clay-loam ground since the 1890s.

The seasonal cycle of sowing and reaping hasn't changed much since Loren's grandfather worked the place, but the market economy

has. While Loren's dad may have produced enough for his family and then some, today the American farmer feeds himself and 77 other people. He is not likely to get rich from his livelihood, though. The prices farmers get for their products have not gone up as fast as the cost of the processed and packaged food in the grocery, or the cost for the raw materials necessary to farm: seed, feed, fuel, chemicals, equipment, and borrowed money.

To survive, the modern farmer has had to learn to produce more food more cheaply. But profit margins are so thin (when they even exist) that anyone who plans to stay in farming had better keep very close tabs on the opera-

tion. Like Loren Wallwey.

"I was always writing stuff down, the amount of feed I fed the breeding herd, the number of days until the finished fat hogs were ready for market, the interval between weaning and breeding back my sows. But I wasn't ever getting anything back." On the busy farm, Wallwey and his wife found that running the place, raising two boys, and keeping accurate accounts left little time for thoughtful analysis of all the records.

TAX REFUND BUYS COMPUTER

In 1983, Loren and Gloria Wallwey took their income tax refund check and went to visit Lyle George. A 27-year-old "farm boy," George runs a company called The Computer Farm, headquartered in nearby Wayne, a Nebraska town of 5,000. Over the last two years he has sold computer systems to about 45 farmers using a straightforward, honest sales pitch. "It can't do anything you couldn't do yourself, if you had enough time," George tells the farmers. "You can hand-spade a quarter section of land (160 acres), or you can go out and disc it with a tractor and implements. Just like that tractor, a computer plows through your information."

Loren, like about 100,000 other farmers in the United States who own computers, was convinced, and popped for an Apple III with a pair of disk drives and a printer. To help Gloria prepare her Sunday School lessons and write letters, he got a word-processing program; for their two sons, Jon and Greg, he bought a couple of games; and for farm accounting he purchased *VisiCalc*, an electronic spreadsheet. No new implement for his tractor would have been as cheap as that \$5,052 package.

Using *VisiCalc*, Loren constructed a system for keeping track of the breeding herd—14 sows and a boar, Sammy—he counts as his moneymakers. (Sows average litters of 10; the market value of each pig averages \$35.) He tracks most statistics of the breeding herd, litter by litter:

- DATE OF BIRTH
- NUMBER OF PIGS BORN ALIVE
- NUMBER OF PIGS BORN DEAD (in a healthy herd this runs about 10 percent)
- AVERAGE WEIGHT OF EACH PIG AT BIRTH
- TOTAL WEIGHT OF THE LITTER
- NUMBER OF PIGS SURVIVING UNTIL WEANING DATE
- AGE (in days) AT WEANING DATE
- SIRE (sow's mate)
- DAYS ELAPSED UNTIL THE SOW WAS BRED AND CONCEIVED, OR "SETTLED"

Having all this information in one place, on one set of tables, gives Loren the comfort, the opportunity to make informed decisions about future breeding and marketing. He can spot trends in the operation. For instance, one sow may always have small litters when farrowing in the cold months, while another may always have trouble becoming pregnant and

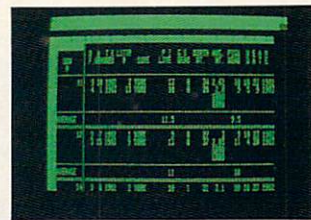
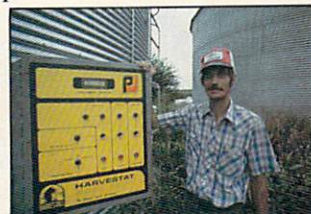
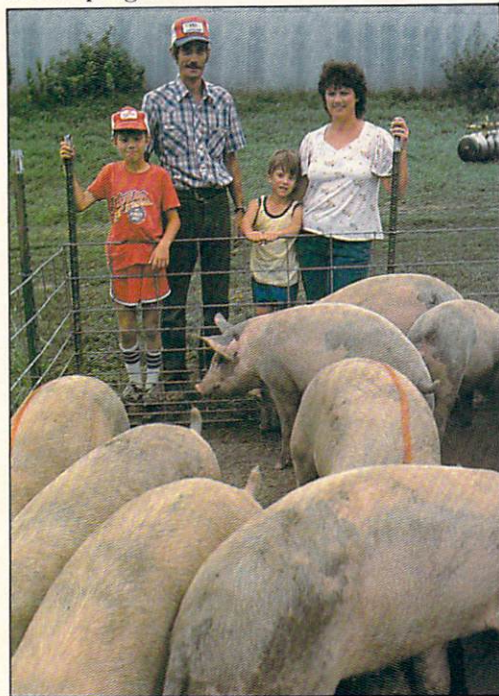
require three or four heat cycles to finally be settled.

"My dad thinks I'm crazy for doing all this detailed record-keeping. Weighing the feed and all. 'What difference does it make?' he asks. 'You're going to keep feeding the hogs regardless.' But I tell him I'm not here to raise hogs just to make them look pretty. I'm here to make a living!"

SAMMY THE BOAR: BEYOND COMPUTERS

Since the initial purchase, Loren has added to his computer system. He's bought a database program (which gets used for grocery lists, among other things), a typing program for the boys, and a modem, which he uses to access information networks, such as Instant Update, from the Professional Farmers of America.

Ultimately, Loren would like to have his entire farming operation—the corn, soybean, and oat crops, everything else he grows on the 400-acre place, plus the feeder-pig (baby pig) ration program—all run with computer help.



He wants to find out just what it costs to produce everything on the farm—from a bushel of corn to a litter of 10 little pigs. The way he sees it working, Loren would spend a few minutes every evening on the computer, which he keeps next to the piano in the family room, entering words and numbers: what seed and fertilizer he put into the fields; what oil, parts, and fuel he put into equipment; and what food and medicine he gave the pigs. His own labor, counted in hours, would also be added up in the different categories.

Many evenings, while all these ideas and numbers are rumbling around in his head, Loren goes out and spends a few minutes with Sammy, the boar, whose job can never be taken over by a computer.

Left: The Wallwey family portrait. Top right: Loren and one of his "dedicated" computers; the Harvestat controls the climate inside the silos. Middle: Jon and Greg playing Pac-Man. Bottom: A VisiCalc screen showing how each sow's litters are tracked.

The Second Tale

How to Impress Bankers



One hundred and fifty miles south of Wallwey's place, still in Nebraska but close to the borders of Missouri and Kansas, another Apple computer (a IIe) sits next to another piano.

It belongs to Fritz Farms, Inc., an operation run by Ken and Grace Burgert, and Grace's brother John Fritz and his wife, Ruth. Here, in Crab Orchard, Nebraska, the computer seems to be a natural for these financially adventurous, college-educated farmers.

With more than \$1 million in land, livestock, and equipment shared between the two families, bookkeeping figures were previously sent out to a large computerized accounting operation set up especially to keep records for farmers. The system was reliable and accurate, but it was slow, with figures and spreadsheets often tied up in the mail. Ken felt he wasn't getting timely access to his records. His decisions were sometimes made by having to remember facts, rather than by actual checking.

"WILL YOU SPEAK ENGLISH?"

Before they bought their own computer, Ken and Grace, who both hold master's degrees from the University of Nebraska, attended a few seminars in Lincoln and at the local community college in Beatrice. Grace, who had handled the bookkeeping, found herself confounded by the language the instructors used. "I wanted to say to them once, 'I'm a novice, would you just speak English to me?'"

Ken and Grace consulted with David McFarling and Diane Walkowiak, a husband-and-wife team that designed an accounting program, called *Agri-Ledger*, especially for farmers. With this program, the Burgerts divided their farming into different "enterprises," each of which they analyze for profit or loss.

The *Agri-Ledger* program could theoretically provide enough space to maintain records on 2,500 different enterprises, but on the Fritz farm, they only keep tabs on nine: fat hogs (those to be sold for meat), farrowing hogs (the baby pig operation), fat cattle (those being fed for meat), the milo crop, and five fields of corn.

LIKE A CAB ON A TRACTOR

After living with the computer for a year and handling all the bookkeeping chores in-house, Ken now says: "A computer will become as common on a farm as a cab on a tractor." And Grace, who has overcome her terror of the "nit-picking" green screen, realizes that it gives them an advantage at the bank.

"Our lenders are impressed if you come in with a good set of records. The computer is just another tool to insure we have those good records. And when you go to see a man once a year for a \$200,000 or \$300,000 loan, you like to make him happy."

When a visitor asks Ken if he always sleeps well, carrying so much debt, he laughs. "If people in town took the kind of risks that we take, it'd probably drive them up the wall. Today we



risk so much more capital than farmers used to. Maybe we work harder, maybe we don't. But we don't live any better when you get down to the bottom line. We have to have that size investment [\$1 million] just to make a living."

ON-LINE FARM

Besides helping with money management, the computer puts the Fritz farm operation in touch with marketing and technical help. The Burgerts subscribe to AGNET, a data base for farm information offered by the University of Nebraska, but available to anyone with a computer, a modem, and a phone. Through AGNET, market reports from Washington, management model programs, and a wide selection of farm production aid programs, such as feed-mixing, cattle-pasturing, and irrigation are available. Fees are \$30 an hour during business hours, less at other times.

Ken has listed his five corn fields, which are irrigated with gigantic sprinkler systems called pivots, with the AGNET data base. Here's how the computer helps him plan his summer irrigation schedule:

At the beginning of the season, Ken informed the IBM 370 mainframe computer in Lincoln of the pertinent details about each field of corn he planted—the type of corn seed (days to maturity), the type of soil in the field, the number of seeds planted per acre (24,000), and the pivot system's capacity to spread water on

ANDREW SACKS is a freelance writer and photographer living in Chelsea, Michigan. He and his wife raise pigs and chickens, and are in the process of computerizing their photography business.



the field (800 gallons/minute). Then, as the growing season progresses, he takes moisture readings from sensors buried from 6 to 30 inches deep in his fields.

Ken dials the computer in Lincoln, gives it his ID number, then the moisture readings and the amount of recent rainfall he's recorded at the farm. The big computer automatically factors in the temperature and the wind velocity for the past few days and calculates how much water has been lost through "evapo-transpiration." (The term refers both to water lost through evaporation from moist ground, and water lost when it passes from plant leaves back into the atmosphere.)

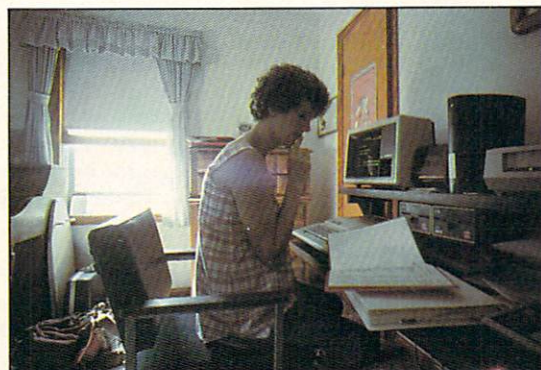
Based on these computerized calculations, Ken knows when to run his pivots, and for how long. The importance of the calculations becomes more evident as he explains that in summer, when a 100-degree Fahrenheit reading is fairly common, his fields can lose water at the rate of 1.5 inches of rainfall per day—and sometimes the sprinkler system can replace it at the rate of only .5 inches per day.

During the drought of '83, no machine could furnish the priceless rain farmers awaited. Through Ken's tabletop Apple, the IBM 370 at AGNET headquarters could only remind him of how badly rain was needed.

"We knew what the computer would tell us," Grace explained. "Keep watering!!!"

They ran the diesel pumps on their irrigation pivots 24 hours a day, for six weeks—and saved the corn crop. ☞

Above: The computer tells Ken Burgert (in background) when to water his corn fields, and for how long. Top left: A healthy ear of corn. Top middle: Grace Burgert and her daughter, Amy. Top right: Ken Burgert and John Fritz. Bottom left: Grace Burgert keeps the books on an Apple IIe. Bottom right: Ruth Fritz feeds the pigs.



HELPFUL HINTS

SHORT PROGRAMS
FOR SHORTCUTS

EDITED
BY ROXANE
FARMANFARMAIAN

A well-placed little program or a simple programming trick can make all the difference in the way you feel about your computer. Here's a mix of hackers' hints to make your computer deliver more pleasure and add more excitement to the time you spend with it. Most important, they can help you extend its usefulness in a variety of ways.

Print out Your Disk Directory and Find Out How Much Free Space Is Left on Your Disk.

Want a printout of your disk directory for your files? How about a quick check to see how much room you've still got on your disk, just in case you're getting close to capacity? These programs will do both, for ADAM, Apple, Atari, Commodore, IBM, TRS-80 CoCo, or Model III computers.

ADAM (Boot SmartBASIC)

```
10 PR#1
20 CATALOG
30 PR#0
```

Apple

To check free disk space, RUN the FILEM program on the DOS master or ProDOS user disk. To get a printout of the disk directory, type in the same program as for the ADAM.

Atari

```
10 DIM LINES(128)
20 OPEN #1,6,0,"D:*.*)"
30 TRAP 70
40 INPUT #1;LINES
50 LPRINT LINES
60 GOTO 40
70 CLOSE #1
```

Commodore 64 & VIC-20

```
LOAD "S",8
OPEN 4,4
CMD 4:LIST
PRINT#4
CLOSE 4
```

IBM

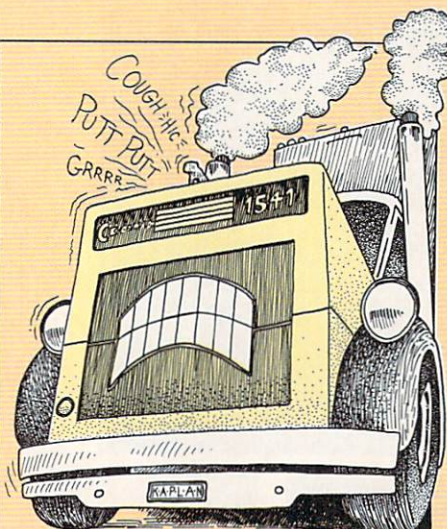
Type DIR>PTR at the DOS prompt.

TRS-80 CoCo

```
POKE 111,254:DIR
```

TRS-80 Model III (Boot DOS)

Type the following at the TRSDOS READY prompt. If you have only one drive, type: DIR:0(PRT)
If you have two drives and you wish to have a printout for the disk in your second drive, type DIR:1(PRT)



Stop Your 1541 Disk Drive from Sounding Like a Mack Truck.

Commodore 64 and VIC owners: To stop your disk drive's read/write head from "grinding" or "bumping," try the following program. RUN it before loading any software; it will stay in effect until the drive or computer is turned off.

```
10 OPEN 15,8,15
20 PRINT#15,"M-W";CHR$(106);CHR$(0);
CHR$(1);CHR$(133)
30 CLOSE 15
40 END
```

GILBERT D. HELLAND
Scott Air Force Base, Illinois

Rule Your Stationery with Your IBM or TRS-80 Model III/4.

Ever wish you could put lines on your writing paper or stationery? Well, here's the program to do it for you. Just type it in, place an 8½ × 11-inch piece of paper in your printer (fanfold paper works, too), and type RUN. If you want to shorten or lengthen the lines, change the number 79 in line 10. To change the number of lines on your paper, change the 60 in line 100.

```
10 CLS:FOR X=1 TO 79:AS=AS+CHR$(95):NEXT X
20 PRINT "DO YOU WANT THE LINES ON YOUR PAPER"
30 PRINT "SINGLE, DOUBLE, OR TRIPLE SPACED?"
40 PRINT:INPUT "ENTER 1, 2, OR 3";SP
50 IF SP<1 OR SP>3 THEN 40
60 CLS:PRINT "WHEN YOUR PRINTER IS READY, PLEASE"
70 PRINT "PRESS ANY KEY."
80 KS=INKEY$:IF KS="" THEN 80
90 FOR I=1 TO 6:LPRINT:NEXT I
100 FOR I=1 TO 60 STEP SP+1:LPRINT AS
110 FOR J=1 TO SP:LPRINT:NEXT J
120 NEXT I
```

THOMAS GASPER
Mascoutah, Illinois

Save or Load Using Your 1541 Disk Drive Even When You Get a ?DEVICE NOT PRESENT Error on Your Screen!

Commodore users, does this scenario ring a bell? You boot your disk, type in a new program, RUN it and print it out—everything's dandy. You then make all the right moves to save it to disk and . . . the computer pulls a fast one on you by throwing

a ?DEVICE NOT PRESENT error onto the screen. Nothing you do seems to re-establish communication between the computer and the disk drive. You've no choice but to let the program die on the screen.

Wait! Press RUN-STOP/RESTORE and type in these two BASIC statements:

```
CLOSE 15
OPEN 15,8,15,"I"
```

This re-establishes communication.

Translate BASIC Programs for Your Kaypro or Other CP/M Machine.

Do you have a Kaypro or other CP/M computer? Want to translate text-only BASIC game and application programs? Kaypro's Microsoft BASIC-80 (5.0) is similar to other BASICs, especially TRS-80 Model III BASIC (which is also built into all Model 4s), though text programs for the Commodore 64, IBM, and Apple can also be translated relatively easily. Most statements in a Model III BASIC program will work exactly the same on a Kaypro. We list here the ones that can cause problems and suggest ways to solve some of those problems. (*Further references to the Kaypro apply to most CP/M computers.*)

First, omit any statements that contain these commands: PEEK, POKE, SET, RESET, POINT, TIMES, MEM, VARPTR, USR, PRINT USING, PRINT #-1, and INPUT #-1. Differences between the two machines make translating these commands all but impossible. Whether the program will still work without them depends on how important a role they play in the program. When you've become a truly canny translator, you may be able to figure out some good Kaypro equivalents.

Second, commands that involve reading or writing on a disk—OPEN, GET, CLOSE, INPUT#, PRINT#, FIELD, LOC, EOF, LSET, and PUT—may not translate directly from Model III to Kaypro, though very similar commands exist in BASIC-80 (5.0). If you study the section of the Kaypro Microsoft BASIC manual on disk I/O (Chapter 4), you may be able to figure out how to translate these statements conveniently.

Finally, here are some handy equivalents for translating statements we haven't mentioned so far, that aren't the same for Kaypro and the Model III. Change CLS to PRINT CHR\$(26); and change RND(0) to RND(1) wherever they appear. For the Model III's RND(X) statement, where X is an integer greater than zero, substitute INT(RND(1)*X)+1 on the Kaypro.

Omit the Model III's CLEAR statement entirely from your Kaypro translation. And substitute RANDOMIZE in your Kaypro version where RANDOM appears in the Model III program. This statement prints a message on the screen. If that's not desirable, read up on the RANDOMIZE(X) command in the Kaypro BASIC-80 (5.0) manual.

Designating where on the screen something is to be printed is impor-



Let Your Apple Sing.

Apples have only one voice, but they can sing with verve. The following program will get your Apple warbling in no time. Type it in, RUN it, then POKE a pitch value (between 2 and 255) into location 8 (e.g., POKE 8,255) and a duration value (between 1 and 255) into location 6. Finally, CALL the routine by entering CALL 768.

```
10 FOR I=0 TO 28:READ A:POKE 768+I,A:NEXT I
1000 DATA 165,8,74,133,10,164,8,173,48,192,136,234
1010 DATA 234,208,251,165,7,56,229,10,133,7,176,237
1020 DATA 198,6,208,233,96
```

This can be incorporated into programs that would otherwise leave your Apple silent, or it can be used on its own. Add the above routine into the following tuneful example.

```
20 FOR I=1 TO 7
30 READ TN,DR:POKE 8,TN:POKE 6,DR:CALL 768
40 NEXT I
2000 DATA 121,75,162,40,162,40,153,75,162,120,128,75,121,75
```

tant to the functioning of some programs. Since the Model III's screen is smaller than the Kaypro's, translating the PRINT@ statement involves a rather long equation. For every PRINT@W... in a Model III program, where W is a constant (e.g., 5), a variable (e.g., SUM), or an expression (e.g., 2*A+BK), substitute PRINT CHR\$(30);STRINGS(W-INT(W/64)*64);12);STRINGS(INT(W/64),10);... to ensure your program operates more or less correctly on the screen. Similarly, for PRINT TAB(W);... on the Model III, substitute PRINT TAB(W+1);... which should work in most cases. If that doesn't work, try PRINT STRINGS(-(W MOD 128 > 64),10);TAB((W MOD 128) MOD 64 + 1);... on the Kaypro.

If you plan to do a lot of translating, it would be wise to obtain a Model III BASIC manual for reference.

A Kaypro version of Banner is included in this month's programming section. Compare it to the TRS-80 Model III version. Note changes in lines 20, 30, 170, 180, 260, 320, 370, and 620, which all contain either CLS or TAB. Note the similarities. Now it's your turn!

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Better yet—add the two POKES right into your program wherever you want the music or narration to begin and end.

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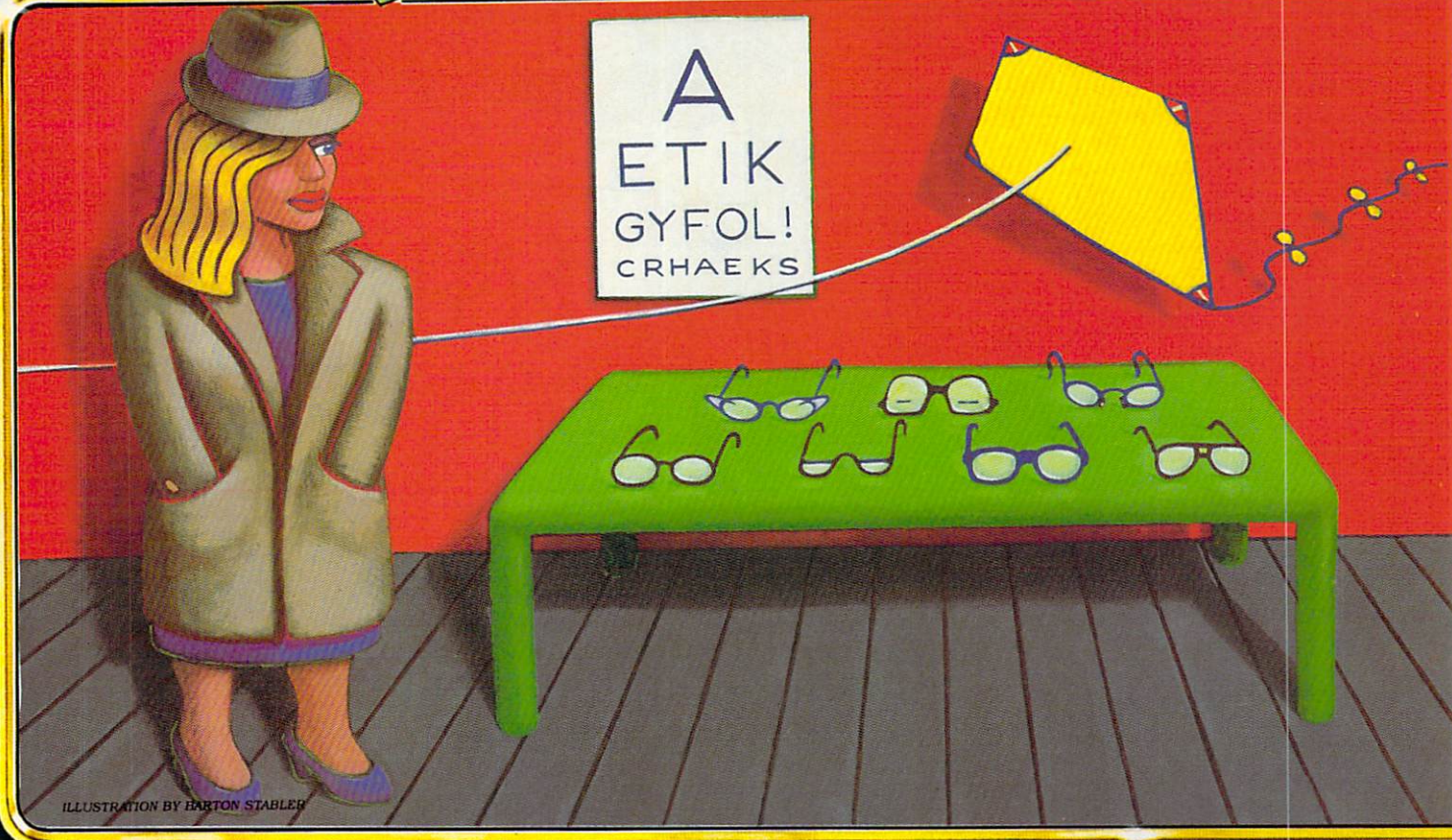


ILLUSTRATION BY BARTON STABLER

A P R I L

PUZZLE

Page 54

The facts of the case are as clear as that chart on the wall— but is your eyesight sharp enough to pick them out before it's too late?

SPRING PROGRAMS

Page 59

Let yourself soar with *Kite*, and announce the coming of Spring with a high-tech *Banner*.

PROGRAMMING P.S. Page 71 Notes to previous month's programs.

ILLUSTRATION BY JIM CHERRY III

Cherry

MORE THAN MEETS THE EYE

Can You Find the Hidden Message?

