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PUBLISHED BY SCHOLASTIC INC.

AUGUST 1985

VOLUME 3
NUMBER 8

NEW ATARI 130 XE
A HANDS-ON REVIEW

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K-POWER: Game Strategies, Music Programs, and a Contest

INSIDE: ORIGINAL PROGRAMS FOR ADAM, APPLE II SERIES, ATARI, C 64 & VIC-20, IBM PC & PCjr, TRS-80 COCO & MODEL III

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How to avoid paying your bills.

by Alan Greenspan

Alan Greenspan, Famous Economic Advisor

"The other day, a prominent politician in the executive branch of our government phoned me up.

'Alan,' he said to me, 'the budget is a mess.'

'No joke,' I said.

'Not that budget,' the prominent politician continued. 'My budget. My checking's overdrawn. They're threatening to disconnect my phones. I even got into a shouting match with my wife when I tried to lay off the servants.'

'Civil?'

'Not very. And I think I'm about to be audited. What would I show them? Who keeps receipts for embassy parties?'

At this point, we were disconnected. And although it was too late to teach proper money management to this prominent politician, there is a lesson all of us can learn from his misfortune.

Everyone has to pay their bills, and nobody likes to do it.

You can keep file folders full of bills, drawers stuffed with grocery receipts, envelopes brimming with cancelled checks, and at the end of the month, it still takes hours to figure out just where your money has gone. Not to mention how long it takes to straighten things out at the end of the year.

Well, after years of financial consulting, I've discovered a way to avoid paying your bills: let an Apple® II Personal Computer pay them for you.

There are several advantages to letting an Apple handle your finances.

It will save you time.

It will organize everything.

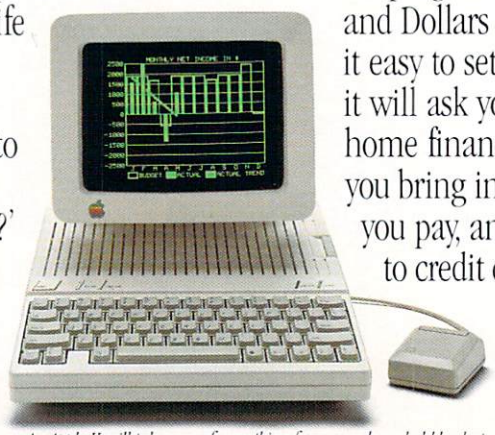
It will tell you, at a glance, exactly what is going on with your money.

It will pay your bills, and never send you any.

And now, I'd like to turn the page over to those nice people at Apple, who will explain, in their own excruciating detail, just what I'm talking about."

The Apple II and the Home Budget.

With software programs like The Home Accountant™ and Dollars & Sense,™ the Apple II makes it easy to set up household books. First, it will ask you some questions about your home finances. Like how much money you bring in each month, how much rent you pay, and whether you owe money to credit card companies, mortgage holders, or any other surly characters. Then, it will ask you to enter some of the bills you receive each month whose prices may vary:



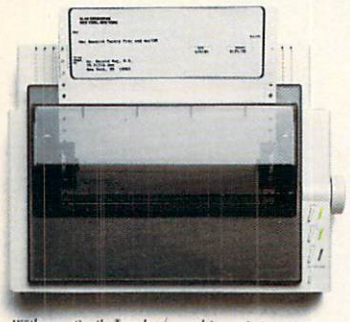
An Apple II will take care of everything from your household budget to your taxes with software programs like Dollars & Sense, The Home Accountant, and Tax Preparer.

phone, utilities, and the like. Then, it will ask you where you keep your money, and for the numbers of your various checking and savings accounts.

That's really all there is to it. After that, an Apple II can automatically write checks for all your fixed expenses each month. It will also tell you what other bills you can be expecting, and when you enter their costs, an Apple II will pay them, too.

An Apple II will see to it that your checkbooks remain balanced, and that you'll know when your expenses are about to exceed your income. It can even help you plan to buy a new car. Or a home.

Or a fur-lined boat, if your budget permits.



With our Scribe® color/graphics printer, you can automatically print out your own checks—not to mention reports, papers, almost anything. Except money.

How to avoid your banker.

After the Apple II writes your checks, it can call your bank with the help of your telephone and an Apple modem. And faster than a teller can say "Next window, please," you can find out all your balances, enter deposits, see what checks have cleared, transfer money from one account to another, and even pay off some of your credit cards and other bills electronically—without ever writing a check.

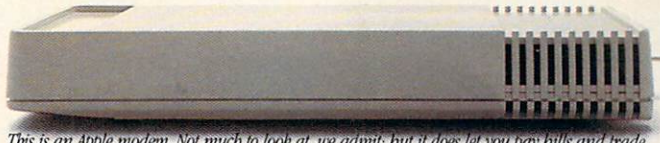
So the only time you'll have to go to the bank is when you want to visit with your money, personally.

Which, when done in moderation, we can recommend most highly.

*It can manage your entire stock portfolio with programs like Dow Jones Investor's Workshop™ and Charles Schwab and Company's The Equalizer.™ It can even show you what's going on in your bank account.**

The Apple II and making money.

An Apple II can do wondrous things for your personal finances. With several different software programs, you can become your own stockbroker. Again, by



This is an Apple modem. Not much to look at, we admit; but it does let you pay bills and trade stocks by phone. It also connects your Apple II to a wealth of information services, like THE SOURCE℠ and CompuServe®.

using an Apple modem, you'll gain instant access to financial news sources like *The Wall Street Journal, Barrons,* and the Dow Jones News/Retrieval® service. Find out what they've been saying on *Wall $treet Week.* And in most cases, get up to the minute price quotes on over six thousand stocks, options, and other securities.

An Apple II lets you buy and sell securities right in your home or office, at the moment you want to make the trade. It automatically updates your portfolio and gives you detailed holding reports. It even produces charts and graphs, so you can quickly see how you and your investments are doing.

A little tax relief.

If you become perturbed everytime the subject of doing taxes comes up, an Apple II can do them for you with programs like Forecast™ and Tax Preparer.™

It can store your records, plan for the next year, and calculate your taxes.

You'll be alerted to payments you've made over the year that may be tax-deductible. It even keeps year-round records, automatically updating totals and making corrections for you. It will even print out completed tax forms that the I.R.S. will accept.

And it can do about 10,000 other things totally unrelated to taxes or this ad. So there's no telling how far an Apple II can take you.

"Well, I think that about covers it. And what if, after all of this, you still have some money left over?

Congratulations. You're doing a lot better than the government."

A note to Dr. Greenspan's relatives: He says, "Don't get excited. This isn't my real bank account." © 1985 Apple Computer, Inc. Apple and the Apple logo are registered trademarks of Apple Computer, Inc. The Home Accountant is a trademark of Continental Software. Dollars & Sense and Forecast are trademarks of Monogram. Dow Jones News/Retrieval and Dow Jones Investor's Workshop are trademarks of Dow Jones and Company, Inc. Tax Preparer is a trademark of Howard Software Services. Scribe is a registered trademark licensed to Apple Computer, Inc. THE SOURCE is a service mark of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc. CompuServe is a trademark of CompuServe Corporation, an H & R Block Company. The Equalizer and Equalizer are trademarks of Charles Schwab & Company, Inc. Spectrum is a registered service mark of the Chase Manhattan Corporation. For an authorized Apple dealer near you call ***(800) 538-9696.*** *In Canada, call* ***(800) 268-7796*** *or* ***(800) 268-7637.***

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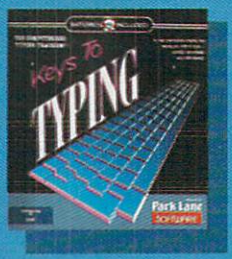

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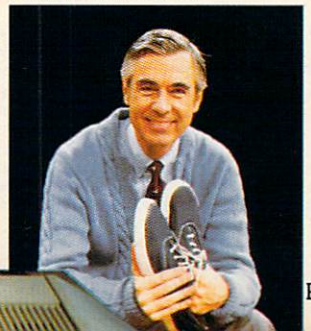

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FAMILY COMPUTING (ISSN 0738-6079) is published monthly by Scholastic Inc., 730 Broadway, New York, NY 10003. Subscriptions: in the U.S. and possessions, 12 issues for $19.97; outside the U.S. add $6 (surface mail) or $25.97 (airmail). Office of publication: 351 Garver Rd., P.O. Box 2700, Monroe, OH 45050-2700. Second-class postage paid at Monroe, OH 45050-9998 and additional offices. POSTMASTER: Send address changes and notice of undelivered copies to FAMILY COMPUTING, P.O. Box 2511, Boulder, CO 80302. Printed in U.S.A. Copyright © 1985 by Scholastic Inc. All rights reserved.

COVER:
FOREGROUND PHOTOGRAPH BY ANTHONY LOEW
BACKGROUND PHOTOGRAPH BY ANDY LEVIN/BLACKSTAR

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Win a Dream Machine!
You can win an IBM PC AT or Fat Mac. No purchase necessary. See details on entry form following page 72.

EDITOR'S NOTE

FAMILIES COMPUTING

Meeting one's readers is just about the best way for an editor to stay fresh. At one time—when I worked on school magazines for Scholastic, our parent company—that was easy. Just call a school and arrange a visit. That's all it took, and I could talk to and observe actual readers—students and teachers—in action. Each school trip would lead to countless good ideas for articles, for new approaches to old topics, even to entire new magazine concepts at times.

With families as our readers, the task of staying "in touch" is a lot trickier to accomplish. Imagine our going door to door in search of computing families. Or, how about even calling on families we know and asking if we could hang around awhile and watch them live with their computers. Impossible!

Of course, various research vehicles can and do provide feedback from readers, but they tend to be fairly clinical and lack a personal touch. My favorite source of reader contact remains the U.S. mail.

During the past several weeks we've enjoyed a rare outpouring of letters in response to our Computing Family of the Year contest. These entries have provided us with insight into a wide variety of computing styles. Overall, however, we've discovered and confirmed several basic facts about our readers. Among these findings are:

1. The family experience with computing is broad, encompassing learning, entertainment, and business and home management.

2. Family computing is a growing phenomenon. With several family members wanting access to the computer, buying a second or third (or more) machine is not unusual. And with the whole family computing, computer use easily becomes more sophisticated, expanding into additional areas while the system is expanded as well.

3. School has a definite influence on computing among families. Parents remain eager to see their children's computer skills and knowledge expand, and often encourage and enrich their children's computer learning at home.

4. Family computing frequently originates in the office or work place, with a parent who wants to extend the power of the computer into the home.

5. Family computing is catching. Letter after letter told the tale of the lone computer enthusiast spreading his or her zeal throughout the family, to even the most resistant family members, or to friends.

How do we serve this wide variety of interests? This month's issue is an example. You'll find our usual mix of regular articles on education, games, entertainment, telecomputing, and products, plus a new department on "working at home." If you're intrigued by the idea of becoming your own stockbroker, don't miss Norman Nicholson's cover story. And for parents concerned about whether computers make a difference in kids' learning, there's Kathy Chin's article, "Growing Up with Computers."

That's our story—a balance of interests. It's the same balance we see in our readers. Next month watch for the story of the FAMILY COMPUTING Family of the Year. We'll introduce and announce all the contest winners to you. And, although the contest is over, if you want to tell us about your computing family, we still want to hear from you.

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

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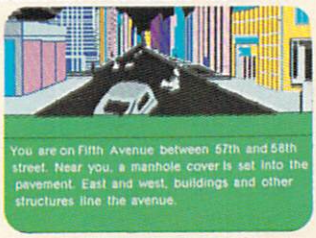
You are on Fifth Avenue between 57th and 58th street. Near you, a manhole cover is set into the pavement. East and west, buildings and other structures line the avenue.

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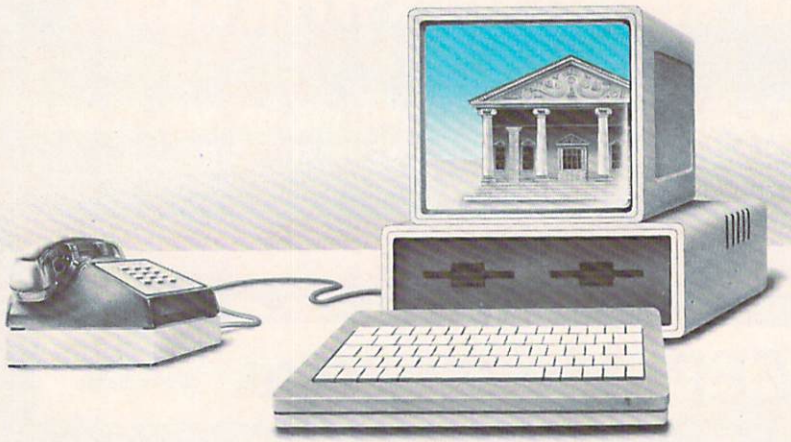

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LETTERS

MAC ATTACK

We are charter subscribers and are renewing for another year. We would have renewed for two years, but we have been waiting very patiently for our computing magazine to recognize our computer.

Every month there are plenty of programs for readers to have fun with, but never any for our Mac. We've tried using the programs designed for Apple but invariably there'll be a bug that keeps us from using it.

We're hoping that the new subscription year will bring us a computing magazine with Mac ideas, hints, and programs.

THE HARTWAYS
Miami, Florida

EDITOR'S NOTE: *Your patience will pay off! Later this year we'll be publishing product information and original programs for Macintosh.*

A TIP FOR TI OWNERS

In the Letters column in an earlier issue, Jim Klocek of Downers Grove, Illinois, expressed his woes about TI programs being in short supply. I'd like to inform him that he can write or call Learn-a-Bit, 7325 N. Alpine Road, Rockford, IL 61111; (815) 282-1111. It has a good supply of programs he may want (and hardware, too).

It also has classes for programming, etc. And the guys are good to work with and buy from.

JOHN L. GATZ
Rockford, Illinois

GAMING ADVENTURES

I discovered text adventures last weekend. I am not much of a book reader, so I was sure a text adventure would be no fun at all. I was wrong! An hour after I loaded it into my computer, my brothers and the next door neighbors were in my bedroom. Three hours later we finished. It was better than any board games I have played. Everybody should try at least one of these games. They really make my days off work gratifying.

MARK BREGEL
Los Angeles, California

CORRECTION

In the March issue's Buyer's Guide to Modems, we listed incorrect information about Prentice products. The POPCOM X100 retails for $475, or $495 with Dow Jones Straight Talk *and a Mac Cable, or* pfs: ACCESS. *The POPCOM C100 retails for $445, or $465 with* pfs: ACCESS. *We regret the error.*

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Windham Classics. You could think of them as a great way to introduce your kids to the classics. Then again, you could just think of them as a great way for your kids to have fun.

Apple® II Series,
IBM® PC/PC jr, Commodore 64.™

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BEHIND THE SCREENS

PEOPLE, NEWS, AND TRENDS

EDITED BY JUNE ROGOZNICA

Taking Stock of Computers

If you're considering a financial investment this year, take a good look at some of the computer-related companies gracing the stock pages these days.

According to *Inc.* magazine, one-third of the 100 fastest growing publicly held small companies in the country are computer, software, or data-processing related. *Inc.* defines "small" companies as those with sales of at least $100,000 but no more than $25 million. The companies were rated by their percentage of revenue growth over a five-year period—1980 to 1984.

"As in past years, companies in various branches of the computer business dominate the list, spanning a range from integrated-circuit manufacturers to personal computer retailers," according to the INC. 100, an annual *Inc.* magazine listing.

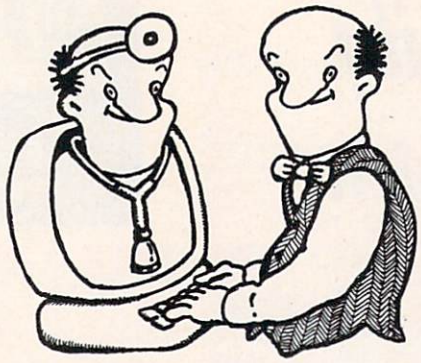
Another interesting note: Computer companies rated well in terms of job creation. For example, Micron Technology of Boise, Idaho, had the third largest percentage increase in employees nationwide. Micron's staff grew from 15 in 1980 to 958 in1984. Not bad for a 7-year-old company.

A New Age Adviser

Joseph McDonald, who runs a quilt-making business in Syracuse, New York, was ready for a career change. So, he sought out a job counselor. Not too uncommon, you might think. Except his adviser was a computer, named SIGI.

There are currently more than 300 SIGI systems residing in high-school and college career-counseling centers, as well as public libraries and career-information offices. Developed by the Educational Testing Service, SIGI software offers people a chance to match their value priorities with the best occupation. SIGI Plus, an enhanced version of the original system, contains some 1,500 occupation titles, targeting 15 values including high income, variety, prestige, independence, and security.

How does SIGI work? The computer first prompts the user to examine his interests, skills, preferred activities, and values. Based on the user's responses, the computer then sifts through its data base and pulls up a list of occupations stressing the aspects identified as first priority (such as "working with people"). Secondary priorities help the computer narrow down the list.



What does SIGI do that a human counselor can't? SIGI can sift through reams of information quicker, more thoroughly, and with a greater degree of efficiency. "It's somewhere between a career counselor and a workbook," says McDonald, who is still narrowing down his new job prospects. "It's more stimulating than books," and more "objective" than a counselor.

—LINDA WILLIAMS

Of Bytes & Burgers

The MacArthur Park restaurant in Palo Alto, California, is an upscale, yuppie hangout where waiters and waitresses have exchanged pens and order pads for handheld computer terminals.

MacArthur Park is the test site for a computerized restaurant system designed by Validec, a start-up company based in nearby San Carlos.

When patrons place their orders, a waiter or waitress will abbreviate the items on their handheld gizmos. The terminals emit a radio signal which is captured by an IBM PC in the back of the restaurant. The IBM PC is hooked up to printers that automatically print out the order in the bar, broiler, deep-fry section, and pantry. Thus, the appropriate personnel will know how the customer wants his eggs cooked or what drinks to prepare. The management hopes waiters and waitresses will be able to serve more tables with increased efficiency.

Handheld computers: the new rage in restaurants?

At the end of the meal, customers get an organized, state-of-the art computer printout listing everything they have eaten—from potato skins with sour cream to barbeque ribs with extra sauce.

—KATHY CHIN

Support for ADAM

Despite Coleco's announcement in January to halt production of the ADAM computer, the 250,000 owners of the machine haven't been abandoned.

Coleco says it will continue to develop and produce ADAM software that is compatible with the ColecoVision. And the company still maintains the toll-free number, (800) 842-1225. But, Coleco isn't the only avenue for advice, products, and information. M.W. Ruth Co. (Dept. FA5, 510 Rhode Island Ave., Cherry Hill, NJ 08002) offers both hardware and software for the ADAM. For mail-order information, call (609) 667-2526.

Al Gerson of Lynbrook, New York, sends out *AUGment*, a bimonthly newsletter to his 6,000-member ADAM Users' Group (AUG). The publication suggests where to find software and hardware, and reviews third-party products. AUG's library of public-domain software includes nine disks/data packs with four to five programs each. In addition, Gerson offers a booklet with tips on how to organize a local ADAM users' group. The annual membership fee is $12. For more information, write AUG, Box P, Lynbrook, NY 11563; or call (516) 746-0066.

You can contact the following users' groups by mail:

- ADAM Users Group, 1206 12th Way, West Palm Beach, FL 33407.
- #1 ADAM Users' Group, P.O. Box 3761, Cherry Hill, NJ 08034
- Central Ohio ADAM Users Group, 730 Thurber Drive, Apt. N, Columbus, OH 43215.

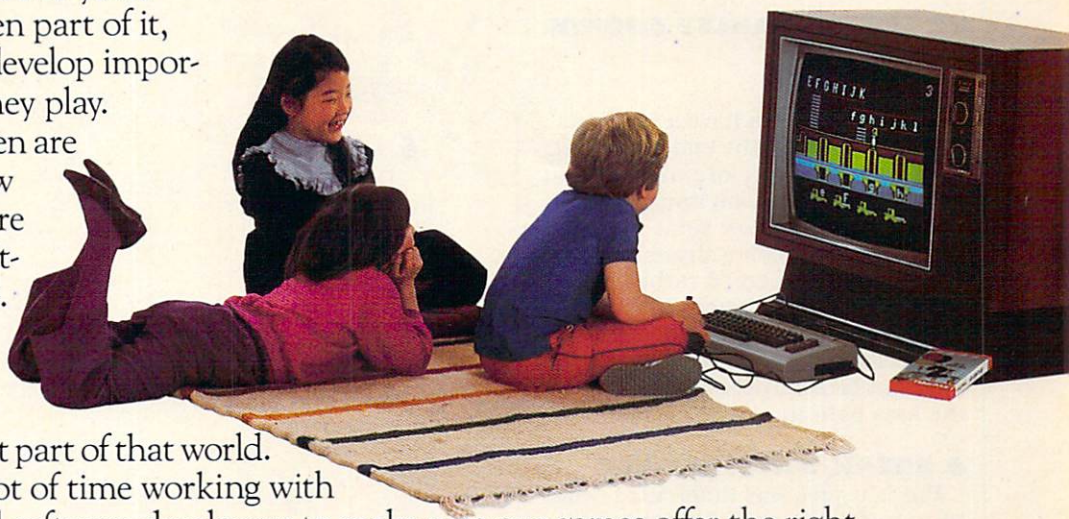
—LINDA WILLIAMS

ILLUSTRATION BY HOLLY KOWITT

Fisher-Price Learning Software, for a lot of little reasons.

A child's world. For years Fisher-Price has been part of it, helping little ones develop important new skills as they play.

But now children are growing up in a new world, a world where computers offer exciting new experiences. And we think Fisher-Price Learning Software can be an important part of that world.



We've spent a lot of time working with leading educational software developers to make sure our games offer the right combination of fun and educational value. We've covered five key areas of your child's learning development: Math. Language. Creativity. Basic learning skills. And computer literacy. And all the games have been thoroughly kid-tested, so we know they're easy to play and offer lasting fun value.

There are games for preschoolers and children under 8, and another series for children up to 12. Games that let children build an alphabet city. Play number games in a race against time. Or learn reading skills with a favorite storybook character. Each game offers the fun, value and educational quality you've come to expect from Fisher-Price.

All in all, there are some pretty big reasons to develop Fisher-Price Learning Software.

But mostly, we do it for the little ones.

Cartridges are available for **Atari,®** **Commodore 64/128™** and **Coleco Adam®** home computers and **ColecoVision.®** Disks are available for **Commodore 64/128™** and **Apple.®**

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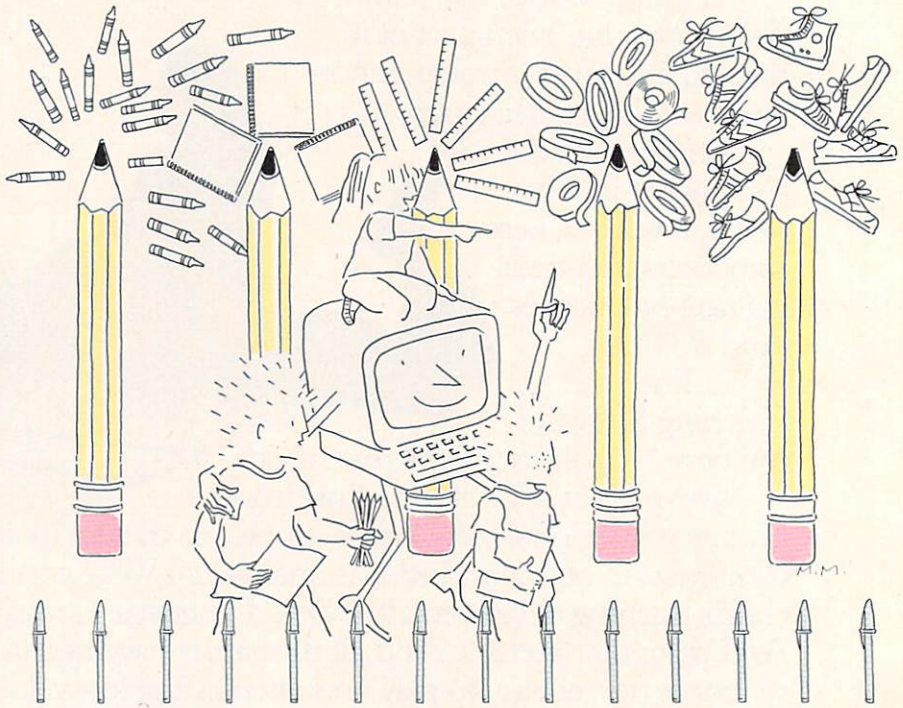
HOME-SCHOOL CONNECTION

THE BACK-TO-SCHOOL GAME
Let Your Kids and the Computer Simplify Organizing for Fall

BY LORENE HANLEY DUQUIN



Countless mothers have a love-hate relationship with the end of August. I am one of them. I love the fact that school will begin soon and our lives will once again follow some kind of schedule. But during those last, hot, summer days when I'd rather be swimming or just lounging around, the job of organizing clothes and supplies for three elementary-school kids can be frustrating at best. Even the kids hate it.

A BREAK WITH THE PAST

But last year was different. I decided to find some way of letting the computer help to bring order to the back-to-school chaos. With the computer involved, the kids were bound to be more interested. And with my kids, more interest means less work and fewer hassles for me.