PUZZLE BY PETER FAVARO AND SARAH KORTUM
PROGRAM BY LANCE PAAVOLA AND STEVEN C. M. CHEN

While sitting in the waiting room of noted optometrist Dr. Seymour Shades, Private Eye Lynette Leighton noticed that the man next to her was buried in a jumbled-word puzzle. At least he has something to pass the time with, she thought, glancing at her watch. Preoccupied and already late for her next appointment, she hardly thought twice about it when the word-puzzle man left and his seat was taken by someone else. But suddenly, a voice broke into her reverie.

"Hey, Doll, fancy meetin' youse here!"

Lynette's senses were awakened by the gravelly voice and the distinctive smell of the \$3 aftershave that were the calling cards of none other than . . .

"Fingers! What are you doing out of jail?" Lynette asked, amazed at seeing the notorious jewel thief, Frank ("Fingers") Larsen, who was convicted in *The Case of the Missing Lapiz Lazuli* (November 1984 FAMILY COMPUTING).

"The warden is a very close friend of my uncle, the bank president, so I got time off for good behavior."

As they spoke, Lynette noticed that Fingers was working on the same kind of jumbled-word puzzle as had the man before him. She glanced around the waiting room and noticed several seedy-looking types furiously scribbling away in a similar vein. Some came in, jotted something down, then got up and left without even visiting the doctor. Then Lynette noticed something else. A newspaper, lying on the



seat to her right, was opened to display a full-page advertisement, announcing a week-long rare-gem exhibition and auc-

tion at Timpany's Jewelry Store.

Lynette sensed that there was more than one puzzle to be solved in the room,

and glanced around for more clues. The room was decorated with antique eye charts in ornate frames. She studied them carefully.

ILLUSTRATIONS BY JOSH COSFIELD



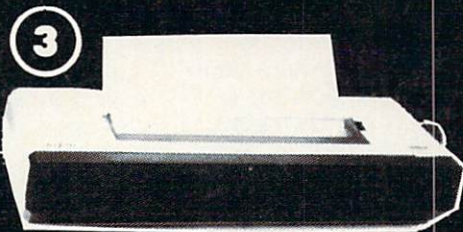
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and noticed that one chart seemed to be peeling away from the frame, revealing part of another eye chart underneath. She read this chart carefully in spite of Fingers' continual interruptions: "Hey Toots! How do youse spell 'of'? Is it O-V or O-V-E?"

The longer Lynette studied the eye chart, the more certain she became that it contained a jumbled word message, and that her optometrist was engaged in something a little more shady than fitting prescription sunglasses. She jotted down each line of the eye chart, then got up and left the waiting room.

At her office, Lynette tried using her computer to generate every possible word, large or small, that each line of the chart contained. But she discovered pretty quickly that this wasn't the best way to go about it, as the letters in the longer jumbles formed an astronomical number of word combinations. She figured she had to decide which letter or letters from each jumble were most likely to begin the correctly unscrambled word, and tell her computer to show only combinations that began with these letters. Using this method, she was able to select one word out of the possible combinations for each line, which when read together with the words from the other lines, told the day and place of a planned robbery.

But one crucial piece of information was missing: the time. In order to catch the robbers in the act and put Fingers and his optometrist pal in the slammer, Lynette had to find the clue in the eye chart that would point her to the time of the robbery.

HOW TO PLAY

This month's program, *Optical Illusion*, is a handy tool for unscrambling word jumbles and anagrams of all kinds. It's based on a routine that generates all the possible combinations of the letters in any given

word. Use the program (and your wits!) to unscramble the mystery message in Dr. Shades' eye chart.

Type each line of the program into your computer exactly as shown, carefully making the appropriate modifications (if needed). Before RUNNING the program, SAVE it to disk or cassette.

Please be a careful typist—each letter, number, space, and punctuation mark makes a difference in whether or not the program runs correctly. If you have trouble later on, chances are that a simple typing error is at fault. Try proofreading what you've typed in against the listing in the magazine—it's likely you'll soon discover your mistake.

Before RUNNING the program, you *must* set your computer to all uppercase letters. When you first type RUN, the program will prompt you to ENTER JUMBLED WORD OR "Q" TO QUIT. This is your cue to type in one of the scrambled lines of Dr. Shades' chart, then press RETURN or ENTER. The program will count the letters and tell you how many combinations of those letters exist. It will then prompt you to press the space bar or the RETURN (or ENTER) key, depending on whether you wish to view all of the possible combinations, or provide one or more letters from the word and view only those combinations that begin with the letter or letters you supplied.

This is an important decision. As words grow longer, the number of ways to scramble their letters increases rapidly. For example, a three-letter word can be jumbled no more than six different ways, but a six-letter word has up to 720 possible combinations!

To view all the combinations, press the space bar. The combinations will be displayed by screenfuls. When the program pauses at the end of a screen, press the space bar to con-

tinue the process, or any other key to return to the initial prompt, where you may enter another jumbled word.

To view fewer combinations, press the RETURN or ENTER key. At the next prompt, enter one or more letters you've chosen from the jumble. Press RETURN or ENTER, and the computer will tell you how many combinations begin with the letter(s) you've selected. If you still feel there are too many, press RETURN or ENTER once again, and the computer will permit you to enter another (larger) group of let-

ters, reducing further the number of possible combinations. If you're satisfied, press the space bar, and the computer will begin displaying the combinations.

To make this month's puzzle program useful for solving any jumbled-word puzzle, not just the one on the eye chart, we omitted the section that tests your answer and tells you whether you're right or wrong. Once you think you've solved this month's puzzle, you can check your answer against the solution on page 62. No peeking!

Base Version (TRS-80 Model III)/Optical Illusion

```

10 CLEAR 1000
20 DIM C$(20),LINK(20),PS(20),R(20):Q$=CHR$(34)
30 SH=12:SW=64:TRU=-1:TX=0:ES$=" <ENTER> "
40 AS$="PRESS <SPACE BAR> TO DISPLAY ALL OF THEM,"+ES
50 BS$=", OR ANY OTHER KEY TO ENTER ANOTHER WORD."
60 CLS:PS$="ENTER JUMBLED WORD OR "+Q$+"Q"+Q$
70 PS$=PS$+" TO QUIT.":GOSUB 1000:PRINT
80 TS$="":GOSUB 3000:IF TS$="Q" THEN END
90 LT=LEN(TS$):IF LT<2 OR LT>20 THEN 60
100 BOT=1:LW=0:WDS$=""
110 FOR X=1 TO LT:VS=MID$(TS$,X,1)
120 IF VS<"A" OR VS>"Z" THEN 150
130 WDS$=WDS$+VS:LW=LW+1
140 C$(LW)=VS:PS(LW)=1:LINK(LW)=LW
150 NEXT X:IF LW<2 THEN 60
160 CLS:HS$="":LH=0:GOSUB 4000:V=LW:GOSUB 5000
170 PS$=WDS$+" HAS"+M$+"LETTERS, FORMING"+FAC$
180 PS$=PS$+"COMBINATION(S).":GOSUB 1000:PRINT
190 PS$=AS$+"TO CHOOSE THE FIRST LETTER(S)"+BS
200 GOSUB 1000:GOSUB 6000:IF K=32 THEN 420
210 IF K<>13 THEN 60
220 CLS:PS$="SELECT A LETTER OR LETTERS FROM "+WDS$
230 PS$=PS$+", AND I WILL DISPLAY ALL COMBINATIONS"
240 PS$=PS$+" BEGINNING WITH THAT LETTER OR GROUP"
250 PS$=PS$+" OF LETTERS.":GOSUB 1000
260 TS$="":GOSUB 3000:HS$=TS:LH=LEN(HS$):F=0
270 FOR Y=1 TO LH:TS=MID$(HS$,Y,1)
280 FOR X=BOT TO LW:IF C$(LINK(X))<>TS THEN 310
290 T=LINK(X):LINK(X)=LINK(BOT):LINK(BOT)=T
300 BOT=BOT+1:F=F+1:X=LW
310 NEXT X:NEXT Y:IF F=LH THEN 360
320 CLS:PS$="SORRY, "+WDS$+" DOES NOT CONTAIN ONE"
330 PS$=PS$+" OR MORE OF THE LETTERS YOU ENTERED."
340 GOSUB 1000:FOR X=1 TO SH:PRINT:NEXT X
350 GOSUB 7000:CLS:BOT=1:LH=0:GOTO 170
360 CLS:GOSUB 4000
370 PS$="THERE ARE"+FAC$+"COMBINATIONS BEGINNING"
380 PS$=PS$+" WITH "+HS$+"":GOSUB 1000:PRINT
390 PS$=AS$+"TO CHANGE INITIAL LETTERS"+BS:GOSUB 1000
400 GOSUB 6000:IF K=13 THEN BOT=1:GOTO 220
410 IF K<>32 THEN 60
420 CLS:IF LW-BOT>0 THEN 450
430 NS$=HS$:IF BOT<=LW THEN NS$=NS$+C$(LINK(BOT))
440 GOSUB 2000:GOTO 650
450 LVL=2:WC=0:Q=0:MAX=INT(SW/(LW+1))
460 FOR X=1 TO LW:PRINT C$(LINK(X));:NEXT X
470 WC=WC+1:IF WC<MAX THEN PRINT " ";:GOTO 530
480 PRINT:WC=0:Q=Q+1:IF Q<SH THEN 530
490 Q=0:PRINT:PS$="PRESS <SPACE BAR> TO CONTINUE"
500 PS$=PS$+" DISPLAYING COMBINATIONS OR ANY OTHER"

```

```

510 PS=PS+" KEY TO EXIT.":GOSUB 1000:GOSUB 6000
520 CLS:IF K<>32 THEN 60
530 T=LINK(LW):FOR X=LW TO LW-LVL+2 STEP -1
540 LINK(X)=LINK(X-1):NEXT X
550 LINK(LW-LVL+1)=T:PS(LVL)=PS(LVL)+1
560 IF PS(LVL)>LVL THEN 640
570 FLAG=0:FOR X=BOT TO LW-1:FOR Y=X+1 TO LW
580 IF C$(LINK(X))<>C$(LINK(Y)) THEN 600
590 IF R(LINK(X))>R(LINK(Y)) THEN FLAG=TRU:Y=LW
600 NEXT Y:NEXT X
610 IF LVL>2 THEN LVL=2
620 IF FLAG THEN 530
630 GOTO 460
640 PS(LVL)=1:IF LVL<>LW-LH THEN LVL=LVL+1:GOTO 530
650 PRINT:NS="NO MORE!":GOSUB 2000
660 GOSUB 7000:GOTO 60
1000 IF LEN(PS)<=SW THEN NS=PS:GOSUB 2000:RETURN
1010 Y=SW+1:Z=1:FOR X=Y TO 2 STEP -1
1020 IF MID$(PS,X,1)=" " THEN Z=0:Y=X:X=2
1030 NEXT X:NS=LEFT$(PS,Y-1):GOSUB 2000
1040 PS=RIGHT$(PS,LEN(PS)-Y+Z):GOTO 1000
2000 IF LEN(NS)=SW THEN PRINT NS:RETURN
2010 PRINT TAB((SW-LEN(NS))/2+TX);NS:RETURN
3000 INPUT TS:ON TRU(TS="") GOTO 3000:RETURN
4000 FAC=1:IF BOT>=LW THEN 4070
4010 R(LINK(BOT))=1:FOR X=BOT+1 TO LW:R(LINK(X))=1
4020 FAC=FAC*(X-BOT+1):TS=C$(LINK(X))
4030 FOR Y=X-1 TO BOT STEP -1
4040 IF TS<>C$(LINK(Y)) THEN 4060
4050 R(LINK(X))=R(LINK(Y))+1:FAC=FAC/R(LINK(X)):Y=BOT
4060 NEXT Y:NEXT X
4070 V=FAC:GOSUB 5000:FAC$=M$:RETURN
5000 M$=STR$(V)+" ":RETURN
6000 K$=INKEY$:IF K$="" THEN 6000
6010 K=ASC(K$):RETURN
7000 PS="PRESS ANY KEY TO CONTINUE.":GOSUB 1000
7010 GOSUB 6000:RETURN

```

Atari/Optical Illusion

```

10 DIM A$(54),B$(41),C$(20),CL$(1),H$(20),N$(40)
20 DIM P$(140),Q$(3),T$(40),V$(1),W$(20)
30 DIM LINK(20),PS(20),R(20)
40 OPEN #1,4,0,"K":POKE 82,0:POKE 752,1:CLS=CHR$(125)
50 A$="PRESS <SPACE BAR> TO DISPLAY ALL OF THEM, <RETR
RN> TO "
60 B$=" , OR ANY OTHER KEY TO ENTER ANOTHER WORD."
70 Q$=CHR$(34):Q$(3)=Q$:Q$(2,2)="Q":PRINT CLS;
80 PRINT " ENTER JUMBLED WORD OR ";Q$;" TO QUIT."
90 GOSUB 3000:IF T$="Q" THEN POKE 752,0:END
100 L=LEN(T$):IF L<2 OR L>20 THEN PRINT CLS;:GOTO 80
110 BOT=1:LW=0:WDS$="":FOR X=1 TO L
120 V$=T$(X,X):IF V$<"A" OR V$>"Z" THEN 140
130 LW=LW+1:WDS$(LW,LW)=V$:PS(LW)=1:LINK(LW)=LW
140 NEXT X:PRINT CLS;:IF LW<2 THEN 80
150 C$=WDS$:H$="":LH=0:GOSUB 4000
160 PS=WDS$:PS(LW+1)=" HAS ":PS(LW+6)=STR$(LW)
170 PS(LEN(PS)+1)=" LETTERS, FORMING "
180 PS(LEN(PS)+1)=STR$(FAC)
190 PS(LEN(PS)+1)=" COMBINATION(S).":GOSUB 1000
200 PRINT :PS=A$
210 PS(55)="CHOOSE THE FIRST LETTER(S)":PS(81)=B$
220 GOSUB 1000:GOSUB 5000:IF K=32 THEN 430
230 IF K<>155 THEN 80
240 PS="SELECT A LETTER OR LETTERS FROM "
250 PS(LEN(PS)+1)=WDS$
260 PS(LEN(PS)+1)=" , AND I WILL DISPLAY ALL COMBINATIO
NS BEGINNING WITH THAT LETTER OR GROUP OF LETTERS."
270 GOSUB 1000:GOSUB 3000:H$=T$:LH=LEN(H$):F=0
280 FOR Y=1 TO LH:V$=H$(Y)
290 FOR X=BOT TO LW:T=LINK(X):IF C$(T,T)<>V$ THEN 320
300 LINK(X)=LINK(BOT):LINK(BOT)=T
310 BOT=BOT+1:F=F+1:X=LW
320 NEXT X:NEXT Y:PRINT CLS;:IF F=LH THEN 360
330 PS="SORRY, ":PS(8)=WDS$
340 PS(8+LW)=" DOES NOT CONTAIN ONE OR MORE OF THE LET

```

```

TERS YOU ENTERED."
350 GOSUB 1000:GOSUB 6000:BOT=1:LH=0:GOTO 160
360 GOSUB 4000:PS="THERE ARE ":PS(11)=STR$(FAC)
370 PS(LEN(PS)+1)=" COMBINATION(S) BEGINNING WITH "
380 PS(LEN(PS)+1)=H$:PS(LEN(PS)+1)=" ":GOSUB 1000
390 PRINT :PS=A$
400 PS(55)="CHANGE INITIAL LETTERS":PS(77)=B$
410 GOSUB 1000:GOSUB 5000:IF K=155 THEN BOT=1:GOTO 240
420 IF K<>32 THEN 80
430 IF LW-BOT>0 THEN 470
440 NS=H$:IF BOT>LW THEN 460
450 NS(LW,LW)=C$(LINK(BOT),LINK(BOT))
460 GOSUB 2000:GOTO 670
470 LVL=2:WC=0:Q=0:MAX=INT(40/(LW+1))
480 FOR X=1 TO LW:T=LINK(X):PRINT C$(T,T);:NEXT X
490 WC=WC+1:IF WC<MAX THEN PRINT " ";:GOTO 550
500 PRINT :WC=0:Q=Q+1:IF Q<20 THEN 550
510 Q=0:PRINT
520 PRINT "PRESS <SPACE BAR> TO CONTINUE DISPLAYING";
530 PRINT " COMBINATIONS OR ANY OTHER KEY TO EXIT.";
540 GOSUB 5000:IF K<>32 THEN 80
550 T=LINK(LW):FOR X=LW TO LW-LVL+2 STEP -1
560 LINK(X)=LINK(X-1):NEXT X
570 LINK(LW-LVL+1)=T:PS(LVL)=PS(LVL)+1
580 IF PS(LVL)>LVL THEN 660
590 FLAG=0:FOR X=BOT TO LW-1:T=LINK(X):FOR Y=X+1 TO LW
600 IF C$(T,T)<>C$(LINK(Y),LINK(Y)) THEN 620
610 IF R(LINK(X))>R(LINK(Y)) THEN FLAG=1:Y=LW
620 NEXT Y:NEXT X
630 IF LVL>2 THEN LVL=2
640 IF FLAG THEN 550
650 GOTO 480
660 PS(LVL)=1:IF LVL<>LW-LH THEN LVL=LVL+1:GOTO 550
670 POSITION 16,21:PRINT "NO MORE!"
680 GOSUB 6000:GOTO 80
1000 IF LEN(PS)<=40 THEN NS=PS:GOSUB 2000:RETURN
1010 Y=41:Z=1:FOR X=41 TO 2 STEP -1
1020 IF PS(X,X)=" " THEN Z=0:Y=X:X=2
1030 NEXT X:NS=PS(1,Y-1):GOSUB 2000
1040 PS=PS(Y+1-Z,LEN(PS)):GOTO 1000
2000 IF LEN(NS)=40 THEN PRINT NS:RETURN
2010 POKE 85,INT((40-LEN(NS))/2):PRINT NS:RETURN
3000 POKE 752,0
3010 INPUT TS:IF TS="" THEN 3010
3020 POKE 752,1:RETURN
4000 FAC=1:IF BOT>=LW THEN RETURN
4010 R(LINK(BOT))=1:FOR X=BOT+1 TO LW:R(LINK(X))=1
4020 FAC=FAC*(X-BOT+1):V$=C$(LINK(X),LINK(X))
4030 FOR Y=X-1 TO BOT STEP -1
4040 IF V$<>C$(LINK(Y),LINK(Y)) THEN 4060
4050 R(LINK(X))=R(LINK(Y))+1:FAC=FAC/R(LINK(X)):Y=BOT
4060 NEXT Y:NEXT X:RETURN
5000 GET #1,K:PRINT CLS;:RETURN
6000 POSITION 7,22:PRINT "PRESS ANY KEY TO CONTINUE.";
6010 GOSUB 5000:RETURN

```

TI-99/4A/Optical Illusion

```

10 DIM C$(20),LINK(20),PS(20),R(20)
20 A$="PRESS <SPACE BAR> TO DISPLAY ALL OF THEM, <ENTE
R> "
30 B$=" , OR ANY OTHER KEY TO ENTER ANOTHER WORD."
40 CALL CLEAR
50 PRINT "ENTER JUMBLED WORD OR "&CHR$(34)&"Q"&CHR$(34)
"&" TO"
60 PRINT TAB(12);"QUIT."
70 PRINT
80 INPUT TS
90 IF TS="" THEN 80
100 IF TS<>"Q" THEN 120
110 END
120 LT=LEN(T$)
130 IF (LT<2)+(LT>20) THEN 40
140 BOT=1
150 LW=0
160 WDS$=""

```

PUZZLE

```

170 FOR X=1 TO LT
180 V$=SEG$(T$,X,1)
190 IF (V$<"A")+(V$>"Z")THEN 250
200 W$=W$&V$
210 LW=LW+1
220 C$(LW)=V$
230 PS(LW)=1
240 LINK(LW)=LW
250 NEXT X
260 IF LW<2 THEN 40
270 CALL CLEAR
280 H$=""
290 GOSUB 4000
300 LH=0
310 P$=W$&" HAS "&STR$(LW)&" LETTERS, FORMING "
320 P$=P$&STR$(FAC)&" COMBINATION(S). "
330 GOSUB 2000
340 PRINT " "
350 P$=A$&"TO CHOOSE THE FIRST LETTER(S)"&B$
360 GOSUB 2000
370 GOSUB 5000
380 IF K<32 THEN 810
390 IF K<>13 THEN 50
400 P$="SELECT A LETTER OR LETTERS FROM "&W$&", AND"
410 P$=P$&" I WILL DISPLAY ALL COMBINATIONS BEGINNING"
420 P$=P$&" WITH THAT LETTER OR GROUP OF LETTERS."
430 GOSUB 2000
440 INPUT H$
450 IF H$="" THEN 440
460 LH=LEN(H$)
470 F=0
480 FOR Y=1 TO LH
490 T$=SEG$(H$,Y,1)
500 FOR X=BOT TO LW
510 IF C$(LINK(X))<>T$ THEN 580
520 T=LINK(X)
530 LINK(X)=LINK(BOT)
540 LINK(BOT)=T
550 BOT=BOT+1
560 F=F+1
570 X=LW
580 NEXT X
590 NEXT Y
600 CALL CLEAR
610 IF F=LH THEN 690
620 P$="SORRY, "&W$&" DOES NOT CONTAIN ONE"
630 P$=P$&" OR MORE OF THE LETTERS YOU ENTERED."
640 GOSUB 2000
650 PRINT : " PRESS ANY KEY TO CONTINUE."
660 GOSUB 5000
670 BOT=1
680 GOTO 300
690 GOSUB 4000
700 P$="THERE ARE "&STR$(FAC)&" COMBINATIONS"
710 P$=P$&" BEGINNING WITH "&H$&". "
720 GOSUB 2000
730 PRINT
740 P$=A$&"TO CHANGE INITIAL LETTERS"&B$
750 GOSUB 2000
760 GOSUB 5000
770 IF K<>13 THEN 800
780 BOT=1
790 GOTO 400
800 IF K<32 THEN 50
810 IF LW-BOT>0 THEN 870
820 N$=H$
830 IF BOT>LW THEN 850
840 N$=N$&C$(LINK(BOT))
850 GOSUB 3000
860 GOTO 1330
870 LVL=2
880 WC=0
890 Q=0
900 MW=INT(28/(LW+1))
910 FOR X=1 TO LW
920 PRINT C$(LINK(X));
930 NEXT X
940 WC=WC+1
950 IF WC>=MW THEN 980
960 PRINT " ";
970 GOTO 1090
980 PRINT
990 WC=0
1000 Q=Q+1
1010 IF Q<17 THEN 1090
1020 Q=0
1030 PRINT :TAB(5);"PRESS <SPACE BAR> TO"
1040 PRINT TAB(5);"CONTINUE DISPLAYING"
1050 PRINT " COMBINATIONS OR ANY OTHER"
1060 PRINT TAB(9);"KEY TO EXIT.";
1070 GOSUB 5000
1080 IF K<>32 THEN 40
1090 T=LINK(LW)
1100 FOR X=LW TO LW-LVL+2 STEP -1
1110 LINK(X)=LINK(X-1)
1120 NEXT X
1130 LINK(LW-LVL+1)=T
1140 PS(LVL)=PS(LVL)+1
1150 IF PS(LVL)>LVL THEN 1290
1160 FLAG=0
1170 FOR X=BOT TO LW-1
1180 FOR Y=X+1 TO LW
1190 IF C$(LINK(X))<>C$(LINK(Y))THEN 1230
1200 IF R(LINK(X))<=R(LINK(Y))THEN 1230
1210 FLAG=-1
1220 Y=LW
1230 NEXT Y
1240 NEXT X
1250 IF LVL<=2 THEN 1270
1260 LVL=2
1270 IF FLAG THEN 1090
1280 GOTO 910
1290 PS(LVL)=1
1300 IF LVL=LW-LH THEN 1330
1310 LVL=LVL+1
1320 GOTO 1090
1330 PRINT :TAB(10);"NO MORE!"
1340 PRINT " PRESS ANY KEY TO CONTINUE."
1350 GOSUB 5000
1360 GOTO 50
2000 IF LEN(P$)>28 THEN 2040
2010 N$=P$
2020 GOSUB 3000
2030 RETURN
2040 Y=29
2050 Z=1
2060 FOR X=29 TO 2 STEP -1
2070 IF SEG$(P$,X,1)<>" " THEN 2110
2080 Z=0
2090 Y=X
2100 X=2
2110 NEXT X
2120 N$=SEG$(P$,1,Y-1)
2130 GOSUB 3000
2140 P$=SEG$(P$,Y-Z+1,LEN(P$)-Y+Z)
2150 GOTO 2000
3000 PRINT TAB((28-LEN(N$))/2);N$;
3010 IF LEN(N$)=28 THEN 3030
3020 PRINT
3030 RETURN
4000 R(LINK(BOT))=1
4010 FAC=1
4020 FOR X=BOT+1 TO LW
4030 R(LINK(X))=1
4040 FAC=FAC*(X-BOT+1)
4050 T$=C$(LINK(X))
4060 FOR Y=X-1 TO BOT STEP -1
4070 IF T$<>C$(LINK(Y))THEN 4110
4080 R(LINK(X))=R(LINK(Y))+1
4090 FAC=FAC/R(LINK(X))
4100 Y=BOT
4110 NEXT Y

```

```
4120 NEXT X
4130 RETURN
5000 CALL KEY(3,K,S)
5010 IF S=0 THEN 5000
5020 CALL CLEAR
5030 RETURN
```

MODIFICATIONS FOR OTHER COMPUTERS

ADAM/Optical Illusion

Use the base version, with the following alterations: Delete line 10. Change CLS to HOME in lines 60, 160, 220, 320, 350, 360, 420, and 520. Finally, change lines 30, 5000, and 6000 to read as follows:

```
30 sh = 19:sw = 31:tru = 1:tx = 1:es = " <RETURN> "
5000 ms = " "+STR$(v)+" ":RETURN
6000 GET k$:IF k$=CHR$(3) THEN END
```

Apple/Optical Illusion

Use the base version, with the following alterations: Delete line 10. Change CLS to HOME in lines 60, 160, 220, 320, 350, 360, 420, and 520. Finally, change lines 30, 5000, and 6000 to read as follows:

```
30 SH = 20:SW = 40:TRU = 1:TX = 1:ES = " <RETURN> "
5000 MS = " "+STR$(V)+" ":RETURN
6000 GET K$:IF K$=CHR$(3) THEN END
```

Commodore 64/Optical Illusion

Use the base version, with the following alterations: Delete line 10. Change CLS to PRINT CLS: in lines 60, 160, 220, 320, 350, 360, 420, and 520. Finally, change lines 30, 2010, and 6000 to read as follows:

```
30 SH=21:SW=40:TRU=-1:ES=" <RETURN> ":CLS=CHR$(147)
2010 PRINT SPC((SW-LEN(NS))/2);NS:RETURN
6000 GET K$:IF K$="" THEN 6000
```

IBM PC/Optical Illusion

Use the base version, except change lines 10, 30, and 2010 to read as follows:

```
10 KEY OFF:LOCATE ,,0
30 SH=21:SW=80:TRU=-1:ES=" <ENTER> ":WIDTH SW
2010 PRINT SPC(INT((SW-LEN(NS))/2));NS:RETURN
```

IBM PCjr/Optical Illusion

Use the base version, except change lines 10, 30, and 2010 to read as follows:

```
10 KEY OFF:LOCATE ,,0
30 SH=20:SW=40:TRU=-1:ES=" <ENTER> ":WIDTH SW
2010 PRINT SPC(INT((SW-LEN(NS))/2));NS:RETURN
```

TRS-80 Color Computer/Optical Illusion

Use the base version, except change line 30 to read as follows:

```
30 SH=11:SW=32:TRU=-1:TX=0:ES=" <ENTER> "
```

TRS-80 Model 4/Optical Illusion

Use the base version, except change lines 10 and 30 to read as follows:

```
10 PRINT CHR$(15);
30 SH=20:SW=80:TRU=-1:TX=0:ES=" <ENTER> "
```

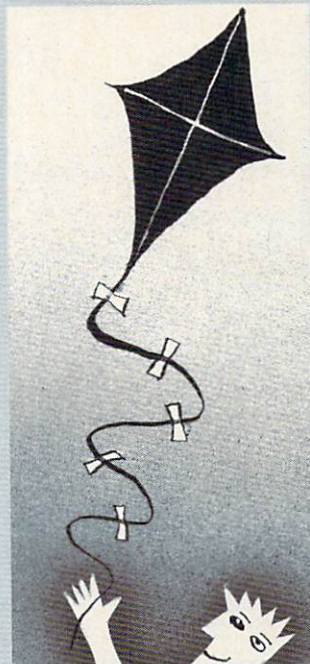
VIC-20 w/8K or 16K RAM Cartridge/Optical Illusion

Use the base version, with the following alterations: Delete line 10. Change CLS to PRINT CLS: in lines 60, 160, 220, 320, 350, 360, 420, and 520. Finally, change lines 30, 2010, and 6000 to read as follows:

```
30 SH=17:SW=22:TRU=-1:ES=" <RETURN> ":CLS=CHR$(147)
2010 PRINT SPC((SW-LEN(NS))/2);NS:RETURN
6000 GET K$:IF K$="" THEN 6000
```

KITE

BY JOEY LATIMER



There's a little of Charlie Brown in all of us on a spring day like today. And what does Charlie do when the wind blows warm and the air is clear? He flies a kite, of course—and so can you, regardless of the weather! Just type in our *Kite* program, grab that old ball of twine, and go soaring!

ADAM/Kite

```
10 DIM a(18)
20 n = 1
30 fr = 0
40 a(1) = 20
50 FOR i = 2 TO 18
60 a(i) = a(i-1)+INT(RND(1)*3)-1
70 NEXT i
80 HOME
90 GR
100 COLOR= 7
110 FOR i = 0 TO 39
120 VLIN 0,39 AT i
130 NEXT i
140 c1 = INT(RND(1)*11)+9
150 IF c1 > 15 THEN c1 = c1-15
160 c2 = INT(RND(1)*11)+9
170 IF c2 > 15 THEN c2 = c2-15
180 w = 0
190 f1 = INT(RND(1)*2)
200 f2 = INT(RND(1)*2)
210 FOR i = 3 TO 19
220 FOR j = -w TO w
230 COLOR= c1
240 IF (f2 AND i/2 = INT(i/2)) OR (NOT f2 AND fr) THEN
    COLOR= c2
250 IF f1 THEN PLOT 20+j,i
260 IF NOT f1 THEN PLOT i+9,11+j
270 IF j < w THEN fr = NOT fr
280 NEXT j
290 w = w+(i < 11)-(i >= 11)
300 NEXT i
310 FOR i = 2 TO 18
320 x = a(i-1)+INT(RND(1)*2)-n
330 IF ABS(x-a(i)) > 1 THEN x = x-SGN(x-a(i))
340 COLOR= 7
350 PLOT a(i),i+18
360 a(i) = x
370 COLOR= INT(RND(1)*8)+8
380 PLOT x,i+18
390 NEXT i
400 IF RND(1) < 0.01 THEN n = NOT n
410 IF RND(1) > 0.95 THEN 140
420 GOTO 310
```

SPRING PROGRAMS

Apple/Kite

```
10 DIM A(18)
20 N = 1
30 FR = 0
40 A(1) = 20
50 FOR I = 2 TO 18
60 A(I) = A(I-1)+INT(RND(1)*3)-1
70 NEXT I
80 HOME
90 GR
100 COLOR= 6
110 FOR I = 0 TO 39
120 VLIN 0,39 AT I
130 NEXT I
140 C1 = INT(RND(1)*11)+9
150 IF C1 > 15 THEN C1 = C1-15
160 C2 = INT(RND(1)*11)+9
170 IF C2 > 15 THEN C2 = C2-15
180 W = 0
190 F1 = INT(RND(1)*2)
200 F2 = INT(RND(1)*2)
210 FOR I = 3 TO 19
220 FOR J = -W TO W
230 COLOR= C1
240 IF (F2 AND I/2 = INT(I/2)) OR (NOT F2 AND FR) THEN
    COLOR= C2
250 IF F1 THEN PLOT 20+J,I
260 IF NOT F1 THEN PLOT I+9,11+J
270 IF J < W THEN FR = NOT FR
280 NEXT J
290 W = W+(I < 11)-(I >= 11)
300 NEXT I
310 FOR I = 2 TO 18
320 X = A(I-1)+INT(RND(1)*2)-N
330 IF ABS(X-A(I)) > 1 THEN X = X-SGN(X-A(I))
340 COLOR= 6
350 PLOT A(I),I+18
360 A(I) = X
370 COLOR= INT(RND(1)*9)+7
380 PLOT X,I+18
390 NEXT I
400 IF RND(1) < 0.01 THEN N = NOT N
410 IF RND(1) < 0.05 THEN 140
420 GOTO 310
```

Atari/Kite

```
10 DIM A(12)
20 N=1
30 FR=0
40 A(1)=20
50 FOR I=2 TO 12
60 A(I)=A(I-1)+INT(RND(0)*3)-1
70 NEXT I
80 GRAPHICS 3+16
90 SETCOLOR 4,9,6
100 C1=INT(RND(0)*11)+9
110 IF C1>15 THEN C1=C1-15
120 C2=INT(RND(0)*11)+9
130 IF C2>15 THEN C2=C2-15
140 C3=INT(RND(0)*11)+9
150 IF C3>15 THEN C3=C3-15
160 SETCOLOR 0,C1,5
170 SETCOLOR 1,C2,10
180 SETCOLOR 2,C3,10
190 W=0
200 F1=INT(RND(0)*2)
210 F2=INT(RND(0)*2)
220 FOR I=0 TO 12
230 FOR J=-W TO W
240 COLOR 1
250 IF (F2 AND I/2=INT(I/2)) OR ( NOT F2 AND FR) THEN
    COLOR 2
```

```
260 IF F1 THEN PLOT 20+J,I
270 IF NOT F1 THEN PLOT I+14,6+J
280 IF J<W THEN FR= NOT FR
290 NEXT J
300 W=W+(I<6)-(I>=6)
310 NEXT I
320 FOR I=2 TO 12
330 X=A(I-1)+INT(RND(1)*2)-N
340 IF ABS(X-A(I))>1 THEN X=X-SGN(X-A(I))
350 COLOR 4
360 PLOT A(I),I+11
370 A(I)=X
380 COLOR 3
390 PLOT X,I+11
400 NEXT I
410 IF RND(0)<0.01 THEN N= NOT N
420 IF RND(0)<0.05 THEN 100
430 GOTO 320
```

Commodore 64/Kite

```
10 DIM A(12)
20 SB=1024
30 CB=55296
40 N=-1
50 FR=0
60 A(1)=20
70 FOR I=2 TO 12
80 A(I)=A(I-1)+INT(RND(1)*3)-1
90 NEXT I
100 PRINT CHR$(147)
110 POKE 53280,14
120 POKE 53281,14
130 C1=INT(RND(1)*13)+1
140 C2=INT(RND(1)*13)+1
150 W=0
160 F1=INT(RND(1)*2)-1
170 F2=INT(RND(1)*2)-1
180 FOR I=0 TO 12
190 FOR J=-W TO W
200 C=C1
210 IF (F2 AND I/2=INT(I/2)) OR (NOT F2 AND FR) THEN C
    =C2
220 IF F1 THEN POKE SB+(20+J)+40*I,160:POKE CB+(20+J)+
    40*I,C
230 IF NOT F1 THEN POKE SB+(I+14)+40*(6+J),160:POKE CB
    +(I+14)+40*(6+J),C
240 IF J<W THEN FR=NOT FR
250 NEXT J
260 W=W-(I<6)+(I>=6)
270 NEXT I
280 FOR I=2 TO 12
290 X=A(I-1)+INT(RND(1)*2)+N
300 IF ABS(X-A(I))>1 THEN X=X-SGN(X-A(I))
310 POKE CB+A(I)+40*(I+11),14
320 A(I)=X
330 POKE SB+X+40*(I+11),160
340 POKE CB+X+40*(I+11),INT(RND(1)*8)+1
350 NEXT I
360 IF RND(1)<0.01 THEN N=NOT N
370 IF RND(1)<0.1 THEN 130
380 GOTO 280
```

IBM PC w/Color Graphics Adapter & IBM PCjr/Kite

```
10 DIM A(12)
20 KEY OFF
30 SCREEN 0,1
40 WIDTH 40
50 LOCATE ,0
60 N=-1
70 FR=0
```

```

80 A(1)=20
90 FOR I=2 TO 12
100 A(I)=A(I-1)+INT(RND*3)-1
110 NEXT I
120 COLOR ,3,3
130 CLS
140 C1=INT(RND*15)+4
150 IF C1>15 THEN C1=C1-16
160 C2=INT(RND*15)+4
170 IF C2>15 THEN C2=C2-16
180 W=0
190 F1=INT(RND*2)-1
200 F2=INT(RND*2)-1
210 FOR I=2 TO 13
220 FOR J=-W TO W
230 COLOR C1
240 IF (F2 AND I/2=INT(I/2)) OR (NOT F2 AND FR) THEN C
OLOR C2
250 IF F1 THEN LOCATE I,20+J
260 IF NOT F1 THEN LOCATE 7+J,I+13
270 PRINT CHR$(219)
280 IF J<W THEN FR=NOT FR
290 NEXT J
300 W=W-(I<7)+(I>=7)
310 NEXT I
320 FOR I=2 TO 12
330 X=A(I-1)+INT(RND*2)+N
340 IF ABS(X-A(I))>1 THEN X=X-SGN(X-A(I))
350 LOCATE I+11,A(I):PRINT CHR$(32)
360 COLOR INT(RND*8)+8
370 A(I)=X
380 LOCATE I+11,X:PRINT CHR$(219)
390 NEXT I
400 IF RND<.01 THEN N=NOT N
410 IF RND<.1 THEN 140
420 GOTO 320

```

TI-99/4A/Kite

```

10 DIM A(12)
20 RANDOMIZE
30 A$="FFFFFFFFFFFFFF"
40 N=-1
50 FR=0
60 CALL CLEAR
70 FOR X=0 TO 7
80 CALL COLOR(X+9,X+6,X+6)
90 CALL CHAR(96+8*X,A$)
100 NEXT X
110 A(1)=16
120 FOR I=2 TO 12
130 A(I)=A(I-1)+INT(RND*3)-1
140 NEXT I
150 CALL SCREEN(6)
160 C1=INT(RND*7)*8+104
170 C2=INT(RND*7)*8+104
180 W=0
190 F1=-INT(RND*2)
200 F2=-INT(RND*2)
210 FOR I=1 TO 13
220 FOR J=-W TO W
230 C=C1
240 IF ((-F2-1)+(I/2<>INT(I/2)))*(F2-FR-1) THEN 260
250 C=C2
260 IF F1 THEN 290
270 CALL HCHAR(6+J,I+10,C)
280 GOTO 300
290 CALL HCHAR(I,J+16,C)
300 IF J=W THEN 320
310 FR=-FR-1
320 NEXT J
330 W=W-(I<6)+(I>=6)
340 NEXT I

```

```

350 FOR I=2 TO 12
360 X=A(I-1)+INT(RND*2)+N
370 IF ABS(X-A(I))<=1 THEN 390
380 X=X-(X<A(I))+(X>A(I))
390 CALL HCHAR(I+10,A(I),96)
400 A(I)=X
410 CALL HCHAR(I+10,A(I),INT(RND*7)*8+104)
420 NEXT I
430 IF RND>.1 THEN 450
440 N=-N-1
450 IF RND<.1 THEN 160
460 GOTO 350

```

TRS-80 Color Computer/Kite

```

10 DIM A(6)
20 N=-1
30 A(1)=16
40 FOR I=2 TO 6
50 A(I)=A(I-1)+RND(2)-1
60 NEXT I
70 CLS(3)
80 C1=175+RND(7)*16
90 IF C1>255 THEN C1=C1-128
100 C2=175+RND(7)*16
110 IF C2>255 THEN C2=C2-128
120 W=0
130 F1=RND(2)-2
140 F2=RND(2)-2
150 FOR I=0 TO 10
160 FOR J=-W TO W
170 C=C1
180 IF (F2 AND I/2=INT(I/2)) OR (NOT F2 AND FR) THEN C
=C2
190 Z=NOT Z
200 IF F1 THEN PLACE=16+J+32*(I) ELSE PLACE=I+11+32*(5
+J)
210 PRINT@PLACE,CHR$(C);
220 IF J<W THEN FR=NOT FR
230 NEXT J
240 Z=NOT Z
250 W=W-(I<5)+(I>=5)
260 NEXT I
270 FOR I=2 TO 6
280 X=A(I-1)+RND(2)-1+N
290 IF ABS(X-A(I))>1 THEN X=X-SGN(X-A(I))
300 PRINT@32*(I+9)+A(I),CHR$(175);
310 A(I)=X
320 PRINT@32*(I+9)+X,CHR$(175+RND(5)*16);
330 NEXT I
340 IF RND(10)<3 THEN N=NOT N
350 IF RND(20)=1 THEN 80
360 GOTO 270

```

TRS-80 Model III/Kite

```

10 DIM A(5)
20 N=-1
30 FR=0
40 A(1)=29
50 FOR I=2 TO 5
60 A(I)=A(I-1)+RND(3)-2
70 NEXT I
80 CLS
90 C1=RND(62)+129
100 C2=RND(62)+129
110 W=0
120 F1=RND(2)-2
130 F2=RND(2)-2
140 FOR I=0 TO 10-10*(NOT F1) STEP 2+F1
150 FOR J=-W TO W
160 C=C1

```

```

170 IF (F2=0 AND I/2=INT(I/2)) OR (F2 AND FR) THEN C=C
2
180 IF F1 THEN PLACE=29+J+64*I ELSE PLACE=(5+J)*64+19+
I
190 PRINT@PLACE,CHR$(C);
200 IF J<W THEN FR=NOT FR
210 NEXT J
220 IF F1 THEN W=W-2*((I<5)-(I>=5)) ELSE W=W-((I<10)-(
I>=10))
230 NEXT I
240 FOR I=2 TO 5
250 X=A(I-1)+RND(2)+N-1
260 IF ABS(X-A(I))>1 THEN X=X-SGN(X-A(I))
270 PRINT @A(I)+64*(I+9),CHR$(128);
280 A(I)=X
290 PRINT @A(I)+64*(I+9),CHR$(153);
300 NEXT I
310 IF RND(10)<3 THEN N=NOT N
320 IF RND(100)<4 THEN 90
330 GOTO 240
    
```

VIC-20/Kite

```

10 DIM A(11)
20 SB=7680
30 CB=38400
40 N=-1
50 FR=0
60 A(1)=11
70 FOR I=2 TO 11
80 A(I)=A(I-1)+INT(RND(1)*3)-1
90 NEXT I
100 PRINT CHR$(147)
110 POKE 36879,110
120 C1=INT(RND(1)*6)
130 C2=INT(RND(1)*6)
140 W=0
150 F1=INT(RND(1)*2)-1
160 F2=INT(RND(1)*2)-1
170 FOR I=0 TO 12
180 FOR J=-W TO W
190 C=C1
200 IF (F2 AND I/2=INT(I/2)) OR (NOT F2 AND FR) THEN C
=C2
210 IF F1 THEN POKE SB+(11+J)+22*I,160:POKE CB+(11+J)+
22*I,C
220 IF NOT F1 THEN POKE SB+(I+5)+22*(6+J),160:POKE CB+
(I+5)+22*(6+J),C
230 IF J<W THEN FR=NOT FR
240 NEXT J
250 W=W-(I<6)+(I>=6)
260 NEXT I
270 FOR I=2 TO 11
280 X=A(I-1)+INT(RND(1)*2)+N
290 IF ABS(X-A(I))>1 THEN X=X-SGN(X-A(I))
300 POKE CB+A(I)+22*(I+11),6
310 A(I)=X
320 POKE SB+X+22*(I+11),160
330 POKE CB+X+22*(I+11),INT(RND(1)*5)+1
340 NEXT I
350 IF RND(1)<.01 THEN N=NOT N
360 IF RND(1)<.05 THEN 120
370 GOTO 270
    
```

SOLUTION TO OPTICAL ILLUSION

If you were probably able to unscramble lines 1 through 5 of the eye chart. Properly arranged, the five lines read as follows: TEAM MEETS MONDAY TIMPANY BASEMENT. The hidden clue to the time of the robbery is contained in the line numbers to the left of each line on the chart. Each number points to one letter in the correctly unscrambled word for that line (for example, the first line of the chart unscrambles to the word TEAM, and the number to the left of that line (1) tells you to take the first letter: 'T...'). When the letters taken from each line of the chart are read in order, they spell out the time of the robbery: 12:30 PM.

BANNER

BY JOHN JAINSHIGG



Want to send someone an unusual greeting? Design a grand welcome for a returning student or traveler? Or simply announce something in letters TOO BIG to be ignored? You can, with our *Banner* program, your computer, and your printer. *Banner* will print any brief message lengthwise on your printer in letters up to 8 inches high (or more, depending on carriage width).

Type in the program as shown for your computer. Then, add the DATA statements, lines 1000-1290, from the ADAM version. SAVE the program to disk or cassette.

When you're ready to print your banner, first make sure your printer is hooked up and turned on, then type RUN. The program will ask you how many characters your printer can print on a line (a standard printer prints 80 characters on a line, but 40 characters is also common). Check your printer manual if you're

not sure, and input the required information. Then press RETURN or ENTER.

Next, the program will prompt you to tell it how big you want the letters of your banner to be. Select from among the range of sizes the computer offers.

Then the computer will ask what character you want used in composing your banner. Input a single character (e.g., *, \$, #). The computer will draw the big letters in your banner using the character you have selected.

Finally, the program will prompt you to input your message. Use uppercase letters, numbers, spaces, and normal punctuation only. Lowercase, special, and graphic characters will appear as blanks in the completed banner. Note that on some systems, putting a comma in your message will cause the part of the message following it to be ignored. To avoid wasting paper, it's best to experiment with short messages first. Have fun!

ADAM/Banner

```

10 DIM a%(471),bin%(6)
20 HOME
30 PRINT "GETTING READY ... PLEASE WAIT."
40 FOR i = 0 TO 464 STEP 8
50 FOR j = 0 TO 7
60 IF j = 0 OR j = 7 THEN a%(i+j) = 0:GOTO 80
70 READ a%(i+j)
80 NEXT j
90 NEXT i
100 a%(80) = 8
110 a%(87) = 8
120 a%(367) = 63
130 a%(447) = 63
140 FOR i = 0 TO 6
150 bin%(i) = 2^i
160 NEXT i
170 HOME
180 PRINT TAB(12);"*BANNER*"
    
```



```

190 PRINT
200 PRINT "HOW TALL DO YOU WANT THE"
210 PRINT "LETTERS IN YOUR BANNER"
220 PRINT
230 INPUT "(1=SHORTEST; 11=TALLEST)?";cc
240 IF cc < 1 OR cc > 11 THEN 220
250 HOME
260 PRINT "WHAT CHARACTER SHALL I USE TO"
270 PRINT "COMPOSE THE LETTERS OF YOUR"
280 PRINT "BANNER"
290 PRINT
300 INPUT "(E.G., *, $, #)?";ch$
310 IF ch$ = "" THEN 250
320 ch$ = LEFT$(ch$,1)
330 HOME
340 PRINT "PLEASE ENTER THE MESSAGE YOU"
350 PRINT "WANT PRINTED ON YOUR BANNER."
360 PRINT "DO NOT USE LOWERCASE LETTERS"
370 PRINT "OR COMMAS."
380 PRINT
390 INPUT message$
400 PRINT
410 PRINT "WHEN YOUR PRINTER IS READY,"
420 PRINT "PLEASE PRESS ANY KEY."
430 GET k$
440 HOME
450 PR #1
460 FOR i = 1 TO LEN(message$)
470 pntr = (ASC(MID$(message$,i,1))-32)*8
480 IF pntr < 0 OR pntr > 464 THEN pntr = 0
490 FOR j = pntr TO pntr+7
500 ln$ = ""
510 v = a$(j)
520 FOR k = 6 TO 0 STEP -1
530 IF v >= bin$(k) THEN v = v-bin$(k):c$ = ch$:GOTO 5
540 c$ = " "
550 FOR l = 1 TO cc
560 ln$ = c$+ln$
570 NEXT l
580 NEXT k
590 FOR k = 1 TO (cc+1)/2
600 PRINT ln$
610 NEXT k
620 NEXT j
630 NEXT i
640 PR #0
650 HOME
660 PRINT "YOUR BANNER IS FINISHED."
670 PRINT
680 PRINT "PRESS <P> TO PRINT ANOTHER"
690 PRINT "BANNER OR <E> TO END."
700 GET k$
710 IF k$ = "P" OR k$ = "p" THEN 170
720 IF k$ <> "E" AND k$ <> "e" THEN 700
730 END
1000 DATA 0,0,0,0,0,0,0,0,61,61,0,0
1010 DATA 0,56,0,0,56,0,18,63,18,18,63,18
1020 DATA 18,58,107,107,46,36,51,54,12,24,51,35
1030 DATA 6,47,121,93,118,39,0,0,52,56,0,0
1040 DATA 0,0,30,63,51,33,33,51,63,30,0,0
1050 DATA 42,62,28,28,62,42,8,8,62,62,8,8
1060 DATA 0,0,13,14,0,0,8,8,8,8,8,8
1070 DATA 0,0,3,3,0,0,3,6,12,24,48,32
1080 DATA 30,63,37,41,63,30,1,17,63,63,1,1
1090 DATA 17,51,39,45,57,17,34,35,41,61,55,34
1100 DATA 6,14,26,63,63,2,58,59,41,41,47,38
1110 DATA 30,63,41,41,47,6,32,35,39,44,56,48
1120 DATA 22,63,41,41,63,22,16,57,41,43,62,28
1130 DATA 0,0,54,54,0,0,0,0,109,110,0,0
1140 DATA 0,8,28,54,99,65,18,18,18,18,18,18
1150 DATA 65,99,54,28,8,0,16,48,37,45,56,16
1160 DATA 30,63,33,45,61,29,15,31,50,50,31,15
1170 DATA 63,63,41,41,63,22,30,63,33,33,51,18
1180 DATA 63,63,33,51,30,12,63,63,41,41,41,33
1190 DATA 63,63,40,40,40,32,30,63,33,37,39,39
1200 DATA 63,63,8,8,63,63,33,33,63,63,33,33