It's worth a try, I told myself, as I sat down with the word-processing program to list all the supplies my kids could possibly need. When I finished, here's what my list looked like:

```
THE DUQUIN FAMILY BACK-TO-SCHOOL
SHOPPING LIST

NAME:

PLEASE ANSWER THE QUESTIONS BELOW . . .

DO YOU NEED PENCILS?
   IF YES, HOW MANY PENCILS?
   WHAT KINDS OF PENCILS?
DO YOU NEED PENS?
   IF YES, HOW MANY PENS?
   WHAT KIND OF PENS?
DO YOU NEED NOTEBOOKS?
   IF YES, HOW MANY NOTEBOOKS?
   WHAT KIND OF NOTEBOOKS?
DO YOU NEED . . .
   A NEW RULER?
   A NEW PENCIL BOX?
   CRAYONS?
   PASTE OR GLUE?
   PAPER?
   AN ERASER?
   A BOX OF TISSUES?
   A ROLL OF TAPE?
   A CALENDAR?

DO YOU NEED A NEW SMOCK FOR PAINTING?
DO YOU NEED A NEW BOOK BAG?
DO YOU NEED A NEW LUNCH BOX?
DO YOU NEED GYM SNEAKERS?
DO YOU NEED A GYM SUIT?
PLEASE LIST BELOW ANY OTHER THINGS
YOU NEED:
```

"What do you think?" I asked my husband, Dick, a middle-school teacher with a lot to do to get ready for his own classes. "This is great," he said. "I think I'll use it right now to make a list of the things I'm going to need for school."

Dick sat down at the computer and I went outside to sit in the cool night air and listen to the crickets. *This just might work after all*, I told myself.

The next morning, I told the kids we were going to play a back-to-school game on the computer. "It's kind of like a scavenger hunt," I said. "On the computer screen is a list of the things you usually need for school. What you have to do is go through your school supplies from last year. Then answer the questions on the computer. When you're finished, you'll each have your own shopping list for school, and I'll give you a treat."

The kids thought it sounded like fun and scurried off, while I went outside to sit in the morning sun and read a novel. *It's working so far*, I told myself.

Nine-year-old Christopher and 7-year-old Tommy finished first and printed out their lists. But Betsy, who was still in preschool, needed help. "Don't worry, Mom," Tommy said. "Chris and I went to nursery school a few years ago. We know what she needs." So the boys helped Betsy, and I went back to my book.

The kids were excited about having their own shopping lists and during lunch they asked when we could go buy the things they needed.

"Well," I told them. "First I have to go through the newspaper ads and see what's on sale."

"We can do that, Mom," said Christopher.

"Good idea," I said. "Maybe you can list the sales on the computer."

My children don't know how to use our electronic spreadsheet program so, after lunch, I used the word processor to make a spreadsheet listing the supplies we needed and the local stores that had sales. Then it was the kids' turn to work. They looked through the paper and filled in the blanks while I went outside for an afternoon swim. *This year's back-to-school organizing isn't bad*, I told myself.

When the kids finished the spreadsheet, it looked like this:

ILLUSTRATION BY MONA MARK

File: Price List

ITEM	REVCO DRUGSTORE	WOOLWORTHS	K-MART	BROOKS	GOLD CIRCLE
PENCILS		.97			.44
PENS	.79	.97		.79	.99
TRAPPER KEEPER	3.99	3.47		3.47	3.32
RULER					
CRAYONS	.59	.57			
PASTE			.33		
GLUE	.59	50	.33		.44
PAPER		.47		.69	.29
ERASER		.27			
TISSUES					
SMOCK					
BOOK BAGS					25% off
LUNCH BOXES		4.77	4.44	4.99	
GYM BAGS					
MARKERS			.99		.53

Sale prices specific to author's locality and no longer current

FIELD-TESTING

The next morning we went shopping. Christopher, Tommy, and Betsy were responsible for their own lists. I took the spreadsheet. We had already decided which store had the best sale, but I wasn't surprised when we got there that a few of the items were sold out. Instead of getting a rain check, I just looked at my spreadsheet and we went to the store with the next-best prices to buy the rest of the things we needed. No frustration. No problems. And we all went swimming when we got home.

Now if I could only organize their back-to-school clothes as easily, I thought. But buying clothes is a little more complicated. Later that evening, however, I had an idea. I worked out a little grid on the computer that we could use to record the children's measurements. At the bottom I left room for a shopping list. The kids could help fill it in and we could print it out and take it with us when we shopped for clothes. It looked like this:

NAME: DATE:

PLEASE RECORD YOUR MEASUREMENTS BELOW:

HEIGHT: WAIST:

WEIGHT: HIPS:

IN-SEAM: CHEST:

Things to Buy:

The kids had fun measuring and weighing themselves, and entering the information into the computer. And I liked the idea that we could save the information on a disk for a permanent record of their growth from year to year.

"Isn't there something else we can do?" asked Tommy.

"Well, yes," I said knowing that the next job was trying on last year's clothes to see what still fit. It was a job everyone hated, and the computer couldn't help. But when the kids were finished, I went back to the computer and typed in my own list of what we had to buy. For example, on Christopher's list I typed: NEEDS BLUE, GRAY, AND BEIGE PANTS. NEEDS JEANS. NO BUTTON-DOWN SHIRTS. NEEDS WHITE TURTLENECKS. NEEDS SOCKS AND UNDERWEAR.

Shopping was easy because I had everything I needed to know right on the computer list. And the kids didn't mind as much, either, because the shopping excursion didn't take as long as in the past.

I don't hate the end of August nearly as much as I did before. Now if only I could find some way of getting the computer to take the kids shopping . . . . FC

LORENE HANLEY DUQUIN *has written for several women's and family magazines. She wrote "Playing The Thank-You-Note Game" in the January* FAMILY COMPUTING.

FOR PARENTS ONLY

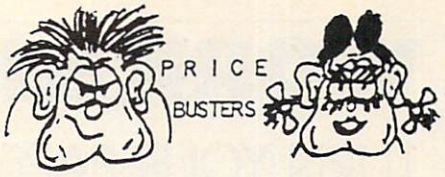
Here are some other list-making and record-keeping jobs that your kids might want to take over for you:

Gift Files. Have your kids make a gift list of the birthday or holiday presents they plan to buy or make for friends and relatives. If they save the information on a disk, they'll have a good record of what they've given people each year.

Address File. Teachers, coaches, scout leaders and other youth-group leaders send home a list with the names, addresses, and telephone numbers of the children in the group. Have your kids save the information on a disk so you and they will know exactly where it is.

Medical Files. Start a medical information disk and let the kids update their own health files each time they go to the doctor. They can keep track of their growth, their inoculations, childhood illnesses, medications they've taken, and other important health information.

Pet Files. Why not let your kids take over the medical record-keeping for their pets, too?



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AP2= Apple II, II+, IIC, IIE. MAC= Apple Mac
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AP2	MAC	ATD	C64	IBM	Name of Program or Item:
$35	...	$35	$35	$35 r	Flight Simulator II
$26	$26	$23	$23	$26 e	Hitchhikers Guide- Galaxy
$32	$32	...	$32	$32 r	Sargon III
...	...	...	...	$29 r	King's Quest II
$26	$26	$26	$26	$26 r	Zork 1 (32k)
...	...	...	...	$26 r	Gato
$23	$26	$23	$23	$23 r	Lode Runner
$26	...	$26	$26	... r	Summer Games
...	...	...	$26	... r	Summer Games II
$38	...	$38	$38	$38 r	Ultima II, III (each)
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$26	$32	$26	$26	$26 e	Mastertype (New, Improved)
$32	...	...	$32	$32 e	Math Blaster
$32	$32	...	$21	$32 e	Mind Prober
$32	...	...	$32	$32 e	Spell It
$26	...	...	$26	$26 e	Reader Rabbit
$32	...	...	$32	$32 e	Word Attack
$62	...	...	$62	$62 e	SAT: Barron's Study Progrm
$26	...	...	...	... e	Carmen San Diego
$44	...	...	$44	$44 e	Speedreader II
$29	...	...	$29	$29 e	Mission Algebra
$51	...	$51	$51	... e	Muppet Learning Keys+Disk
					MFR'D BY ELECTRONIC ARTS:
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$28	...	$25	$25	... r	Archon II: Adept
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$25	$28	$19	$19	$25 r	Pinball Construction Set
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WORKING AT HOME

TURN YOUR PAPER DATA INTO ELECTRONIC DATA
Got Invoices to Generate, Expenses to Record, the IRS to Please? Put Your Business Into a Data Base!

BY ANDREW SACKS

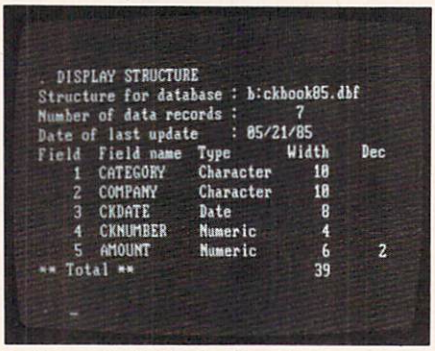
Working on assignment for magazines, agencies, and corporations, I run a photo business that generates about 150 invoices a year. It's an interesting way to earn a living. I meet a lot of people, don't have set hours, and have the pleasure (and burden) of being totally responsible for what I produce.

After 15 years of being in the business, I recently began to feel overwhelmed with the amount of paperwork needed to keep things running well. Besides having to produce and track the invoices, I seem to pay out every second dollar to suppliers, assistants, labs, and utilities. Unlike me, the IRS loves detailed ledger books of expenses, business diaries, and any other paperwork that supports my claim that I run a legitimate small business. So a fair amount of time is devoted to keeping records in order and correctly documenting expenses.

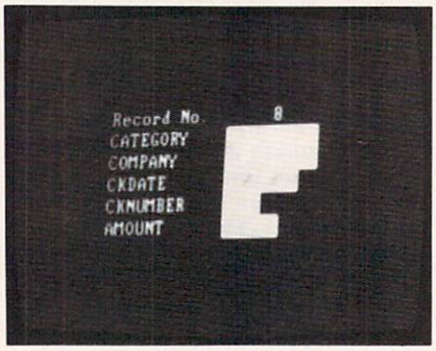
When all the dust finally settles from watching the money go in one pocket and out the other, there are the negatives and transparencies (the actual product of all my work) to be filed in the library for future sales.

Sound familiar? Can you visualize the mounds of paper? Well, I found a solution.

Although my business is specialized, anyone who operates as an independent supplier of goods and/or services (e.g. craftspeople, consultants, writers) has the same basic needs and problems. Currently, a small personal computer system (Apple IIe), which cost little more than a good 35mm camera and a few lenses, is helping to organize, store, and retrieve information that relates to every part of my business. Many of the principles and concepts I learned about integrating a computer into a small business can be applied to any number of other enterprises.



Setting up the fields of a file called CKBOOK85 in *dBase III*.



An empty record, waiting for input.

A completed record in file CKBOOK85.

THE PAPER JUNGLE

About 30 percent of my record-keeping is generating clients' invoices. When I shoot a job, I make detailed notes in a large calendar diary—the client's name, address, phone number, and all the particulars of the job. These include number of rolls of film used, mileage to the site, processing charges, shipping charges, etc. While this sounds like just a few notes to make, some longer jobs stretch over several days, involve extra help, out-of-town travel expenses, and three or four types of film (all priced differently), and run up lab bills from several suppliers. Some weeks the calendar book ends up looking like a madman's diary.

Formerly, I neatly copied this information into a bound record book, in the format to be used for typewritten invoices. A bookkeeper would borrow this tidy, bound volume once a month, then type and mail the triplicate invoices. She would keep one set, I another, and the client would receive and pay the third. This system had its advantages and drawbacks.

While the idea of farming out the work was good, the bound volume never seemed to be on hand when I needed it to look up a few facts. Second, the bookkeeper—the person who knew and understood my operation best—decided to become a CPA. As her time became more limited, her services became more expensive.

After a while I became the typist, and my wife started entering the invoices in a receivables ledger. So the original invoice information would be scribbled into the calendar book,

ANDREW SACKS *is a freelance photographer and writer who lives in Chelsea, Michigan, with his family.*

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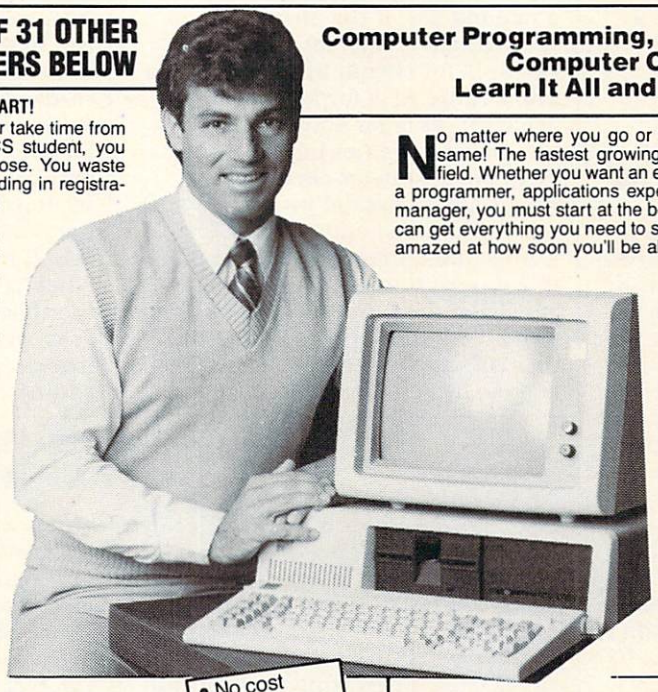

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The people who understand how to get the information and what to do with it are the ones who run the Accounting, Marketing, and Business Management areas. Managers depend on people who determine computer applications ...on people who program to get the needed data. So if you're interested in computers, send in this postage-paid ad for free career facts.

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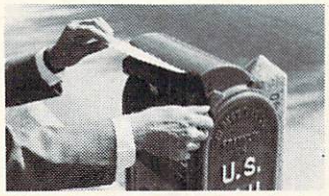

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transferred and totaled in the bound book, then typed into triplicate invoices, entered in a ledger, and finally totaled by client categories—to give me an idea where the dollars were coming from. That's about five steps for every job. As a typist I was fast, but I never worked without a bottle of Wite-out by my side.

IN SEARCH OF A MODERN MACHETE

About the time all this copying and typing was wearing me out, the price of computers was coming down, and they were showing up in the darndest places. The auto parts store had one that would spit out invoices as it adjusted the inventory records. I saw my neighbor, who farms for a living, install one on his kitchen counter. A music teacher put one in his studio that could do extraordinary things, and even the bumper-sticker printer (*see "Machine Politics," in the November 1983* FAMILY COMPUTING) had one rigged up to do typography and layout for him.

I knew nothing about programs, or programming, and in fact I didn't want to learn about these things. I hoped the computer would be a time-saver, but without an understanding of the lingo, or programming techniques, it looked like I was destined to spend two nights a week in a classroom learning Pascal and *dBase II*.

But, I found a freelance computer programmer who had a good government job during the day, and had the yearning to take on a challenge like me and my problems at night. For money, of course.

Consulting Mark, I felt like a sea captain going to a shipwright. I had certain types of cargo that I carried, certain routes that I sailed, and particular ways that I worked. I needed a machine to take orders well, stay on course, plus get me there and back a little faster and more comfortably than my old ship.

I spent a good deal of time outlining on paper how I thought the computer ought to help out. And Mark, the programmer, told me what was possible, what was economical, and, in only a few cases, what was just too complicated and involved to attempt on a 128K machine.

On his advice, I bought *dBase II* (Ashton-Tate has since introduced the more powerful *dBase III*), which runs on an Apple IIe fitted with a CP/M circuit board.

SWINGING INTO ACTION

Now, after a photo job is complete, I take my calendar book of scribbles and notes to the computer. The program has been configured to ask for the NAME of the client, and whether or not he or she should be added to a mailing list. If the answer is yes, then *dBase II* asks for the category—#1 is for clients in journalism or publishing, #2 is for advertising agencies, #3 is for corporate buyers (people who are not buying photos every day), #4 is for clients who would have a special interest in agricultural photos, and so on.

After the names are entered, I type in a description of the completed job. Then the program asks for library file information so it can file the day's work in its memory. This is done by SUBJECT, SUB-SUBJECT, LOCATION, and DATE SHOT. (I also can take the 24,000 slides currently filed, and enter their statistics into this new system—if I get a month of rainy days!)

Expenses that were incurred on the job are requested next: film by TYPE, AMOUNT, and COST/ROLL; PROCESSING, TRAVEL expenses, and ASSISTANTS. MODELS come last. The program proceeds with a series of screens that are preformatted with spaces, say, for the number of rolls of film and cost per roll left open for the operator to complete. The computer does the multiplication and addition involved in creating the invoice.
When all of the screens have been either filled out, or bypassed by the appropriate response, it prints an invoice, complete with date, names, addresses, items, charges, and totals.

THE MAGIC AND POWER OF *dBASE II*

Last week I had a few days' lull in actual photographic assignments, so I thought I'd send out reminders to people I know who run farm magazines, or advertise farm products, that I was still in business. I had 50 copies of an interesting agricultural scene printed up, and wanted to mail this photo to all of them.

Label-making. Getting the disk that had all the names and addresses on it, I asked the computer to transfer only those names that were in category 4 (or farm-oriented) into a "temporary memory." Then I instructed the mailing-label program to print up labels from the list in "temporary memory." The pieces were in the mail that afternoon.

By hand, I would have had to search through my index-card file, which I had begun three years ago, for the same names. The trouble with that card file was that it never was quite up to date.

As the commands become second-nature, you will appreciate the versatility of *dBase II*. I could have been even more specific, getting only the farm people in Illinois, for example, by instructing the computer to APPEND FROM B:MAILLIST FOR CATEGORY = 4 .AND. STATE = IL.

The command INDEX instructs the machine to display the contents of a file in either alphabetical or numerical order, depending on the type of field you ask the computer to index. For example, the mailing list can be indexed by company name, so everyone who works for Ford Motor Co. and is on the list shows up in the "F" section of the list. This is handy for seeing if you have left any important people at Ford off the list.

Accounting. As I have become more comfortable with the program, I've even brewed up a small accounting system from scratch to create a check register and a ledger sheet for expenses. The information from every business check I write is entered in a file of *dBase II* called CKBOOK85. The fields of information are arranged like this: CATEGORY (Type of expense); COMPANY (To whom the check was written); CKDATE (Date the check was written); CKNUMBER (Check number); AMOUNT (Dollar amount).

I can print out reports that summarize how much money I have spent on all of the 22 fixed categories of expenses I maintain. This can be done by using the command format SUM AMOUNT FOR CATEGORY = POSTAGE. The computer will go to work paging through hundreds of check entries, and within a minute or so, depending upon how much information it has to sift through, the answer will appear on the screen. By repeating the same command for all of the 22 different categories, I get a monthly or quarterly (my choice) report on where the money is going. The tedium of asking the machine to do the same procedure for 22 different categories has been eliminated by recording the process on a separate part of the disk, called a command file, and simply typing DO A:CKLEDGER.

FRIENDLY ADVICE FROM A VETERAN

1. Before customizing your data base, plan it out on paper. Draw pictures with boxes representing different categories. Ask someone experienced with data-base management: "Will this work?"

2. Don't underestimate the time it will take to transfer the record-keeping of a small business to the computer. Someone—maybe you—actually has to enter the data.

3. Keep a duplicate set of paper records while you're making the transition, in case Murphy's law strikes.

BENEFITS

Although the creation of a clear, typographically attractive invoice is one of the rewards of adding a computer to my business, what is deposited in the data bank (and saved on disk) while making the invoice is a second and perhaps more valuable dividend. For instance, after six months of entering invoices, by asking the computer to sum up the number of rolls of black-and-white or color film charged to all clients, I get a precise count on how much Tri-X, Kodachrome, or Polaroid film I used. So when the supply-house chief says he's got 300 rolls of such-and-such film at a rock-bottom price, the computer can tell me if I would be likely to use that much before it spoils.

The information in the data base can be manipulated in any way, to give answers to almost any question (*see box*). "How many miles were driven in the car for business?" can answer the IRS' question about what the car is really used for. The computer can tell me if, factoring in the cost of gasoline, repairs, and the auto itself, I made or lost money driving the automobile during the past work year.

After working with my customized *dBase II* program for six months, I realized that a fellow who ran a computer store was right when he told me, "It can't do anything you couldn't do yourself. It just will do it faster and more easily." He sold a lot of computers to farmers and used this analogy: "You could go out and spade up a 160-acre field by hand, or you could use a tractor and plow. Either way will eventually get the job done."

I'm glad to be using a tractor and plow. FC

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TELECOMPUTING

TELECOMMUNICATIONS BOOKS—ONLINE TOUR GUIDES

BY RICHARD SLATTA

Your neighbors perform stock trading, bank transactions, and school research at home, all with the help of their computers and modems. The wonders of telecomputing—the information, communication, and fun it provides—are no secret to you. But you're probably in a fog about how to realize them: Which modem to buy; how to figure out the baud rates, protocols, and commands needed for online connections; and which information service to sign up for. For help, try turning away from the computer and toward a local bookstore or library. You'll find a wide array of telecomputing books to guide you and help fill the electronic communication gap.

TAKE OFF WITH A BEGINNER'S GUIDE

One of the first—and still one of the best—introductions to the whys, hows, and wheres of telecommunication is Alfred Glossbrenner's *The Complete Handbook of Personal Computer Communications* (St. Martin's Press, 1983; softcover, $14.95). Geared for the home (rather than the business or professional) computer user, the book is a highly readable, nontechnical guide to communicating with electronic services, e.g. The Source, Dow Jones News/Retrieval, CompuServe, or Delphi.

Glossbrenner gives clear, often entertaining, guided tours of major online services. These tours include descriptions useful in selecting services to access. Glossbrenner also scatters throughout the text short, savvy "On-line Tips" that answer many of the questions new telecomputerists will ask.

A new version of the book, with updates of telephone-access numbers and other information, would be welcome, but the first edition still is one of the best general guides to going online. The wisdom of Glossbrenner's advice remains solid.

Another fun-to-read choice for beginners is *The Joy of Computer Communication* (Dell Publishing, 1984; softcover, $5.95), by William J. Cook. The author's delightful, conversational style reflects his attitude toward telecomputing—it should be fun! Like Glossbrenner, Cook focuses on the recreational aspects of telecomputing. His book is only about half as long as Glossbrenner's, but at about half the price, it's a true bargain.

The book's enthusiasm for commercial online services may charm the reader into signing up for a subscription to CompuServe, The Source, Delphi, or a similar data base. But it isn't as upbeat or thorough in its treatment of business and noncommercial telecommunications services. Those looking for listings of public bulletin boards will be disappointed. Micro owners who wish to investigate some of the thousands of home-run bulletin boards should instead read Jim Cambron's book (*see below*).

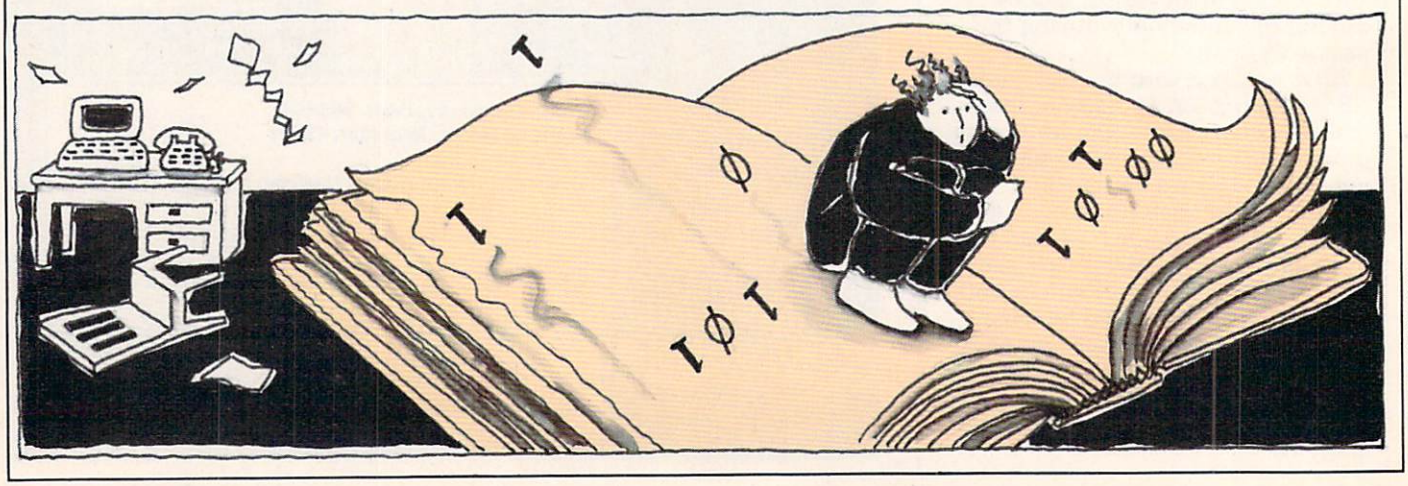
DATA-BASE ROADMAPS

Once you know your way around modems, baud rates, and the like, you'll want to know where to find information online. An excellent guide is *Get Connected*, by Tom Kieffer and Terry Hansen (Ashton-Tate, 1984; softcover, $24.95). The book is aimed at business users, but its clear, nontechnical style and broad coverage make it ideal for home users as well. It explains in plain English how to find useful data on-line; it keeps arcane technical jargon to a minimum.

The book serves as a good shopper's guide for anyone considering a subscription to an online data base. Its reference section lists software and hardware suggestions, computer bulletin boards, and much more. Many of the data sources covered could be useful for schoolchildren doing research. Large, clear type and lots of white space enhance the book's readability. *Get Connected* is, for the most part, a directory of online data bases, with useful nuts-and-bolts instruction for beginners.

Matthew Lesko's *The Computer Data and Data Base Sourcebook* (Avon Books, 1984; softcover, $14.95), on the other hand, is a comprehensive directory. It offers no how-to instructions because it assumes that the reader can already

RICHARD SLATTA *of Raleigh, North Carolina, is a frequent contributor to* FAMILY COMPUTING. *He specializes in telecommunications and educational-computing topics.*



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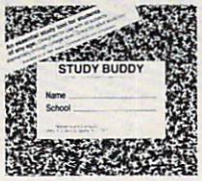

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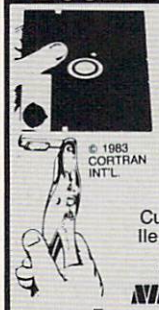

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TELECOMPUTING

use telecommunications hardware and software. The guide doesn't limit itself to online services; some of the 1,000 sources listed take good old hard copy or telephone requests.

In the "Public Data Sources" section, entries are grouped under education, energy, general economics, health statistics, and a number of other categories. Each half-page summary includes the data base's subject, source, contents, period covered, producer, and approximate cost, as well as where it is available. Lesko helps readers make cost-effective decisions about accessing information. For instance, he lists a few agencies that offer free data searches. He reminds readers that information from the federal government is free, and since it carries no copyright, can be downloaded and used without charge or restriction.

A BURST OF FLAVOR

The comprehensive listings in Lesko's book are "extensive," while a less complete but more "intensive" approach characterizes *Inc. Magazine's Databasics* (Garland Publishing, 1984; softcover, $16.95), written by Doran Howitt and Marvin I. Weinberger. The authors focus in-depth on about 100 business-oriented data vendors. In addition to the bare facts, they give the reader a good flavor for what it's like to use the various data bases.

On the minus side, the book suffers from haphazard organization. *Databasics* zigs and zags from topic to topic, with little rhyme or reason. And it begins (as does Lesko's book) with a series of silly "Gee whiz" anecdotes about the wonders of online data bases. But a big plus is the concluding "Special Offer Section" of discount coupons and trial offers. Readers can save money on communications hardware and software, as well as try out various online services for free or at reduced prices.

STEADY COURSES

CompuServe, one of the most popular telecomputing services (with more than 150,000 subscribers), offers a seemingly infinite choice of services. *How to Get the Most Out of CompuServe* (Bantam Books, 1984; softcover, $12.95), by Charles Bowen and David Peyton, takes the reader out on an electronic tour of many CompuServe features—SIGs (Special Interest Groups), games, CB facility, electronic mail, and much more.

Written for home users, the book emphasizes recreational rather than educational or business computing. It includes items of interest to every family member. But because CompuServe (and every online service) evolves constantly, some information already is outdated. For example, the book does not cover CompuServe's Executive Information Service, Electronic Mall, or EasyPlex, an improved electronic-mail system. Yet it will help the new subscriber learn the electronic ins and outs of CompuServe's many features.

EXPLORING A BBS

Would you like to tap into the many computer bulletin boards operating in your community and around the country? They offer message services, free public-domain software, expert advice, and more.

Users who wish to explore the boards will profit from Jim Cambron's *First Primer of Microcomputer Telecommunications* (TAB Books, 1984; softcover, $10.25). Cambron's coverage and writing are slightly more technical than Glossbrenner's and Cook's, but still clear. He explains how modems work, as well as the mysteries of the RS-232 interface, ASCII codes, and communications protocols.

The how-to directions for accessing computer bulletin boards are clear and to the point. The book also reviews a number of popular microcommunication software and hardware options. And it describes the various bulletin-board systems in use. While reading the book, you may be bitten by the sysop bug and start dreaming of setting up your own board. FC

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. TI5483).*

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

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KEYBOARDING ALPHA-PAC

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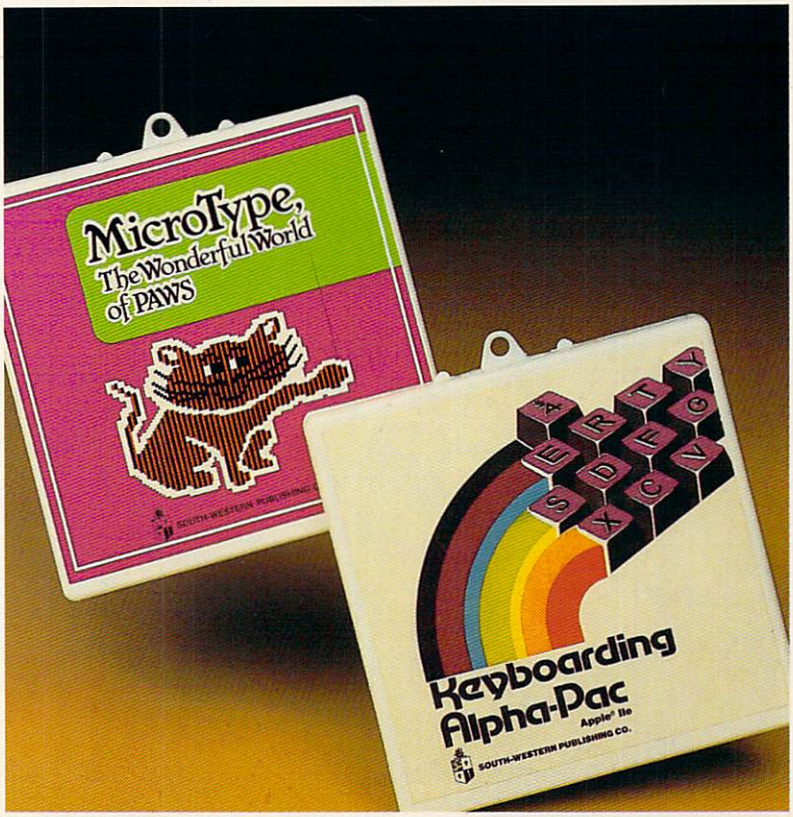

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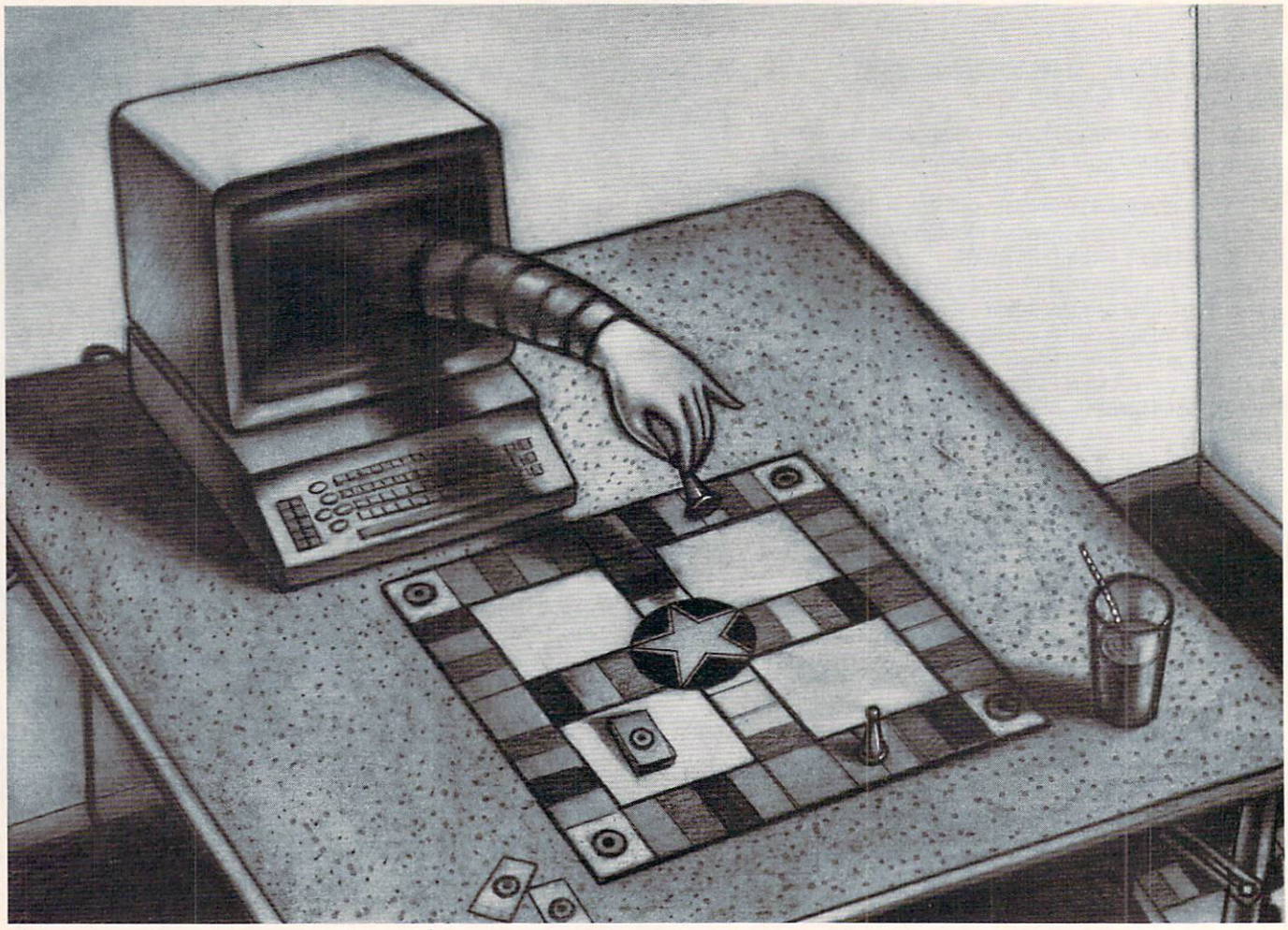
GAMES

TURNING THE TABLETOPS
Computerized Board Games Offer Challenges for the Solo Player, and Play Variety for Groups

BY JAMES DELSON



How many rainy Sundays, quiet weekday evenings, or other precomputer times were you in the mood for a game of Scrabble, chess, or Diplomacy, but couldn't play because solitaire wouldn't do and no one (other than the goldfish and 8-year-old Kim, a games novice) was nearby?

Well, if you're a board game fanatic, be of stout heart. Tabletop greats, and others of the genre, have been translated to the computer screen—and many offer more than just a "solitaire" solution. "Board game" software replicates the competition of its predecessors, adding such computer-specific features as variable skill levels and automatic tracking of moves and scores. Now, solo game fans, as well as families with differing skill levels, can duplicate the fun and challenge of traditional board games on a computer.

JAMES DELSON, *the games critic for* FAMILY COMPUTING, *was a board game fanatic until he discovered the computer translations.*

HUMBLE BEGINNINGS

Some of the first cartridges available for home arcade systems were straightforward clones of checkers, chess, tic-tac-toe, and Reversi. These early translations were just your average, humble, visually boring games, with the plus (for the first time) of solitaire play potential. They were too tame for young audiences seeking home entertainment to rival the corner arcades, which were eating billions of the kids' quarters. And, since sales depended heavily on the lights, colors, Zaps!, Pows!, and Kabooms! characteristic of their arcade competitors, these early translations headed straight for retail remainder bins.

Yet, despite its rocky beginning, the genre wasn't forgotten. As the home-computer market developed, software manufacturers got better and better at translating and enhancing board games.

ILLUSTRATION BY KIM DREW

BOARD GAME ROLL CALL

In the past two years, we've seen and played such diverse adaptations as *Sargon III*, an all-time, best-selling chess program (*see this issue's Software Reviews*); *Monty Plays Scrabble*, a solitaire or multiplayer version of the eternally popular board game; *War of the Samurai*, a variation on the ancient Chinese game of Go; *Renaissance*, an adaptation of the timeless game of Reversi, also known as Othello; *Quizagon*, one of a dozen Trivial Pursuit cousins; and *Computer Diplomacy*, which Avalon Hill adapted from its great multiplayer political/role-playing game.

In the field of strategy and tactics, we've seen the arrival of more than a dozen computer games that incorporate aspects of some long-established board games. *Knights of the Desert*, for example, relates to Avalon Hill's World War II North African Campaign simulation Afrika Corps; *Dreadnoughts* expands on Bismarck, Avalon Hill's World War II naval scenario of pursuit in the North Atlantic; and *Gulf Strike* is an adaptation of its board game namesake that matches the original, right down to a square-for-square reproduction of the game's map on-screen.

PLAYABILITY VS. FAITHFULNESS

Few translations are as faithful as *Gulf Strike*, though. *Monty Plays Scrabble*, for example, needed a new set of rules and play system to make the jump from board to computer game. The computer version incorporates four different play levels for one to three players, allowing a reasonable variable in your electronic opponent's level of expertise; a hint feature, which gives players the chance to achieve higher scores; and the ability to swap your position with Monty, the computer opponent, and to see him "think" as he decides which word to make out of his letters. These changes make the game fun for avid computerists, and more playable for youngsters with limited vocabularies.

The changes in *Computer Diplomacy* provide new players with a good introduction to playing the game. It's an excellent program for beginners, and a great bookkeeping device for experienced players. The game is hindered, though, in that computer players can't control the affairs of state, alliances, and expansionist policies.

TRIUMPHS OF THE MEDIUM

If it's canny opponents you want, the ideal choice is *Sargon III*, the most sophisticated chess program to date. A best-seller from the moment it was released, it offers a wide variety of play levels (based on how long the computer opponent has to "think" while planning its moves), a number of features that encourage players to experiment (such as an open-ended option to take back any number of moves you wish), 107 great chess matches re-created for players to study, and sophisticated chess problems for real experts to try their hand at.

Sargon III is the most advanced board game adaptation available today. Generations, rather than simply several years, ahead of the original Atari *Chess* cartridge, it is pushing back the frontiers of computer gaming instead of merely giving us a translation of chess itself. FC

SOME SUGGESTED BOARD-GAME TRANSLATIONS

1. Classic Board games—for those who want the best in traditional gaming.

Renaissance (United Microware, for C 64 and VIC-20; $19. May be marketed by a different company). Based on Reversi. Gamers take turns placing pieces on a playing board with the object of surrounding and capturing opponent's units. Captured units change to capturing player's color by being turned over. Captured pieces can be recaptured.

War of the Samurai (Krell, for Apple II series, 48K; C 64; IBM PC/PC*jr*, 128K; $39). Based on Go. Placing pieces on a playing board, gamers try to surround and capture opponent's units, which are removed, leaving the board open for further play.

Mychess II (Datamost, for Apple II series, 48K; Atari, 48K; C 64; $34). Based on chess. Superb simulation allows players to move an army of assorted military units across a board, with the object of capturing the opposing king.

Sargon III (Hayden, for Apple II series, 48K; Macintosh; C 64; IBM PC/PC*jr*, 128K; $49). Same as above.

2. Strategy and Tactics—the best adaptations of existing board wargames.

Knights of the Desert (Strategic Simulations, for Apple II series, 48K; Atari, 48K; C 64; IBM PC/PC*jr*, 128K; $39). Based on Afrika Corps. Refight the North African campaign of World War II.

Tigers in the Snow (SSI, for Apple II series, 48K; Atari, 48K; C 64; IBM PC/PC*jr*, 64K; $39). Based on Battle of the Bulge. Simulation of World War II's famous battle.

Breakthrough in the Ardennes (SSI, for Apple II series, 48K; Atari, 48K; C 64; $59). Same as above.

Battle of Normandy (SSI, for Apple II series, 48K; Atari, 40K; C 64; IBM PC/PC*jr*, 64K; $39 disk, $20 cassette). Based on D-Day. Plan and execute the D-day simulation.

Gulf Strike (Avalon Hill, for Atari, 48K; planned for Apple and C 64; $30). Based on Gulf Strike. Using a wide assortment of military units, U.S. player tries to halt a Soviet attempt to seize Iran.

Dreadnoughts (Avalon Hill, for Apple II series, 48K; C 64; $30). Based on Bismarck. Germany's famed W.W. II battleship attempts to sink Allied shipping, whose warships hunt it down.

Computer Bismarck (SSI, for Apple II series, 48K; $59). Same as above.

3. Current Favorites—games for the family to play together.

Quizagon (Springboard, for Apple II series, 48K; Atari, 48K; C 64; IBM PC/PC*jr*, 64K; $44). Similar to Trivial Pursuit. Probes memory on historical, geographical, and cultural topics.

Trivia Series (BCI Software, for C 64, six disks at $5 each). Based on Trivial Pursuit. Same as above.

Computer Diplomacy (Avalon Hill, for IBM PC/PC*jr*, 256K; $50). Based on Diplomacy. One to seven players use political savvy, strategy, and tactics to achieve dominance over turn-of-the-century Europe.

Monty Plays Scrabble (Epyx, for C 64; from Ritam for Apple II series, 48K; IBM PC/PC*jr*, 64K; $29–$39). Based on Scrabble. Program randomly generates letters.

Starclash II (Baen Software, for IBM PC, 64K; $29). Based on A.D. 6000. Players seek to colonize and dominate known galaxies.

Commodore 64 Accessories

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Commodore-64 IEEE Interface Allows you to run Pet Peripherals on the C-64, including the One Megabyte Disk Drive and 15½" Printer	$109.95	$69.00	$65.95
Juki Printer/Typewriter Letter Quality, daisy wheel, use as typewriter and/or printer (auto correction) (Add $10 Shipping)	$349.00	$249.00	$229.95*
SCM 80 CPS Printer Tractor/Friction 10" Famous Name Printer does Graphics w/Interface. (Add $10 Shipping)	$299.00	$159.00	$149.95*
Cardco G Plus Interface Converts Commodore to centronics for use with most printers, plus does Commodore graphics on graphic printers	$109.00	$59.00	$49.95
Alphacom 40 Column Printer Thermal technology - does graphics. (Add $10 Shipping) *Alphacom C-64 or Atari Interface $8.95.*	$99.00	$24.95	$22.95
190K Slim-Line Disk Drive Cooler, 20% faster, quieter than 1541 drive (Add $10 Shipping)	$249.00	$169.00	$139.95*
One Megabyte Disk Drive (1000K) Double sided drive hooks up to C-64 with IEEE interface, perfect as a second drive. (Add $10 Shipping)	$889.00	$199.00	$179.95*
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A Computer, Modem, and Investment Software Give You Access at Home to the Same Information as Wall Street Professionals

BY NORMAN NICHOLSON

It is 9:30 in the evening and Fred Shipworth has just said good night to his 10-year-old daughter. Although he didn't show it, he was a little worried. After leaving the office, he had, as usual, picked up the evening paper and looked in the business section for news about the 11 stocks he was currently carrying in his portfolio. This evening he had noticed that one of them, Fly By Night Airlines, wasn't going to pay its quarterly dividend.

What to do? He sat down at his PC, loaded a communications program into the disk drive, and logged onto Dow Jones News/Retrieval. After querying DJN/R for news about Fly By Night, he waited for several seconds. Then a few short sentences flickered across his screen. "There's the item about their missing the dividend," he said to himself. Fred then used a graphing program with a data disk containing the weekly closing prices of Fly By Night, and an index of the airline industry's average closing prices. His suspicions were confirmed when the screen display showed the price of Fly By Night dipping below the airlines' index when the company had last missed a dividend payment. "I just know that stock is going to drop over the next few days," he mused.

Fred logged off Dow Jones News/Retrieval

NORMAN NICHOLSON *is the editor of* Computerized Investing *newsletter, published by the American Association of Individual Investors, 612 N. Michigan Ave., Chicago, IL 60611; (312) 280-0170. He is also Associate Professor of Finance at DePaul University.*

FOREGROUND PHOTOGRAPH BY ANTHONY LOEW
BACKGROUND PHOTOGRAPH BY ANDY LEVIN/BLACKSTAR

INVESTMENT SOFTWARE SAMPLER

The following descriptions of investment software packages and financial data bases (alphabetical by company) were originally prepared for The Individual Investor's Microcomputer Resource Guide, *1985 edition (AAII). To fully utilize much of this software, a modem and a printer are required.*

TAS-64

Abacus Software; P.O. Box 7211; Grand Rapids, MI 49510; (616) 241-5510; for Commodore 64; disk drive, modem recommended; $85.

TAS-64 is a charting and technical analysis system. Price and volume data are automatically retrieved with a modem through Dow Jones News/Retrieval, or entered manually. A number of charts and graphs may be displayed on the split screen to show technical indicators such as moving averages.

Portfolio Manager-Stock Management Volume 1

Basic Byte, Inc.; P.O. Box 924; Southfield, MI 48037-0924; (313) 540-0655; for Atari; Commodore 64 & VIC-20; IBM PC; $79–$89.

This record-keeping program keeps track of up to 70 stocks. Updated price information must be entered manually. The program keeps track of the number of shares owned per stock, total cost, calculated cost per share, present quote, total preset value, and amount of capital gain or loss. Dividend records are maintained by manual entry upon receipt.

The Dow Jones Market Analyzer

Dow Jones & Co.; P.O. Box 300; Princeton, NJ 08540; (800) 257-5114 or (609) 452-2000; for Apple II series (Apple III in emulation); IBM PC/XT 128K; TI Professional, 128K; modem required; $349.

The Dow Jones Market Analyzer is a technical-analysis tool which generates charts and graphs for investment decision-making. The program accepts up to a year's worth of price data, automatically updated through the Dow Jones News/Retrieval Service. It then generates relative strength and comparison charts.

Market Manager PLUS

Dow Jones & Co.
For Apple IIe/IIc with 128K; Macintosh with 128K; IBM PC/XT with 128K; printer and modem required; $249.

Dow Jones' *Market Manager PLUS* is a portfolio-management system that tracks a variety of investment vehicles. Instant evaluation of holdings is available using the Dow Jones Current Quotes data base. The *Market Manager PLUS* also records pertinent tax information on each security transaction. Dividends, interest, expiring options, stocks going long-term, and maturing bonds are all tracked. Special features include a price-alert report that flags securities meeting the investor's preset limits, and "what if" analysis displaying potential gains and losses.

Investor's Workshop

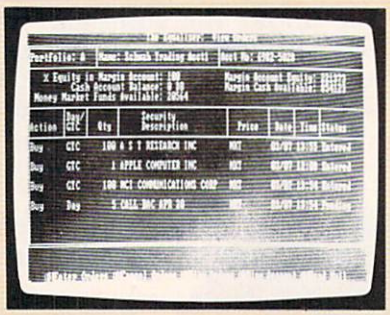
Dow Jones & Co.
For Apple II plus/IIe; modem required; $149.

Investor's Workshop monitors stock and bond portfolios for current values, performs technical analysis, and tracks up to 80 different securities (stocks, bonds, T-bills, mutual funds, and options) through up to 80 different transactions. The program generates bar charts and simple moving averages. Portfolio updates and other financial data are available through Dow Jones News/Retrieval.

Spreadsheet Link

Dow Jones & Co.
For Apple II/II plus/IIe with 48K (*VisiCalc*); Apple II/II plus/IIe with 64K (*MultiPlan*); Macintosh with 128K and Dow Jones' *Straight Talk* (*MultiPlan*); $249 for IBM and Apple; $99 for Macintosh.

Spreadsheet Link enables users of *VisiCalc*, *Lotus 1-2-3*, and *MultiPlan* to access information from Dow Jones News/Retrieval and automatically transfer it to spreadsheets for analysis. Users can analyze current and historic stock market quotes, fundamental information from Media General Financial Services, and earnings forecasts from Corporate Earnings Estimator.



***The Equalizer*: Viewing and cancelling an order with Charles Schwab.**

and placed another floppy into the disk drive. In a few moments he was online with his broker. Since he had already read the closing quote on Fly By Night in the evening paper, he bypassed the stock-quotes menu and went straight to the stock-order menu. First he entered the necessary passwords. Then he typed an order to his broker to buy 10 "puts" (an option betting that the stock price will fall) on Fly By Night, enough to cover the 1,000 shares that he owned. The order was for execution the next morning at the opening of the market. "I still might lose some money," thought Fred, "but I should be covered against a large loss."

A farfetched scenario? No, not really. Thousands of investors with personal computers are already using financial information systems to get a variety of investment information, including market quotes, as well as place stock and options orders with their brokers.

For years the finance industry has depended on the latest in telecommunications technology for executing orders and bringing market information and quotes to brokers' desks. Now, competitive forces in the brokerage industry have brought this same technology to the doorstep and into the den of the individual investor. All that the home investor needs to tap into this network are a microcomputer and the right software. To access the financial data bases, of course, you need a modem; and to take advantage of all the graphing functions of investment software, a printer with graphics capability.

Also, keep in mind that while this investment software is relatively well-designed from a user point of view, unless you have some grounding in investment theory, these packages can be confusing. They are not guaranteed to make you rich!

STOCK QUOTES/TRADING

These technological advances in finance have been accompanied by an equally dramatic decline in costs. A few years ago, it cost several hundred dollars a month to receive online securities quotes in real-time.

Today, real-time stock quotes can be had for $25 to $30 a month above the basic minimum service charge, which is about $15 a month for most financial data bases. For this, an investor receives one hour's connect time, which includes market quotes on a 15- to 20-minute delay basis, and often a link to a discount brokerage firm. (Yes, you still have to trade through a broker, unless you want to buy a seat on the stock exchange!) Beyond the initial hour's usage, charges are billed on a minute-by-minute basis (*see box, page 28*).

Of course, it takes a fairly active and/or substantial investment portfolio to justify the cost of an online securities trading service, but there are many other investment-related uses for personal computers. There are now literally hundreds of software packages on the market for the individual investor. Prices range from a

few dollars for a disk of public-domain programs to nearly $2,000 for a full-blown technical analysis software system. Most of this software is written for Apple and IBM computers, though you can find some for Atari, Commodore, TI-99/4A, and the TRS-80 Color computers.