```

```

1210 DATA 2,3,1,1,63,62,63,63,12,30,51,33
1220 DATA 63,63,1,1,1,63,63,24,12,24,63
1230 DATA 63,63,28,14,63,63,30,63,33,33,63,30
1240 DATA 63,63,36,36,60,24,30,63,33,34,63,29
1250 DATA 63,63,36,38,63,25,16,57,41,41,47,6
1260 DATA 32,32,63,63,32,32,63,63,1,1,63,63
1270 DATA 60,62,3,3,62,60,63,63,6,12,6,63
1280 DATA 51,63,12,12,63,51,48,56,15,15,56,48
1290 DATA 35,39,45,57,49,33

```

Apple/Banner

```

10 DIM AX(471),BIN$(6)
20 HOME
30 PRINT TAB(6);"GETTING READY ... PLEASE WAIT."
40 FOR I = 0 TO 464 STEP 8
50 FOR J = 0 TO 7
60 IF J = 0 OR J = 7 THEN AX(I+J) = 0:GOTO 80
70 READ AX(I+J)
80 NEXT J
90 NEXT I
100 AX(80) = 8
110 AX(87) = 8
120 AX(367) = 63
130 AX(447) = 63
140 FOR I = 0 TO 6
150 BIN$(I) = 2^I
160 NEXT I
170 HOME
180 PRINT TAB(17);"*BANNER*"
190 PRINT
200 PRINT "HOW MANY LETTERS CAN YOUR PRINTER"
210 INPUT "PRINT ON A SINGLE LINE?";CL
220 IF CL >= 7 AND CL <= 136 THEN 270
230 PRINT
240 PRINT "I DON'T THINK THAT'S RIGHT."
250 PRINT "PLEASE CHECK YOUR MANUAL."
260 GOTO 200
270 HOME
280 PRINT "HOW TALL DO YOU WANT THE LETTERS"
290 PRINT "IN YOUR BANNER"
300 PRINT
310 PRINT "(1=SHORTEST; ";INT(CL/7);"=TALLEST)";
320 INPUT CC
330 IF CC < 1 OR CC > INT(CL/7) THEN 300
340 HOME
350 PRINT "WHAT CHARACTER SHALL I USE TO"
360 PRINT "COMPOSE THE LETTERS OF YOUR BANNER"
370 INPUT "(E.G., *, $, #)?";CH$
380 IF CH$ = "" THEN 340
390 CH$ = LEFT$(CH$,1)
400 HOME
410 PRINT "PLEASE ENTER THE MESSAGE YOU WANT"
420 PRINT "PRINTED ON YOUR BANNER. DO NOT USE"
430 PRINT "LOWERCASE LETTERS OR COMMAS."
440 PRINT
450 INPUT MESSAGE$
460 PRINT
470 PRINT "WHEN YOUR PRINTER IS READY,"
480 PRINT "PLEASE PRESS ANY KEY."
490 GET K$
500 PR #1
510 FOR I = 1 TO LEN(MESSAGE$)
520 PNTR = (ASC(MID$(MESSAGE$,I,1))-32)*8
530 IF PNTR < 0 OR PNTR > 464 THEN PNTR = 0
540 FOR J = PNTR TO PNTR+7
550 LN$ = ""
560 V = AX(J)
570 FOR K = 6 TO 0 STEP -1
580 IF V >= BIN$(K) THEN V = V-BIN$(K):C$ = CH$:GOTO 6
590 C$ = " "
600 FOR L = 1 TO CC
610 LN$ = C$+LN$
620 NEXT L

```

SPRING PROGRAMS

```
630 NEXT K
640 FOR K = 1 TO (CC+1)/2
650 PRINT LINES
660 NEXT K
670 NEXT J
680 NEXT I
690 PR# 0
700 HOME
710 PRINT "YOUR BANNER IS FINISHED."
720 PRINT
730 PRINT "PRESS <P> TO PRINT ANOTHER BANNER"
740 PRINT "OR <E> TO END.";
750 GET K$
760 IF K$ = "P" THEN 270
770 IF K$ <> "E" THEN 750
780 END
```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

Atari/Banner

```
10 DIM A(471),BIN(6),MESSAGES(255),LINES(255),C$(255),
  CH$(1)
20 OPEN #1,4,0,"K:"
30 PRINT CHR$(125)
40 POSITION 5,0:PRINT "GETTING READY ... PLEASE WAIT."
50 FOR I=0 TO 464 STEP 8
60 FOR J=0 TO 7
70 IF J=0 OR J=7 THEN A(I+J)=0:GOTO 100
80 READ A
90 A(I+J)=A
100 NEXT J
110 NEXT I
120 A(80)=8
130 A(87)=8
140 A(367)=63
150 A(447)=63
160 FOR I=0 TO 6
170 BIN(I)=INT(2^I+.5)
180 NEXT I
190 PRINT CHR$(125)
200 POSITION 16,0:PRINT "*BANNER*"
210 PRINT
220 PRINT "HOW MANY LETTERS CAN YOUR PRINTER"
230 PRINT "PRINT ON A SINGLE LINE";
240 INPUT CL
250 IF CL>=7 AND CL<=136 THEN 300
260 PRINT
270 PRINT "I DON'T THINK THAT'S RIGHT."
280 PRINT "PLEASE CHECK YOUR MANUAL."
290 GOTO 220
300 PRINT CHR$(125);
310 PRINT "HOW TALL DO YOU WANT THE LETTERS"
320 PRINT "IN YOUR BANNER"
330 PRINT
340 PRINT "(1=SHORTEST; ";INT(CL/7);"=TALLEST)";
350 INPUT CC
360 IF CC<1 OR CC>INT(CL/7) THEN 330
370 PRINT CHR$(125);
380 PRINT "WHAT CHARACTER SHALL I USE TO"
390 PRINT "COMPOSE THE LETTERS OF YOUR BANNER"
400 PRINT
410 PRINT "(E.G., *, $, #)";
420 INPUT CH$
430 IF CH$="" THEN 370
440 CH$=CH$(1,1)
450 PRINT CHR$(125);
460 PRINT "PLEASE ENTER THE MESSAGE YOU WANT"
470 PRINT "PRINTED ON YOUR BANNER. DO NOT USE"
480 PRINT "LOWERCASE LETTERS OR COMMAS."
490 PRINT
500 INPUT MESSAGES
510 PRINT
520 PRINT "WHEN YOUR PRINTER IS READY,"
530 PRINT "PLEASE PRESS ANY KEY."
540 GET #1,K
```

```
550 OPEN #2,8,0,"P:"
560 FOR I=1 TO LEN(MESSAGES)
570 PNTR=(ASC(MESSAGES(I,I))-32)*8
580 IF PNTR<0 OR PNTR>464 THEN PNTR=0
590 FOR J=PNTR TO PNTR+7
600 LINES=""
610 V=A(J)
620 FOR K=6 TO 0 STEP -1
630 IF V>=BIN(K) THEN V=V-BIN(K):C$="*":GOTO 650
640 C$=""
650 FOR L=1 TO CC
660 C$(2)=LINES
670 LINES=C$
680 NEXT L
690 NEXT K
700 FOR K=1 TO (CC+1)/2
710 PRINT #2;LINES
720 NEXT K
730 NEXT J
740 NEXT I
750 CLOSE #2
760 PRINT CHR$(125);
770 PRINT "YOUR BANNER IS FINISHED."
780 PRINT
790 PRINT "PRESS <P> TO PRINT ANOTHER BANNER"
800 PRINT "OR <E> TO END."
810 GET #1,K
820 IF K=ASC("P") THEN 300
830 IF K<>ASC("E") THEN 810
840 END
```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

Commodore 64/Banner

```
10 DIM AX(471),BIN%(6)
20 PRINT CHR$(147);
30 PRINT TAB(5);"GETTING READY ... PLEASE WAIT."
40 FOR I=0 TO 464 STEP 8
50 FOR J=0 TO 7
60 IF J=0 OR J=7 THEN AX(I+J)=0:GOTO 80
70 READ AX(I+J)
80 NEXT J
90 NEXT I
100 AX(80)=8
110 AX(87)=8
120 AX(367)=63
130 AX(447)=63
140 FOR I=0 TO 6
150 BIN%(I)=2^I
160 NEXT I
170 PRINT CHR$(147);
180 PRINT TAB(16);"*BANNER*"
190 PRINT
200 PRINT "HOW MANY LETTERS CAN YOUR PRINTER"
210 INPUT "PRINT ON A SINGLE LINE";CL
220 IF CL>=7 AND CL<=136 THEN 270
230 PRINT
240 PRINT "I DON'T THINK THAT'S RIGHT."
250 PRINT "PLEASE CHECK YOUR MANUAL."
260 GOTO 200
270 PRINT CHR$(147);
280 PRINT "HOW TALL DO YOU WANT THE LETTERS"
290 PRINT "IN YOUR BANNER"
300 PRINT
310 PRINT "(1=SHORTEST;";STR$(INT(CL/7));"=TALLEST)";
320 INPUT CC
330 IF CC<1 OR CC>INT(CL/7) THEN 300
340 PRINT CHR$(147);
350 PRINT "WHAT CHARACTER SHALL I USE TO"
360 PRINT "COMPOSE THE LETTERS OF YOUR BANNER"
370 PRINT
380 INPUT "(E.G., *, $, #)";CH$
390 IF CH$="" THEN 340
400 CH$=LEFT$(CH$,1)
410 PRINT CHR$(147);
420 PRINT "PLEASE ENTER THE MESSAGE YOU WANT"
```

SPRING PROGRAMS

```
430 PRINT "PRINTED ON YOUR BANNER. DO NOT USE"
440 PRINT "LOWERCASE LETTERS OR COMMAS."
450 PRINT
460 MESSAGES=""
470 INPUT MESSAGES
480 PRINT
490 PRINT "WHEN YOUR PRINTER IS READY,"
500 PRINT "PLEASE PRESS ANY KEY."
510 GET K$
520 IF K$="" THEN 510
530 OPEN 4,4
540 CMD4
550 FOR I=1 TO LEN(MESSAGES)
560 PNTR=(ASC(MID$(MESSAGES,I,1))-32)*8
570 IF PNTR<0 OR PNTR>464 THEN PNTR=0
580 FOR J=PNTR TO PNTR+7
590 LINES=""
600 V=AX(J)
610 FOR K=6 TO 0 STEP -1
620 IF V>=BIN$(K) THEN V=V-BIN$(K):C$=CH$:GOTO 640
630 C$=" "
640 FOR L=1 TO CC
650 LINES=C$+LINES
660 NEXT L
670 NEXT K
680 FOR K=1 TO (CC+1)/2
690 PRINT LINES
700 NEXT K
710 NEXT J
720 NEXT I
730 PRINT#4
740 CLOSE 4
750 PRINT CHR$(147);
760 PRINT "YOUR BANNER IS FINISHED."
770 PRINT
780 PRINT "PRESS <P> TO PRINT ANOTHER"
790 PRINT "BANNER OR <E> TO END."
800 GET K$
810 IF K$="P" THEN 270
820 IF K$<>"E" THEN 800
830 END
```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

IBM PCs/Banner

```
10 DIM AX(471),BIN$(6)
20 WIDTH 40
30 SCREEN 1,0
40 CLS
50 PRINT TAB(6);"GETTING READY ... PLEASE WAIT."
60 FOR I=0 TO 464 STEP 8
70 FOR J=0 TO 7
80 IF J=0 OR J=7 THEN AX(I+J)=0:GOTO 100
90 READ AX(I+J)
100 NEXT J
110 NEXT I
120 AX(80)=8
130 AX(87)=8
140 AX(367)=63
150 AX(447)=63
160 FOR I=0 TO 6
170 BIN$(I)=2^I
180 NEXT I
190 CLS
200 PRINT TAB(17);"*BANNER*"
210 PRINT
220 PRINT "HOW MANY LETTERS CAN YOUR PRINTER"
230 INPUT "PRINT ON A SINGLE LINE";CL
240 IF CL>=7 AND CL<=136 THEN 290
250 PRINT
260 PRINT "I DON'T THINK THAT'S RIGHT."
270 PRINT "PLEASE CHECK YOUR MANUAL."
280 GOTO 220
290 CLS
300 PRINT "HOW TALL DO YOU WANT THE LETTERS"
310 PRINT "IN YOUR BANNER"
```

```
320 PRINT
330 PRINT "(1=SHORTEST;";STR$(INT(CL/7));"=TALLEST)";
340 INPUT CC
350 IF CC<1 OR CC>INT(CL/7) THEN 320
360 CLS
370 PRINT "WHAT CHARACTER SHALL I USE TO"
380 PRINT "COMPOSE THE LETTERS OF YOUR BANNER"
390 INPUT "(E.G., *, $, #)";CH$
400 IF CH$="" THEN 360
410 CH$=LEFT$(CH$,1)
420 CLS
430 PRINT "PLEASE ENTER THE MESSAGE YOU WANT"
440 PRINT "PRINTED ON YOUR BANNER. DO NOT"
450 PRINT "USE LOWERCASE LETTERS."
460 PRINT
470 LINE INPUT MESSAGES
480 PRINT
490 PRINT "WHEN YOUR PRINTER IS READY,"
500 PRINT "PLEASE PRESS ANY KEY."
510 K$=INKEY$
520 IF K$="" THEN 510
530 FOR I=1 TO LEN(MESSAGES)
540 PNTR=(ASC(MID$(MESSAGES,I,1))-32)*8
550 IF PNTR<0 OR PNTR>464 THEN PNTR=0
560 FOR J=PNTR TO PNTR+7
570 LNS=""
580 V=AX(J)
590 FOR K=6 TO 0 STEP -1
600 IF V<=BIN$(K) THEN LNS=STRING$(CC,32)+LNS:GOTO 630
610 V=V-BIN$(K)
620 LNS=STRING$(CC,CH$)+LNS
630 NEXT K
640 FOR K=1 TO (CC+1)/2
650 LPRINT LNS
660 NEXT K
670 NEXT J
680 NEXT I
690 CLS
700 PRINT "YOUR BANNER IS FINISHED."
710 PRINT
720 PRINT "PRESS <P> TO PRINT ANOTHER"
730 PRINT "BANNER OR <E> TO END."
740 K$=INKEY$
750 IF K$="P" THEN 290
760 IF K$<>"E" THEN 740
770 END
```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

Kaypro w/BASIC-80 (5.0)/Banner

```
10 DIM AX(471),BIN$(6)
20 PRINT CHR$(26);
30 PRINT TAB(26);"GETTING READY ... PLEASE WAIT."
40 FOR I=0 TO 464 STEP 8
50 FOR J=0 TO 7
60 IF J=0 OR J=7 THEN AX(I+J)=0:GOTO 80
70 READ AX(I+J)
80 NEXT J
90 NEXT I
100 AX(80)=8
110 AX(87)=8
120 AX(367)=63
130 AX(447)=63
140 FOR I=0 TO 6
150 BIN$(I)=2^I
160 NEXT I
170 PRINT CHR$(26);
180 PRINT TAB(37);"*BANNER*"
190 PRINT
200 INPUT "HOW MANY LETTERS CAN YOUR PRINTER PRINT ON
A SINGLE LINE";CL
210 IF CL>=7 AND CL<=136 THEN 260
220 PRINT
230 PRINT "I DON'T THINK THAT'S RIGHT."
240 PRINT "PLEASE CHECK YOUR MANUAL."
250 GOTO 200
260 PRINT CHR$(26);
```

SPRING PROGRAMS

```

270 PRINT "HOW TALL DO YOU WANT THE LETTERS IN YOUR BANNER"
280 PRINT
290 PRINT "(1=SHORTEST;";STR$(INT(CL/7));"=TALLEST)";
300 INPUT CC
310 IF CC<1 OR CC>INT(CL/7) THEN 280
320 PRINT CHR$(26);
330 PRINT "WHAT CHARACTER SHALL I USE TO COMPOSE THE LETTERS"
340 INPUT "OF YOUR BANNER (E.G., *, $, #)";CH$
350 IF CH$="" THEN 320
360 CH$=LEFT$(CH$,1)
370 PRINT CHR$(26);
380 PRINT "PLEASE ENTER THE MESSAGE YOU WANT PRINTED"
390 PRINT "ON YOUR BANNER. DO NOT USE LOWERCASE LETTERS."
400 PRINT
410 LINE INPUT MESSAGES$
420 PRINT
430 PRINT "WHEN YOUR PRINTER IS READY, PLEASE PRESS ANY KEY."
440 K$=INKEY$
450 IF K$="" THEN 440
460 FOR I=1 TO LEN(MESSAGES$)
470 PNTR=(ASC(MID$(MESSAGES$,I,1))-32)*8
480 IF PNTR<0 OR PNTR>464 THEN PNTR=0
490 FOR J=PNTR TO PNTR+7
500 LNS=""
510 V=A%(J)
520 FOR K=6 TO 0 STEP -1
530 IF V<BIN$(K) THEN LNS=STRING$(CC,32)+LNS:GOTO 560
540 V=V-BIN$(K)
550 LNS=STRING$(CC,CH$)+LNS
560 NEXT K
570 FOR K=1 TO (CC+1)/2
580 LPRINT LNS
590 NEXT K
600 NEXT J
610 NEXT I
620 PRINT CHR$(26);
630 PRINT "YOUR BANNER IS FINISHED."
640 PRINT
650 PRINT "PRESS <P> TO PRINT ANOTHER BANNER OR <E> TO END."
660 K$=INKEY$
670 IF K$="P" THEN 260
680 IF K$<>"E" THEN 660
690 END

```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

TI-99/4A/Banner

```

10 DIM A(471), BIN(6)
20 CALL CLEAR
30 PRINT "GETTING READY. PLEASE WAIT."
40 FOR I=0 TO 464 STEP 8
50 FOR J=0 TO 7
60 IF (J<>0)*(J<>7) THEN 90
70 A(I+J)=0
80 GOTO 100
90 READ A(I+J)
100 NEXT J
110 NEXT I
120 A(80)=8
130 A(87)=8
140 A(367)=63
150 A(447)=63
160 FOR I=0 TO 6
170 BIN(I)=2^I
180 NEXT I
190 CALL CLEAR
200 PRINT TAB(11);"*BANNER*"
210 PRINT

```

```

220 PRINT "HOW MANY LETTERS CAN YOUR"
230 INPUT "PRINTER PRINT ON A LINE?":CL
240 IF (CL>=7)*(CL<=136) THEN 290
250 PRINT
260 PRINT "I DON'T THINK THAT'S RIGHT."
270 PRINT "PLEASE CHECK YOUR MANUAL."
280 GOTO 220
290 CALL CLEAR
300 PRINT "HOW TALL DO YOU WANT THE"
310 PRINT "LETTERS IN YOUR BANNER"
320 PRINT
330 PRINT "(1=SHORTEST;";STR$(INT(CL/7));"=TALLEST)";
340 INPUT CC
350 IF (CC>=1)*(CC<=INT(CL/7)) THEN 380
360 PRINT
370 GOTO 330
380 CALL CLEAR
390 PRINT "WHAT CHARACTER SHALL I USE"
400 PRINT "TO COMPOSE THE LETTERS OF"
410 PRINT "YOUR BANNER"
420 PRINT
430 INPUT "(E.G., *, $, #)?:CH$
440 IF CH$="" THEN 380
450 CH$=SEG$(CH$,1,1)
460 CALL CLEAR
470 PRINT "PLEASE ENTER THE MESSAGE YOU";
480 PRINT "WANT PRINTED ON YOUR BANNER.";
490 PRINT "DO NOT USE LOWERCASE"
500 PRINT "LETTERS OR COMMAS."
510 PRINT
520 INPUT MESSAGES$
530 PRINT
540 PRINT "WHEN YOUR PRINTER IS READY,"
550 PRINT "PLEASE PRESS ANY KEY."
560 CALL KEY(3,K,S)
570 IF S=0 THEN 560
579 REM --USE 580 OPEN #1:"RS232" FOR SERIAL PRINTER--
580 OPEN #1:"PIO"
590 FOR I=1 TO LEN(MESSAGES$)
600 PNTR=(ASC(SEG$(MESSAGES$,I,1))-32)*8
610 IF (PNTR>=0)*(PNTR<=464) THEN 630
620 PNTR=0
630 FOR J=PNTR TO PNTR+7
640 LNS=""
650 V=A(J)
660 FOR K=6 TO 0 STEP -1
670 IF V<BIN$(K) THEN 710
680 V=V-BIN$(K)
690 C$=CH$
700 GOTO 720
710 C$=" "
720 FOR L=1 TO CC
730 LNS=C$&LNS
740 NEXT L
750 NEXT K
760 FOR K=1 TO (CC+1)/2
770 PRINT #1:LNS
780 NEXT K
790 NEXT J
800 NEXT I
810 CLOSE #1
820 CALL CLEAR
830 PRINT "YOUR BANNER IS FINISHED."
840 PRINT
850 PRINT "PRESS <P> TO PRINT ANOTHER"
860 PRINT "BANNER OR <E> TO END."
870 CALL KEY(3,K,S)
880 IF K=ASC("P") THEN 290
890 IF K<>ASC("E") THEN 870
900 END

```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

TRS-80 Color Computer/Banner

```
10 DIM A(471),BIN(6)
20 CLS
30 PRINT "GETTING READY ... PLEASE WAIT."
40 FOR I=0 TO 464 STEP 8
50 FOR J=0 TO 7
60 IF J=0 OR J=7 THEN A(I+J)=0:GOTO 80
70 READ A(I+J)
80 NEXT J
90 NEXT I
100 A(80)=8
110 A(87)=8
120 A(367)=63
130 A(447)=63
140 FOR I=0 TO 6
150 BIN(I)=INT(2^I)
160 NEXT I
170 CLS
180 PRINT TAB(12);"*BANNER*"
190 PRINT
200 PRINT "HOW MANY LETTERS CAN YOUR"
210 INPUT "PRINTER PRINT ON A LINE";CL
220 IF CL>=7 AND CL<=136 THEN 270
230 PRINT
240 PRINT "I DON'T THINK THAT'S RIGHT."
250 PRINT "PLEASE CHECK YOUR MANUAL."
260 GOTO 200
270 CLS
280 PRINT "HOW TALL DO YOU WANT THE"
290 PRINT "LETTERS IN YOUR BANNER"
300 PRINT
310 PRINT "(1=SHORTEST;";STR$(INT(CL/7));"=TALLEST)";
320 INPUT CC
330 IF CC<1 OR CC>INT(CL/7) THEN 300
340 CLS
350 PRINT "WHAT CHARACTER SHALL I USE TO"
360 PRINT "COMPOSE THE LETTERS OF YOUR"
370 PRINT "BANNER"
380 PRINT
390 INPUT "(E.G., *, $, #)";CH$
400 IF CH$="" THEN 340
410 CH$=LEFT$(CH$,1)
420 CLS
430 PRINT "PLEASE ENTER THE MESSAGE YOU"
440 PRINT "WANT PRINTED ON YOUR BANNER."
450 PRINT "DO NOT USE LOWERCASE LETTERS."
460 PRINT
470 LINE INPUT MESSAGES$
480 PRINT
490 PRINT "WHEN YOUR PRINTER IS READY,"
500 PRINT "PLEASE PRESS ANY KEY."
510 K$=INKEY$
520 IF K$="" THEN 510
530 FOR I=1 TO LEN(MESSAGES$)
540 PNTR=(ASC(MID$(MESSAGES$,I,1))-32)*8
550 IF PNTR<0 OR PNTR>464 THEN PNTR=0
560 FOR J=PNTR TO PNTR+7
570 LNS=""
580 V=A(J)
590 FOR K=6 TO 0 STEP -1
600 IF V<BIN(K) THEN LNS=STRING$(CC,32)+LNS:GOTO 630
610 V=V-BIN(K)
620 LNS=STRING$(CC,CH$)+LNS
630 NEXT K
640 FOR K=1 TO (CC+1)/2
650 PRINT#-2,LNS
660 NEXT K
670 NEXT J
680 NEXT I
690 CLS
700 PRINT "YOUR BANNER IS FINISHED."
```

```
710 PRINT
720 PRINT "PRESS <P> TO PRINT ANOTHER"
730 PRINT "BANNER OR <E> TO END."
740 K$=INKEY$
750 IF K$="P" THEN 270
760 IF K$<"E" THEN 740
770 END
```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

TRS-80 Model III/Banner

```
10 DIM AX(471),BIN(6)
20 CLS
30 PRINT TAB(17);"GETTING READY ... PLEASE WAIT."
40 FOR I=0 TO 464 STEP 8
50 FOR J=0 TO 7
60 IF J=0 OR J=7 THEN AX(I+J)=0:GOTO 80
70 READ AX(I+J)
80 NEXT J
90 NEXT I
100 AX(80)=8
110 AX(87)=8
120 AX(367)=63
130 AX(447)=63
140 FOR I=0 TO 6
150 BIN(I)=2^I
160 NEXT I
170 CLS
180 PRINT TAB(28);"*BANNER*"
190 PRINT
200 INPUT "HOW MANY LETTERS CAN YOUR PRINTER PRINT ON
A SINGLE LINE";CL
210 IF CL>=7 AND CL<=136 THEN 260
220 PRINT
230 PRINT "I DON'T THINK THAT'S RIGHT."
240 PRINT "PLEASE CHECK YOUR MANUAL."
250 GOTO 200
260 CLS
270 PRINT "HOW TALL DO YOU WANT THE LETTERS IN YOUR BA
NNER"
280 PRINT
290 PRINT "(1=SHORTEST;";STR$(INT(CL/7));"=TALLEST)";
300 INPUT CC
310 IF CC<1 OR CC>INT(CL/7) THEN 280
320 CLS
330 PRINT "WHAT CHARACTER SHALL I USE TO COMPOSE THE L
ETTERS"
340 INPUT "OF YOUR BANNER (E.G., *, $, #)";CH$
350 IF CH$="" THEN 320
360 CH$=LEFT$(CH$,1)
370 CLS
380 PRINT "PLEASE ENTER THE MESSAGE YOU WANT PRINTED"
390 PRINT "ON YOUR BANNER. DO NOT USE LOWERCASE LETTER
S."
400 PRINT
410 LINE INPUT MESSAGES$
420 PRINT
430 PRINT "WHEN YOUR PRINTER IS READY, PLEASE PRESS AN
Y KEY."
440 K$=INKEY$
450 IF K$="" THEN 440
460 FOR I=1 TO LEN(MESSAGES$)
470 PNTR=(ASC(MID$(MESSAGES$,I,1))-32)*8
480 IF PNTR<0 OR PNTR>464 THEN PNTR=0
490 FOR J=PNTR TO PNTR+7
500 LNS=""
510 V=AX(J)
520 FOR K=6 TO 0 STEP -1
530 IF V<BIN(K) THEN LNS=STRING$(CC,32)+LNS:GOTO 560
540 V=V-BIN(K)
550 LNS=STRING$(CC,CH$)+LNS
```

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SPRING PROGRAMS

```
560 NEXT K
570 FOR K=1 TO (CC+1)/2
580 LPRINT LNS
590 NEXT K
600 NEXT J
610 NEXT I
620 CLS
630 PRINT "YOUR BANNER IS FINISHED."
640 PRINT
650 PRINT "PRESS <P> TO PRINT ANOTHER BANNER OR <E> TO
END."
660 KS=INKEY$
670 IF K$="P" THEN 260
680 IF K$(">"E" THEN 660
690 END
```

After you have typed in the above lines, add the DATA statements (lines 1000-1290) from the ADAM version.

VIC-20 w/8K or 16K RAM Cartridge/Banner

```
10 DIM A$(471),BIN$(6)
20 PRINT CHR$(147);
30 PRINT "GETTING READY ..."
40 PRINT "PLEASE WAIT."
50 FOR I=0 TO 464 STEP 8
60 FOR J=0 TO 7
70 IF J=0 OR J=7 THEN A$(I+J)=0:GOTO 90
80 READ A$(I+J)
90 NEXT J
100 NEXT I
110 A$(80)=8
120 A$(87)=8
130 A$(367)=63
140 A$(447)=63
150 FOR I=0 TO 6
160 BIN$(I)=2^I
170 NEXT I
180 PRINT CHR$(147);
```

```
190 PRINT TAB(7);"*BANNER*"
200 PRINT
210 PRINT "HOW MANY LETTERS"
220 PRINT "CAN YOUR PRINTER"
230 PRINT "PRINT ON A"
240 INPUT "SINGLE LINE";CL
250 IF CL>=7 AND CL<=136 THEN 300
260 PRINT
270 PRINT "I DON'T THINK THAT'S RIGHT."
280 PRINT "PLEASE CHECK YOUR MANUAL."
290 GOTO 210
300 PRINT CHR$(147);
310 PRINT "HOW TALL DO YOU"
320 PRINT "WANT THE LETTERS"
330 PRINT "IN YOUR BANNER"
340 PRINT
350 PRINT "(1=SHORTEST;"
360 PRINT STR$(INT(CL/7));"=TALLEST)";
370 INPUT CC
380 IF CC<1 OR CC>INT(CL/7) THEN 340
390 PRINT CHR$(147);
400 PRINT "WHAT CHARACTER SHALL"
410 PRINT "I USE TO COMPOSE THE"
420 PRINT "LETTERS OF YOUR"
430 PRINT "BANNER"
440 PRINT
450 INPUT "(E.G., *, $, #)";CH$
460 IF CH$="" THEN 390
470 CH$=LEFT$(CH$,1)
480 PRINT CHR$(147);
490 PRINT "PLEASE ENTER THE"
500 PRINT "MESSAGE YOU WANT"
510 PRINT "PRINTED ON YOUR"
520 PRINT "BANNER. DO NOT USE"
530 PRINT "LOWERCASE OR COMMAS."
540 MESSAGE$=""
550 INPUT MESSAGE$
560 PRINT
```

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```

570 PRINT "WHEN YOUR PRINTER IS"
580 PRINT "READY, PLEASE PRESS"
590 PRINT "ANY KEY."
600 GET K$
610 IF K$="" THEN 600
620 OPEN 4,4
630 CMD4
640 FOR I=1 TO LEN(MESSAGES)
650 PNTR=(ASC(MID$(MESSAGES,I,1))-32)*8
660 IF PNTR<0 OR PNTR>464 THEN PNTR=0
670 FOR J=PNTR TO PNTR+7
680 LINES=""
690 V=AZ(J)
700 FOR K=6 TO 0 STEP -1
710 IF V>=BIN%(K) THEN V=V-BIN%(K):C$=CH$:GOTO 730
720 C$=" "
730 FOR L=1 TO CC
740 LINES=C$+LINES
750 NEXT L
760 NEXT K
770 FOR K=1 TO (CC+1)/2
780 PRINT LINES
790 NEXT K
800 NEXT J
810 NEXT I
820 PRINT#4
830 CLOSE 4
840 PRINT CHR$(147);
850 PRINT "YOUR BANNER IS"
860 PRINT "FINISHED."
870 PRINT
880 PRINT "PRESS <P> TO PRINT"
890 PRINT "ANOTHER BANNER OR"
900 PRINT "<E> TO END."
910 GET K$
920 IF K$="P" THEN 300
930 IF K$(">"E" THEN 910
940 END

```

Now add lines 1000-1290 from the ADAM version.

PROGRAMMING P.S.

Notes to previous months' programs

ADAM/Perpetual Calendar (January 1985, page 70) and **Apple/Perpetual Calendar** (page 72)

From mail we've received, it appears that there was some confusion regarding line 50 of *Perpetual Calendar* for ADAM and Apple. The line in question reads

```

50 BLS = BLS + " " (ADAM)
50 BLS = BLS + " " (Apple)

```

If you look closely, you'll see that there are not one, but *two* spaces between the quotation marks. ADAM and Apple owners who have trouble with *Perpetual Calendar* should check line 50 to make sure they typed it in correctly.

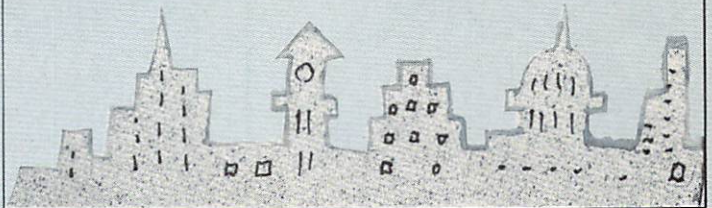
Apple/Mailing List (November 1984, page 102)

Mailing List runs fine under Apple's DOS 3.3—but not under ProDOS. If you wish to run *Mailing List* under ProDOS, change lines 40 and 5000 to read as follows:

```

40 DS = CHR$(4):GS = CHR$(7):EX$ = "PRESS <RETURN> TO
EXIT.":PS = " PLEASE PRESS ANY KEY TO CONTINUE."
5000 PRINT DS;"CAT":PRINT:RETURN

```



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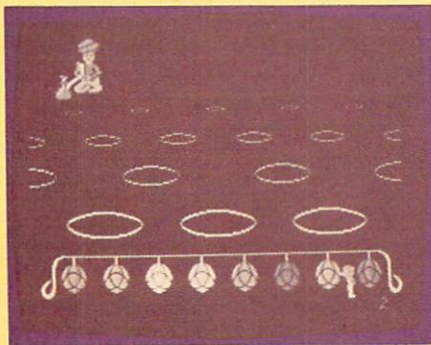
POKER

Edited by Anne Krueger

FOR THE COMPUTER GENERATION

Music Man Makes Games 'Groove'!

All sorts of characters turn up in the computer software business. One of the most interesting newcomers to hit the scene is Activision's designer Russell Lieblich. Russell, who's 32, has played a big part in



Masters of the Lamp's music is more "groove-oriented."

two of Activision's newest games: *Web Dimension* and *Masters of the Lamp*. He's a pianist, saxophonist, and swinging bachelor musician, who began programming in 1980 when musicians went on strike in Los Angeles. He wrote music for cartoons while composing his own and playing in a band in his spare time.

"A friend told me that Mattel needed musicians. I needed a job so I tried it," Russell remembers. After writing the music for Mattel's *Snafu*, he joined Activision, where he wrote 20 songs in 1984!

Eleven of the songs are included in *Web Dimension* which Russell also programmed; the other nine accompany the action in *Masters of the Lamp*—a great new game he worked on with Activision's 23-year-old graphics expert, Peter Kaminski.



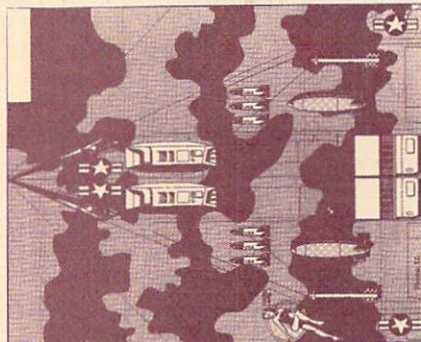
Designer Russell Lieblich incorporated jazz music into *Web Dimension*.

"The songs in *Web Dimension* are more baroque and jazzy—it's an eclectic blend of music designed not as an accompaniment, but as an escape. The music in *Masters of the Lamp*," Russell explained, "was written to be more groove-oriented. It contains a rock-funk element."

Software Scoop!

The latest and greatest from **Electronic Arts** is **Mail Order Monsters** and **Racing Destruction Set**—two "construction-set" Commodore 64 games that let you 1) build monsters or 2) design race tracks. Designer **Paul Reiche III**, who worked on **Archon** and **Archon II**, teamed up with designers **Evan** and **Nicky Robinson** to create the monster game, where you design your own monsters from a catalog of body parts, weapons, and defenses, then pit them against each other or the computer. Both games are on sale now for about \$35 each. . . Interested in the newspaper biz? You or your class at school can create your own newspapers or newsletters with **Springboard Software's** new **The Newsroom** program (\$49). IBM PC and PCjr owners, Apple users, and

C 64 fans can generate a newspaper from a library of 600 pieces of art and layout options, while learning newspaper production, copywriting, and editing. The best part is the good-looking end-product that you can print out! . . . If you're into paper airplanes, you're gonna love **Simon & Schuster Electronic Publishing Group's**



Print great airplanes with your Macintosh using **Simon & Schuster's** new software.

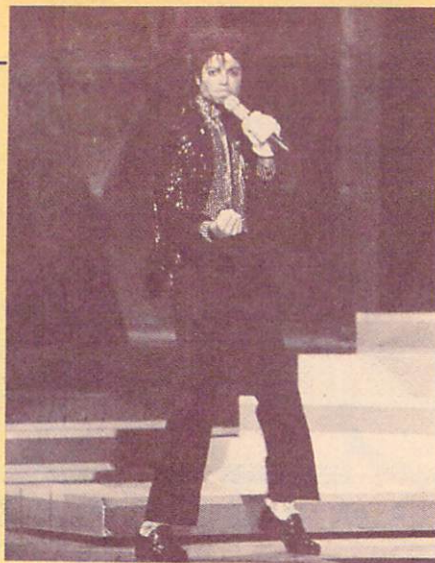
The Great International Paper Airplane Construction Kit for the Macintosh (\$39). This software contains lots of full-page paper-airplane designs that can be embellished on the wings and fuselage with aeronautical art. Then print 'em out, fold 'em up, and let 'em rip.

In brief: **Spinnaker's Windham Classics** now include two new titles of interactive fiction: **Treasure Island** and **Alice in Wonderland** (\$26 each for C 64, Apple II series, and IBM PC and PCjr). . . **Mystery Master: Felony!** from **CBS Software** puts you in the detective seat (\$34 for Apple II series, Commodore 64, IBM, and PCjr). . . You're **Sherlock Holmes** and you can meet **Edison**, **Henry Ford**, and **Louis Armstrong** (among others) on the S.S. *Destiny* in **Imagic's** adventure-mystery called **Another Bow** (\$39 for IBM PC and Apple II series). . .

Mixing Music and Micros

Would you believe Michael Jackson's "Thriller" music could teach you note-reading and keyboarding technique? With *Computer Sheet Music* (\$29) from Passport Designs, and your C 64 or Apple, what you play on either the Sound Chaser or MIDI keyboards will appear as notes on an on-screen staff. Whether you play alone or with the computer's accompaniment, notes you hit correctly will light up in a different color on the screen. You can even sing along, since lyrics come with the package. Passport Designs, which says it's "capitalizing on the rock-video explosion," also plans disks with music by The Police and Duran Duran.

"Every Breath You Take," by The Police, Van Halen's "Jump," and Lionel Richie's "All Night Long," plus seven other preset songs, come on *MacMusic* (\$49), another Passport product. *MacMusic* makes your C 64 emulate a Macintosh, using on-screen icons and pull-down menus. You select a preset instrument sound from the menu and, using a joystick or KoalaPad, actually draw it on the screen as a colored waveform. You then go to the EDIT section, where you can cut and paste parts of



Make music with Michael!

the melody and SAVE it to disk. Passport Designs also offers the Sound Chaser keyboard (\$199); 116 N. Cabrilla Highway, Half Moon Bay, CA 94019; (415) 726-0280.

Want to top the "Thriller" video? You can make your own with a C 64 and Sight & Sound's *Music Video Kit* (\$49). Using a powerful new computer language, you select among 50 characters, or invent your own, and then animate them on any of 20 hires backgrounds. How about break-dancers in the desert, cavorting under a sky filled with flying saucers? The possibilities are endless. Add music you synthesize, or use one of the preprogrammed songs. You

can record, store, and overdub animated sequences, with the four-track video recorder. Sight & Sound, 3200 S. 166th St., P.O. Box 27, New Berlin, WI 53151; (800) 558-0910.

Are you ready to put some of your C 64 compositions on paper? Now you can create, record, edit, and print out the tunes you play, with Sequential Inc.'s four-part *Music-Mate* package (\$39 each). The package works with the MusicMate keyboard (\$99) and includes 20 preprogrammed instrument sounds and sound effects. You'll need a Commodore 801 or other dot-matrix printer with graphics card, to make a hard copy. Sequential Inc. is at 3051 N. First St., San Jose, CA 95134; (408) 946-5240.

Broderbund's *The Music Shop* (\$44) for the C 64, is another composition program featuring Mac-like windows and pull-down menus. It has on-screen notation; on-screen page-turning, rather than scrolling; and simple editing commands such as cut and paste and copy. Versions are planned for IBM PCjr and Macintosh. When you buy the program, you get a coupon for a free Hohner harmonica. Why not see if your musical talent goes beyond computers! Contact Broderbund at 17 Paul Drive, San Rafael, CA 94903-2101; (415) 479-1170. —LINDA WILLIAMS

LOGON

L E T T E R S

K-POWER SHRUNK!

Congratulations on the good job of a "magazine within a magazine." The smaller K-POWER insert looks as good as ever.

CHRIS PAWLAK, 14
Troy, Michigan

... I like K-POWER but now it will take approximately eight issues to equal one issue of the old K-POWER. Why did you do it?

ERIC DEMARCO, 13
Colorado Springs, Colorado

Dear Chris and Eric,

You may have noticed that a lot of the hype surrounding the computer "age" has calmed down. That's because industry experts got so excited about computer technology they grossly overestimated how many people were going to buy computers. Now, lots of people are buying computers, but at a slower

pace than was expected. This has been a hardship for computer hardware and software companies since they expected more sales. Because of this, some companies have gone out of business; some others have less money to spend on advertising than they thought they would. The money they have, they are spending on "adult" or "all-family" magazines like FAMILY COMPUTING.

It didn't make good economic sense to keep publishing K-POWER independently without more support from these companies. So we thought the best thing to do was to incorporate K-POWER into FAMILY COMPUTING each month. We've maintained the most popular parts of K-POWER: Dr. Cursor's Clinic, where you can find answers to your technical questions; Strategy tips and

Hint Hotline for avid gamers; our monthly contest; musical Microtones programs; and Compucopia's short-short programs. Plus, we hope you like the added bonus of the game reviews, games column, and programs available in FAMILY COMPUTING.

Since the computer industry seems to be settling down to good strong and steady growth now, we feel very positively about the future. Who knows? If our readers continue to support K-POWER and the computer industry grows as strong as originally forecasted—we may one day have a separate K-POWER publication again!

In the meantime, thank you for your continued support of K-POWER. Keep writing! We'll keep addressing the issues important to the computer generation.

THE EDITORS

DOCTOR KURSOR'S KLINIC

HOW TO "FLIPPY-IZE" A DISK

What is a "flippy" disk?

DR. KURSOR: Sounds like a flipped-out floppy, right? Unfortunately, that's sometimes an accurate description . . .

IBM PCjr's and some other computers have disk drives that use both sides of a floppy disk to store information. That's how the jr can cram 360K onto a single disk.

In these drives, it's best to use special "double-sided" disks. "Double-sided" means both sides of a disk have been tested and certified by the manufacturer.

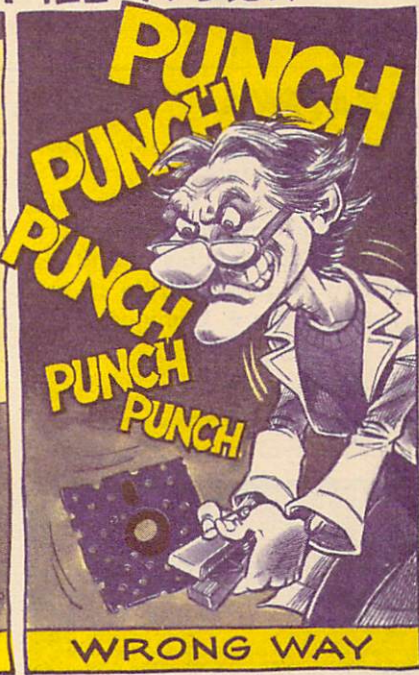
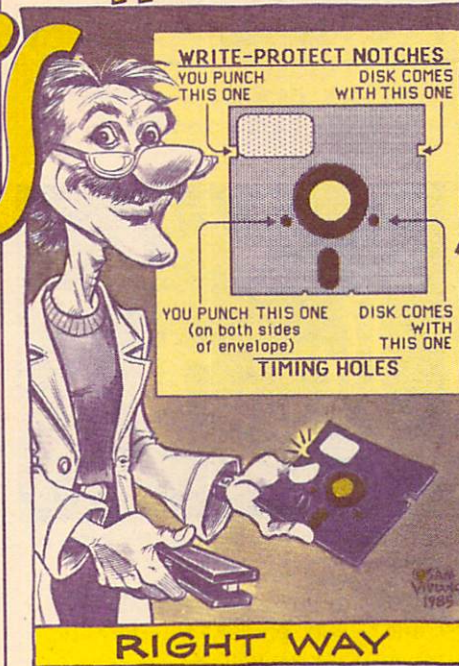
Most disk drives, though, read and write on just the top side of the disk. Cheaper "single-sided" disks, with only one side certified, work fine in these drives.

Some clever hacker, noticing that both sides of even single-sided disks have a magnetic coating, flipped a disk over and discovered you can use the bottom side too, doubling your storage!

To "flippyize" a disk, you have to cut or punch a write-protect notch directly opposite the existing one. (Otherwise, when you flip the disk over, the computer thinks you've covered the notch, and won't write on the disk.)

Then there are the timing holes right next to the big center hole in the black envelope that covers the disk. There's a still smaller hole in the disk's surface that lines up with these holes and serves as a marker so the drive knows where on the disk to start writing or reading. If you rotate the disk carefully by hand, you can see the holes line up.

If you have a TRS-80 or other drive that uses these holes, you'll need to punch another pair (one in front and one in back) directly



opposite them to allow the drive to sense the disk's position when it's turned upside down. (See illustration.) Try your flippy disk without these extra holes first, and only punch them if your drive needs them.

Some companies sell kits with special punches, rulers, and disk protectors especially designed to help you make these holes safely and in the right places.

Warning! Flippyizing can be dangerous to a disk! Here's why:

First, if you're not careful when making the holes, you can scratch or otherwise damage the surface of the disk, making it partly or completely unusable. If there's already data on the disk, you may lose it.

Second, "single-sided" disks are often double-sided disks that have been tested and found to have a flaw on the bottom side. So, it's possible that some sectors on that side will be "bad."

Third, the inside of the black disk envelope is coated with a special substance designed to lift dust off the disk surface and whisk it into a corner of the envelope. When you turn the disk upside down, it rotates in the opposite direction, and some of that dust might actually be deposited back onto the surface . . . on both the bottom and "good" sides.

So flippy disks, while they can save you money, are a risky business. Don't use a flippy for anything you can't afford to lose.

I have an Apple computer. Can I use a DOS 3.3 master disk to run your programs?

DR. KURSOR: To run most K-POWER and FAMILY COMPUTING programs, you don't need any kind of DOS!

But if you want to save a program on disk after you've typed it in, you can boot up your Apple with either DOS or ProDOS. You should also have a disk handy that you've initialized under the kind of DOS you're using (see your DOS manual to find out how to do this).

When you're ready to SAVE, put the disk you've initialized into the drive and type SAVE followed by the name of the program (for example, SAVE MICROTONES OR SAVE THIS PROGRAM).

The next time you want to run the program, you'll have to boot up the system with the same kind of DOS you used when you first saved the program.

Need an answer to a hi-tech question?

Send your questions to Dr. Kursor's Clinic, c/o K-POWER, 730 Broadway, New York, NY 10003.

Illustration: Sam Viviano

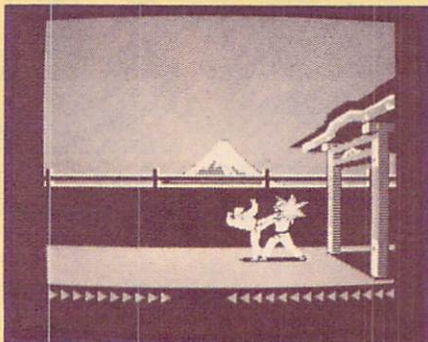
STRATEGY

TIPS, TRICKS, AND HINTS

KARATEKA

Broderbund. Strategy/arcade. Your mission: To infiltrate the warlord Akuma's stronghold. Using your skill in the martial arts, defeat his guards, kill Akuma himself, and rescue your bride-to-be, Mariko. (Hints and game for Apple, Commodore 64.)

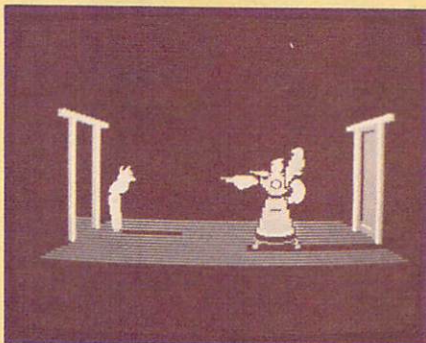
Use the keyboard rather than the joystick; it's more responsive and has three-command memory.



Force flunkies back with good, swift kicks.

Here's a good method for killing flunkies and Akuma himself: Stand in one spot and wait for them to approach you. When they move, give them a couple of kicks, to force

them back. Repeat this procedure until you've utterly decimated your opponent.



Step toward your opponent, step back, let loose.

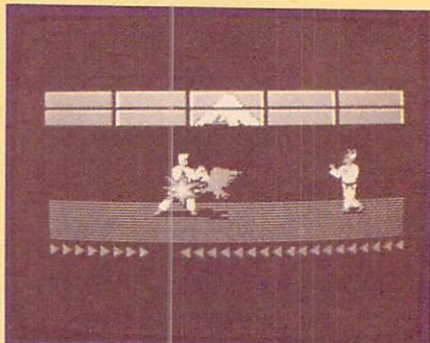
For opponents who don't come to you, provoke them by stepping into them before they start to kick you. When they set up for the kick, back out of range. After they kick, beat on them a little.

A kick may be effective on anything that stands in your way.

At a certain point (on- or off-screen), your opponents will not back up any farther. Force them to that location; they'll be much more vulnerable to multiple blows.

When fighting a formidable opponent, rely mostly on the middle kick; chances are, it will hit at least once per volley.

Don't rely on only one method of attack; different opponents require different strategies.



Set up your blows before trying to kill the bird.

When fighting the bird, it pays to practice and prepare. Figure out what kick or punch you must use, and start doing it before the bird reaches you. Also, when it comes time to kill the bird, back off to the other side of the room so you have time to set up your blows.

—SPECIAL KS

GALACTIC GLADIATORS and GALACTIC ADVENTURES

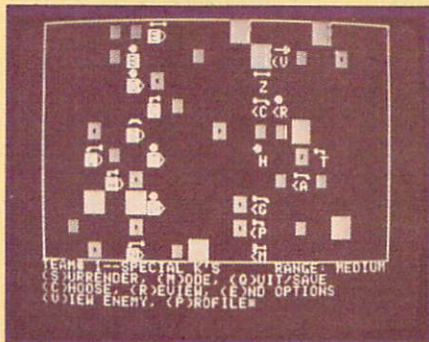
Strategic Simulations. Role-playing/adventure/construction set. Your mission in *Galactic Gladiators* (GG): To put together your own team of different species and arm it with a vast assortment of weapons. Go forth and slug it out against another team controlled by friends or the computer. Your mission in *Galactic Adventures* (GA): Starting with one character, take off, hire other members to create a team, and adventure in scenarios that come on the disk or those you make up yourself. (Hints and game for Apple, IBM PC [GG]; Apple, Atari [GA].)

In GG, you can start with a party of up to 10 combatants. A good starting team consists of three to four heavily armored characters carrying a range of weapons (to act as front defensive forces), one to two quick Phasorists (to shoot at the enemy from long distances), and a

Slime Devil or Orangaphin (for unusual abilities). The rest of the party should be made up of heavily armed hand-weaponists (like infantry to do the close-range dirty work).

On the subject of Gorsai: In GG, do not include them in your party. They'll change sides and betray you at the worst moments.

In GA, it's a good idea to visit



Galactic Gladiators lets you put together your own team of combatants.

as many worlds as possible, buying the special items offered at each planet. Once you've got your S-Phasors and special armor, you'll have trouble visiting worlds where this equipment is outlawed.

In GA, gemstones and gapers aren't the best bet, because they're illegal in many worlds. Stick with missile imploders; they'll defuse your opponents' missiles and you'll be able to attack them when they're unarmed.

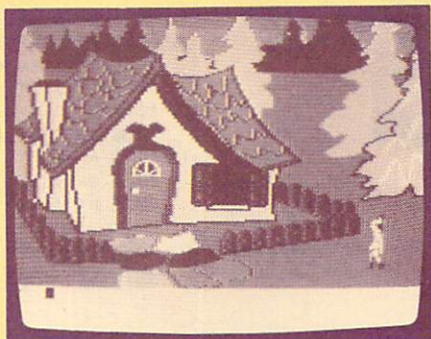
The higher your leadership, the more members you can have on your team. To easily increase your leadership points, go on an adventure to the Orangaphin world. As soon as you get to the first room, which is always empty, "G"ive up. Do this a few times and you'll obtain up to 10 members on your team.

—DAVID LANGENDOEN, 16, Brooklyn, New York

KING'S QUEST

Sierra On-Line. Animated graphic adventure. Your mission: To find the treasures of the Kingdom of Daventry and return them to the king so that you may inherit the throne. (Hints and game for Apple, IBM PC, PCjr version from IBM.)

- You'd do well to go under water.
- Sticks and stones can break big bones.
- Watch your step when your head's in the clouds.



New surprises at every turn in designer Roberta Williams' latest endeavor—the animated text-graphic adventure, *King's Quest*.

- With luck, you'll be left alone by the leprechauns.
- A bird in hand will take you to new heights.
- Trolls love eggs even more than human flesh.
- Mushrooms often put things into proportion.
- How do you quench a dragon's thirst?
- One way to see the forest is from the trees. —BRIAN BARTH, 15, McAllen, Texas

H I N T H O T L I N E

Expedition Amazon, Penguin Software (Apple, Commodore 64). Graphic adventure/arcade. Your mission: To explore the jungles of the Amazon and the temples below in search of the Lost City of Ka.

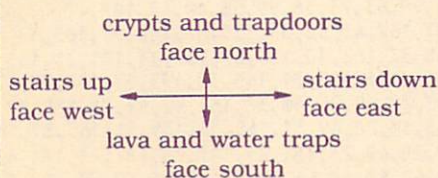
• Here's a shopping list.

For jungle exploration, have the following: four mosquito nets and a boat (two, if you can afford them).

For subterranean exploration, you'll need at least three lamps (with extra batteries), tools, and three or more ropes.

Wherever you explore, be sure to have all the bullets, grenades, and first-aid kits you can carry. Automatic rifles are a great investment; buy one if you can't find any. The radio and Loran equipment may come in handy if you're lost, but really aren't necessary.

• The documentation says that passages (i.e. trapdoors, crypts, etc.) face in certain compass directions. We found that:



—DAMON QSGOOD, 16, Brooklyn, New York

Castle Wolfenstein, Muse Software (Apple, Atari, Commodore 64, IBM PC/PCjr). Arcade adventure. Your mission: To escape from a Ger-

man POW prison, with the secret plans in hand.

• Avoid the long text beginning by pressing CONTROL-RESET (or equivalent) quickly after getting killed. You must do this immediately! The program will reboot, ask you to choose between keyboard or joystick, and resume where you left off. —ANDY KEIFFER, 13, Rochester, New York

Questron, Strategic Simulations (Apple, Atari, Commodore 64). Role-playing adventure. Your mission: To become the most powerful knight in the land and destroy the evil sorcerer Mantor by stealing the *Great Book of Evil Magic*.

• Once you have the magic trumpet, find your way through the fog to the village on the sea early in the game (saving after every forward move), and buy a short bow. It will cost you 940 gold pieces, but will pay for itself when you attack the castle.

• Some weapons are more effective against certain monsters. Keep track of the best combinations. For example, clubs work best against the piercing pungie.

• You can get better prices for your items in the Land of Evil than in the Questron Empire (9/10 the original price, as opposed to 1/2). So if you plan to sell anything, sell it there. —CHRIS VAN KIRK, 16, New York, New York; ALLEN KNUTSON, 15, Brooklyn, New York

Shadow Keep, Telarium (Apple, Commodore 64). Role-playing adventure. Your mission: With your band of up to nine members, enter the Shadow Keep and slay the demon Dal Brad.

• While you're moving through the Keep, don't input your commands in advance. If an aggressor surprises you, and you've already entered a "F"orward command, the computer will read it as a "F"ight command, thereby wasting your turn.

• One of the best magic items to buy is the Sun Amulet. When activated, it prevents monsters from attacking for 15 hours. This time can be used for resting or exploring safely.

• When attacking a group of creatures, always go for the one in the middle. If you kill a monster, the ones on the edges are erased first. This helps you avoid wasting attacks. —SPECIAL Ks

We're looking for a few good hints! Help K-POWER readers be all that they can be by sending us hints for your favorite games. We have all the *Zork* and *Pac-Man* hints we can handle, but we'll be glad to publish and pay \$10 for hints we've not heard of. Send them to Hint Hotline, c/o K-POWER, 730 Broadway, New York, NY 10003. (Note: the computer system(s) listed in brackets indicate(s) the computer version(s) the hint works for.)

MUSIC TODAY

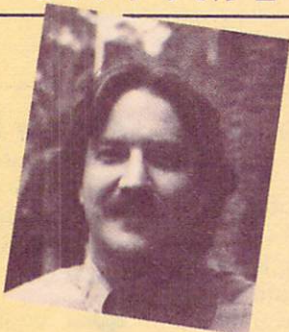
MUSIC PROGRAMS BY JOEY LATIMER

"Where's that music comin' from?" asked Merle, the Hacksville barber.

"Must be emanatin' from Town Hall, by the sound of it," replied Harry, the locksmith. "Wherever it's comin' from, it sure is dandy pickin'!"

Little did the boys know that the combo they were hearin' was really just my little ol' computer, Jake. You see, the other day I was sittin' on the porch swing, countin' my wigglin' toes, when I got this here idea to launch Jake into fame as a country music star. The first thing I had to do was find him some good material . . . so I sat down with Barney, my guitar, and wrote up a tune I call "Hacksville Hoedown." Barney taught the song to Jake, and the rest is history.

If you'd like to hear Jake's debut song on your computer, just type in the program from this here magaziney and then swing your partner, do-si-do.



ATARI/HACKSVILLE HOEDOWN