THREE TYPES OF SOFTWARE

Investment software usually falls into one of three broad categories: portfolio management and tracking (keeping track of your investments), fundamental analysis or stock screening (identifying stocks that meet specific financial-performance or stock-valuation criteria), and technical analysis (looking for buy/sell signals by graphing and manipulating stock-price and volume data).

The most frequent use of microcomputers by investors is for portfolio tracking and analysis, and, not surprisingly, there are more programs for **portfolio management** on the market than for any other task. Typically, these programs, such as Dow Jones' *Market Manager Plus*, allow you to keep records on a variety of investment vehicles. They also enable you to print out various reports. Options covered include unrealized gains and losses, company earnings, year-to-date transactions, stocks going "long-term," dividends, etc. Prices are either entered manually, or, in some programs, downloaded automatically from a financial data-base information service.

Programs for **fundamental analysis** (stock screening) are normally used by knowledgeable investors to select suitable stocks for long-term holdings in their portfolios. Financial data is usually supplied on data disks which are sent to subscribers on a monthly basis. The data is then screened by the user in order to find stocks having desirable financial characteristics. For example, an investor might wish to screen for stocks having a price/earnings (P/E) ratio that is lower than the current market P/E, relatively high growth in income, and a favorably low debt-to-capital ratio. With the aid of a stock-screening program, thousands of stocks can be analyzed in a few minutes, and the results can be printed out as a graph. It would take several days, or even weeks, to do the same analysis at the library.

Technical analysis programs are often used by investors who wish to trade stocks actively. A technical analysis program usually draws graphs, which give buy and sell signals based on upward market price and volume data for individual stocks, or downward trends in the market as a whole. A typical use would be to superimpose a moving average (for 15 days, a month, etc.) of the daily closing price for a stock on a graph of the daily price itself. If the daily price crosses the moving average on the upswing, a buy signal is given. Conversely, if the daily price line crosses the moving average on the downswing, a sell signal is indicated.

You should be aware that the use of technical analysis to generate buy and sell signals for

INVESTMENT SOFTWARE SAMPLER

The Portfolio Evaluator

Financial Applications Inc.; P.O. Box 34094; Houston, TX 77234; (713) 947-2899; for Commodore 64; disk drive; optional modem and printer; $39.95.

The Portfolio Evaluator is a complete portfolio-management system for the individual investor. It enables you to keep records for multiple portfolios and six types of securities. The system provides a number of reports, including unrealized gains/losses, income, earnings, and year-to-date transactions. Prices may be entered manually or automatically retrieved through Warner Computer Systems.

Plain Vanilla Portfolio System 1

Iris Communications Inc.; 660 Newport Center Drive, Suite 735; Newport Beach, CA 92660; (714) 720-0800; for Apple II series; IBM PC; $99.95.

This stock market record-keeping program is designed for the serious investor with minimal computer skills. All instructions are displayed on-screen, enabling users to record stock or option purchases and sales simply by flipping the "on" switch. *Plain Vanilla* provides current holdings and value data, such as number of shares owned, original price, and present worth, and creates profit-and-loss statements according to the 1984 tax law.

Market Analyzer

N-Squared Computing; 5318 Forest Ridge Road; Silverton, OR 97381; (503) 873-5906; for Apple II plus, 64K/IIe/IIc; IBM PC/PC*jr*, 256K; modem optional; $295.

Market Analyzer is a comprehensive market data analysis software package that allows the user to create any type of market indicator, compare one to another or to a broad market average, and plot the results. Automatic data manipulation and on-screen charting are useful features. A data disk, containing about two years of weekly data compiled from *Barron's Market Laboratory*, can be updated.

Fundgraf

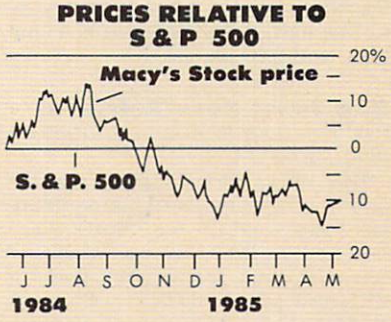
Parsons Software; 118 Woodshire Drive; Parkersburg, WV 26101; (304) 424-5191; for TRS-80 Color Computer, 32K; Extended BASIC required for complete graphics presentation; $49.95 (cassette); $69.95 (disk); IBM PC/PC*jr*, 64K; $99.95.

Fundgraf allows graphic and/or numerical comparisons of stocks or mutual funds for any period up to 200 weeks long. The program will generate buy-and-sell signals based on the calculated moving average. It allows the user to select the number of weeks used for the moving average.

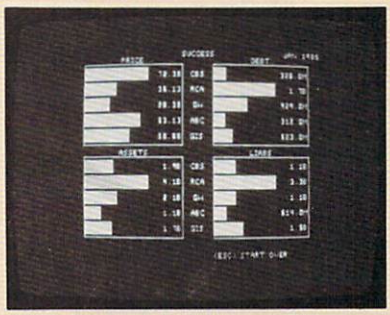
Stockpak II

Standard & Poor's Corp.; 25 Broadway, 15th floor; New York, NY 10004; (800) 852-5200; for Apple II series; IBM PC/PC*jr*; $30 set up charge; composite (1,500 leading companies), NYSE, or AMEX, each $245 annually; OTC, $490 annually.

With *Stockpak II*, a fundamental analysis program marketed by CBS Software, investors are able to review key financial information on up to 4,600 companies, perform simple or complex searches to locate specific types, and graphically compare and analyze information on groups of companies. The system consists of a program disk and one data-base disk for the NYSE, AMEX, or composite markets; two disks are provided for OTC markets. A market composite disk with data for more than 1,500 firms is also available. Monthly data-base updates are included.



S&P's *Trendline*: Charting trends.



S&P's *Stockpak II*: Picking a solid company.

Value/Screen

Value Line, Inc.
711 Third Ave., New York, NY 10017; (212) 687-3965; for Apple II series, 64K; IBM PC, 64K; $348 annual subscription with monthly updates; $211 annual subscription with quarterly updates.

Value/Screen is a fundamental analysis program that enables the user to screen stocks meeting certain investment needs. The system covers more than 1,600 stocks, includes 32 critical parameters for analysis, and can select those stocks meeting up to nine criteria simultaneously. There are no input requirements since all data and information are compacted onto a single data disk.

FINANCIAL DATA BASES AND ONLINE STOCKBROKERS

Online data bases, some of which allow you to trade securities through discount stockbrokers, charge varying rates for day and evening, for 300- and 1200-baud usage, and have surcharges for certain services. Please check with the individual service for details.

CompuServe

Information Services Division; 5000 Arlington Centre Blvd.; Columbus, OH 43220; (800) 848-8990.

CompuServe is a broad-spectrum information service. Stock quotes are available through Microquote. Portfolio management templates, stock and option prices, and trading are available through Qwik & Reilly, discount brokers. There's a surcharge for the Q&R service. With the Executive Information Service, you can get access to Standard & Poor's Reports, Value Line, and SEC filings.

Dow Jones News/Retrieval

P.O. Box 300; Princeton, NJ 08540; (800) 257-5114.

Dow Jones News/Retrieval specializes in providing late-breaking financial news, from the *Wall Street Journal* and *Barron's* as well as other financial news services. By using a KEYword search, DJN/R will supply all the articles containing those KEYwords. DJN/R users can receive quotes from all major exchanges on a 15- to 30-minute delay basis.

Other financial data bases available include Disclosure II, which extracts SEC 10-K, 10-Q, and 8-K reports from over 6,000 companies, and Media General, which provides in-depth historical data on over 3,000 companies.

National Computer Network

1929 N. Harlem Ave.; Chicago, IL 60635; (312) 622-6666.

National Computer Network data bases contain real-time updates, among them TICK—trade-by-trade data for all stocks on the NYSE. Data from Media General are available for in-depth fundamental analysis and stock scanning. For those users who need only raw data, NITE-LINE provides inexpensive access to data for a fixed rate without surcharge. Several specialized statistical-analysis routines, such as Interactive Data Analysis (IDA), are also available.

The Equalizer

Charles Schwab & Co., Inc.; Schwab Technology Services; 101 Montgomery St., 13th floor; San Francisco, CA 94104; (415) 627-7197; company reports, network use, and S & P MarketScope extra; demo disk available at $5; for Apple IIe/IIc with 128K; IBM PC/XT with 128K; $199.

Checking 20-minute delay price on IBM, on CompuServe.

The Equalizer is a home-brokerage software package with communications ability that combines trading, research, and record-keeping. It provides a direct link to the computer system of Charles Schwab, the leading discount broker, for buying or selling securities. *The Equalizer* package automatically dials DJN/R for quotes and news, and it can retrieve a four-page report on any of over 4,600 companies. A full-color portfolio is automatically updated by Schwab's computer.

The Source

1616 Anderson Road; McLean, VA 22102; (800) 336-3366 or (703) 734-7500.

The Source is a comprehensive data-base system providing a wide array of securities data: both real-time and delayed quotes, commodity prices, stock-market commentary, business news, and in-depth company information. The Source provides financial information through its Unistox data base. Also, the Media General data base has in-depth information on more than 3,100 stocks. The Commodity News Service wire and *Donoghue's Money Letter* are available. Stocks may be traded through Spear Securities.

Warner Computer Systems Inc.

1 University Plaza, Hackensack, NJ 07601; (201) 489-1580 or (800) 626-4634.

Warner Computer Systems has several data bases that contain in-depth historical information on investment instruments. For example, the Exchange Master Service provides earnings information and trading statistics dating back to Jan. 1, 1975, for more than 20,000 securities. In addition, the Compustat data base contains extensive information on over 6,000 companies going, in many cases, as far back as 20 years.

short-term trading is quite controversial. Evidence from several studies has led most academics to the conclusion that commission costs from trading eventually turn any temporary trading gains into losses.

For investors who wish to trade in highly speculative markets, there are programs available for options, financial futures, bond analysis, convertible bond hedging, interest-rate arbitrage, mutual fund analysis, and more. With the aid of high-powered statistics packages now available for micros, it is quite possible to duplicate at home the in-depth securities market research being done at universities and large financial institutions.

You can also develop your own analytical tools by using a spreadsheet modeling program, such as *Lotus 1-2-3* or Microsoft's *Multi-Plan*. Spreadsheet software is often used by investors for stock portfolio tracking and analysis. When used in conjunction with a specialized telecommunications program, such as the Dow Jones *Spreadsheet Link*, which loads market prices received from a financial information service into a spreadsheet template, the burden of data entry becomes trivial. For those investors who can write the necessary formulas into the spreadsheet template, this approach offers great versatility.

BUYING TIPS/RESOURCES

In buying investment software, the user often faces a dilemma. Computer dealers are likely to stock only a few of the better-known programs, and often, the salesperson cannot effectively demonstrate the software. The alternative is to buy software by mail. But that's not completely satisfactory either, since the program may not live up to its advertising promises. It's a good idea to try out a demo disk first or to ask for a 15- to 30-day return privilege.

An excellent source of information is *The Complete Investment Book: Trading Stocks, Bonds, and Options with Computer Applications*, by Richard Bookstaber (Scott, Foresman; $19.95). The book offers investment strategies, plus programs written in Microsoft BASIC. Also, the American Association of Individual Investors, which has 20 users' groups around the country, operates a computer bulletin board ([312] 280-8764), which has several public domain programs.

Telecommunications technology, coupled with personal computers and the right software, now allows individuals at home to access the same information as Wall Street professionals. The computer's high-speed processing capability also lets you rapidly analyze large amounts of data, and its unique graphics ease the task of interpreting data.

However, investment theories and the techniques used by investors, both amateur and professional, have not changed. It's still your own knowledge—perhaps aided by the use of a personal computer—that will determine how successful an investor you ultimately may be. FC

HELPFUL HINTS

TIPS BY TEENS

EDITED BY ROXANE FARMANFARMAIAN

Summer's the time to try out crazy experiments with your computer. Check out these hints for several great programming tricks, and some neat schemes for color and sound. **Reminder**: Turn off your computer and peripherals before tinkering with them. Parental guidance is recommended for young children undertaking these activities.

Get Your TI Voice Synthesizer To Say Those Phrases!

Ever noticed how your Solid State Speech Synthesizer spells out some of the phrases in its vocabulary list? This is because it looks for each word in the list separately. The solution? Bracket the phrase with pound signs (#) to make the synthesizer treat the phrase as a unit. For example, type CALL SAY ("I AM THE #TEXAS INSTRUMENTS# HOME COMPUTER").

STEVEN BOOKER, *age 13*
Browns Mills, New Jersey

Start Off Your Programs With Pizzazz.

Want a neat-looking title at the head of your programs? ADAM, Apple, C 64, and IBM owners, just add the following lines to the beginning of any of your programs. To change the vertical position of the title, change the value of VE in line 10.

APPLE

```
10 VE = 12:HOME
20 INPUT "ENTER YOUR MESSAGE ";M$
30 HOME:FOR X = 1 TO LEN(M$)
40 FOR CH = 32 TO ASC(MID$(M$,X,1))
50 VTAB VE:HTAB X+(40-LEN(M$))/2
60 PRINT CHR$(CH):NEXT CH,X
```

ADAM

Type in the above program but change the 40 in line 50 to 31.

C 64

```
10 VE=11:PRINT CHR$(147);
20 INPUT "ENTER YOUR MESSAGE";M$
30 PRINT CHR$(147):FOR X=1 TO LEN(M$)
40 FOR CH=32 TO ASC(MID$(M$,X,1))
50 IF CH>128 AND CH<160 THEN CH=160
60 POKE 214,VE:PRINT
70 PRINT TAB(X+(40-LEN(M$))/2-1);
80 PRINT CHR$(CH);:NEXT CH,X
```

IBM

```
10 VE=12:CLS
20 INPUT "ENTER YOUR MESSAGE";M$
30 CLS:FOR X=1 TO LEN(M$)
40 FOR CH=32 TO ASC(MID$(M$,X,1))
50 LOCATE VE,X+(40-LEN(M$))/2
60 PRINT CHR$(CH):NEXT CH:NEXT X
```

WILLIAM HATCHER, *age 14*
McEwen, Tennessee

Wire Your CoCo To Your Stereo For A Light Show Setup.

Ever wish you could hook up your TRS-80 Color Computer to your stereo so colors on the screen would change to the beat of the music? Well, you can. You'll need a Radio Shack analog joystick (catalog no. 26-3008), two pieces of wire as long as the distance between your stereo and your CoCo and two shorter wires of equal length, one or two connectors like those on either end of the cable between your stereo and speakers, two alligator clips, a 100k ohm ½-watt resistor, two 4.3-volt Zener diodes, and a reference such as *First Book of Electronic Projects* (TAB Books). *Make sure your joystick and stereo are unplugged.*

1. Devise a connector as shown in diagram. Disconnect one of the speakers from your stereo. Plug one end of the connector into the stereo input jack, and the other end into the speaker. (For stereos without jacks, wire the connector directly to the stereo and speaker.) **Warning:** *Never* allow the wires connected to the alligator clips to touch when the power is on, otherwise you risk blowing the fuses in your stereo.

2. Open up the *right* joystick from the bottom and attach the alligator clips as shown. Plug in your joystick and turn on your computer.

3. Move the joystick to the bottom left corner and type in the following:

```
10 CLS(0)
20 A=8*(JOYSTK(0)+1)/64
30 CLS(A)
40 GOTO 20
```

4. Turn on your stereo, put on your favorite record (or tape), and RUN the program. You might have to move your joystick around a bit to get the best colors. If everything is wired correctly, colors will pulsate on your screen in time with the music.

DAN SCHIERL, *age 16*
Chilton, Wisconsin

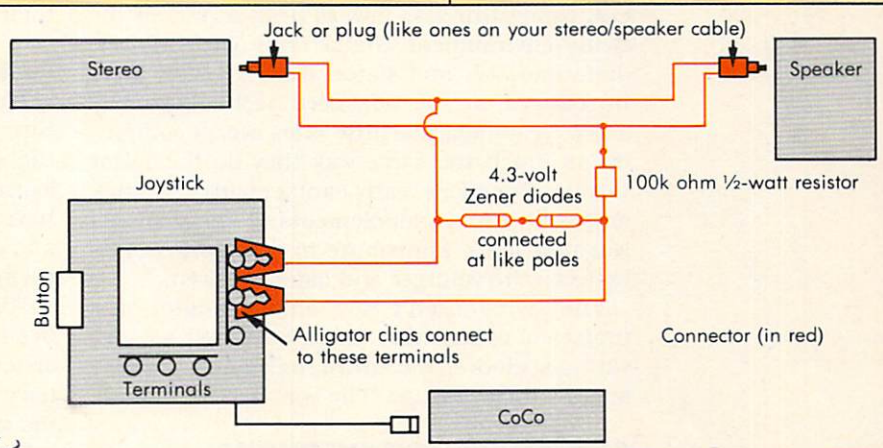


DIAGRAM BY SUSAN TAYLOR FROM SCHEMATIC BY RICHARD MATTHEWS/SEAR-MATTHEWS AUDIO SYSTEMS

Control That Printer!

Are you tired of le-e-eaning over to press the FORM FEED button when printing out a BASIC program? Ever wish your printer would beep when it's done printing? Try these routines, which work with Epson and compatible printers. Check your printer manual for other codes.

Commodore 64/VIC-20

Enter `OPEN 4,4` to open a channel to the printer. Then type

`PRINT#4,CHR$(7);` (to ring bell), or
`PRINT#4,CHR$(10);` (for line feed), or
`PRINT#4,CHR$(12);` (for form feed)

Finally, enter `PRINT#4:CLOSE 4`

Atari/TRS-80 Model III/IBM

`LPRINT CHR$(7);` (to ring bell), or
`LPRINT CHR$(10);` (for line feed), or
`LPRINT CHR$(12);` (for form feed)

DAVE FORMAN, *12*
Greensburg, Pennsylvania FC

Growing Up

THE VAN NUYS TWINS BUILD

Christopher with one of his favorites: Ducks Ahoy! *by CBS*

At the age of 4, Christopher and Matthew Van Nuys are already proteges of the information generation. Born into a home containing four personal computers, computing has always been a part of the twins' environment. Unlike their older brother, Jonathan, 12, and sister, Kira, 16, who were introduced to the advanced technology only a few years ago, the little ones accept computers in much the same way they do the TV or toaster. The twins' early contact with a joystick and software, as supplements to conventional learning tools, contribute to other differences between the younger and older children.

The twins aren't shy about singing the praises of computers, which have cast a captivating spell over the entire household. It's very simple, they explain, "The com-pee-ter is fun!"

COMPUTERS FOR EVERYONE

Here in Rohnert Park near San Francisco, California, the Van Nuys children live with their parents, Ute Elisabeth and David, a dog named Lake, a NEC PC8000, an Atari 800, an Apple IIe, and a Texas Instruments 99/4A.

David, a clinical psychologist, uses the NEC PC in his upstairs office. The instigator behind the family's electronic fever, he purchased the NEC PC8000 more than three years ago after taking a few computer courses. Elisabeth dreams of owning a Macintosh, but actually uses the Apple and Atari for writing freelance articles and testing software.

Jonathan competes for time at the Apple to write his weekly movie column for the local newspaper. Kira word-processes with *Bank Street Writer* on the Apple.

Meanwhile, the twins work with educational software. Elisabeth recalls that when they were babies, the two would almost fall out of her arms trying to touch the keyboard. "They were intrigued by the colors on the screen and the number of keys," she says.

That was only the beginning. By the time they were 2 years old, the boys were able to turn on the computer without supervision. Now, at age 4, they can insert disks and run programs on their own.

The twins are completely unintimidated by anything electronic. Because of their experience in using micros, they express greater interest in mechanical gadgetry and computer equipment than their siblings did at that age.

Like typical computer enthusiasts, the twin brothers can give definite opinions about their most treasured programs and why they like them. With several years of microcomputer experience under their tiny belts, they already have strong opinions about "good" and "bad" software. At times they have even strayed away from their parents at the computer store to tell other customers which products are best for their children.

OLDER VS. YOUNGER

The key difference between the twins and Kira and Jonathan when they were that age is the control the toddlers have in their own learning process. "Ever notice how babies who have discovered a light switch like to flip it on and off?" asks Elisabeth. "Well, computers give them that kind of control."

The learning that takes place comes directly from the computer. For the older brother and sister, on the other hand, skills they already have acquired (like reading and math) are being transferred to the computer.

With initial instruction from David and Elisabeth, the twins mastered the alphabet and numbers before they turned 3 years old. They are beginning to write letters, recognize colors and shapes, and read many words that most children learn only at ages 5 or 6.

The boys first learned to recognize the words "yes" and "no," mainly because the preschool software asks questions that require hitting the "Y" key for yes and the "N" key for no. With a program called *Reader Rabbit* from The Learning Company, they are reading such

KATHY CHIN *is a California-based writer whose articles on computers have appeared in a number of magazines including* InfoWorld.

With Computers

SKILLS FOR TWO AT THE KEYBOARD

BY KATHY CHIN

words as cat, pin, and hat.

Writing is another area seemingly changed by the computer. Kira, like many children learning to print, made her letters very large, about two inches high. Jonathan, too, formed huge letters, and has messy writing, even today. Yet to everyone's amazement, the twins are writing small, legible letters, probably in imitation of the small letters they're accustomed to seeing on the computer screen. Learning does not stop at the computer, however. The twins can read and write words they have not seen in the software they use.

The boys have developed their fine motor skills through the use of the keyboard and joystick. In addition to developing small-muscle control, they already can distinguish between left and right, something Kira and Jonathan didn't grasp until they were somewhat older.

Computers won't replace people, though, says Elisabeth. "If no one tells them an 'A' is an 'A,' it's just two leaning sticks with a bar across the middle." Contrary to a common misconception, computers have not replaced any of the other activities essential to the twins' growth. "Educators express concern that computers will supplant other activities," says Elisabeth. "It's simply not true. If I had a child who spent five or six hours in front of a computer, I'd be very worried," she continues. "I'd wonder why the child would want to tune out everything else, and I'd limit time spent with the computer. But it hasn't been necessary."

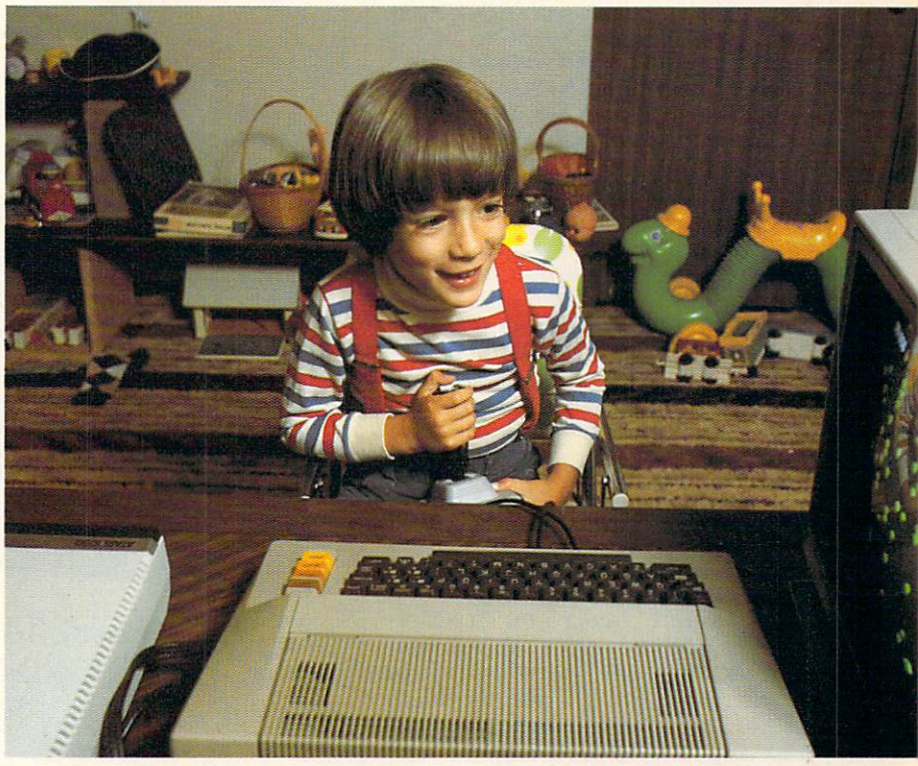
Although they are twins, the boys seem to have little in common besides their birthdate and love for computers. Matthew has dark hair, is outgoing, and stands 1½ inches taller than blond-headed, introverted Christopher. Even their computer habits are dissimilar.

According to David, Christopher spends more time at the computer, logging in at least a half hour at the Atari several times a week. His favorite programs include *Sea Horse Hide and Seek* by CBS Software, and *Alph in the Color Caves* from Spinnaker.

Matthew, on the other hand, spends only about half as much time at the computer as Christopher, and tends to favor *Stickybear ABC* by Xerox and *Learning With Leeper* by Sierra. Yet, Elisabeth reports, the twins are at approximately the same skill level.

"Matthew watches Christopher at the computer, and they teach each other," she says. "Each is the other's best friend." Elisabeth reasons that Matthew does not need as much sensory input as Christopher in learning skills such as reading.

Their differences help make the two a complementary pair. Since Matthew is physically the stronger of the two, he can best insert the cartridges into the Atari, while Christopher, quicker with his hands, controls the joystick.



Matthew playing Centipede *by Atari*

A FAMILY FOCUS

Computers are no longer treated as a novelty in this home. Yet they are more than household appliances. Aside from the obvious benefits of the computers, the micros have enhanced family communication. They are one of the few centers in the home where different age groups come together to share a common interest. Kira, though not nearly as taken with the computer as Jonathan, will often spend time at the keyboard to play with the twins.

"The twins really like it when David and I hold them on our laps in front of the computer," says Elisabeth. "There's more conversation around the computers than any toy in the house."

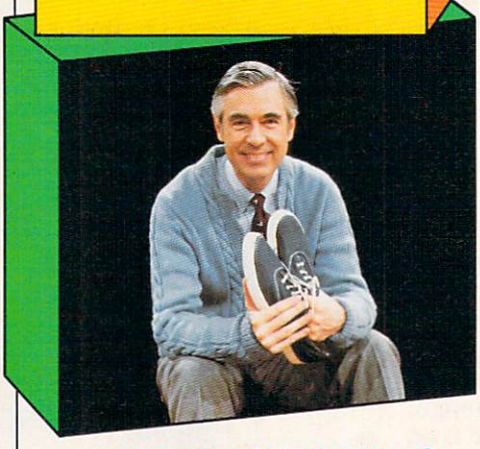
Family interest and support have undoubtedly helped the twins learn more about computers than most 4-year-olds. But what will happen when they go to school? Will they have to start all over again?

David and Elisabeth are convinced that good educators can take children at their current level and teach them even more. Thus, the bridge from home to school computing shouldn't be a major issue. FC

Clockwise from top left: Christopher, David, Ute Elisabeth, Matthew, Kira, Jonathan

PHOTOGRAPHS BY K. GYPSY ZABOROSKIE

Do You Remember Building Blocks?



MISTER ROGERS TALKS ABOUT HIS KIND OF PRODUCTIVITY SOFTWARE

BY JOHN WALLACE

Every day, sometime after school, Mister Rogers and his neighborhood friends come to visit. His 30-minute television program, "Mister Rogers' Neighborhood," has made the softspoken, cardigan-sweatered, sneakered soul with a song for every occasion a familiar face to millions of children for almost 20 years.

A TV visit with Fred Rogers moves slowly and quietly from activity to activity—which can be an unnerving experience for old folks used to the jump cuts and splices of most commercial television. But Rogers' young friends don't mind the pace at all. The formula works. The same formula is employed in Many Ways to Say I Love You *(CBS Software, for C 64; $29.95), new software Rogers developed with his colleagues at Family Communications (a nonprofit production company that turns out Rogers' pamphlets, videotapes, records, and other learning aids).*

The first in a series from Mister Rogers, Many Ways . . . *lets children paste a short message and a variety of animated shapes onto a greeting card. Although she couldn't print out her message,* FAMILY COMPUTING *reviewer Marlene Anne Bumgarner found* Many Ways . . . *an inviting tool for the whole family—one that, with a little adult help at the outset, children as young as age 4 can manage on their own. Bumgarner called it a first-class "love processor," a description that delighted Rogers.*

A relative newcomer to computing, Rogers was unaware of the machine's possibilities. Yet, he learned quickly. He's thought a great deal about the benefits and drawbacks of computer use among children, and recently shared his thoughts with us.

FC: Why the computer? What do computers and software have to offer children that they can't get on good television?

Mister Rogers: It's the interaction. The child is able to make things happen. One of my hopes in "The Neighborhood" is to encourage imaginative play. Anything that helps the child imagine things is good. Unless you first imagine something, you can't do it. We have to help give children tools, building blocks for active play. And the computer is *one* of these building blocks. No computer will ever take the place of wooden toys or building blocks. But that doesn't mean they have to be mutually exclusive.

FC: And how does *Many Ways to Say I Love You* get children to play? What do you hope will be its primary effect on kids?

Mister Rogers: It encourages kids to get in touch with one another. I told the software people from the beginning that I wouldn't be interested in creating anything that didn't ultimately get people closer together. When you're creating a card, you're thinking all about the person you're making it for. Or, you might be making it for someone with somebody else. I'm interested in using computers to encourage healthy human relationships.

FC: How did you come to develop software in the first place?

Mister Rogers: I got into television because I didn't like it, and I guess I got into computers for the same reason. I've always been pretty much antimachine. I think it's probably because I don't understand machines. I've always been an artist. I started out as a musician—I [still] write all the music and scripts for the TV show. I just haven't ever been comfortable with machines.

My son had a roommate in college who was a real computer whiz, and it really confounded me. How could that thing work, I kept asking myself.

I saw television in its early days and just hated it. I didn't like people throwing pies in one another's faces. I don't like demeaning behavior; I don't like people being made the butt of jokes. But you can say that only for just so long; it doesn't mean anything until you decide to do something about it. I've always tried to be different [on The Neighborhood]. The same with computers.

FC: Are you familiar with a lot of other software that's available?

Mister Rogers: Our people at Family Communications are. But since I don't know what's out there, my work isn't really affected by what others have done. That's the way it is with television, too. I don't watch television very much at all.

FC: Then your work isn't really a response to perceived video-game violence or excessive cruelty in some existing software.

Mister Rogers: Well, I know that stuff is there. It's just that I don't choose to spend my time watching it. Once you've watched a sampling of that kind of thing, you've seen it all. I'm terribly concerned about violence, because it's so unlike real life. Being exposed to that—the research is clear—makes people afraid. And when people are afraid, they become dependent. The easiest people to sell things to are dependent people.

FC: In your experience, how do young children and computers mix?

Mister Rogers: It depends on the health of the child. Most of the kids I've seen don't fear the computer at all. They'll crawl right up to it and start playing.

FC: What advice would you give parents trying to sort out what software to buy for home use?

Mister Rogers: I'd hope they feel about software the same way they'd feel about buying books and videotapes. What you bring into your home really should be in accord with your own family traditions. Children will know what you believe if you tell them and demonstrate it to them. It's up to the parent to be choosy, and in choosing, allow their children to know who they are and what they stand for.

FC: So the computer can act as a sort of mirror for young children—to reflect the family's values.

Mister Rogers: Yes, because a child longs to belong to his or her family. Children want to know what it is about their family that makes them tick. FC

JOHN WALLACE *is reviews editor of* FAMILY COMPUTING *magazine.*

BUYER'S GUIDE TO

MUSIC HARDWARE AND SOFTWARE

MAKING MUSIC WITH YOUR COMPUTER IS AS EASY AS A ONE, AND A TWO, AND A THREE, AND A FOUR...

BY JOEY LATIMER

"That sounds like a mosquito!" I was told the first time I attempted to make music on a computer. Hearing that after several hours of programming made me want to scream. "If only I had a computerized synthesizer," I thought to myself. "I'd blow the critics away!"

Three years later, almost any computer user can generate computer music that *will* "blow the critics away!" Playing music with a computer no longer is a programmer's chore. It's become as easy as gliding your fingers across a keyboard, wiggling a joystick, or tickling a touch pad.

With today's music software and hardware, you *can* turn your computer into a synthesizer or composing tool. Your computer can tutor you in music theory and concepts, or play computerized renditions of your favorite songs. You're able to practice composing and playing songs using an add-on keyboard or your computer's own keyboard. When you're ready, you can record a song.

To get the right texture in your music, some music software and hardware let you pick different instruments for your orchestra. You can fix mistakes before anyone hears them. And best of all, when you've finished recording your song, you can save it on your own disk album and play it back for family and friends . . . all in the same day!

Sound farfetched? Expensive? Amazingly, not so. Check out the Music Software and Music Hardware charts on the next pages. Products are listed by key features such as price, compatibility, ease of use, and description/comments. Manufacturer information also is provided. The text will help you evaluate which products on the charts are best for you and your family.

ILLUSTRATION BY AKIO MATSUYOSHI

JOEY LATIMER, FAMILY COMPUTING's *associate technical editor on the West Coast, composes the musical Microtones programs each month. He is a musician, recording engineer, and computer programmer.*

MUSIC SOFTWARE

Continued on next page.

COMPANY	PRODUCT	HARDWARE REQUIRED	COMMENTS	EASE OF USE	# VOICES
Access Software, Inc. 3678 W. 2100 S. Salt Lake City, UT 84120 (801) 973-0123	MASTER COMPOSER $34 Synthesizer and composing tool	Commodore 64; printer optional	Features powerful sequencer. Enter and save sheet music, or compose own.	DIFFICULT	3
Activision 2350 Bayshore Frontage Road Mountain View, CA 94043 (415) 960-0410	THE MUSIC STUDIO $29.95 Synthesizer and composing tool	Commodore 64 plus joystick or KoalaPad; printer optional	Features easy-to-use animated screens and icons.	EASY	3
Artworx 150 N. Main St. Fairport, NY 14450 (800) 828-6574	ALLEGRO $39.95 Synthesizer and composing tool	Commodore 64; game paddles and printer optional. Planned for Macintosh	Features comprehensive editing and compiling system.	DIFFICULT	3
Algo-Rhythm Software 176 Mineola Blvd. Mineola, NY 11501 (800) 645-4441	CANTUS, THE MUSIC IMPROVISER $54 Educational/game	Commodore 64	Plays randomly generated music using "patches" user creates.	AVERAGE	3
Alfred Publishing 15335 Morrison St. Sherman Oaks, CA 91403 (818) 995-8811	MUSIC MADE EASY $29.95 Educational	Apple II series; Commodore 64	Teaches music theory via drills and testing.	EASY	1
Atari Corp. 1312 Crossman Road P.O. Box 61657 Sunnyvale, CA 94088 (408) 745-4851	MUSIC II, RHYTHM AND PITCH Under $25 Educational	Atari 800/XL/XE, 16K	Teaches rhythm and pitch via drill and practice.	EASY	1
	MUSIC COMPOSER Under $25 (cartridge) Composing tool	Atari 800/XL/XE, 16K	Enter, arrange, and edit music via menu choices.	AVERAGE	4
Blackhawk Data Corp. 307 N. Michigan Ave. Chicago, IL 60601 (312) 236-8473	TUNESMITH/PC $49.95 Synthesizer and composing tool	IBM PC/PC*jr*, 96K 1	Lets user edit music-definition language of PC.	AVERAGE	1
Broderbund 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170	THE MUSIC SHOP $44.95 Synthesizer and composing tool	Commodore 64; joystick and printer optional	Features icons, windows, and full-page music scores.	EASY	3
ComputerWare P.O. Box 668 Encinitas, CA 92024 (619) 436-3512	SYNTHER 77 $24.95 (cassette); $27.95 (disk) Synthesizer	TRS-80 CoCo, 32K	Turns keyboard into a 2-octave piano. Choice of 12 octaves.	EASY	1
Electronic Courseware Systems 1210 Lancaster Drive Champaign, IL 61821 (217) 359-7099	MUSICAL STAIRS $29.95 Educational/game	Apple II series, 48K; Commodore 64; IBM PC/PC*jr*, 128K	Teaches concept of intervals via drill-and-practice game.	EASY	1
Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171	MUSIC CONSTRUCTION SET $22.95–$39.95 Synthesizer and composing tool	Apple II plus/IIe/IIc, 48K; Macintosh; Atari, 48K; Commodore 64; IBM PC/PC*jr* 128K; joystick, KoalaPad, printer, and Mockingboard (Apple only) optional	Lets you cut, paste, and edit songs by moving icons around screen.	EASY	2–6
EnTech Software P.O. Box 185 Sun Valley, CA 91353 (818) 768-6646	ADD MUS'IN $39 Programmer's utility	Commodore 64 and *Studio 64*; Music Mate keyboard optional	Converts *Studio 64* files for use in your own programs.	AVERAGE	3
	STUDIO 64 $39 Synthesizer and composing tool	Commodore 64; Music Mate keyboard optional	Converts computer keyboard into piano keys.	EASY	3
Future Vision P.O. Box 34 N. Billerica, MA 01862	VIDEO TUNES $34.95 (cassette) Composing tool	ADAM	Uses joystick control to place and edit notes on a staff.	AVERAGE	3
Hayden Software 600 Suffolk St. Lowell, MA 01854 (800) 343-1218	MUSIC WORKS $79.95 Synthesizer and composing tool	Macintosh plus mouse; printer optional	Uses Macintosh's icons, windows, and high resolution to create quality graphics and music in a construction-set format.	AVERAGE	4
Koala Technologies 2065 Junction Ave. San Jose, CA 95131 (800) KOA-BEAR	SPIDER EATER $29.95 Educational/game	Commodore 64 plus KoalaPad	Teaches where notes are on a piano keyboard. Easy for children to create simple melodies and strange sounds.	EASY	1
Mastertronic International 7311B Grove Road Frederick, MD 21701 (301) 695-8877	MAKE MUSIC WITH MISTERTRONIC $9.99 Composing tool	Commodore 64; joystick and printer optional	Includes five preset instrument sounds.	AVERAGE	1
Melodian Inc. 115 Broadway, Suite 1202 New York, NY 10006 (800) MEL-ODIA	CONCERT MASTER $39.95 Synthesizer and composing tool	Commodore 64; Melodian keyboard optional	Features real-time three-track recording, including a metronome, variable tempo, and an animated musical staff.	AVERAGE	3
	RHYTHM MASTER $39.95 Educational/game	Commodore 64; Melodian keyboard optional	Teaches rhythm patterns in a game format that gets more difficult as play progresses.	AVERAGE	1
Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (800) 221-9884	BANK STREET MUSIC WRITER $49.95 Synthesizer and composing tool	Atari, 48K; Commodore 64. Planned for Apple II series, IBM.	Lets you compose, edit, and play back songs. Tone shaping is represented by charts. Needs no prior musical knowledge.	AVERAGE	3–4
NewArts Co. P.O. Box 2700 Huntington Beach, CA	GUITAR CHORD POWER $39.95 Educational	Commodore 64	Displays more than 8,000 chords with sound. Built-in tutorial teaches chord construction. Best for guitar players.	EASY	1
Passport Designs 625 Miramontes St., No. 103 Half Moon Bay, CA 94019 (415) 726-0280	MACMUSIC $49.95 Synthesizer and composing tool	Commodore 64 plus joystick; may work with Soundchaser 64	Makes composing as simple as drawing. As you draw composition—you hear it!	EASY	3

All software on disk, unless otherwise noted.

SAVES/LOADS PRESET SOUNDS	SAVES/LOADS SONGS	ACCOMPANIMENT	INSTRUMENTS	COLOR GRAPHICS	RECORDS LIVE	SEQUENCES NOTES	TUTORIALS	PROGRAMMING INFO	PRINTS SCORES
Y	Y	N	Y	N	Y	Y	Y	Y	Y
Y	Y	N	Y	Y	Y	Y	N	N	Y
Y	Y	Y	Y	N	N	Y	N	Y	Y
Y	Y	N	Y	Y	N	N	Y	N	N
N	Y	N	Y	N	N	Y	N	Y	Y
N	N	N	N	N	N	N	Y	N	N
N	Y	N	N	Y	N	Y	N	Y	N
N	Y	N	N	Y	N	N	Y	Y	N
Y	Y	N	Y	Y	N	Y	N	N	Y
Y	Y	N	Y	N	Y	Y	Y	Y	N
N	N	N	N	Y	N	N	Y	N	N
N	Y	Y	N	N	N	Y	N	N	Y
N	Y	N	N	N	N	N	N	Y	N
N	Y	Y	Y	Y	Y	Y	Y	N	N
N	Y	N	N	Y	N	Y	N	N	N
Y	Y	N	Y	N	Y	Y	Y	N	Y
N	N	N	N	Y	N	N	Y	N	N
Y	Y	N	Y	Y	N	Y	N	N	Y
Y	Y	Y	Y	Y	Y	N	Y	N	N
N	N	Y	Y	Y	N	N	N	N	N
Y	Y	N	Y	Y	N	Y	N	N	Y
N	N	Y	N	Y	N	N	Y	N	N
Y	Y	Y	N	Y	Y	Y	N	N	N

IS YOUR COMPUTER 'MUSICAL'?

There's no getting around the fact that making music with your computer depends on which computer you own. If you own a Commodore 64, you already have a powerful musicmaker in your home. That's because the C 64 contains what's called a SID (Sound Interface Device) chip that acts as a built-in programmable synthesizer and offers eight octaves of high-quality sound and three voices. Because of the SID chip, C 64 owners will find a multitude of compatible music products listed in the Music Hardware and Music Software charts. In fact, most of the under-$200 add-on keyboards FAMILY COMPUTING took a look at work with the C 64.

That's great news for Commodore 64 users, but other computer owners shouldn't despair. Atari (four voices), Macintosh (four voices), VIC-20 (three voices), and TI/99-4A computers (three voices) also come equipped with sound chips, although less sophisticated than the SID chip.

Apple II series and TRS-80 Models III and 4 users have to work harder to make beautiful music because their machines have no true built-in sound capabilities. Apple and TRS-80 Model 4 computers come equipped with tiny built-in speakers, but their music quality is poor. Radio Shack's TRS-80 Model III computers don't have a speaker at all. They can be programmed to send music through the cassette port, but the musical results aren't so hot. Musical Apple and TRS-80 owners can upgrade their machines to the C 64's music level by adding an integrated circuit board that contains sound chips and output jacks for plugging into a stereo (we list several in the Music Hardware chart). For example, adding a Mockingboard card to an Apple improves the sound considerably and increases the number of voices from 1 to 6.

The new Yamaha Music Computer and Atari's ST computer both offer substantial music capabilities via their built-in MIDI interfaces (*see The Future of Computer Music, page 38*).

SOFTWARE THAT'S MUSIC TO YOUR EARS

With or without an add-on keyboard, it's music software that really makes your computer hum. Software packages fall into several categories. Some programs turn your computer into a sophisticated synthesizer or composing tool. Others are educational: pure music theory drill-and-practice or music tutorials (*for more on this category, refer to July* FAMILY COMPUTING, *page 31*). Some combine music education or composing lessons with a game format, and a few are technical utilities for musical programmers.

To evaluate which program is best for you or your family, first read the comments column in the Software Chart, and the Yes and No columns that detail specifics. Keep in mind that ease of use doesn't refer to the quality of the music the program can generate, but indicates how quickly the average computer user will be able to use the program.

Knowledge of the following terms will help you pinpoint the best software selection for your musical/computing needs:

Voices: The number of musical voices listed in this column of the Music Software chart equals the number of parts, or tracks, which can be used to create a musical arrangement using the program highlighted. The C 64, for instance, can produce three-part harmony or record a maximum of three tracks, so most software for the C 64 uses those three voices. Atari computers, however, have four voices, and not all music software uses them all.

Instruments: Some music programs have factory preset instrument sounds built in. For example, one program may offer guitar, piano, flute, and organ instrument sounds. That means you have only these instrument

MUSIC SOFTWARE Continued

COMPANY	PRODUCT	HARDWARE REQUIRED	COMMENTS	EASE OF USE	# VOICES
Passport Designs 625 Miramontes St., No. 103 Half Moon Bay, CA 94019 (415) 726-0280	MONO/POLY SYNTHESIZER Included with Soundchaser 64 Synthesizer/educational	Commodore 64 plus Soundchaser 64 keyboard	Lets user create monophonic and polyphonic synthesized sounds.	EASY	1–3
Scarborough Systems 55 S. Broadway Tarrytown, NY 10591 (914) 332-4545	SONGWRITER $39.95 Composing tool	Apple II series, 48K; Atari, 48K; Commodore 64; IBM PC (needs color graphics monitor adapter)/PCjr, 64K	Simple composing tool saves melodies and songs.	EASY	3
Sequential Circuits 3051 N. First St. San Jose, CA 95134 (408) 946-5240	SONG BUILDER $39.95 Composing tool	Commodore 64	Lets user overdub up to three layers of notes.	AVERAGE	3
	SONG EDITOR $39.95 Composing tool	Commodore 64	Displays songs written with *Song Builder*. Lets user edit them.	AVERAGE	3
	SONG PRINTER $39.95 Printing tool	Commodore 64	Lets user print out music in standard music notation.	AVERAGE	3
	SOUND MAKER $39.95 Sound-making tool	Commodore 64	Provides 4-color graphic display that looks like front panel of synthesizer. Lets user change tone and volume of sound.	AVERAGE	3
Sight & Sound Music Software 3200 S. 166th St. P.O. Box 27 New Berlin, WI 53151 (800) 558-0910	MUSIC PROCESSOR $24.95 Synthesizer and composing tool	Commodore 64; Incredible Music Keyboard and joystick optional	Includes powerful music editor with command language similar to BASIC.	AVERAGE	3
	MUSIC VIDEO KIT $39.95 Educational/game	Commodore 64 plus joystick	Creates music videos including background scenes, actors, props, and music that user selects or writes with the program's help.	AVERAGE	3
	3001 SOUND ODYSSEY $24.95 Synthesizer/educational	Commodore 64; Incredible Music Keyboard and joystick optional	Includes powerful synthesizer and in-depth tutorial on sound synthesis, and sequencer for recording.	AVERAGE	3
	KAWASAKI SYNTHESIZER $24.95 Synthesizer and composing tool	Commodore 64; Incredible Music Keyboard optional	Two-disk set includes "The Performer" and "The Composer." Futuristic graphics enhance music.	DIFFICULT	3
	KAWASAKI RHYTHM ROCKER $24.95 Synthesizer	Commodore 64; Incredible Music Keyboard optional	Enables user to play synthesizer to bass and drum patterns while watching hi-res graphics displays.	DIFFICULT	3
Spinnaker Software Corp. 1 Kendall Square Cambridge, MA 02139 (617) 494-1200	ROCK 'N RHYTHM $26.95 Composing tool	Atari, 48K; Commodore 64 plus joystick	Record songs in a simulated recording studio. Play back songs on a jukebox.	AVERAGE	3-4
Springboard Software 7807 Creekridge Circle Minneapolis, MN 55435 (800) 328-1223	MUSIC MAESTRO $34.95 Educational/game	Apple II series, 48K; color monitor recommended	Lets children 4–12 create tunes, learn note names, combine graphics with music.	EASY	1
Sweet Micro Systems, Inc. 50 Freeway Drive Cranston, RI 02920 (800) 341-8001	SPEECH DEVELOPMENT SYSTEM $39.95 Utility software	Apple II plus/IIe, 64K plus Mockingboard stereo/ synthesizer card	Software utility allows user to modify phoneme string created by a text-to-speech algorithm.	AVERAGE	6
	DEVELOPER'S TOOLKIT $29.95 Composing tool	Same as above	Helpful utility program eases the development of music and sound, and speech enhanced software.	AVERAGE	6
Tandy/Radio Shack 1800 One Tandy Center Ft. Worth, TX 76102 (817) 338-2395	ORCHESTRA-90 $79.95 Synthesizer	TRS-80 CoCo, 16K; Models I/III/4, 48K	Connects computer to stereo; lets you create, play, and edit music. Built-in communications package for CoCo.	AVERAGE	5
Tech-Sketch Inc. 26 Just Road Fairfield, NJ 07006 (800) 526-2514	LIGHT PEN MUSIC COMPOSER AND PRINTER DUMP Included with Music Port Synthesizer and composing tool	Commodore 64 plus Music Port keyboard, and Light Pen	Lets user select from icon-based menu; build, edit, save measures; and record up to 10 minutes of music.	EASY	3
Triton Products P.O. Box 8123 San Francisco, CA 94128 (800) 227-6900	MUSIC MAKER $15.95 (cartridge) Composing tool	TI-99/4A (cartridge); storage system recommended	Compose by moving notes on a staff and watch notes on sound frequency chart.	AVERAGE	3
Waveform Corp. 418 N. Buchanan Circle, No. 12 Pacheco, CA 94553 (415) 825-1722	MUSICALC 1, SYNTHESIZER AND SEQUENCER $29.95 Synthesizer and composing tool	Commodore 64; ColorTone Keyboard optional	Holds 32 preset songs and sound "patches" at one time. Lets user record notes while performing or while sequencing one note at a time.	DIFFICULT	3
	MUSICALC 2, SCOREWRITER $19.95 Printing utility	Commodore 64 plus *MusiCalc 1* software	Prints scores from songs created using *MusiCalc 1*. Lets two or more Commodore 64s run *MusiCalc* at the same time to synchronize.	DIFFICULT	0
	MUSICALC 3, KEYBOARD MAKER $19.95 Composing tool	Commodore 64 plus *MusiCalc 1* software	Contains 70 preset scales and lets you create new scales in conjunction with *MusiCalc 1*.	AVERAGE	0
Yamaha International Corp. P.O. Box 6600 Buena Park, CA 90620 (714) 522-9011	FM VOICING PROGRAM $50 Synthesizer and composing tool	Yamaha CX5M plus YK-01 or YK-10	Lets user load and save own instrument sounds.	DIFFICULT	8
	FM MUSIC COMPOSER $50 Synthesizer and composing tool	Yamaha CX5M plus YK-01 or YK-10	Displays staff on-screen for composing.	DIFFICULT	8
	FM MUSIC MACRO $50 (cartridge) Synthesizer and composing tool	Yamaha CX5M; keyboard optional	Plug-in cartridge lets programmers add own sounds to own programs with their music computer.	DIFFICULT	8

All software on disk, unless otherwise noted.