```

10 DIM CH(4,4),V1(192),V2(192),M(192)
20 GRAPHICS 18:SETCOLOR 0,6,8
30 POSITION 8,4:PRINT #6;"THE":PRINT #6:PRINT #6;" HAC
KSVILLE HOEDOWN"
40 FOR X=1 TO 192:READ M:M(X)=M:NEXT X
50 FOR X=1 TO 4:FOR Y=1 TO 4:READ A:CH(X,Y)=A:NEXT Y:N
EXT X
60 FOR X=1 TO 185 STEP 8:READ A
70 FOR Y=0 TO 3:FOR Z=X+2*Y TO X+2*Y+1
80 V1(Z)=CH(A,Y+1-2*(Y=3)):V2(Z)=CH(A,4)*(Y=1 OR Y=3)
90 NEXT Z:NEXT Y:NEXT X
100 FOR X=1 TO 192
110 SOUND 0,M(X),10,4:SOUND 1,V1(X),10,4:SOUND 2,V2(X)
,10,4
120 FOR D=1 TO 33+(X<129):NEXT D
130 IF X>128 THEN SOUND 0,0,0
140 NEXT X:GOTO 100
1000 DATA 35,31,40,35,31,40,35,31,40,35,31,40,35,31,40
1010 DATA 35,53,47,40,53,47,40,53,47,40,53,47,40,53,47

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1020 DATA 40,53,47,42,35,47,42,35,47,42,35,47,42,35,47
1030 DATA 42,35,47,29,31,35,29,31,35,31,35,47,42,40,35
1040 DATA 40,40,42,42,108,96,81,72,64,53,47,40,31,29
1050 DATA 31,35,40,35,31,40,47,42,40,35,31,35,40,42,47
1060 DATA 42,53,47,60,53,64,60,64,53,60,53,60,64,72,81
1070 DATA 64,64,60,53,60,64,72,81,53,47,60,53,81,72,64
1080 DATA 60,64,64,72,72,85,85,85,85,47,47,40,35,31,35
1090 DATA 40,40,42,42,42,42,53,47,42,47,47,40,35,31
1100 DATA 35,40,40,47,47,47,47,47,53,47,42,47,47,40,35
1110 DATA 31,35,40,35,31,31,31,31,0,53,47,42,47,47,40
1120 DATA 35,31,35,42,40,40,40,42,42,53,47,42
2000 DATA 162,108,128,81,243,96,162,81
2010 DATA 217,72,144,108,193,96,128,64
3000 DATA 1,1,2,2,3,3,1,3,1,1,2,2
3010 DATA 3,3,1,3,4,4,1,1,4,4,3,3

```

COMMODORE 64/HACKSVILLE HOEDOWN

```

10 DIM CH$(4,4),V1$(192),V2$(192),M$(192)
20 S=54272:FOR X=S TO S+24:POKE X,0:NEXT X
30 POKE S+6,240:POKE S+13,240:POKE S+20,240
40 PRINT CHR$(147):POKE 53280,7:POKE 53281,7
50 POKE 214,11:PRINT:POKE 211,7
60 PRINT CHR$(144);"TUNING UP ... PLEASE WAIT."
70 FOR X=1 TO 192:READ M$(X,1),M$(X,2):NEXT X
80 FOR X=1 TO 4:FOR Y=1 TO 4:FOR Z=1 TO 2
90 READ CH$(X,Y,Z):NEXT Z,Y,X
100 FOR X=1 TO 185 STEP 8:READ A
110 FOR Y=0 TO 3:FOR Z=X+2*Y TO X+2*Y+1:FOR J=1 TO 2
120 V1$(Z,J)=CH$(A,Y+1+2*(Y=3),J)
130 V2$(Z,J)=CH$(A,4,J)*(-(Y=1 OR Y=3))
140 NEXT J,Z,Y,X
150 PRINT CHR$(147):POKE 214,11:PRINT:POKE 211,9
160 PRINT "THE HACKSVILLE HOEDOWN"
170 POKE S+4,33:POKE S+11,33:POKE S+18,33:POKE S+24,15
180 FOR X=1 TO 192
190 FOR D=1 TO 40:NEXT D
200 POKE S+1,V1$(X,1):POKE S,V1$(X,2)
210 POKE S+8,V2$(X,1):POKE S+7,V2$(X,2)
220 POKE S+15,M$(X,1):POKE S+14,M$(X,2)
230 NEXT X:GOTO 180
1000 DATA 56,99,63,75,50,60,56,99,63,75,50,60
1010 DATA 56,99,63,75,50,60,56,99,63,75,50,60,56,99
1020 DATA 63,75,50,60,56,99,37,162,42,62,50,60,37,162
1030 DATA 42,62,50,60,37,162,42,62,50,60,37,162,42,62
1040 DATA 50,60,37,162,42,62,50,60,37,162,42,62,47
1050 DATA 107,56,99,42,62,47,107,56,99,42,62,47,107,56
1060 DATA 99,42,62,47,107,56,99,42,62,47,107,56,99,42
1070 DATA 62,67,15,63,75,56,99,67,15,63,75,56,99,63,75
1080 DATA 56,99,42,62,47,107,50,60,56,99,50,60,50,60
1090 DATA 47,107,47,107,18,209,21,31,25,30,28,49,31
1100 DATA 165,37,162,42,62,50,60,63,75,67,15,63,75,56
1110 DATA 99,50,60,56,99,63,75,50,60,42,62,47,107,50
1120 DATA 60,56,99,63,75,56,99,50,60,47,107,42,62,47
1130 DATA 107,37,162,42,62,33,135,37,162,31,165,33,135
1140 DATA 31,165,37,162,33,135,37,162,33,135,31,165,28
1150 DATA 49,25,30,31,165,31,165,33,135,37,162,33,135
1160 DATA 31,165,28,49,25,30,37,162,42,62,33,135,37
1170 DATA 162,25,30,28,49,31,165,33,135,31,165,31,165
1180 DATA 28,49,28,49,23,181,23,181,23,181,23,181,42
1190 DATA 62,42,62,50,60,56,99,63,75,56,99,50,60,50
1200 DATA 60,47,107,47,107,47,107,47,107,47,107,37
1210 DATA 162,42,62,47,107,42,62,42,62,50,60,56,99,63
1220 DATA 75,56,99,50,60,50,60,42,62,42,62,42,62,42
1230 DATA 62,42,62,37,162,42,62,47,107,42,62,42,62,50
1240 DATA 60,56,99,63,75,56,99,50,60,56,99,63,75,63
1250 DATA 75,63,75,63,75,63,75,37,162,42,62,47,107,42
1260 DATA 62,42,62,50,60,56,99,63,75,56,99,47,107,50
1270 DATA 60,50,60,50,60,47,107,47,107,47,107,37,162

```


1280 DATA 42,62,47,107
 2000 DATA 12,143,18,209,15,210,25,30,8,97,21
 2010 DATA 31,12,143,25,30,9,104,28,49,14,24
 2020 DATA 18,209,10,143,21,31,15,210,31,165
 3000 DATA 1,1,2,2,3,3,1,3,1,1,2,2
 3010 DATA 3,3,1,3,4,4,1,1,4,4,3,3



TI-99/4A/HACKSVILLE HOEDOWN

```

10 DIM CH(4,4),V1(192),V2(192),M(192)
20 CALL CLEAR
30 PRINT " TUNING UP ... PLEASE WAIT."
40 FOR X=1 TO 192
50 READ M(X)
60 NEXT X
70 FOR X=1 TO 4
80 FOR Y=1 TO 4
90 READ CH(X,Y)
100 NEXT Y
110 NEXT X
120 FOR X=1 TO 185 STEP 8
130 READ A
140 FOR Y=0 TO 3
150 FOR Z=X+2*Y TO X+2*Y+1
160 V1(Z)=CH(A,Y+1+2*(Y=3))
170 V2(Z)=CH(A,4)-44000*((Y=0)+(Y=2))
180 NEXT Z
190 NEXT Y
200 NEXT X
210 CALL CLEAR
220 PRINT " THE HACKSVILLE HOEDOWN"
230 FOR X=1 TO 192
240 CALL SOUND(100,V1(X),10,V2(X),10,M(X),10)
250 NEXT X
260 GOTO 230
1000 DATA 880,988,784,880,988,784,880,988,784,880,988
1010 DATA 784,880,988,784,880,587,659,784,587,659,784
1020 DATA 587,659,784,587,659,784,587,659,784,587,659
1030 DATA 740,880,659,740,880,659,740,880,659,740,880
1040 DATA 659,740,880,659,1047,988,880,1047,988,880
1050 DATA 988,880,659,740,784,880,784,784,740,740,294
1060 DATA 330,392,440,494,587,659,784,988,1047,988,880
1070 DATA 784,880,988,784,659,740,784,880,988,880,784
1080 DATA 740,659,740,587,659,523,587,494,523,494,587
1090 DATA 523,587,523,494,440,392,494,440,392,587,523
1100 DATA 494,440,392,587,659,523,587,392,440,494,523
1110 DATA 494,494,440,440,370,370,370,370,659,659,784

```

```

1120 DATA 880,988,880,784,784,740,740,740,740,587
1130 DATA 659,740,659,659,784,880,988,880,784,784,659
1140 DATA 659,659,659,659,587,659,740,659,659,784,880
1150 DATA 988,880,784,880,988,988,988,988,988,587,659
1160 DATA 740,659,659,784,880,988,880,740,784,784,784
1170 DATA 740,740,740,740,659,740
2000 DATA 196,294,247,392,131,330,131,392
2010 DATA 147,440,220,294,165,330,247,494
3000 DATA 1,1,2,2,3,3,1,3,1,1,2,2
3010 DATA 3,3,1,3,4,4,1,1,4,4,3,3

```



VIC-20/HACKSVILLE HOEDOWN

```

10 DIM CHX(4,4),V1X(192),V2X(192),MX(192)
20 PRINT CHR$(147):POKE 214,10:PRINT
30 PRINT "THE HACKSVILLE HOEDOWN"
40 FOR X=1 TO 192:READ MX(X):NEXT X
50 FOR X=1 TO 4:FOR Y=1 TO 4:READ CHX(X,Y):NEXT Y,X
60 FOR X=1 TO 185 STEP 8:READ A
70 FOR Y=0 TO 3:FOR Z=X+2*Y TO X+2*Y+1
80 V1X(Z)=CHX(A,Y+1+2*(Y=3))
90 V2X(Z)=CHX(A,4)*(-(Y=1 OR Y=3))
100 NEXT Z,Y,X
110 POKE 36878,5:FOR X=1 TO 192:POKE 36876,MX(X)+200
120 POKE 36874,V1X(X):POKE 36875,V2X(X)
130 FOR D=1 TO 40-3*(X<128):NEXT D
140 IF X>128 THEN POKE 36876,0
150 NEXT X:GOTO 110
1000 DATA 37,39,35,37,39,35,37,39,35,37,39,35
1010 DATA 37,28,31,35,28,31,35,28,31,35,28,31
1020 DATA 35,28,31,34,37,31,34,37,31,34,37,31
1030 DATA 34,37,31,40,39,37,40,39,37,39,37,31
1040 DATA 35,35,34,34,28,35,15,19,23,28,31,35
1050 DATA 37,35,37,39,35,31,34,35,37,39,37,35
1060 DATA 28,31,25,28,23,25,23,28,25,28,25,23
1070 DATA 23,25,28,25,23,19,15,28,31,25,28,15
1080 DATA 23,23,19,19,12,12,12,12,31,31,35,37
1090 DATA 35,34,34,34,34,34,28,31,34,31,31,35
1100 DATA 35,35,31,31,31,31,31,28,31,34,31,31
1110 DATA 37,35,37,39,39,39,39,28,31,34,31,31
1120 DATA 39,37,34,35,35,35,34,34,34,28,31,34
2000 DATA 235,245,239,228,225,243,235,235
2010 DATA 228,246,237,228,231,243,239,239
3000 DATA 1,1,2,2,3,3,1,3,1,1,2,2
3010 DATA 3,3,1,3,4,4,1,1,4,4,3,3

```

M I C R O N O T E S

"Melting Pot," a computer melody created with **EnTech's Studio 64** software, has nabbed songwriter **Louis "Bones" Harris** a \$1,000 prize, free recording-studio time, and a MusicMate keyboard in EnTech's First Annual Songwriting Contest! "Bones," who is 27, writes songs for his own band called **Tarxanne** in Buffalo, New York. He began working with a C 64 six months before he entered the contest. Second-prize winner was 21-year-old **Randall Locke** from Dennison, Texas. His winning song was called "**The Square Dance**" and his prize included a \$500 check and free recording-studio time. EnTech Chairman **Ray Soular** handed out the awards at the Consumer Electronics Show in Las Vegas in January. He said plans for the Second Annual Songwriting Contest were underway! For more information, contact EnTech, P.O. Box 185, Sun Valley, CA 91353; (818) 768-6646.



EnTech Chairman Ray Soular (left) congratulates contest winner Louis "Bones" Harris.

COMPUCOPIA

S H O R T - S H O R T P R O G R A M S

APPLE/ALPHAPUZZLE

```

10 DIM A(5,5),MX(1000)
20 HOME:PRINT TAB(14);"*ALPHA PUZZLE*"
30 HTAB 1:VTAB 21:PRINT "I=UP; J=LEFT; L=RIGHT; K=DOWN
; S=SOLVE.":FOR I = 0 TO 4:FOR J = 0 TO 4
40 A(I,J) = 65+I+J*5+38*(I = 4 AND J = 4)
50 HTAB 18+I:VTAB 8+J:PRINT CHR$(A(I,J)):NEXT J:NEXT I
60 CX = 4:CY = 4:FOR I = 1 TO 100
70 F = 0:D = INT(RND(1)*4)+73:GOSUB 1000:ON F GOTO 70
80 MX(I) = D:GOSUB 2000:NEXT I
90 HTAB 18+CX:VTAB 8+CY:GET K$:D = ASC(K$):IF D = 3 TH
EN END
100 IF D < 73 OR D > 76 AND D <> 83 THEN 90
110 IF D <> 83 THEN F = 0:GOSUB 1000:ON F GOTO 90:MX(I
) = D:GOSUB 2000:I = I+1:GOTO 90
120 FOR J = I-1 TO 1 STEP -1:D = MX(J):D = D+2*((D = 7
3 OR D = 74)-(D = 75 OR D = 76))
130 GOSUB 1000:GOSUB 2000:NEXT J:HTAB 1:VTAB 21
140 PRINT "***PLEASE PRESS ANY KEY TO PLAY AGAIN***";
150 GET K$:ON K$ <> CHR$(3) GOTO 20:END
1000 MX = CX-(D = 76)+(D = 74):MY = CY+(D = 73)-(D = 7
5)
1010 F = (MX < 0 OR MX > 4 OR MY < 0 OR MY > 4):RETURN
2000 TR = A(CX,CY):A(CX,CY) = A(MX,MY):A(MX,MY) = TR
2010 HTAB 18+CX:VTAB 8+CY:PRINT CHR$(A(CX,CY))
2020 HTAB 18+MX:VTAB 8+MY:PRINT CHR$(A(MX,MY))
2030 CX = MX:CY = MY:RETURN
    
```

```

20 CLS:PRINT CHR$(23);TAB(8);"*ALPHA PUZZLE*"
30 PRINT@W*11,"I=UP; J=LEFT; L=RIGHT; K=DOWN;":PRINT T
AB(11);"S=SOLVE."
40 FOR I=0 TO 4:FOR J=0 TO 4:A(I,J)=65+I+J*5-(24+Q*15)
*(I=4 AND J=4)
50 PRINT@W*(J+3)+Q*(I+12),CHR$(A(I,J));:NEXT J:PRINT:N
EXT I
60 CX=4:CY=4:FOR I=1 TO 100
70 F=0:D=RND(4)+72:GOSUB 1000:ON -F GOTO 70
80 M(I)=D:GOSUB 2000:NEXT I
90 K$=INKEY$:IF K$="" THEN 90 ELSE D=ASC(K$)
100 IF D<73 OR D>76 AND D<>83 THEN 90
110 IF D<>83 THEN F=0:GOSUB 1000:ON -F GOTO 90:M(I)=D:
GOSUB 2000:I=I+1:GOTO 90
120 FOR J=I-1 TO 1 STEP -1:D=M(J):D=D-2*((D=73 OR D=74
)-(D=75 OR D=76))
130 GOSUB 1000:GOSUB 2000:NEXT J
140 PRINT@W*11,"**PRESS ANY KEY TO PLAY AGAIN**":PRINT
150 K$=INKEY$:IF K$="" THEN 150 ELSE 20
1000 MX=CX+(D=76)-(D=74):MY=CY+(D=75)-(D=73)
1010 F=(MX<0 OR MX>4 OR MY<0 OR MY>4):RETURN
2000 TR=A(CX,CY):A(CX,CY)=A(MX,MY):A(MX,MY)=TR
2010 PRINT@W*(CY+3)+Q*(CX+12),CHR$(A(CX,CY));
2020 PRINT@W*(MY+3)+Q*(MX+12),CHR$(A(MX,MY));
2030 CX=MX:CY=MY:RETURN
    