SAVES/LOADS PRESET SOUNDS	SAVES/LOADS SONGS	ACCOMPANIMENT	INSTRUMENTS	COLOR GRAPHICS	RECORDS LIVE	SEQUENCES NOTES	TUTORIALS	PROGRAMMING INFO	PRINTS SCORES
N	N	N	Y	N	N	N	Y	Y	N
Y	Y	N	N	Y	Y	N	N	N	N
Y	Y	Y	N	N	Y	N	Y	N	N
Y	Y	Y	N	N	N	Y	Y	N	N
N	Y	N	N	N	N	N	Y	N	Y
Y	N	N	Y	N	N	N	Y	N	N
Y	Y	Y	Y	Y	Y	Y	N	Y	Y
N	Y	Y	N	Y	Y	N	N	N	N
Y	Y	N	Y	Y	Y	Y	Y	N	N
Y	Y	Y	Y	Y	Y	Y	N	N	N
N	Y	Y	Y	Y	Y	N	N	N	Y
Y	Y	Y	Y	Y	Y	Y	N	N	N
N	Y	N	N	Y	Y	Y	Y	N	N
Y	N	N	N	N	N	N	Y	Y	N
Y	N	N	N	N	N	N	Y	Y	N
N	Y	N	Y	N	N	Y	N	N	N
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	Y	N	N	Y	N	Y	N	N	Y
Y	Y	Y	Y	Y	Y	Y	N	Y	N
N	N	N	N	Y	N	N	Y	N	Y
N	Y	N	N	Y	N	N	Y	N	N
Y	T	Y	Y	Y	Y	Y	Y	N	N
N	Y	N	N	Y	N	Y	N	Y	Y
N	N	Y	N	Y	N	Y	N	Y	N

sounds available for playback in your compositions. A "Y" in this column means you have the flexibility to create your *own* instrument sounds and change those sounds until they're exactly as you wish. Creating and manipulating sounds usually is done by changing settings on your screen while listening to the results.

Saves/Loads Sounds: A program that saves and loads individual sounds lets the user create libraries of instrument sounds for later use. These sounds can be reloaded and used in the performance and playback of compositions. If a program doesn't save instrument sounds, those sounds are lost whenever the computer is turned off.

Saves/Loads Songs: This feature lets the user save entire compositions (as opposed to individual instrument sounds). This save step comes after the user records or sequences the song.

Accompaniment: A "Y" in this column means the music program offers automatic computer accompaniment. You've probably seen organs and electronic keyboards that play bass, drums, and rhythm while you play along. In many programs, your computer can provide this kind of accompaniment.

Graphics: If the music program you're interested in has a "Y" in this column, it's likely you'll need a color monitor to get the most out of the program. Parts of programs with color graphics display have been known to disappear on monochrome screens.

Records: Many frustrated musicians have a secret desire to go to a recording studio and record a song "live." When a program has a "Y" in this column, the recording studio comes right into your home! Software that records live performances can record a song as you play it, and then play it back for you.

Sequences: With many music programs, it's also possible to sequence notes individually. This means you're able to arrange the notes you want, place them where you want them (visually on a staff, for instance), and have the computer play back the song when you're ready (as opposed to recording everything at once, live). With some programs, you move the notes onto a graphic display of a music staff using a joystick, KoalaPad, or mouse. Other programs use the keyboard to sequence a song.

Tutorials: Many programs featured in the software chart contain built-in tutorials. If a program offers a help screen or a tutorial covering subjects necessary for the program operation, you'll find a "Y" in this column. Educational games, by their inherent nature, also earn a "Y" in this column.

Programming Info: One of a best ways to make your own game programs shine is to add music to them. Software packages with a "Y" in this column include documentation for programmers who want to add freshly synthesized creations to their own programming efforts.

Prints Scores: One of the most popular features among the new composing programs is score printing. If you're running a program with a "Y" in this column, and you have a compatible printer with graphics capabilities, you can print sheet music of your compositions. For serious musicmakers, having the printed sheet music can be a big help when editing a large composition.

BLOW THE CRITICS AWAY

Once you've chosen product(s) suitable for your own musicmaking tastes, you'll find yourself jamming in no time. I know several of the products highlighted on these pages have proven invaluable in my own computer music endeavors. My critics (family and friends within earshot) have forgotten my mosquito-buzzing musical efforts of the past. Now they listen to my computer music and say, "That sounds a lot like *2001: A Space Odyssey*." I just smile.

THE FUTURE OF COMPUTER MUSIC

If you're interested in computers and music, you'll be hearing the word "MIDI" a lot in the future. MIDI (Musical Instrument Digital Interface) already is a big deal in the recording industry. A MIDI is an interface that links different makes and models of professional music equipment and synthesizers.

When a professional musician finishes a performance on a MIDI-equipped keyboard, he or she can go to a MIDI-equipped computer and analyze the information (the speed and pressure at which the keys were hit, which keys were pressed, etc). The musician then can change, save, print, or reject the sounds.

On the home front, a MIDI interface makes it possible, for example, to link a Casio keyboard to an Atari computer. The Atari will store music, print scores, and provide video graphics, while the Casio hums out a tune using its built-in instrument sounds and rhythm patterns.

Several companies market MIDI interfaces for Apple, Atari, Commodore, and IBM computers right now in the $100 to $200 price range. The real cost comes in when you consider the price of a MIDI-equipped keyboard. The least expensive one we know of is the Casio CZ-101, and it retails for about $500! Industry insiders, however, expect the price of MIDI interfaces and of MIDI-equipped computers to come down as home demand increases, so don't be surprised if current software and hardware packages are revised to become MIDI-compatible.

In fact, MIDI interfaces already are being integrated into personal computers. Yamaha's Music Computer contains a hot on-board eight-voice synthesizer. This computer lets you interface with either MIDI-equipped keyboards or two Yamaha compatible keyboards (*see Music Hardware chart*). Atari's ST computer also boasts a MIDI interface and advanced music capabilities.

For more information on the MIDI standard, call or write Hybrid Arts, 11920 W. Olympic Blvd., Los Angeles, CA 90064; (213) 826-3777, or log on to the 24-hour MIDI bulletin board at (213) 826-4288. FC

MUSIC HARDWARE

PRODUCT	COMPANY	DESCRIPTION	HARDWARE REQUIRED	EASE OF USE	COMPATIBLE SOFTWARE
COLORTONE KEYBOARD $39.95	Waveform Corp. 418 N. Buchanan Circle No. 12 Pacheco, CA 94553 (415) 825-1722	25-key touch-sensitive keyboard. Full-size flat keys.† Plugs into joystick port. *ColorTone Keyboard* software included.*	Commodore 64	Easy	*MusiCalc 1** *MusiCalc 2** *MusiCalc 3**
ECHO PLUS $149.95	Street Electronics 1140 Mark Ave. Carpenteria, CA 93013 (805) 684-4593	Speech, music, and sound synthesizer card. Allows up to 6 voices. Requires stereo hookup.	Apple II plus/IIe, 64K; joystick or mouse optional	Average	*Music Construction Set**
INCREDIBLE MUSICAL KEYBOARD $29.95	Sight & Sound Music Software, Inc. 3200 S. 166th St. New Berlin, WI 53151 (800) 558-0910	24-key plastic keyboard. Half-size keys.† Fits over existing computer keyboard. *Incredible Musical Keyboard* software and two music books included.*	Commodore 64	Easy	*Music Processor** *Music Video Kit** *3001 Sound Odyssey** *Kawasaki Rhythm Rocker** *Kawasaki Synthesizer** *Allegro**
MELODIAN KEYBOARD $99 (Keyboard) $169 (Keyboard and Software)	Melodian, Inc. 115 Broadway No. 1202 New York, NY 10006 (212) 757-2287	40-key plastic keyboard. Full-size keys.† Comes with interfaces to plug into joystick and user ports. *Concert Master, Rhythm Master* software included.*	Commodore 64	Easy	*Concert Master** *Rhythm Master**
MOCKINGBOARD C $179	Sweet Micro Systems, Inc. 50 Freeway Drive Cranston, RI 02920 (401) 461-0530 or (800) 341-8001	Stereo music and voice synthesizer card. Plugs into internal slot. Includes RCA interface cables for stereo hookup. Demonstration disk and text-to-speech algorithm included.	Apple II/II plus/IIe, 48K	Difficult	*Speech Development System** *Developer's ToolKit** *Music Construction Set*
THE MUSIC CARD MC1 $75	ALF Products 1315 F Nelson St. Denver, CO 80215 (800) 321-4668	Internal nine-voice music synthesizer. Comes with software that lets Apple users enter musical compositions on disk. Songs can be played back through stereo system.	Apple II/II plus/IIe, 48K. Joystick optional	Easy	
MUSICMATE KEYBOARD $99	Sequential Circuits 3051 N. First St. San Jose, CA 95134 (408) 946-5240	32-key plastic keyboard. Full-size keys.† Plugs into joystick port. One program included.*	Commodore 64	Easy	*Song Builder** *Song Editor** *Song Printer** *Sound Maker** *Add Mus'In** *Studio 64**
MUSIC PORT KEYBOARD $119.95	Tech-Sketch Inc. 26 Just Road Fairfield, NJ 07006 (800) 526-2514	32-key plastic keyboard. Full-size keys.† Plugs into user port. *Light Pen Music Composer and Printer Dump* program included.*	Commodore 64	Average	
ORCHESTRA-90 $79.95	Radio Shack/Tandy Corp. 1800 One Tandy Center Fort Worth, TX 76102 (817) 338-2395	Stereo music synthesizer module with percussion. Plugs into I/O bus connector. Requires stereo hookup. *Orchestra-90* software (cassette) included.*	TRS-80 Models III/4, cassette player	Average	
SOUNDCHASER 64 KEYBOARD $100	Passport Designs 625 Miramontes St., No. 103 Half Moon Bay, CA 94019 (415) 726-0280	49-key plastic keyboard. Full-size keys.† Interface to plug into game port and jacks for stereo hookup included. *Monophonic* and *Polyphonic* software included.*	Commodore 64	Average	May work with *MacMusic**
SOUNDMASTER II $49.95	Kearsarge Industries 12310 Pinecrest Road Reston, VA 22091 (703) 620-5760	Internal board enables Apples to produce arcade and some music sounds. Requires stereo hookup.	Apple II/II plus/IIe, 48K	Easy	
YAMAHA KEYBOARDS $100 (YK-01) $200 (YK-10)	Yamaha International Corp. P.O. Box 6600 Buena Park, CA 90620 (714) 522-9011	YK-10 keyboard has 49 full-size keys; the YK-01, 48 half-size keys.† They plug into the CX5M.	CX5M Music Computer	Difficult	*FM Voicing Program** *FM Music Composer** *FM Music Macro**

*Software highlighted on chart, pages 34–37. †Key size based on piano keys. All software on disk, unless otherwise noted.

HANDS-ON REVIEW:

ATARI 130XE

SOME CALL IT OLD FAITHFUL

BY JOE GELMAN

The most amazing thing about the new Atari 130XE is how little it's changed from the Atari 800, which was released in 1979. The second most amazing thing is that it's still a good computer and—for $149 or less—a great buy.

The original 800 was ahead of its time in many ways, and its special sound and graphics features still rival those of computers costing much more. Its successor, the 800XL—a slimmed down version of the 800 with the BASIC language built-in, was not much different. That was when Atari was owned by Warner Communications. The 130XE is a product of the "new" Atari, owned by ex-Commodore pilot Jack Tramiel.

The Atari 130XE is compatible with the 600XL and 800XL, as well as with most of the hardware and software designed for the original 800. Some bugs in Atari BASIC have been fixed, and an additional 64K of memory (for a total of 128K RAM) has been included. However, very little software takes advantage of the extra memory.

The keyboard's quality and feel have improved, and the four function keys (which help make programs easier to use) have been located above, rather than beside, the keyboard. The built-in graphics characters now appear on the front of the keys, obviously a carryover from the Commodore 64.

GAMES—AND MUCH MORE

Atari's early leadership in the video game market actually hurt its computers' reputation. The name "Atari" instantly conjured up images of *Pac-Man* and *Donkey Kong*. Overlooked by many people was the fact that Apple, Commodore, and IBM computers were playing those same games, while handling more-serious tasks as well. And yes, the Atari computer is capable of word processing, spreadsheeting, telecommunications, and helping at tax time.

Although 80-column displays have long been available for the old Atari 800 (through third-party suppliers), most Atari owners stick with the standard 40-column display. There are a handful of word-processing programs that support 80-column displays on the Atari. *Letter Perfect* by LJK Inc., is one example; Batteries Included has an 80-column attachment in the works that will be supported by its *Paper Clip* word processor.

EASY SETUP

The Atari 130XE is an excellent computer for the home because it's so easy to set up. It can be connected to any TV set, or to a computer monitor, if you prefer. Packed with the 130XE is a good, 132-page guide to setting up the computer, and a BASIC language tutorial for beginners. If you purchase game or educational software on cartridge, there's no need for a cassette recorder or disk drive, so you can have a functioning system for less than $150. But be aware that any serious use of the computer (word processing, spreadsheets, keeping financial records) does require a disk drive.

Another strong point of the Atari line has been reliability. Most of the original 800s have operated for years without failing. The 130XE is well made and should maintain that good record.

What's inside? The 130XE uses the 6502 CPU (central-processing unit), the same "brain" in Apple II series and Commodore computers. But it's the three special custom chips (ANTIC, GTIA, and POKEY) that give the Atari its unique personality. A fourth chip (nicknamed "FREDDY") has been added to the 130XE to manage the additional 64K of RAM.

Graphics. The ANTIC and GTIA chips are responsible for Atari's unique graphics. There are 16 different modes (11 graphics and 5 text) and 256 colors, although not all colors and modes can be displayed at the same time without special programming. With some imagination and clever programming, you can mix many of these modes on-screen to create amazing graphics displays not possible on other computers. And the power of Atari's graphics is certainly not limited to games. Programs such as *SynCalc* use Atari's graphics capability to highlight "windows" of information.

Sprites. Another graphics feature controlled by ANTIC is players and missiles. Players and missiles (also called "sprites") are images that can be moved anywhere on the screen without disturbing other images. The enemy ships and photon torpedoes of the classic Atari game *Star Raider* are players. (*See Doctor Kursor's Klinic and the* PGraph! *program in the July issue for more on players and missiles.*)

Sound. The POKEY chip handles Atari's four-voice sound (as well as a number of other tasks). Music programs such as *Music Construction Set* (Electronic Arts) and *Bank Street Music Writer* (Mindscape) make creating your own scores a pleasure. Atari BASIC includes a versatile

Contributing Technical Editor JOE GELMAN *wrote the Buyer's Guide to Computers for the June issue. He can be found this August taking the waters at Saratoga Springs, New York.*

SOUND command, so adding music and special effects to your own programs is convenient.

BASIC. The built-in BASIC language has a number of useful features. The full-screen editor makes correcting mistakes and duplicating lines a simple matter. Syntax errors are reported as soon as you press RETURN. The line with the error is displayed with a cursor highlighting the most likely mistake—a big help for beginners. Most computers, including those from Apple, IBM, and Radio Shack, only report syntax errors when you actually RUN the program, and don't offer any assistance in locating the mistake. On the 130XE you don't have to retype the whole line to make a correction—just move the cursor over the mistake, fix it, and press RETURN.

Another time-saving feature of the BASIC is that it allows you to use abbreviations when programming. For example, the command SETCOLOR 0,12,6 can be typed as SE.0,12,6. BASIC will expand the SE. to its full spelling for you. Blank spaces are added and removed as needed, creating readable listings from even the sloppiest typing.

Atari BASIC has some drawbacks: It's not directly compatible with most programs written in a version of Microsoft BASIC (Apple, IBM, Commodore, and TRS-80). You can convert many programs to run in Atari BASIC, but it requires additional programming effort. Unfortunately, error messages are reported as numeric codes, rather than in English. A "file not found" error is displayed as ERROR-170. You'll want to keep the manual and its list of error codes and their meanings nearby!

Actually, most of the problems of Atari BASIC are easily cured by substituting one of the many alternative languages. A version of Microsoft BASIC on cartridge is available. For the ambitious, Optimized Systems Software's BASIC XL is an excellent upgrade for Atari BASIC. It's compatible with the built-in BASIC, while adding many commands that make conversions from Microsoft BASIC easy.

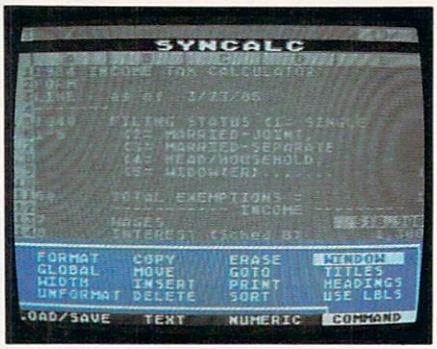
There's no shortage of other languages for the Atari. Logo, FORTH, Pascal, C, ACTION! (an excellent product from OSS), and assemblers are available. Dozens of books for the beginning and expert Atari owner can be found at major booksellers.

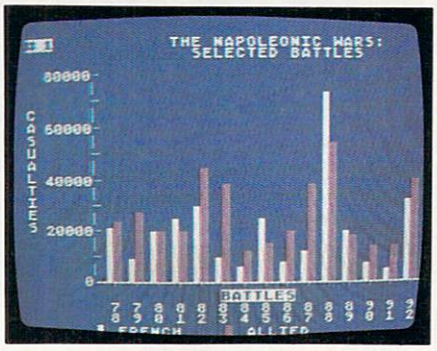
USING THE EXTRA 64K

The 130XE's extra memory is supported by a new disk-operating system, DOS 2.5. You'll receive DOS 2.5 with the purchase of the Atari 1050 disk drive. Current owners can obtain it free from registered Atari user groups or download it from CompuServe's Atari Forum (PCS-132).

DOS 2.5 is designed to use the additional 64K of memory as a "RAM disk." (*See Dr. Kursor's Klinic, June issue.*) That means you can load a program or file into RAM, and access it more quickly than if it were in a disk drive. For programs or applications that access the disk frequently, the speed of the RAM disk can be a real timesaver.

The problem is, only unprotected programs, such as *AtariWriter* or your own programs, which allow you to install the new DOS 2.5, can be used with a RAM disk. Most 130XE owners will want ready-made commercial programs to take advantage of the extra 64K.





As these shots from *SynCalc* (Synapse) and *BGraph* (Batteries Included) show, Atari's graphics can be used for more than games.

ATARI 130XE FACTS

SUGGESTED LIST PRICE: $149
MEMORY: 128K RAM; 24K ROM
STANDARD TEXT MODE: 40 columns × 24 rows
VIDEO OUTPUT: TV or monitor
GRAPHIC MODES: 11
TEXT MODES: 5
COLORS: 256
HIGHEST GRAPHICS RESOLUTION: 320 × 192
SOUND: 4 voices
KEYBOARD: 62 keys; four function keys
FEATURES: Built-in Atari BASIC with full-screen editor; two joystick/paddle ports; cartridge port; cartridge expansion port

If demand is great enough, no doubt existing programs will be upgraded to use the extra memory for special features such as larger word-processing files. Right now, the extra memory is a *mirage*.

PERIPHERALS/SOFTWARE

Since the Atari's been around so long, and the 130XE is compatible with past models, there's plenty of peripheral equipment and software to be had. The Atari 1050 disk drive (about $150), which will give you the ability to save your programs and access the much wider variety of disk-based software, is the first upgrade a new owner should consider.

Once done, there's a good selection of both game and applications software available. If you're writing, filing, charting, or number-crunching, sooner or later you'll also need a printer to get your work onto paper. Most third-party printers require the purchase of an Atari 850 interface or a special Atari printer interface (such as the Ape-Face, $79). Some printers, like the Epson HomeWriter and the Okimate 10 color printer, are sold with a special Atari interface.

Modems, light pens, and touch tablets are also available for the 130XE. Again, most third-party modems require special interfaces/cables; the Atari 1030 modem plugs right in and works with a wide range of communications software.

FACING THE FUTURE

Atari is a rocky company right now. Its long-term profitability (and survival) probably depends more on the success of its new ST series computers than on the 130XE. Even Atari Chairman Tramiel concedes that sales of 8-bit computers are slumping. All along the line, computer companies are focusing efforts on new 16- or 32-bit computers, such as the Atari ST, Apple Macintosh, IBM PC AT, Tandy 1000, Commodore Amiga, etc.

So why consider the 130XE?

At $149 or less, the 130XE is a solid value. With a disk drive, the system costs around $300. Compare this with other new computer systems, which cost $800 and up. There's enough software available for the 130XE right now in stores and through mail order to satisfy the most voracious computerist. If the software you want and need is available *now*, don't worry about whether Atari Corp. survives the next year or not. The 130XE will provide a solid base for word processing and entertainment for years to come.

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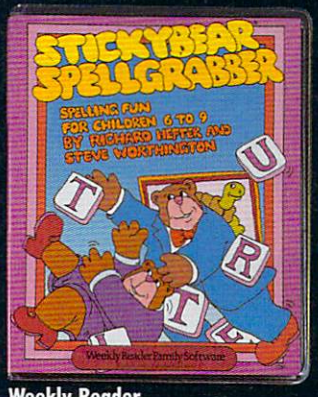

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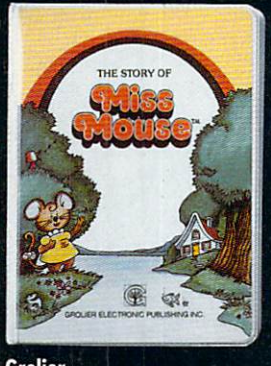

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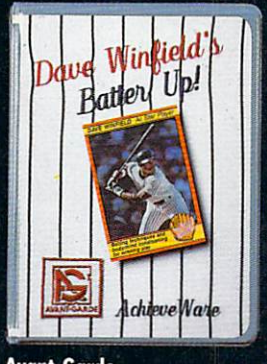

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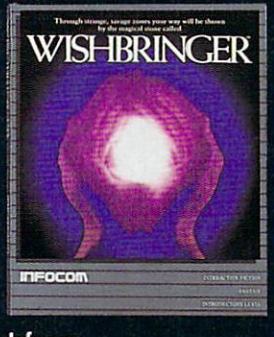

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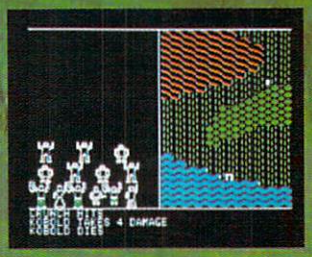
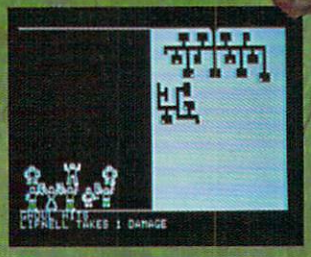


The wave of deadly monsters continues as dwarfish Kobolds threaten your party.



One of your comrades is injured by Ghouls during a search of the dungeons.

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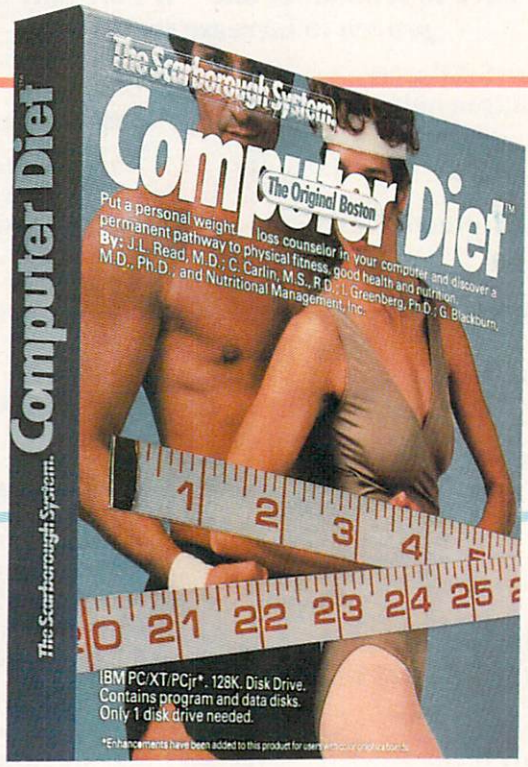

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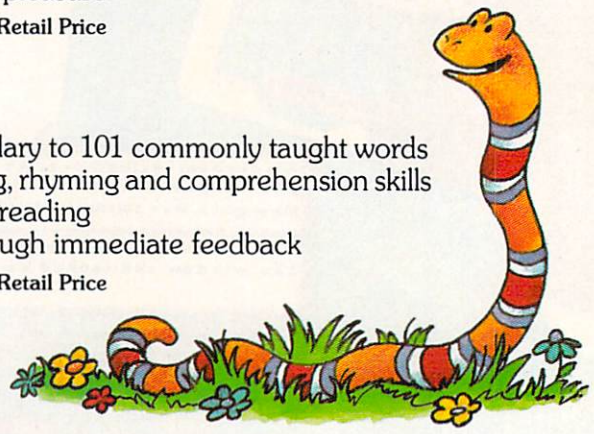

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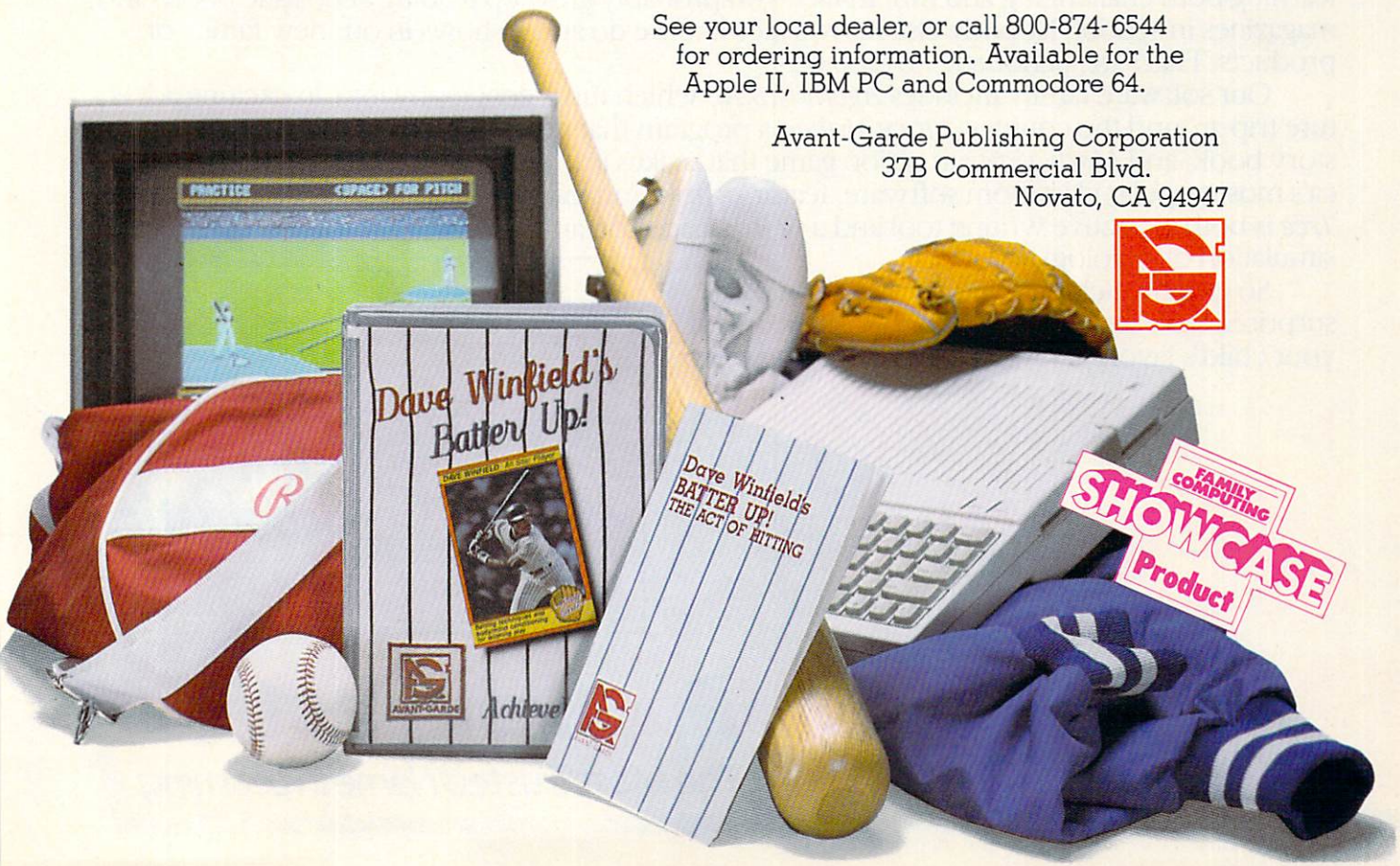

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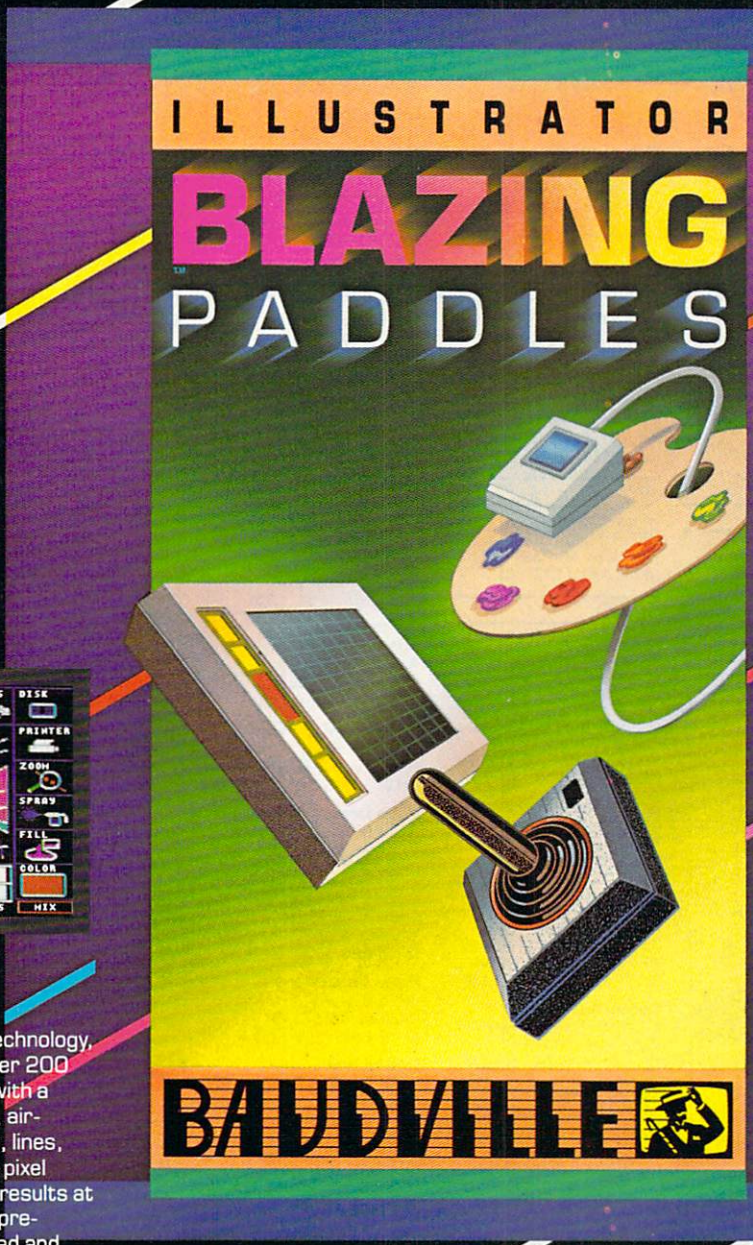

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Computer Link
2850 Iris
Boulder, CO 80302
(303) 444-7300 (4)

DELAWARE

Products Plus Inc.
209 W. Division St.
Dover, DE 19901
(302) 734-1519 (1,3,4)

FLORIDA

Computer Center
7143-D N. 9th Ave., Between Olive Road & Creighton
Pensacola, FL 32504
(904) 478-6558 (4)

Education Computers Etc.
1651 N. Monroe
Tallahassee, FL 32303
(904) 681-0786 (1)

MicroAge Computer Stores
1681 Forum Place
West Palm Beach, FL 33401
(305) 683-5779 (1,2)

Best Software Service
1011 Chokecherry Drive
Winter Springs, FL 32708
(305) 695-4003 (1,2,3,4)

Family Computer Center
1711 N. Pine St.
Ocala, FL 32670
(904) 622-9090 (4)

Sunshine Discount Software
956 N.E. 62 St.
Ft. Lauderdale, FL 33334
(305) 493-5047 (1,2,3,4)

SEB Computer
1705 University Blvd. N.
Jacksonville, FL 32211
(904) 743-7050 (1,2)

Computer Scene
1641 NE 163rd St.
North Miami Beach, FL 33162
(305) 945-1014 (1,2)

DataBase
8962 State Road #84
Davie, FL 33324
(305) 474-3355 (1,3)

Entre Computer Center
1301 Beville Road
Daytona Beach, FL 32019
(904) 756-1230 (3)

Software Forum
2305 Ponce de Leon Blvd.
Coral Gables, FL 33134
(305) 441-2116 (1)

Heathkit
8262 Arlington
Jacksonville, FL 32211
(904) 725-4554 (3)

GEORGIA

Software City
5500 Abercorn St.
Savannah, GA 31405
(912) 352-7638 (1,4)

Cardinal Computers
903 N. Glenwood Ave.
Dalton, GA 30720
(404) 226-0502 (4)

Software City
2483 Airport Thruway
Columbus, GA 31904
(404) 327-9578 (1)

Future Systems
2525 Washington Road
Augusta, GA 30904
(404) 737-8313 (1,2,3)

Software Forum
125 Peachtree St.
Atlanta, GA 30303
(404) 584-9833 (1,2)

HAWAII

Software Library
805 Pohukaina St.
Honolulu, HI 96813
(808) 533-1123 (2)

IDAHO

Software Galeria
1850 East 17th St.
Idaho Falls, ID 83401
(208) 524-0891 (2)

ET Computer Institute
Pocatello Mall
Pocatello, ID 83201
(208) 232-2900 (1)

Software Center Northwest
1020 Main St.
Boise, ID 83702
(208) 336-4242 (2,3)

ILLINOIS

Software City
2304 Rano Road
Arlington Hts, IL 60004
(312) 259-4260 (1,2,3,4)

Computer Tree
1022 W. Lincoln Hwy.
DeKalb, IL 60115
(815) 758-8666 (1,2,3,4)

High Tech Systems
1301 N. Richmond Road, Suite A
McHenry, IL 60050
(815) 344-1288 (3,4)

Softwaire Centre
8219 Golf Road
Niles, IL 60648
(312) 965-9044 (1,2,3,4)

Disk 'N' Tech
15148 S. Lagrange Road
Orland Park, IL 60462
(312) 460-1060 (1)

A Byte-Better
1313 Fifth Ave.
Rockford, IL 61108
(815) 964-1545 (1,3,4)

Cinarco-Elliott Computer Center
2200 36th Ave.
Moline, IL 61265
(309) 797-0137 (1,2)

INDIANA

Harbourtown Sales
21 Harbour Town Shoppes
Noblesville, IN 46060
(317) 877-4900 (1)

Software City
6502 Grape Road
Mishawaka, IN 46545
(219) 272-9709 (1,2,3,4)

Software Galeria
9431 N. Meridian St.
Indianapolis, IN 46260
(317) 843-9815 (1,3)

Computer Corner
6722 E. State Blvd.
Fort Wayne, IN 80690
(219) 493-6505 (4)

IOWA

Iowa Book/Supply Co.
8 S. Clinton
Iowa City, IA 52240
(319) 337-4188 (4)

Cinarco Elliott Audio Visual & Computer Center
234 West Third
Davenport, IA 52801
(319) 324-0639 (1,2)

Cosmos Computers
1721 Grant St.
Bettendorf, IA 52722
(319) 355-2641 (4)

KANSAS

Hitec Computer Center
1210 S. Rock Road
Wichita, KS 67207
(316) 685-1131 (1,2)

Computer Centre
136 & Mur-Len
348, POB 4000
Olathe, KS 66062
(913) 829-3110 (3)

Software Centre/Leawood
3732 W. 95th
Leawood, KS 66206
(913) 341-6711 (1,2,4)

Wichita Software Center
2120 N. Woodlawn
Wichita, KS 67208
(316) 683-5211 (1,2,4)

Computer Trend
1038 S. Oliver
Wichita, KS 67202
(316) 686-5100 (1,2)

Majestic Electronics
3995 E. Harry
Wichita, KS 67218
(316) 682-7559 (1,3,4)

Computer Trend
9930 College Blvd.
Overland Park, KS 66210
(913) 451-8151 (1,2)

The Bottom Line Computers Inc.
800 N. 7 Highway
Blue Springs, KS 64015
(816) 228-1800 (1,2)

The Bottom Line Computers Inc.
316 S. 291 Hwy.
Liberty, KS 64068
(816) 792-1500 (1,2)

The Bottom Line Computers Inc.
1948 S. 291 Hwy.
Olathe, KS 66062
(913) 829-1600 (1,2)

KENTUCKY

Lexington Computer Store
2909 Richmond Road
Lexington, KY 40509
(606) 268-1431 (1,2)

LOUISIANA

Software Mart, Inc.
3300 W. Esplanade Ave. N.
Metairie, LA 70002
(504) 836-2198 (1,3,4)

Software Solutions
Bon Marche Mall
Baton Rouge, LA 70806
(504) 928-2613 (1,2,3,4)

Computer Shoppe, Inc.
3828 Veterans Blvd.
Metairie, LA 70002
(504) 454-6600 (1,2)

MAINE

Home Port Computers
129 Main St.
Waterville, ME 04901
(207) 873-2192 (1,2)

Pierre's Electronics
50 Exchange Street
Portland, ME 04101
(207) 772-8017 (1,2,3,4)

MASSACHUSETTS

Computers Etc.
216 Newbury St.
Peabody, MA 01960
(617) 535-5252 (1,2)

Personal Computer Resources, Inc.
45 Pond St.
Norwell, MA 02061
(617) 871-5396 (1,2)

Counter Intelligence
33 Beach St.
Manchester, MA 01944
(617) 526-1517 (2)

Computer Concepts Home Centre
Store 47A Hanover Mall
Hanover, MA 02339
(617) 826-6842 (1,3,4)

General Computer Stores
Hamilton Plaza West
680 Worcester Road (Rt 9)
Framingham, MA 01701
(617) 872-2084 (1,2,3)

American Data Center
159 Elliott St.
Danvers, MA 01923
(617) 777-5992 (3)

Tech Computer Store, Inc.
19 Alewife Brook Pkwy.
Cambridge, MA 02140
(617) 497-0395 (1,2)

Arel Computer Products
1 Washington St.
Taunton, MA 02780
(617) 824-4254 (1,4)

Instant Software
427 Great Road
Acton, MA 01720
(617) 263-0418 (2,4)

Instant Software
355 Boylston St.
Boston, MA 02116
(617) 353-1582 (2)

Computer Magic Of Waltham
795 Main St.
Waltham, MA 02154
(617) 893-3626 (3,4)

Instant Software
170 Worcester Road
Wellesley, MA 02181
(617) 235-6652 (1,3)

MARYLAND

Rockville Sales
Silver Spring, MD 20906
(301) 946-1564 (1,2,3,4)

The Program Store
White Flint Mall, 11301
Rockville Pike
Kensington, MD 20895
(301) 984-1233 (1,2,4)

MICHIGAN

The Software Shop
4977 Livernoiz
Troy, MI 48098
(313) 524-1581 (2)

Software City
3971 17 Mile Road
Sterling Heights, MI 48078
(313) 978-3701 (1)

The Other Computer Store
214 W. Savidge St.
Spring Lake, MI 49456
(616) 842-1891 (1,2)

Strom Discount Computer
42189 Ann Arbor Road
Plymouth, MI 48170
(313) 455-8022 (1,2,3,4)

Advanced Management Systems
2838 Henry St.
Muskegon, MI 49441
(616) 739-3395 (1,2)

Advanced Management Systems
1016 S. Washington Ave.
Holland, MI 49423
(616) 396-6821 (1,2)

Software Carousel
4270 Plainfield N.E.
Grand Rapids, MI 49505
(616) 361-1381 (1,2,3,4)

The Commodore Connection Ltd.
1013 N. Johnson St.
Bay City, MI 48708
(517) 892-8115 (4)

Computers Plus a Div. of the Olsen Anderson Co.
106 S. McLellan St.
Bay City, MI 48706
(517) 893-9568 (1,2)

MINNESOTA

Bytech Corp.
1408 Northland Drive
Mendota Heights, MN 55120
(612) 452-5897 (1,2,3,4)

Team Electronics
Central Square Mall
Grand Rapids, MN 55744
(218) 326-6684 (1,2)

MISSISSIPPI

Computerland
4611 8th St.
Meridian, MS 39305
(601) 482-8523 (1,2,3,4)

MISSOURI

The Computer Junction, Inc.
852 Country Corners
Washington, MO 63011
(314) 239-7544 (3,4)

Softwaire Centre
12035 Dorsett
St. Louis, MO 63043
(314) 739-8989 (1,2,4)

Lifestyle Computers
1370 Clarkson, Clayton Center
Ellisville, MO 63011
(314) 227-5577 (2)

Softwaire Centre International
7748 Forsyth Blvd.
Clayton, MO 63105
(314) 863-7611 (1,2,3,4)

Softworks
1739 Clarkson Road
Chesterfield, MO 63017
(314) 532-6002 (1,2,3,4)

Softwaire Centre/Independence
3801 S. Noland Road
Independence, MO 64055
(816) 461-3838 (1,2,4)

MONTANA

Computer People
2304 West Main
Bozeman, MT 59715
(406) 587-9544 (2)

NORTH CAROLINA

Digitz
3015 Hillsborough St.
Raleigh, NC 27607
(919) 828-5227 (3)

The Computer Store
4344 Fayetteville Road
Lumberton, NC 28358
(919) 738-3755 (1,4)

The Computer Workshop
1483-A Akers Center
Gastonia, NC 28054
(704) 861-9030 (1,2)

continued

The Programmer

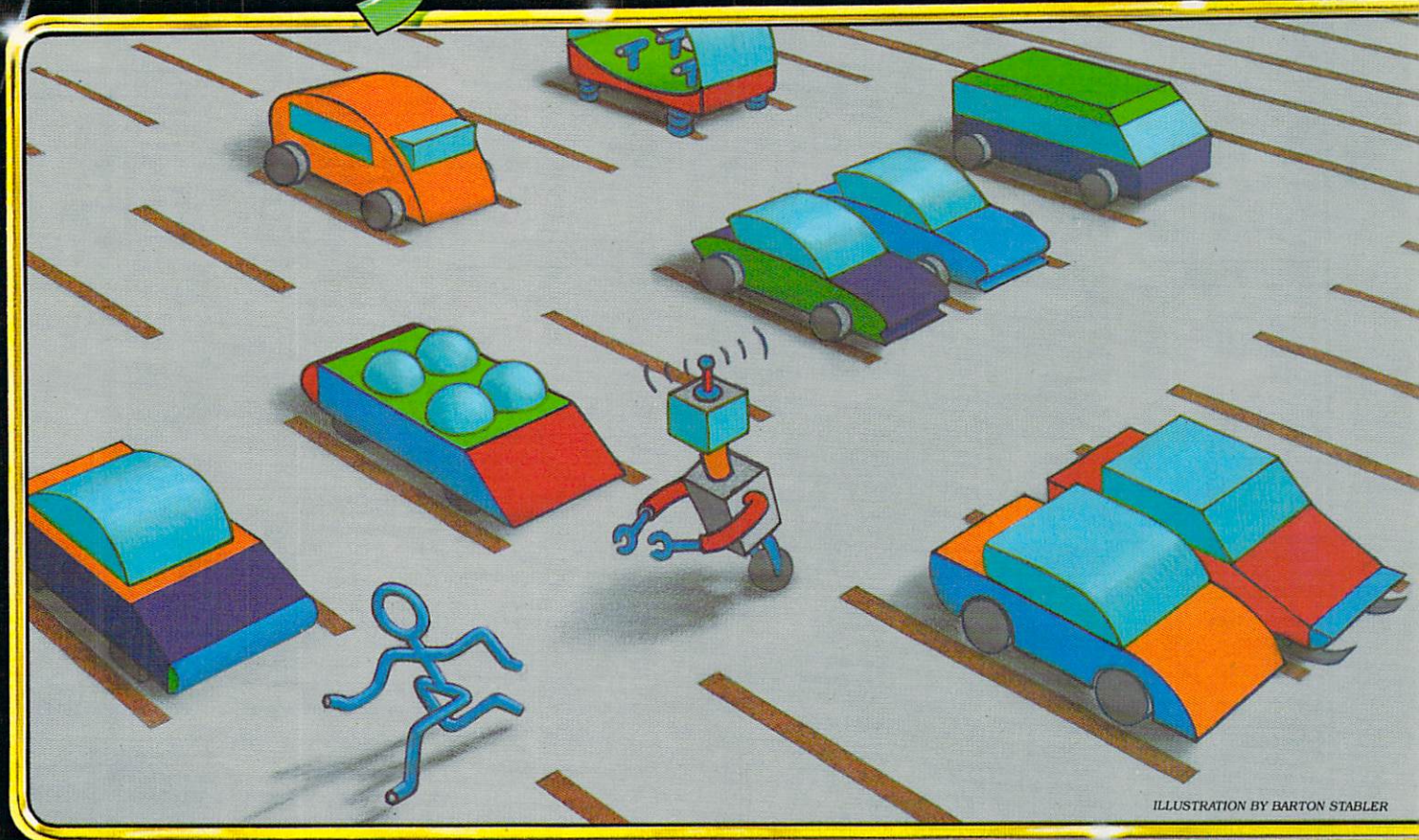

ILLUSTRATION BY BARTON STABLER

AUGUST

TIPS TO THE TYPIST
Page 53

Helpful hints on how to type in programs, and what to do if a program doesn't work.

BEGINNER PROGRAM
Page 54

Boogie down with *Jitterman*—and learn something about computer animation!

ARCADE GAME
Page 57

Just when you thought it was safe to go back in the parking lot—it's *Renegade Robot II*!

FEATURE PROGRAM
Page 61

Apple and Commodore 64 owners can get organized with *Home Information Manager*, an easy-to-use, data-base program.

PROGRAMMING P.S. Page 61 Corrections to previous months' programs and to a "Helpful Hint."

ILLUSTRATION BY JIM CHERRY III

FAMILY COMPUTING SHOWCASE Dealer

Software Express
140 Brevard Court
Charlotte, NC 28202
(704) 372-9087 (2,3)

NORTH DAKOTA

ComputerLand of Fargo
3217 13th Ave. S.
Fargo, ND 58103
(701) 237-3069 (1,2,3)

Ultra Inc.
408 E. Broadway
Bismarck, ND 58502
(701) 258-2546 (1,4)

NEBRASKA

Computer West
4525 S. 134th
Omaha, NE 68137
(402) 330-6110 (1,2)

Computer Trend
8411 W. Center
Omaha, NE 68124
(402) 392-0208 (1,2)

Software Source
8610 Cass. St.
Omaha, NE 68114
(402) 397-4958 (1,2,3)

NEW HAMPSHIRE

Instant Software
35B Lowell Road
Hudson, NH 03051
(603) 883-8080 (1,2)

Instant Software
82 Main St.
Keene, NH 03431
(603) 352-3736 (4)

Instant Software
Nashua Mall
Nashua, NH 03060
(603) 889-0084 (2,4)

Entre Computer Center
1981 Woodbury Ave.
Portsmouth, NH 03801
(603) 431-2400 (3)

Entre Computer Center
Melody Mall, S. Willow St.
Manchester, NH 03103
(603) 624-0300 (3)

NEW JERSEY

Softwaire Centre
90 Route 22 West
Springfield, NJ 07081
(201) 379-4434 (1,3)

Family Computer Center
154 Valley St.
South Orange, NJ 07079
(201) 762-6661 (1)

The Program Store
1344 Willowbrook Mall
Wayne, NJ 07470
(201) 785-2165 (1,2,3,4)

Software City
161 Cedar Lane
Teaneck, NJ 07666
(201) 692-8318 (1,2,3,4)

Software City
553 Bergen Blvd.
Ridgefield, NJ 07657
(201) 943-8951 (1,2,3,4)

Software City
80 Broad St.
Redbank, NJ 07701
(201) 747-6490 (1,2,3,4)

Computer Encounter
1225 State Hwy. 206
Princeton, NJ 08540
(609) 924-8757 (1,2)

Software City
200 Wanaque Ave.
Pompton Lakes, NJ 07442
(201) 831-1004 (1,3,4)

Computer Run
11 N. Broadway
Pitman, NJ 08071
(201) 589-4444 (1,3,4)

Software Galeria
440 Rte 46 West
Parsippany, NJ 07054
(201) 882-9797 (1)

Software City
85 Godwin Ave.
Midland Park, NJ 07432
(201) 447-9794 (1,2,3,4)

AA Educational Software
85 W. Madison Ave.
Dumont, NJ 07628
(201) 825-8136 (1)

Livingston Computers, Inc.
508 S. Livingston Ave.
Livingston, NJ 07039
(201) 994-1148 (1,3)

Software City
3100 Quakerbridge Road
Hamilton, NJ 08619
(609) 890-1066 (1,3,4)

Family Computer Center
636 Rte 46, American Way Outlet Mall
Fairfield, NJ 07006
(201) 882-8370 (4)

The MDI Computer Store
325 Route 9
Englishtown, NJ 07726
(201) 462-4600 (1)

Software Station
6 Littell Road
E. Hanover, NJ 07836
(201) 428-9711 (1,2,3,4)

Village Computer Software Center Inc.
Morris County Mall
Cedar Knolls, NJ 07927
(201) 540-0505 (1)

Software City
106 North Washington
Bergenfield, NJ 07621
(201) 387-8388 (1,2,3,4)

Software Station
6 Littel Road
E. Hanover, NJ 07736
(201) 428-9711 (1,2,3,4)

NEW MEXICO

Academy Computer
1720 Juantabo Blvd.
Albuquerque, NM 87019
(505) 296-4886 (4)

Software Center
7618 Menaul Blvd.
Albuquerque, NM 87110
(505) 292-7848 (1,3)

Team Electronics
1522 Mesilla Valley Mall
Las Cruces, NM 88001
(505) 522-9767 (1,2)

NEW YORK

LBC Software
401 Tarrytown Road
White Plains, NY 10607
(914) 682-7460 (1)

Computer Factory Outlet
1048 Union Road
West Seneca, NY 14224
(716) 674-7200 (1,4)

Software City
2848 Erie Blvd. E.
Syracuse, NY 13224
(315) 445-2577 (4)

Software City
288 N. Main St.
Spring Valley, NY 10977
(914) 352-3444 (1,3,4)

The Computer Information Center
1851 Ridge Road E.
Rochester, NY 14622
(716) 467-2270 (1,3)

AML Supplies Division
71-38 Myrtle Ave.
Queens, NY 11385
(718) 326-1110 (4)

Adirondack Computer Supply
496 Cornelia St.
Plattsburgh, NY 12901
(518) 562-0659 (1,4)

Software City
641 North Broadway
North White Plains, NY 10603
(914) 946-1800 (1)

Software City
187 Main St.
Mt. Kisco, NY 10549
(914) 666-6036 (1,2,3,4)

Computer Resource
7 Washington Ave.
Endicott, NY 13760
(607) 757-0442 (3)

Software Center
114-47 Queens Blvd.
Forest Hills, NY 11375
(718) 793-8112 (1,2,3,4)