```

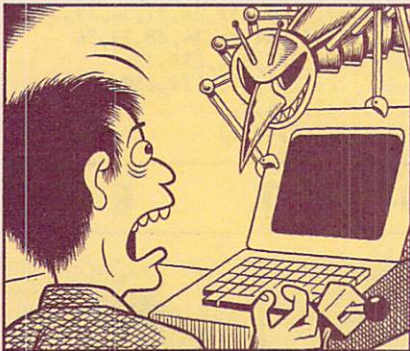
TRS-80s/ALPHAPUZZLE

```

9 REM --COCO OWNERS: CHANGE W=64 TO W=32--
10 DIM A(5,5),M(1000):W=64:IF W=64 THEN Q=2 ELSE Q=1
    
```

Our apologies to programmer Tim Eckel of Perrysburg, Ohio. In the February issue we inadvertently omitted his credit for programming the graphic 3-D Surface Plotter.

C O M P U T E R B U G C O N T E S T



Let's talk bugs. You know, computer bugs—the ones that turn up in all of your best programs. Thanks to a grant from B.A.S.I.C.S. (Bugs Are Something I Can't Stand), K-POWER is setting out to identify the most troublesome computer bugs. For instance, the Daddy Wrong Legs (leftus rightus turnus)—this pest comes complete with eight-leg directional controls. Its natural habitat is arcade-style games—especially those that re-

quire split-second timing and quick moves.

First, Daddy weaves a web somewhere on the *x,y* axis mechanism in your controller. Then, he waits until you need to make a speedy turn to escape certain death . . . and wraps his web around the controller!

We need your scientific help.

Have you spotted any interesting species of computer bugs lately? Let us know and you could win free software. Just fill out the entry blank and mail to "Computer Bug Contest," c/o K-POWER, 730 Broadway, New York, NY 10003. All entries must be received by April 30, 1985. Don't forget to tell us what kind of computer you use!

Computer bug: _____

My bug's habitat and habits: _____

Name _____ Age _____

Address _____

City _____ State _____ Zip _____

Telephone Number (____) _____ Male _____ Female _____

Computer(s) I use: _____

WHAT'S IN STORE

NEW HARDWARE ANNOUNCEMENTS

COMPUTERS

Atari 65XE and 130XE

MANUFACTURER: Atari Corp., 1265 Borregas Ave., Sunnyvale, CA 94086; (408) 745-4851
PRICE: \$120 (65XE); \$140 (130XE)

The long-lived Atari 800, most recently repackaged as the improved Atari 800XL, has been given yet another set of new clothes. This time it's masquerading as the sleek, white Atari 65XE. Like the 800XL, it has 64K, four music voices, 256 luminances, 11 graphics modes, and "player-missile graphics" (sprites). According to Atari, the 65XE will run all software that runs on the Atari 800XL, which means there's a large library available.

The Atari 130XE has all these features, as well as 128K RAM. As of this writing, however, there is no software that takes advantage of the extra memory. With the new Atari monochrome monitor, the XE computers can display 80 characters on the screen, compared to 40 on the 800XL.

In addition, Atari says it plans to produce the 65XEM, a music-oriented computer that will feature an extraordinary eight voices of sound, and other features that allow the user to create "symphonic sound."

Atari 130ST and 520ST

PRICE: \$399 (130ST); \$599 (520ST)



520ST

Nicknamed the "Jacintosh," because this new invention of Atari Chairman Jack Tramiel looks and operates a lot like Apple's Macintosh, the Atari ST series promises "power without the price." The 130ST has 128K RAM, and the 520ST has 512K. Both computers are built with the same Motorola 68000 microprocessor as the Macintosh, and come with a mouse. Extensive built-in memory (192K ROM) provides a nifty operating environment for the

mouse, with "pull-down" menus, and "windows," so that the user can operate programs without having to learn a complex set of commands.

There are low-, medium-, and high-resolution graphics modes: 320 × 200 pixels (dots) with 16 colors; 640 × 200 with four colors; and 640 × 400 in monochrome. In all, 512 colors are available, though only 16 can be used at one time. Three sound voices are built-in. The ST comes with a standard MIDI musical interface, which means you can connect it to all kinds of keyboards and synthesizers.

Other interfaces include a Centronics parallel port, an RS-232C serial port, a connection for a 3.5-inch disk drive (about \$400 for the drive), and two joystick ports. Both Atari ST computers work with a TV, or any type of monitor, including an RGB color monitor. A numeric keypad is part of the keyboard. Atari plans to market disk drives, printers, and monitors designed to complement the ST line, and says the computers will be available in stores before June.

Commodore 128

MANUFACTURER: Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380; (215) 431-9100
PRICE: less than \$300

Commodore has plans to market a sequel to its big-selling Commodore 64. Naturally enough, it's called the Commodore 128, and comes with 128K RAM that is expandable to 512K. Best of all, it will run all software written for the C 64, something that cannot be said for the Commodore Plus/4. In addition, the C 128 will run new software written to take advantage of its extra memory, and CP/M software. This includes best-selling business programs such as *WordStar* and *dBase II*.



Another improvement over the C 64 is the C 128's ability to display 80 characters across the screen.

And, it can be used with an RGB color monitor.

Commodore will market a new line of peripherals with the C 128, including a new 5.25-inch disk drive that can store 350K, a 13-inch color/RGB monitor (C1902), and a Commodore mouse.

MONITORS

Sony Trinitron Monitors

MANUFACTURER: Sony Corp., Sony Drive, Park Ridge, NJ 07656; (201) 930-1000

PRICE: \$550 (CPD-9000); \$595 (CPD-1201); \$595 (KV-1311CR)



KV-1311CR

Sony's well-known Trinitron technology, which helped the Japanese company establish itself as a leading seller of high-end color TVs, has been used in a new line of computer monitors. Sony's latest RGB (Red-Green-Blue) monitor, in three screen sizes and at a reasonable price, should brighten the fast-growing RGB monitor field.

Each of the three high-resolution monitors, in 9-, 12-, and 13-inch screen sizes, features the Trinitron corner-to-corner clarity and brightness, as well as a built-in RGB interface for direct connection to IBM PC and compatible computers.

The 13-inch KV-1311CR monitor (\$595) doubles as a remote-control TV receiver. It has 10-key direct access to up to 125 cable channels. Audio/video inputs allow it to hook up to computers with composite video outputs (i.e. every known computer except Timex, Atari 600XL, or the TRS-80 Color Computer), VCRs, and videodisk players.

Like the KV-1311CR, the CPD-9000 9-inch (\$550) and CPD-1201 12-inch (\$595) monitors offer built-in IBM PC interfaces. They include a horizontal-shift control for adjusting the display's position. All three monitors have analog as well as digital RGB interfacing capabilities. →

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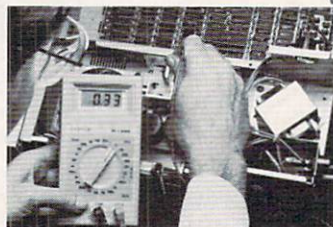
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will give you a total mastery of computer operations and servicing techniques. You'll do programming in BASIC language. You'll prepare interfaces for peripherals such as printers and joysticks. Using utility programs, you'll check out 8088 functioning. And the entire system, including all the bundled software and extensive data manuals, is yours to keep as part of your training.

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NEW HARDWARE

KEYBOARDS

SmartBoard


MANUFACTURER: WICO Corp., 6400 W. Gross Point Road, Niles, IL 60648; (312) 647-7500

PRICE: \$399



WICO's new keyboard alternative, SmartBoard, is a fully programmable Selectric-type keyboard with a numeric keypad, and a built-in programmable trak ball that can be used in place of cursor-control keys. The SmartBoard, designed primarily to help the user navigate through complicated business and graphics programs, is "plug-compatible" with the IBM PC, XT, and IBM-compatible computers. It works with the Apple II/II plus/IIe with a \$60 adapter, and interfaces with the IBM PCjr with a third-party adapter.

There's a "key swap" function which enables the user to customize the keyboard by swapping one key for another. The keyboard has available both QWERTY or Dvorak formats and features 10 programmable dual-mode function keys (which each can be programmed to represent up to 126 characters of information). On the numeric keypad are 10 numeric keys and four combination numeric-cursor keys: ENTER, plus/minus, NUMERIC LOCK, and SCROLL LOCK.

A program key lets users customize the SmartBall, function keys, and typewriter-style keyboard. The SmartBall, which WICO says can be programmed to work with any software, operates in two modes and can act like a cursor key. For graphics control there is a switch on the board that enables the trak ball to move in eight directions. In both modes, the user can program the trak ball to replace the complicated commands of a specific program. For instance, in one mode the user could program the trak ball so that by moving it up it directs a word-processing program to scroll forward a page; and in the other mode, the same action moves the cursor up a line. 

WHAT'S IN STORE SOFTWARE GUIDE

QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart.

Here's a rundown of the rating categories and what they mean: **●** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS/HOME MANAGEMENT

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				●	D	EH	GQ	EU	V
ADAM CALC Coleco Industries 999 Quaker Lane S. West Hartford, CT 06110 (800) 842-1225 \$49 ©1984	Spreadsheet program simulates electronic ledger page. Good for tracking budgets and expenses for home, small business, and club use. Includes calculator, adjustable column widths, and capabilities for creating graphs. —WILSON	Coleco ADAM (cass. and d.).	90-day warranty.	★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
APPLEWRITER II (Version 2.0) Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010 \$149 ©1984	This easy-to-learn and powerful word-processing program includes a telecommunications mode, tutorial disk, allowance for lines longer than 80 characters, multiple margin settings, and more. —WILSON	Apple IIe/IIc, 64K (d.).	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★
CREATIVE FILER Creative Software 960 Hamlin Court Sunnyvale, CA 94089 (408) 744-0663 \$49 (C 64, Apple) \$99 (IBM) ©1984	Design and print records in medium-size electronic file system for home, small business, and club use. Records may be 98 lines long and can tally numerical information.† —ODISIO	Reviewed on C 64 (d.). Also for IBM PC/PCjr, 64K (d.). Planned for Apple II series, 48K (d.).	90-day warranty; \$11.50 fee thereafter or if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★
FRIENDLY FILER Grolier Electronic Publishing Co. Dept. 333, Sherman Turnpike Danbury, CT 06816 (800) 858-8858 \$39 ©1984	Tutorial module accompanies this junior data-management system, good for small-scale organizational tasks—homework notes, addresses, hobbies, etc.—recommended for data-base newcomers.† —BUMGARNER	Reviewed on Apple II series, 64K (d.). Version planned for C 64 (d.).	90-day warranty; \$15 fee for backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★

RATINGS KEY ● Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

EDUCATION/FUN LEARNING

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	EH	GQ	EU	V	
DAZZLE DRAW Broderbund Software 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 \$59 ©1984	Powerful set of computerized graphic tools lets 9-year-olds on up to adult create stunning drawings and posters for storage on disk or printout. † —BUMGARNER	Apple IIe/IIc, 128K (d.). Mouse, graphics tablet, or joystick.	Unlimited warranty; \$5 fee if user-damaged.	★	★	★	★	★	A	★
EVELYN WOOD DYNAMIC READER Timeworks P.O. Box 321 Deerfield, IL 60015 (800) 323-9755 \$49 (C 64); \$69 (Apple); \$89 (IBM) ©1984	Teaches the Evelyn Wood speed-reading technique for ages 12–adult. Keeps track of performance, diagnoses areas that need work and helps you increase speed. —WILDMAN	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.); IBM PC/PCjr, 128K (d.).	Unlimited warranty.	★	★	★	★	N/A	A	★
EXPERTYPE Coleco Industries 999 Quaker Lane S. West Hartford, CT 06110 (800) 842-1225 \$49 ©1984	Tutorial helps ages 10 and up improve typing speed. Move at your own pace through lessons that will help even fast typists. Lacks zesty graphics or game quality. —DAVENPORT	Coleco ADAM (d. and cass.).	90-day warranty.	★	★	★	★	★	E	★
OPERATION FROG Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3000 \$39 ©1984	No-muss, no-fuss dissection program teaches kids about anatomy as they take frog apart and correctly reassemble it, using "forceps" and a magnifying glass that details each organ. † —FRANK	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.). Joystick or mouse optional.	60-day warranty; \$5 fee thereafter.	★	★	★	★	★	A	★
RAINBOW PAINTER Springboard Software 7807 Creekridge Circle Minneapolis, MN 55435 (800) 328-1223 \$34 ©1984	Electronic coloring book, for younger ones (ages 5–10) not yet up to more sophisticated graphics tools. Provides 50 line drawings and a blank screen to paint on, as well. —BUMGARNER	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.). Planned for IBM PC/PCjr. Joystick or KoalaPad optional.	30-day warranty; \$5 fee if user-damaged.	★	★	★	★	★	E	★
ROCK 'N' RHYTHM Spinnaker One Kendall Square Cambridge, MA 02139 (617) 494-1200 \$26 ©1984	Compose and perform your own pop tunes, record them track by track, just like they do in show biz. Good for the whole family or lone musicians, 10 and up, younger with help. † —SUMMERS	Reviewed on C 64 (d.). Also for Atari Home Computers, 48K (d.). Joystick.	30-day warranty; \$5 fee thereafter.	★	★	★	★	★	A	★
TINK'S ADVENTURE Mindscape 3444 Dundee Road Northbrook, IL 60062 (800) 221-9884 \$24 (Atari, C 64) \$29 (Apple, IBM) ©1984	Kids 4–10 guide Tink on a sea adventure from challenge to challenge (seven all together), intended to reinforce ABCs. Younger children may need some assistance. † —RASKIN	Reviewed on Atari Home Computers, 48K (d.). Also for Apple II series, 48K (d.); C 64 (d.); IBM PC/PCjr, 64K (d.).	90-day warranty.	★	★	★	★	★	A	★
TUK GOES TO TOWN Mindscape 3444 Dundee Road Northbrook, IL 60062 (800) 221-9884 \$24 (Atari, C 64) \$29 (Apple, IBM) ©1984	Kids 4–8 take Tuk to town, encountering seven games, five of which challenge shape recognition, and beginning spelling and vocabulary skills. † —RASKIN	Reviewed on Atari Home Computers, 48K (d.). Also for Apple II series, 48K (d.); Commodore 64 (d.); IBM PC/PCjr, 64K (d.).	90-day warranty.	★	★	★	★	★	A	★
WEATHER TAMERS CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2500 \$39 ©1984	Players customize weather in different locales for clients' needs in simulation for ages 12 and up. May be too slow for younger players, but excellent for older, slower nonarcade players. † —WILDMAN	C 64 (d.). Joystick.	90-day warranty; \$5 fee thereafter.	★	★	★	★	★	A	★
WORD ATTACK Davidson & Associates 6069 Groveoak Place, No.12 Rancho Palos Verdes, CA 90274 (213) 373-0971 \$49 ©1983	Study more than 700 words in nine lists of varying levels of difficulty. Use multiple-choice quiz, fill-in-the-blank test, or an arcade game. Having mastered the words provided, you can add your own. —MORRIS	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.); IBM PC/PCjr, 64K (d.).	1-year warranty (includes user-damaged); \$10 fee thereafter or for backup.	★	★	★	★	★	E	★

RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

GAMES REVIEWS BY JAMES DELSON

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	PS	GQ	EU	V
BIG TOP Funtastic 724 Meadowlark Road Audubon, PA 19403 (215) 666-0337 \$39 ©1984	Youngsters climb, jump, and gather treasure in many-leveled, ladder skill/arcade game with special speeds for kids. Fun and suitable for ages 6 and up.	IBM PC, 64K (d.). Joystick for PCjr.	1-year warranty (includes user-damaged); \$10 fee thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
CHAMPIONSHIP LODGE RUNNER Broderbund 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 \$34 ©1984	Talk about tough! One of the most difficult games designed—has 50 ace levels of the popular <i>Lode Runner</i> . Run through mazes, blast through floors and walls, avoid enemies, and collect treasures, for ages 10 and up.	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.). Joystick optional.	Unlimited warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
CONAN THE BARBARIAN Datasoft 19808 Nordhoff Place Chatsworth, CA 91311 (818) 701-5161 \$39 ©1984	Guide Conan through several levels to defeat the evil Volta. Run, jump, somersault through the air, throw boomerang-like sword to vanquish monsters, and avoid traps. Imaginative, but difficult, for ages 10 and up.	Reviewed on Apple II series, 48K (d.). Also for Atari Home Computers, 48K (d.); C 64 (d.).	3-month warranty; \$7.50 fee thereafter, if user-damaged, or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
CRIME AND PUNISHMENT Imagic 981 University Ave. Los Gatos, CA 95030 (800) 654-7340 \$34 ©1984	You're in the judge's chair and must decide the sentence of convicted criminals, based on the circumstances of each case. This game's fun, and educational to boot. For ages 10 and up.†	Reviewed on IBM PC, 64K/PCjr, 128K (d.). Also for Apple II series, 48K (d.); C 64 (d.).	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
FAHRENHEIT 451 Telarium One Kendall Square Cambridge, MA 02139 (617) 494-1200 \$39 (Apple) \$32 (C 64) ©1984	Text/graphic sequel to Ray Bradbury's novel, set in New York City, involves adventures in a futuristic, totalitarian society. Most playable text/graphic game to date. Ages 14 and up.†	Reviewed on Apple II series, 64K (d.). Also for C 64 (d.).	30-day warranty; \$5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
INDIANA JONES IN THE LOST KINGDOM Mindscape 3444 Dundee Road Northbrook, IL 60062 (800) 221-9884 \$29 ©1984	Tough but rewarding skill/arcade game based on the movie hero's continuing adventures. Brain-teasing logic aspects of game raise it above the usual arcade level. Good for ages 10 and up.	C 64 (d.).	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
KARATEKA Broderbund 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 \$34 (Apple) \$29 (C 64) ©1984	Kick, chop, run, run, run in this exciting arcade game. Fight one-on-one karate encounters against computer opponents blocking your attempts to rescue the princess. For ages 10 and up.	Reviewed on Apple II series, 48K (d.). Planned for C 64 (d.).	Unlimited warranty; \$5 fee if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	@ ★ ★
QUEST OF THE SPACE BEAGLE Avalon Hill 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 \$35 ©1984	First-rate sequel to <i>Jupiter Mission: 1999</i> takes adventurers deeper into the universe to fare for themselves in a series of arcade/strategy challenges. For ages 12 and up.†	Atari Home Computers, 48K (d.). Joystick.	Unlimited warranty; \$10 fee if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
RESCUE RAIDERS Sir-tech Software 6 Main St. Ogdensburg, NY 13669 (315) 393-6633 \$34 ©1983	Put together a mission of men, munitions, and material and set them against the computer to save the world. Fast-moving mix of arcade and tactical elements for ages 10 and up.†	Apple II series, 64K (d.).	30-day warranty (includes user-damaged); \$5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
TOURNAMENT TENNIS Imagic 981 University Ave. Los Gatos, CA 95030 (800) 654-7340 \$24 (ADAM, C 64) \$34 (IBM PCjr) ©1984	Best tennis game seen to date has numerous handicapping features that let novices challenge champs and put up a good match with computer. For ages 10 and up.	Reviewed on Coleco ADAM (cass.). Also for C 64 (d.). Planned for IBM PCjr, 128K (d.).	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★

RATINGS KEY O Overall performance; D Documentation; PS Play system; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; @ ★★ to ★★★ depending on price; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

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WHAT'S IN STORE SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 83 for information such as backup policies and addresses of software manufacturers.

HOME BUSINESS/ HOME MANAGEMENT

Creative Filer

HARDWARE REQUIREMENTS: Reviewed on Commodore 64. Also for IBM PC/PCjr. Version planned for Apple II series.

MANUFACTURER: Creative Software
PRICE: \$49 (C 64, Apple); \$99 (IBM)

Electronic filing programs have a number of worthwhile uses—such as inventory management, maintaining club membership lists, and updating mailing lists. Creative Software's filing system is especially valuable because you can use it in conjunction with the company's spreadsheet and word processor.

Once I mastered it, *Creative Filer* served me quite well. It allows an enormous amount of leeway in setting up a filing system—accepting formats up to 98 lines long. You can print out each format before you SAVE it, to examine it and make sure it's what you need.

Once you've decided on a format and saved it, you can enter information and design different printing formats. I took my local arts organization's membership list and printed it out both in roster form, as well as in mailing-label format.

This program would also come in handy in tracking business costs or inventory. You can total up numeric information entered in specific categories—in order to tally total and unit costs, gross profit, or order quantity, for example.

Some flaws in the program, particularly having to do with the documentation, may frustrate newcomers. The instructions are not always as clear as they could be. At one point, if you press CTL-6 to SAVE formats as the manual suggests, nothing happens. The program won't actually SAVE anything until you name the format. There's no prompt for this procedure. Also, should you wish to stop the printer at mid-page, there's no instruction about which key to press. Pressing the RUN/STOP

key will halt the process, although no mention is made of this in the documentation. (Creative Software assures us that a new Commodore 64 manual is on the way. On request, they'll send the new version to any owner.)

Nevertheless, after having familiarized myself with the formatting procedures, I found *Creative Filer* to be a reasonably priced data-base program. It's easy to use and useful for most home applications and some small businesses. —NORMA ODISIO

Friendly Filer

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Version planned for Commodore 64.

MANUFACTURER: Grolier Electronic Publishing Co.
PRICE: \$39

This is one box of 3 × 5 cards that won't get misplaced. *Friendly Filer* is an easy-to-learn, easy-to-use, junior data-base management program with a tutorial that makes the excellent resource book almost unnecessary. Sample files let you practice sorting and locating information within the data base.

Our children found the introductory tutorial a bit tedious. An animated character named Infolmp arranges and rearranges a list of fruits and prices into categories. We couldn't find a way to escape the lesson once we were in it.

The tutorial's second part, "Learn to Use Friendly Filer," teaches data-base lingo (RECORD, FILE, FIELD, etc.) and is invaluable. We skipped it at first and went straight to the program, but found ourselves confused. Try using the program first, and then go back to this "Learn to Use" section. It makes more sense once you've wandered around the program for a while.

My 12-year-old daughter, Dona, answered all the challenge questions in the practice session with little trouble (which required sorting through sample files); my 9-year-old son, John, skipped that section entirely and still managed to create a data base including names, addresses, telephone numbers, and the favorite sports of half his classmates. We printed the list out for him, but he likes it best inside the computer. One of this program's only major flaws is that if you select the print option and don't have a printer

hooked up, the program stops and must be rebooted—a great inconvenience—and something that could have been remedied with a simple warning signal.

Because *Friendly Filer* is opened and a tool as well as a structured introduction to an important computer application, I'd give it top rating as a home value. What it lacks in power (you have only seven categories for each record, up to 360 records for each file), it makes up for in ease of use and application. Use it to organize homework notes, addresses, recipes, mailing lists, and more. —MARLENE ANNE BUMGARNER

EDUCATION/ FUN LEARNING

Dazzle Draw

HARDWARE REQUIREMENTS: Apple IIe/IIc
MANUFACTURER: Broderbund
PRICE: \$59
MANUFACTURER'S SUGGESTED AGE: None

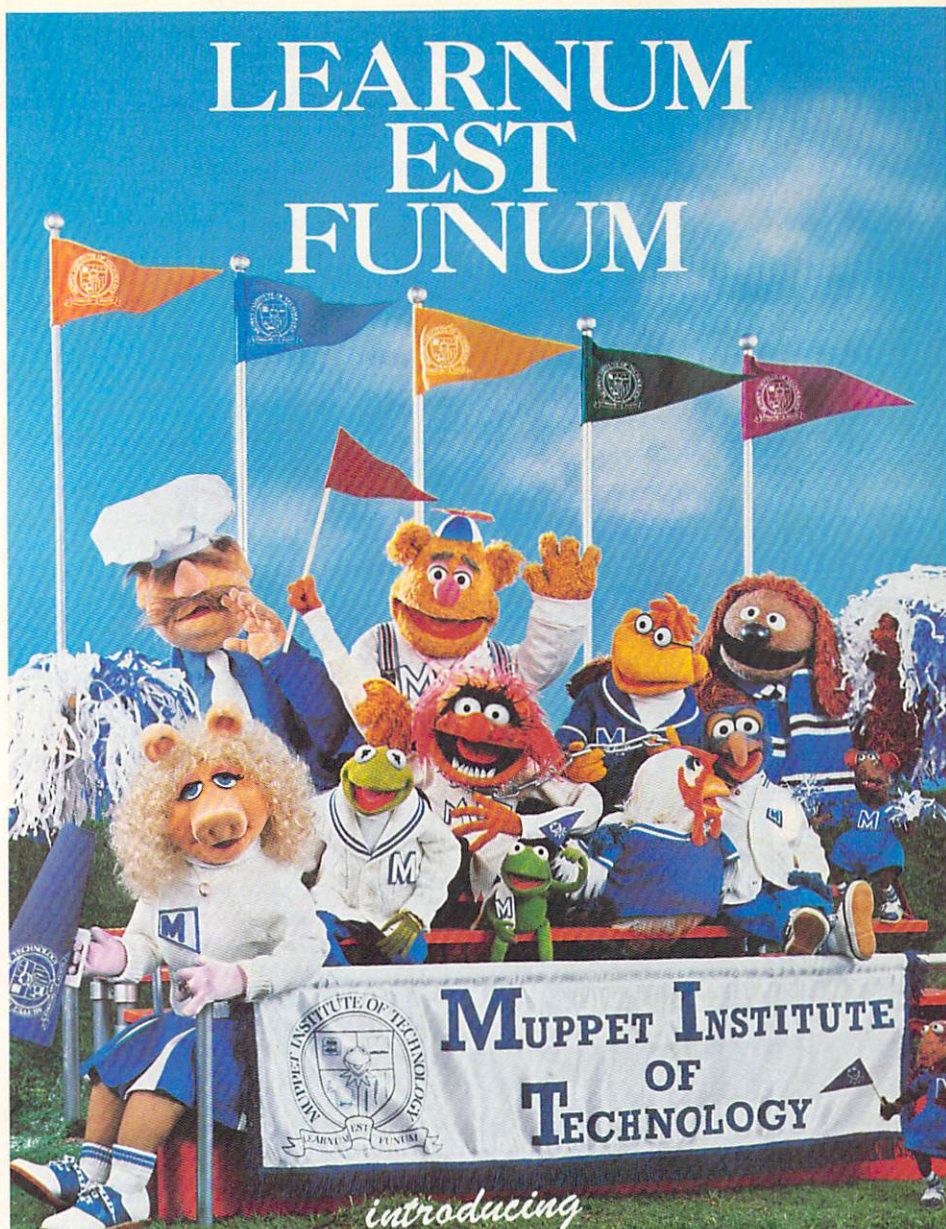
When *Dazzle Draw* arrived at our house, I spent an hour or so familiarizing myself with its pull-down menus and various drawing fea-



tures. I then presented it to my children (who had used *MacPaint* on their father's Macintosh) to see whether they could manage or not.

They immediately demonstrated features I hadn't discovered yet—like ZOOM, which lets you magnify a section of the picture for detailed drawing, and CUT AND PASTE, which lets you edit your creations. The ease with which my kids moved the joystick to each of the main lists of options, selected the operations they wanted to perform, and chose the colors and brush widths, reassured me that this program was kid-proof.

While this package lets amateurs use sophisticated shadowing tech-



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Commodore 64, \$29.95. Apple II, II+, IIe, IIc, \$34.95. Available wherever software is sold.

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Type of Computer:	Store Price	Our Price	Name of Program/Item
ABCDE.GH.JK	\$33 e	\$23	Alphabet Zoo (Spinnaker)
ABCD..G..JK	\$40 e	\$26	Agent USA.48k(Atari \$22)
ABCD..G..JK	\$40 r	\$28	Archon (Electronic Arts)
ABCD..G....	\$40 r	\$28	Archon II: Adept (E.Art)
ABCD..G....	\$35 r	\$23	Beyond Castle Wolfenstein
ABCD..G....	\$40 r	\$26	Bruce Lee. 48k
ABCD..G..J.	\$30 r	\$20	Castle Wolfenstein (32k)
ABC.E..H.J.	\$35 r	\$16	Centipede (IBM \$21)
.BCD..G..JK	\$50 h	\$35	Cut & Paste Word Process
ABCD..G..JK	\$50 r	\$32	Deadline (Infocore)
ABC.E..H.J.	\$35 r	\$16	Donkey Kong (IBM \$21)
ABCD..G..JK	\$35 e	\$23	Early Games-Young Childm
ABCD..G..JK	\$50 h	\$35	Financial CookBook
ABCD..G..JK	\$50 r	\$35	Flight Simulator II
AB..DEFGHIJ.	\$35 r	\$23	Frogger (Cartridges \$30)
ABCD..G..JK	\$35 r	\$25	Hard Hat Mac (Elec.Arts)
ABCD..G....	\$75 h	\$49	Home Acct.(Arrays/Cont)
.....JK	\$150 h	\$99	Home Acct.Plus (Array/C)
ABCD..G....	\$70 h	\$33	Homeward (Sierra On Line)
...D....JK	\$70 h	\$45	Homeward (Sierra On Line)
ABCDE.GH.J.	CALL h	CALL	Koala Pad + Software
ABCD..GH.JK	\$35 r	\$23	Lode Runner (Cart.\$27)
ABCD..G..JK	\$40 e	\$26	MasterType (Scarborough)
ABCD..G..JK	\$50 e	\$32	Math Blaster (Davidson)
ABCD.FG.I..	\$25 e	\$18	Memory Bldr:Concentration
...D..G....	\$40 r	\$28	M.U.L.E (Electronic Arts)
ABCD..G....	CALL e	CALL	Muppet Learning Keys
ABCD..G..JK	\$40 r	\$28	Murder on the Zinderneuf
ABCD..G..JK	\$40 r	\$28	Music Construction Set
ABCD..G..JK	\$40 r	\$28	1 on 1: L.Bird & J.Erving
ABC...H.J.	\$35 r	\$16	Pac Man (IBM \$21)
ABCD..G..JK	\$40 r	\$28	Pinball Construction Set
ABCD..G....	\$50 h	\$32	Print Shop (Broderbund)
AB..E..H.J.	\$35 r	\$19	Robotron (IBM \$21)
ABCD.FG.I..	\$20 r	\$15	Sargon II (Hayden)
ABCD..G..JK	\$50 r	\$32	Sargon III (Hayden)
ABC...G..JK	\$90 e	\$60	SAT: Barron's Study Prog.
ABCD..G..JK	\$40 r	\$28	7 Cities of Gold (64k)
ABC.....	\$40 r	\$28	Sky Fox (Electronic Arts)
ABC...G..JK	\$70 e	\$45	Speed Reader II(Davidson)
ABCD..G..JK	\$40 e	\$26	Spellicopter (Designware)
ABCD..G..JK	\$40 e	\$26	Summer Games (Epyx)
ABC...G..JK	\$40 r	\$26	Trivia Fever (48k)
ABCD..G..JK	\$60 r	\$39	Ultima II,III.(each).48k
ABCD..G....	\$80 h	\$52	Your Personal Net Worth
.....JK	\$100 h	\$65	Your Personal Net Worth
ABCD..G..JK	\$40 r	\$26	Zork 1,2,3.(Apple \$29)ea.

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WHAT'S IN STORE SOFTWARE REVIEWS

niques to create pictures, it also will appeal to more experienced artists who want to take advantage of its more powerful tools. The manual is wonderful, assuming no previous knowledge of the complicated world of computer graphics, or even of computers. The book's "Dazzling Debut" introduction helped me, step by step, execute my first drawing, and then guided me on to the program's other features.

I especially liked the tools that let me capture or cut out sections of the drawing and flip, copy, paste, or color them. A mirror feature lets you create symmetrical designs. You can add text to your work in a number of styles and sizes. Nine-year-old John liked being able to undo the last detail he had added to his drawing if it didn't suit him. A special CONSTRAIN function helps you draw more precisely around circles or straight lines. Twelve-year-old Dona wanted to "undo the last undo," as she can on the Mac, in order to experiment a bit more. But she was drawing in color for the first time, and delighting in it.

With the proper printer and interface cards (see this issue's *Buyer's Guide*) you can print out your work. This is the first program I've encountered that made me seriously consider buying a color printer. Unfortunately, *Dazzle Draw*'s versatility and "double hi-res" graphics capabilities require an extended 80-column card for use on the IIe—an extra many families still don't have.

—MARLENE ANNE BUMGARNER

Operation Frog

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for Commodore 64. Joystick or mouse optional.
MANUFACTURER: Scholastic Software
PRICE: \$39
MANUFACTURER'S SUGGESTED AGE: 9+

"I don't know how to dissect a frog!"

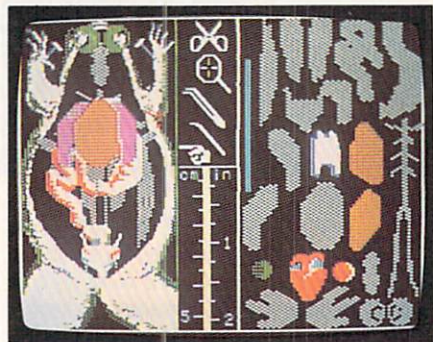
That was the cry from my fifth-grader when she first turned on *Operation Frog* and started playing without benefit of instructions or parental help. Within two hours, however, she could dissect and reassemble the frog, and was asking questions such as, "Why is the brain so small?" and "Can you really put something that's living back together again?"

Operation Frog is an excellent science simulation. You are provided with scissors, forceps, a probe, and

a magnifying glass. Both the graphics and the dissection process seem quite realistic—for example, you can't remove the kidneys until you've removed all the organs on top of them. To foster good technique, the program lets you cut only one organ at a time. Repeatedly having to pick up the scissors, cut, drop the scissors, pick up the forceps, remove an organ, pick up the scissors again, etc. until you've emptied the frog of its entrails can get rather tedious.

A HELP command is always available, to suggest a next step if you get stuck. Once you've removed an organ and placed it on the tray, the magnifying glass allows you an in-depth look into the organ's structure and function. The program's other pluses include the option to EXIT the program at any point and to SAVE an incomplete operation. It also comes with an extensive manual.

This is an excellent package for a school biology class, but I had some initial reservations about how effective it might be at home. Watching my children use it turned those reservations around. My 9-year-old rarely uses the magnifying glass, preferring instead to treat the removal and replacement of organs as a game. My 11-year-old, who is repulsed by the dead mice our cats leave behind on the front steps, really enjoyed taking apart this odorless, bloodless frog, and spent time with the magnifying glass.



One word of caution: There's a lot to learn, but this isn't an open-ended program. There's only one correct solution, and once that is reached, the program might have limited appeal. Still, if you have kids who like to take things apart and put them back together again—as they do with Tinkertoys—*Operation Frog* will provide them with a great opportunity to explore the world of living things.

—CATHY FRANK

Rock 'N' Rhythm

HARDWARE REQUIREMENTS: Reviewed on Commodore 64. Also for Atari Home Computers. Joystick.

MANUFACTURER: Spinnaker

PRICE: \$26

MANUFACTURER'S SUGGESTED AGE: 10+



Tom Snyder, author of such notable computer games as *In Search of the Most Amazing Thing*, *Run for the Money*, and *Agent U.S.A.*, is at it again. Now he's taking on the recording industry with *Rock 'N' Rhythm*, an activity that lets you fill both the technician's and the performer's shoes as you compose, play, and record your own tunes.

The studio tour begins at the jukebox—complete with nine snappy pre-recorded tunes. You'll be able to add up to 18 more of your own creations in the Control and Performance Rooms. Special equipment will let you record with three separate tracks (in the Commodore 64 version; two in the Atari): a melody track, harmony track, and drum track. Go ahead, use the joystick to give the drums a few whacks. If you like what you hear, you can tape it and play it back. The flashing metronome will help you keep a steady beat.

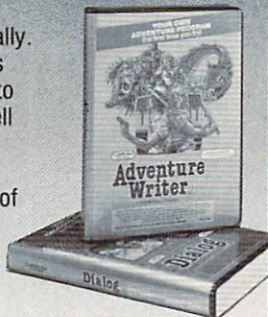
The cardboard overlay turns your keyboard into a minisynthesizer. As you press the keys, the notes sound and their names appear on the screen. The Commodore version lets you experiment with the shape of the sound wave in true synthesizer fashion. The whole process is remarkably easy: Our 7-year-old surprised us by writing a tune his first time around.

Our family worked on several group efforts—with a different family member "playing" each part. Learning how their favorite recordings are made excited our children. And all of us felt proud and satisfied to share music we had created ourselves.

—TAN SUMMERS

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WHAT'S IN STORE SOFTWARE REVIEWS

Tink's Adventure and Tuk Goes to Town

HARDWARE REQUIREMENTS: Reviewed on Atari Home Computers. Also for Apple II series; Commodore 64; IBM PC/PCjr. Joystick.

PRICE: \$24 each (Atari, C 64);

\$29 each (Apple, IBM).

MANUFACTURER'S SUGGESTED AGE: 4-8

Ever since we read *There's a Nightmare in My Closet* and discovered that monsters can be adorable as well as scary, Mercer Mayer's story-book creations have become household favorites. How delighted we were to find Mayer creating computer games. The *Tink-Tonk* series is like an electronic Care Bears or Rainbow Bright. Kids can roam through Mayer's imaginary lands as if they were rummaging through their toy chest.



In *Tink's Adventure*, children learn the ABCs and keyboard layout, helping Tink explore a colorful, mysterious island. In *Tuk Goes to Town*, children practice spelling, vocabulary, and shape discrimination as they guide Tuk through a little town. (Two other programs not reviewed here, *Tonk in the Land of Boddy Bots* and *Tinka's Maze*, focus on memory skills, and counting and simple math skills, respectively.)

Each package has an interactive story, some animated sequences, and five to seven games that can be played at various levels of difficulty. The play system itself is awkward. In an UNSCRAMBLE THE LETTER module, for instance, ESAL is supposed to be correctly typed SEAL. No allowance is made for another possibility, SALE. Because the game follows a nautical theme, an adult might find SEAL the obvious choice, but my kids had a rough time making these distinctions. Also, the game segments lack audio enhancement; correct responses aren't always clearly reinforced.

My kids (ages 4-8) didn't like the

inconsistency of the games and activities. There didn't seem to be real purpose to the lovable characters' wanderings. The game needs more of a story. An older child may enjoy pursuing the potpourri of activities, but may miss the nasty villains and the competition that are standard fare in other games. With nice animation, a whimsical storyboard, and a wide array of game possibilities, this software is potentially a good mix of fun and learning. But parents will need to be on hand to chaperone until the kids learn to navigate through *Tink-Tonk's* rich but confused world.

—ROBIN RASKIN

Weather Tamers

HARDWARE REQUIREMENTS: Commodore 64.

MANUFACTURER: CBS Software

PRICE: \$39

MANUFACTURER'S SUGGESTED AGE: 10+

Remember the expression, "Everybody talks about the weather but nobody does anything about it"? Well, this science simulation will give you and your family the opportunity to do something about the weather. Working alone or with the assistance of up to three other players, you customize the weather to satisfy as many as three "clients" at a time.

First time out, our team of neophyte weather-tamers consisted of my neighbor, Don; his 10-year-old son, Brian; my 14-year-old, Jay; and myself. Clear instructions in the manual, as well as careful on-screen assistance, helped us through the game's initial phases.



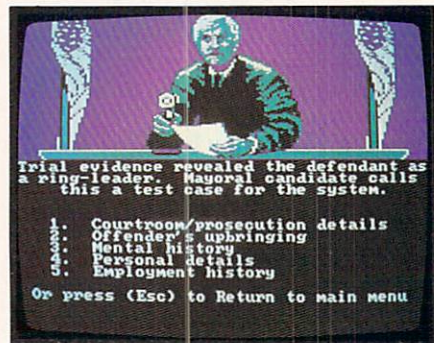
As we played, we received "calls" from new clients requesting different kinds of weather at various locations. Not only did we have to deliver the right weather, we had to do it on time. Wind direction and speed, therefore, were essential elements. Satellites kept us abreast of fluctuating temperature, humidity, air pressure, and wind.

We also were given the opportunity to predict the likelihood of the weather occurring as desired. If you correctly predict that the changes won't produce the desired weather, you can still collect a partial fee.

Featuring excellent graphics and implementation, the program accurately illustrates the way weather fluctuates in response to certain variables. But although our boys voiced enthusiasm for the program, they soon chose to move to a more active type of arcade game. Leaving the program around the computer table never did result in self-initiated play. Don and I, however, look forward to additional opportunities to hone our meteorological skills. Perhaps this program would be best applied in a middle- or high-school earth-science class. It is certainly capable of demonstrating some fundamental principles in a clear and stimulating manner. —KEN WILDMAN

GAMES

Crime and Punishment



HARDWARE REQUIREMENTS: Reviewed on IBM PC. Also for Apple II series; Commodore 64; IBM PCjr.

MANUFACTURER: Imagic

PRICE: \$34

CRITIC'S SUGGESTED AGE: 12+, younger with supervision.

This provocative game puts players in the judge's chair to decide the sentences for convicted criminals. Presented with a crime (kidnapping and murder being among the most serious, minor embezzlement constituting a lesser crime), you determine a fitting punishment based on the evidence presented. The computer then compares your resolution of the cases to a consensus opinion based on actual judges' calls in comparable circumstances.

Regardless of their age or courtroom experience, participants enjoyed this thoughtful program. Con-

science and an impartial eye are what count here. Working alone or in groups of up to six people, players got extremely involved.

Several hours' worth of play really taught about the judicial system, and its pros and cons. It may seem easy to sentence an imaginary person to 20 years in prison, or even death (something I never did and for which I lost points), but when it comes right down to it, even the most hard-bitten players regretted having to do that job in the game.

Better documentation would have improved *Crime and Punishment*. It could use some explanation of how white collar crime differs from violent crime. Also, the computer's judgments puzzled some of the players. Notes on individual cases and why certain decisions were made would have helped. Still, *Crime and Punishment* is a worthwhile program, and one that makes good use of the computer. It allows us to see how our sometimes curious judicial system operates, as no episode of "Perry Mason" ever could.

Fahrenheit 451

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for Commodore 64.

MANUFACTURER: Telarium
PRICE: \$39 (Apple); \$32 (C 64)
CRITIC'S SUGGESTED AGE: 14+



This text/graphic sequel to Ray Bradbury's novel is exciting, colorful, and the most playable of its kind to date. As a seeker of truth in a world gone mad, you roam the streets and buildings of New York City in a hypothetical, futuristic, totalitarian society which forbids the use or even the knowledge of the written word.

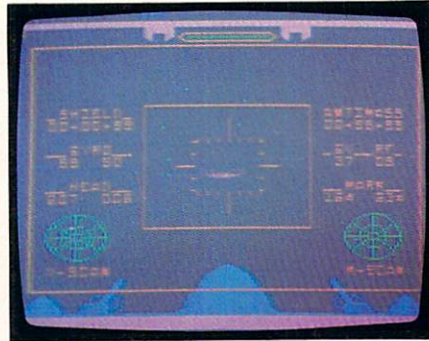
The play system is remarkably versatile for this type of text-based game. You don't get hung up on the use of inexact words, nor do you get killed every five seconds. You can really play—meet people, visit places,

acquire information—all the while observing the awe-inspiring changes wrought upon New York's once-fashionable Fifth Avenue. You also have to avoid savage dogs and vicious security police patrolling the region.

Unfortunately, as with all text/graphic adventures, you will face the problem of what to do when you've solved it. Replay potential is low. Bear in mind, however, this is going to be a three-month (at several hours per weekend) game. If you're seeking a highly playable game of this genre, you can't do better.

Quest of the Space Beagle

HARDWARE REQUIREMENTS: Atari Home Computers. Joystick.
MANUFACTURER: Avalon Hill
PRICE: \$35
CRITIC'S SUGGESTED AGE: 12+



In this first-rate sequel to *Jupiter Mission: 1999*, your star adventurer is stranded in deep space. To get back to Earth, you must master a series of games that challenge your shoot-'em-up, mapmaking, and navigational skills. It's a stimulating, often-frustrating series of demands—tough for even experienced players, impossible for beginners.

First, you must fight a major outer-space battle. Pitted against a fleet of 40 enemy starcraft, you can send in only one of 10 robot spaceships at a time. The system's similar to *Star Raiders*, but controlled manually.

Next, you must negotiate a huge maze. Use the joystick to race through the labyrinth, replenishing dwindling energy and oxygen supplies as you try to solve a mystery and find the exit. Monsters lurk about, walls and pits must be circumnavigated. Beware the creature that shadows you wherever you go.

The final and most difficult challenge demands that you identify your exact position in space, and return to Earth using alien navigational systems you are unfamiliar with, and that defy the possible ac-

ording to your spaceschool lessons! Your travels will be tough—your wilderness is 200,000,000 light-years wide.

One of the toughest games my playtesters and I have encountered, *Quest of the Space Beagle* is both daunting and original. Expect to devote at least 30 hours to *Quest*. If you're a newcomer, expect it to take a lot longer than if you'd already gained your wings, so to speak.

Rescue Raiders

HARDWARE REQUIREMENTS: Apple II series.
MANUFACTURER: Sir-tech
PRICE: \$34
CRITIC'S SUGGESTED AGE: 10+

Rescue Raiders is written for the gamer who appreciates the tried-and-true hybrid: games that mix arcade shooting and flying with tactical decision-making. You buy an army of tanks, mobile missile launchers, and helicopters; and hire personnel. Then, you dispatch them against the computer's forces to try and save the world.



The helicopters are equipped with limited supplies of munitions—bullets, bombs, and "smart missiles"—the latter capable of seeking out and destroying enemy 'copters. Tanks afford heavy ground support; infantry can act as ground or air-mobile forces. To combat enemy choppers that break through your copter line, deploy missile carriers. Draw on demolition team vehicles to eliminate the enemy's base. Use engineers to rebuild your guns. Acting in concert, these forces constitute a formidable army. But it will take hours of play to learn how to use them effectively.

A fast-moving, challenging game for intermediate to advanced players, *Rescue Raiders* will appeal to those who go for arcade action. My arcade-loving playtesters insisted it deserved a place up there at the top, alongside *Choplifter*.

—REVIEWS BY JAMES DELSON

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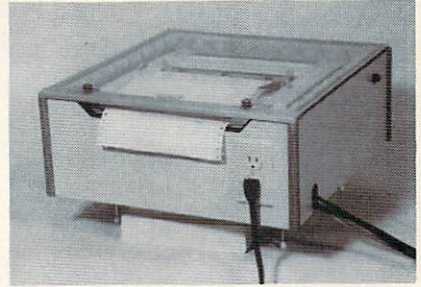
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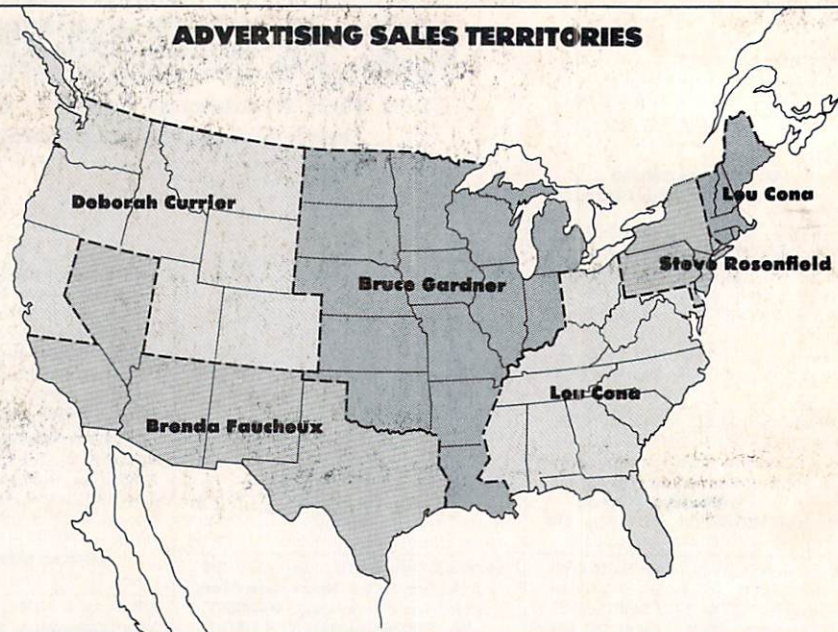
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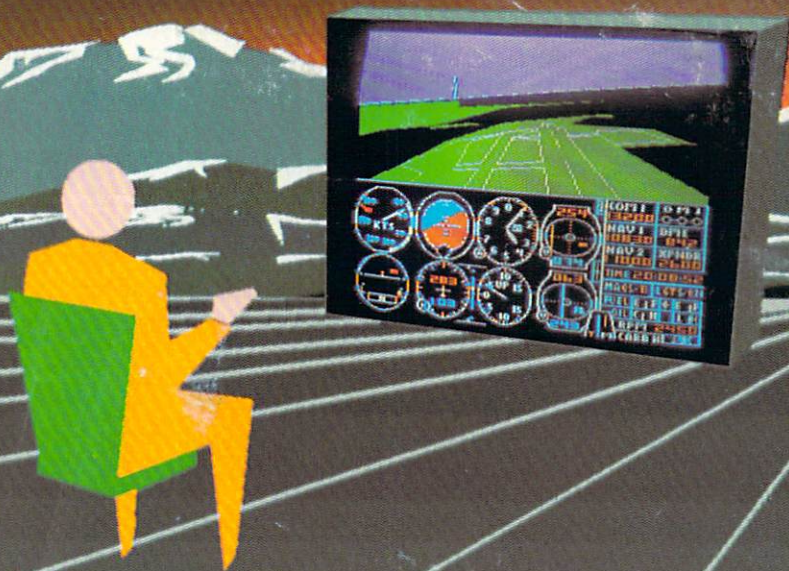
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