Micro Images Industries, Inc.
164-06 Cocheron Ave.
Flushing, NY 11358
(718) 445-7124 (1,3,4)

Anudata Inc.
Plaza 9
RRI Box 46, Rt 9 N.
Fishkill, NY 12590
(914) 896-5777 (3)

Sysut Computers
2505 Ave. U
Brooklyn, NY 11229
(718) 743-8303 (4)

Computer Assisted Learning Inc.
1406 Fulton Street
Brooklyn, NY 11216
(718) 638-4379 (1,2,3,4)

NEVADA

Century 23
4530 Meadows Lane
Las Vegas, NV 89107
(702) 870-1534 (1,2)

OHIO

Software City
584 Miamiburg
Centerville Road
Centerville, OH 45459
(513) 439-1237 (1,2,3,4)

A.D.S. Systems Inc.
1306 Brandywine Blvd.
Zanesville, OH 43701
(614) 454-6853 (1,2)

Soft City
813 Boardman Poland Road
Youngstown, OH 44512
(216) 758-6687 (3)

Personal Computer Co.
7178 West Blvd.
Youngstown, OH 44512
(216) 758-6607 (1,2)

Basic Computer Systems
942 Grady's Plaze
Niles, OH 44446
(412) 342-5505 (4)

Marion Computer Center, Inc.
1205 Delaware Ave.
Marion, OH 43302
(614) 382-2881 (3)

Software Galeria
28809 Chagrin Blvd.
Cleveland, OH 44122
(216) 464-7757 (1,2,3,4)

Earthrise Micro Systems
1731 Brice Rd.
Columbus, OH 43068
(614) 363-1100 (3,4)

Software Shuttle
90 Patterson Road
Dayton, OH 45419
(513) 293-2594 (1,2,3,4)

The Program Store
829 Bethel Road
Columbus, OH 43214
(614) 457-1153 (1,2,3,4)

The Program Store
4442 Cross Roads E.
Columbus, OH 43232
(614) 863-0051 (1,4)

Softwiry City
5890 Mayfield Road
Cleveland, OH 44124
(216) 473-8124 (3)

Softwaire Centre Int'l
43 E. 6th St.
Cincinnati, OH 45202
(513) 721-4455 (1,2,3,4)

Software Centre of Canton
4037 Hills & Dales Road
Canton, OH 44708
(216) 492-9163 (1,3)

Beg Bytes
1301 Boardman-Poland Road
Poland, OH 44514
(216) 758-0009 (1,2,3)

OKLAHOMA

Video-Comp
1030 N.W. 38th St.
Lawton, OK 73502
(405) 355-9798 (1,2,4)

Computer Associates
2301 West Main St.
Norman, OK 73069
(405) 360-6818 (2)

OREGON

Learning Services
2677 Willakenzie, Suite 5
Eugene, OR 97401
(503) 683-3827 (3)

Softwaire Centre
11386 Beaverton-Hillsdale Hwy.
Beaverton, OR 97005
(503) 626-8696 (3)

PENNSYLVANIA

Pittsburgh Computer Store
612 Smithfield St.
Pittsburgh, PA 15222
(412) 391-8050 (1,2)

Morgan's Computer & Education Center
535 Clairton Blvd.
Pittsburgh, PA 15236
(412) 653-6150 (1,2)

Summit Computer Center
6 East Willow Grove
Philadelphia, PA 19118
(215) 247-3660 (1)

Some Hole in the Wall
6394 Castor Ave.
Philadelphia, PA 19149
(215) 533-1211 (1,4)

Softwaire Center Int'l
Lancaster & Plank Ave.
Paoli, PA 19301
(215) 647-8616 (1,2,3)

Software City
55 E. Germantown Road
Norristown, PA 19401
(215) 277-6050 (3)

Basic Computer Systems
Lawrence Village Plaza
New Castle, PA 16101
(412) 342-5505 (4)

Nationwide Computer Products
1380 S. Pennsylvania Ave.
Morrisville, PA 19067
(215) 295-0055 (1)

The Floppy Disk
Windsor Park Shopping Center
5224 Simpson Ferry Road
Mechanicsburg, PA 17055
(717) 697-6813 (4)

EastCoast Software
49 Derrytown Mall
Hershey, PA 17033
(717) 533-8125 (1,2,3,4)

Basic Computer Systems
2473 E. State St.
Hermitage, PA 16148
(412) 342-5505 (4)

Software City Discount
108 Lincoln Hwy.
Fairless Hills, PA 19030
(215) 943-4544 (1,2,3)

AB Computers
252 Bethelem Pike
Colmar, PA 18915
(215) 822-7727 (1,2,4)

The Computer Source
546 Penn Ave.
W. Reading, PA 19611
(215) 375-4231 (1,2)

Software Galeria
Devon Square Shopping Center
700 W. Lancaster Ave.
Wayne, PA 19087
(215) 687-1590 (1,2,3,4)

Quinn Computer Supply
506 Broadway
Scranton, PA 18505
(717) 347-6050 (1,3,4)

Software Unlimited
934 Woodbourne Road
Revittown, PA 19056
(215) 949-0400 (1,2,3,4)

Pittsburgh Computer Store
47 Clairton Blvd.
Pleasant Hills, PA 15236
(412) 655-8220 (1,2,3)

RHODE ISLAND

Microlimits
10 Cedar Swamp Road
Smithfield, RI 02917
(401) 231-3252 (1,4)

SOUTH CAROLINA

Horizon-Commodore Super Store
347 S. Pleasantburg Drive
Greenville, SC 29607
(803) 235-8659 (4)

The Software Hous, Inc.
7565 Rivers Ave.
Charleston, SC 29418
(803) 797-6860 (1,2,3,4)

SOUTH DAKOTA

Ultra Inc.
210 E. Kemp Ave.
Watertown, SD 67502
(605) 882-2239 (1,4)

TENNESSEE

Stewart Software Co.
4646 Poplar Ave.,
Suite 107
Memphis, TN 38117
(901) 767-8914 (1)

TEXAS

Software Ink
4020C Kemp
Wichita Falls, TX 76308
(817) 696-0817 (1,2,3,4)

Tri-Star Computer Centers
401 West Loop 340
Waco, TX 76710
(817) 772-5560 (1,2)

International Automated Systems Inc.
1110 Lincoln St.
Laredo, TX 78040
(512) 724-2030 (4)

The Software Place
6369 Westheimer
Houston, TX 77057
(713) 781-1488 (1,2,3)

Software Galeria
Willowbrook Court
Houston, TX 77068
(713) 580-6922 (1,2,3)

Custom Computer Services
1280 Hawkins Blvd.
El Paso, TX 79925
(915) 594-1176 (3)

Soft Warehouse, Inc.
14580 Beltwood Pkwy. E.,
Suite 190
Dallas, TX 75234
(214) 386-9174 (1,2,3)

Softwaire Centre
5290 Belt Line at Montfort
Dallas, TX 75240
(214) 991-6911 (1,2)

Team Electronics 193
1236 San Jacinto Mall
Baytown, TX 77521
(713) 422-0630 (1,2,3)

Impulse Sound Audio Video Computer
2109 4th St.
Bay City, TX 77414
(409) 244-4075 (1,4)

The Computer Man + Plus + Inc.
109 W. Hornbeck
P.O. Box 670
Fort Stockton, TX 79735
(915) 336-7431 (1,2,4)

VIRGINIA

Software Plus
7598 W. Broad St.
Richmond, VA 23229
(814) 285-2170 (1)

I/O Computer
7558 Virginia Drive
Norfolk, VA 23505
(804) 583-1609 (1,3,4)

Software City
3825-B S. George Mason Drive
Falls Church, VA 22401
(703) 845-9393 (3)

Family Computer Center
1191 Seven Fair Oaks Mall
Fairfax, VA 22033
(703) 385-2758 (1)

Jack Hartman
2840 Peters Creek Road
Roanoke, VA 24019
(703) 362-1891 (1)

Softwaire Centre Inc.
8411 Old Courthouse Road
Vienna, VA 22180
(703) 356-3600 (1,2,3,4)

The Program Store
6201 Arlington Blvd.
Seven Corners Center
Falls Church, VA 22044
(703) 536-5040 (1,2,3,4)

WASHINGTON

Lakeside Computers
1200 Cooper Point Road
Olympia, WA 98502
(206) 786-0909 (1,2,3)

Micro Computer Systems
1512 S.E. Everett Mall Way
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Madison, WI 53719
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TIPS TO THE TYPIST

Typing in FAMILY COMPUTING'S programs is a great way to become familiar with your computer and get some free software "to boot." But it's frustrating to type in a long program only to find it doesn't work as it should. When this happens, simple typing errors are most often the cause. So to help you gain greatest value from the time you spend computing with us, we've put together some tips on how to avoid typing errors—and what to do if a program doesn't run right. Read them carefully and you'll be up and running in no time!

SOME GENERAL RULES

1. Do set up your computer in a well-lighted, comfortable location, and prop the magazine up so that you don't have to strain to read the printed listing.

2. Do read instructions and program headings carefully. Make sure your computer has enough memory, the right version of BASIC, and the appropriate peripherals (joysticks, printers, disk drives, etc.) for a program.

3. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, try typing in shorter programs first. Type in a longer program in easy stages, SAVEing each installment as you go.

4. Until you are fairly familiar with BASIC, **do** assume that every word, number, letter, space, and punctuation mark in a program listing must be copied accurately if the program is to function as intended.

5. Do watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements: long lines filled with numbers or incomprehensible secret codes. If possible, have someone else read DATA to you as you type, and help you proofread it if you have trouble later on. Proofreading from a printout is best.

6. Do be aware that program listings printed in FAMILY COMPUTING sometimes differ from what you will see on your computer's screen or in printouts you produce at home. Our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER until you've checked to see if the program "line" you're typing really ends there. The way to tell is to check if the line following begins with a multiple of 10 that follows in sequence from the previous logical line. REM statements are the exception and typing them in is optional.

Several computers (ADAM, Apple, Atari, and TI) format BASIC programs according to unique rules of their own. Don't let this throw you—just type in the listing exactly as printed in the the magazine and your computer is guaranteed to accept it, even though it may end up looking a little different on your screen.

7. One foolproof way to correct an error in a BASIC program line is to type the line in again from the beginning, and press RETURN or ENTER to set it in place of the old one in your computer's memory.

WHICH PROGRAMS WILL RUN ON MY COMPUTER?

Unless a program heading indicates otherwise, programs will run on any version of the computer specified, with the following exceptions:

- Apple programs run under AppleSoft (*not* Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIc. The Macintosh is not supported as of this writing.
- Our Atari programs may in some cases be incompatible with the Atari 1200XL.
- IBM PC owners may occasionally require a Color Graphics Adapter to run our graphics programs.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.
- TRS-80 Model III programs will run on the Model 4 in Model III mode.

DEBUGGING HINTS

Sometimes even the most careful typist makes a mistake. Don't expect your program to run right off the bat. If you have problems, remain patient and follow these general instructions for a probable quick fix.

LIST the program in screen-size chunks (check your manual for instructions on how to LIST parts of a program). Even better, if you have a printer, get a printout. Compare what you've typed in—letter by letter—to the published program. Make sure that you haven't typed the numeral 0 (which is slashed in our listings) for the letter O (which isn't), swapped a small letter "l" for the numeral one, dropped or mixed up some punctuation, switched uppercase text for lowercase or vice versa (particularly in DATA statements or within quotes), or miscounted the characters (and/or spaces) between a pair of quotes. Get someone to help you if possible.

Check your DATA statements—then check them again. Mistakes in DATA statements are the single most common cause of program failures. Bad DATA can cause a program to malfunction at any point, which can be misleading.

WHAT TO DO WHEN YOU'VE DONE IT ALL

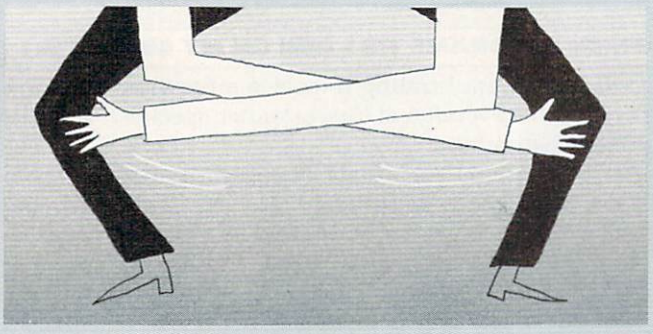
We're proud of our programs, and we want you to enjoy them as much as we enjoy writing them. If you just can't figure out what's wrong with a program, we'd like to help. But we can't if you don't provide us with important information. When you write us (no telephone calls, please), indicate:

- Which program you're having trouble with.
- Which type of computer you own, the type of BASIC you are using, how much RAM your computer has, and what DOS and peripherals you're using, if any.
- What error messages your computer has given you.
- Your name, address, and telephone number.

If possible, please enclose a printout. Address all correspondence to Programming P.S., FAMILY COMPUTING, 730 Broadway, New York, NY 10003.

JITTERMAN

BY JOEY LATIMER



The other day, while watching a "Gumby" rerun, I became fascinated with the dexterity used to animate that little clay figure. With the proper manipulations, Gumby appears to run, jump, crawl, bend, stretch, and dance. It's frightening how real he can be.

Computers weren't used to create Gumby, but they are used quite a bit today in animation of all kinds. This month's Beginner Program is a simple but semiserious attempt at computer animation.

Animation works by flashing a series of still images in front of your eyes fast enough so that differences between them are interpreted as movement. In conventional animation, these still images are called "cels", short for celluloid—the transparent material animators draw on.

In *Jitterman*, three groups of PRINT statements define three views of a dancing figure. These three "cels" are PRINTed one over another, creating the appearance of motion. As the program goes on, the cels are PRINTed further and further to the right—making the dancing man jitterbug across the screen. When Jitterman reaches the right side of the screen, he's blanked out, only to reappear at the left side.

Jitterman was designed to dance to almost any type of song. If you want, you can change the way Jitterman looks, or design your own animation "cels" by changing the characters between the quotes in each block of PRINT statements. Nine PRINT statements make up each cel, and there are nine characters, including spaces, between the quotes in each PRINT statement.

Jitterman's speed is kept under control by letting a little time elapse between PRINTing each of his cels. The time-wasting is accomplished in each case by a pair of statements that look something like this:

```
FOR D=1 TO 50
NEXT D
```

You may recognize the familiar FOR/NEXT loop that BASIC uses for counting and doing things over and over. This kind of FOR/NEXT loop (termed "empty" because it contains no statements between the FOR expression and the NEXT expression) serves merely as a delay, counting from 1 to 50 before allowing the program to continue. "Delay loops" like this are often used to control timing in a program. You can speed Jitterman up or slow him down by changing the second number (e.g. the 50) in the FOR statement of each of the delay loops to a lower or a higher value.

If you experiment with this program and come up with something you're excited about, please drop us a line. If we like it, we might mention it in a future issue. Send a printout (no tapes or disks, please) and explanation to:

Beginner Programs
c/o FAMILY COMPUTING
730 Broadway
New York, NY 10003

Apple/*Jitterman*

```
10 HOME
20 VTAB 10
30 PRINT "----------------------------------------"
40 FOR X = 1 TO 30
50 VTAB 1
100 PRINT TAB(X);"    O    "
110 PRINT TAB(X);"   ###   "
120 PRINT TAB(X);"  # # #  "
130 PRINT TAB(X);"  # # #  "
140 PRINT TAB(X);"    #    "
150 PRINT TAB(X);"   # #   "
160 PRINT TAB(X);"  #   #  "
170 PRINT TAB(X);" #     # "
180 PRINT TAB(X);" V     V "
190 FOR D = 1 TO 16
200 NEXT D
210 VTAB 1
220 PRINT TAB(X);"    <    "
230 PRINT TAB(X);"  #####  "
240 PRINT TAB(X);" #  #  # "
250 PRINT TAB(X);"#   # #  "
260 PRINT TAB(X);"    #    "
270 PRINT TAB(X);"   # #   "
280 PRINT TAB(X);"    #    "
290 PRINT TAB(X);"   # #   "
300 PRINT TAB(X);"  V   V  "
310 FOR D = 1 TO 13
320 NEXT D
330 VTAB 1
340 PRINT TAB(X);"    >    "
350 PRINT TAB(X);"  #####  "
360 PRINT TAB(X);" #  #  # "
370 PRINT TAB(X);"  # #   #"
380 PRINT TAB(X);"    #    "
390 PRINT TAB(X);"    #    "
400 PRINT TAB(X);"    #    "
410 PRINT TAB(X);"    #    "
420 PRINT TAB(X);"   V V   "
430 FOR D = 1 TO 13
440 NEXT D
450 NEXT X
460 VTAB 1
470 FOR X = 1 TO 9
480 PRINT TAB(30);"         "
490 NEXT X
500 GOTO 40
```

Atari/*Jitterman*

```
9 REM --"POKE 752,1" TURNS OFF THE CURSOR--
10 POKE 752,1
20 PRINT CHR$(125)
30 POSITION 0,10
40 PRINT "----------------------------------------"
50 FOR X=0 TO 29
100 POSITION X,1:PRINT "    O    "
110 POSITION X,2:PRINT "   ###   "
120 POSITION X,3:PRINT "  # # #  "
130 POSITION X,4:PRINT "  # # #  "
140 POSITION X,5:PRINT "    #    "
150 POSITION X,6:PRINT "   # #   "
160 POSITION X,7:PRINT "  #   #  "
170 POSITION X,8:PRINT " #     # "
180 POSITION X,9:PRINT " V     V "
190 FOR T=1 TO 3
200 NEXT T
210 POSITION X,1:PRINT "    <    "
220 POSITION X,2:PRINT "  #####  "
230 POSITION X,3:PRINT " #  #  # "
240 POSITION X,4:PRINT "#   # #  "
250 POSITION X,5:PRINT "    #    "
260 POSITION X,6:PRINT "   # #   "
```

ILLUSTRATIONS BY JOSH GOSFIELD

```
270 POSITION X,7:PRINT "    #    "
280 POSITION X,8:PRINT "   # #   "
290 POSITION X,9:PRINT "  V   V  "
300 FOR T=1 TO 2
310 NEXT T
320 POSITION X,1:PRINT "    >    "
330 POSITION X,2:PRINT "  #####  "
340 POSITION X,3:PRINT " #  #  # "
350 POSITION X,4:PRINT "  # #   #"
360 POSITION X,5:PRINT "    #    "
370 POSITION X,6:PRINT "    #    "
380 POSITION X,7:PRINT "    #    "
390 POSITION X,8:PRINT "    #    "
400 POSITION X,9:PRINT "   V V   "
410 FOR T=1 TO 2
420 NEXT T
430 NEXT X
440 FOR X=1 TO 9
450 POSITION 29,X
460 PRINT "         "
470 NEXT X
480 GOTO 50
```

Commodore 64/*Jitterman*

```
 9 REM --SET SCREEN AND BORDER COLORS--
10 POKE 53280,0
20 POKE 53281,0
30 PRINT CHR$(147)
40 FOR X=1 TO 30
50 PRINT CHR$(19);
100 PRINT TAB(X);"    0    "
110 PRINT TAB(X);"   ###   "
120 PRINT TAB(X);"  # # #  "
130 PRINT TAB(X);"  # # #  "
140 PRINT TAB(X);"    #    "
150 PRINT TAB(X);"   # #   "
160 PRINT TAB(X);"  #   #  "
170 PRINT TAB(X);" #     # "
180 PRINT TAB(X);" V     V "
190 PRINT "----------------------------------------"
200 FOR D=1 TO 16
210 NEXT D
220 PRINT CHR$(19);
230 PRINT TAB(X);"    <    "
240 PRINT TAB(X);"  #####  "
250 PRINT TAB(X);" #  #  # "
260 PRINT TAB(X);"#   # #  "
270 PRINT TAB(X);"    #    "
280 PRINT TAB(X);"   # #   "
290 PRINT TAB(X);"    #    "
300 PRINT TAB(X);"   # #   "
310 PRINT TAB(X);"  V   V  "
320 FOR D=1 TO 13
330 NEXT D
340 PRINT CHR$(19);
350 PRINT TAB(X);"    >    "
360 PRINT TAB(X);"  #####  "
370 PRINT TAB(X);" #  #  # "
380 PRINT TAB(X);"  # #   #"
390 PRINT TAB(X);"    #    "
400 PRINT TAB(X);"    #    "
410 PRINT TAB(X);"    #    "
420 PRINT TAB(X);"    #    "
430 PRINT TAB(X);"   V V   "
440 FOR D=1 TO 13
450 NEXT D
460 NEXT X
470 PRINT CHR$(19);
480 FOR X=1 TO 9
490 PRINT TAB(30);"         "
500 NEXT X
510 GOTO 40
```

IBM PCs/*Jitterman*

```
10 CLS
20 KEY OFF
30 WIDTH 40
40 LOCATE 10,1,0
50 PRINT "----------------------------------------"
60 FOR X=1 TO 30
100 LOCATE 1,X:PRINT "    0    "
110 LOCATE 2,X:PRINT "   ###   "
120 LOCATE 3,X:PRINT "  # # #  "
130 LOCATE 4,X:PRINT "  # # #  "
140 LOCATE 5,X:PRINT "    #    "
150 LOCATE 6,X:PRINT "   # #   "
160 LOCATE 7,X:PRINT "  #   #  "
170 LOCATE 8,X:PRINT " #     # "
180 LOCATE 9,X:PRINT " V     V "
190 FOR D=1 TO 3
200 NEXT D
210 LOCATE 1,X:PRINT "    <    "
220 LOCATE 2,X:PRINT "  #####  "
230 LOCATE 3,X:PRINT " #  #  # "
240 LOCATE 4,X:PRINT "#   # #  "
250 LOCATE 5,X:PRINT "    #    "
260 LOCATE 6,X:PRINT "   # #   "
270 LOCATE 7,X:PRINT "    #    "
280 LOCATE 8,X:PRINT "   # #   "
290 LOCATE 9,X:PRINT "  V   V  "
300 FOR D=1 TO 2
310 NEXT D
320 LOCATE 1,1,0
330 LOCATE 1,X:PRINT "    >    "
340 LOCATE 2,X:PRINT "  #####  "
350 LOCATE 3,X:PRINT " #  #  # "
360 LOCATE 4,X:PRINT "  # #   #"
370 LOCATE 5,X:PRINT "    #    "
380 LOCATE 6,X:PRINT "    #    "
390 LOCATE 7,X:PRINT "    #    "
400 LOCATE 8,X:PRINT "    #    "
410 LOCATE 9,X:PRINT "   V V   "
420 FOR D=1 TO 2
430 NEXT D
440 NEXT X
450 FOR X=1 TO 9
460 LOCATE X,30:PRINT "         "
470 NEXT X
480 GOTO 60
```

TRS-80 Color Computer/*Jitterman*

```
10 CLS
20 PRINT @320,"--------------------------------"
30 FOR X=1 TO 21
40 PRINT @0
100 PRINT TAB(X);"    0    "
110 PRINT TAB(X);"   ###   "
120 PRINT TAB(X);"  # # #  "
130 PRINT TAB(X);"  # # #  "
140 PRINT TAB(X);"    #    "
150 PRINT TAB(X);"   # #   "
160 PRINT TAB(X);"  #   #  "
170 PRINT TAB(X);" #     # "
180 PRINT TAB(X);" V     V "
190 FOR D=1 TO 13
200 NEXT D
210 PRINT @0
220 PRINT TAB(X);"    <    "
230 PRINT TAB(X);"  #####  "
240 PRINT TAB(X);" #  #  # "
250 PRINT TAB(X);"#   # #  "
260 PRINT TAB(X);"    #    "
270 PRINT TAB(X);"   # #   "
280 PRINT TAB(X);"    #    "
```

```
290 PRINT TAB(X);"   # #   "
300 PRINT TAB(X);"  V   V  "
310 FOR D=1 TO 7
320 NEXT D
330 PRINT @0
340 PRINT TAB(X);"    >    "
350 PRINT TAB(X);"  #####  "
360 PRINT TAB(X);" #  #  # "
370 PRINT TAB(X);"  # #   #"
380 PRINT TAB(X);"    #    "
390 PRINT TAB(X);"    #    "
400 PRINT TAB(X);"    #    "
410 PRINT TAB(X);"    #    "
420 PRINT TAB(X);"   V V   "
430 FOR D=1 TO 7
440 NEXT D
450 NEXT X
460 PRINT @0
470 FOR X=1 TO 9
480 PRINT TAB(21);"         "
490 NEXT X
500 GOTO 30
```

TRS-80 Model III/*Jitterman*

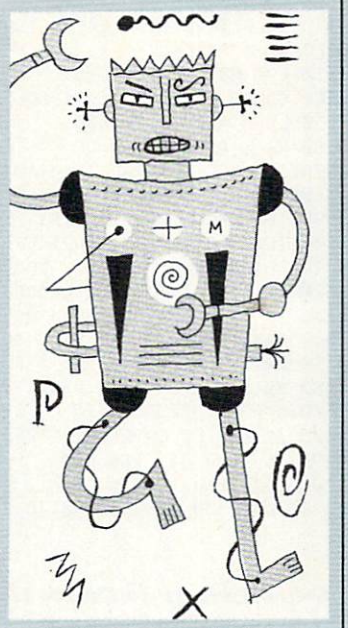
```
10 CLS
20 PRINT @640,"----------------------------------------
------------------------"
30 FOR X=1 TO 52
40 PRINT @0,"";
100 PRINT TAB(X);"    0    "
110 PRINT TAB(X);"   ###   "
120 PRINT TAB(X);"  # # #  "
130 PRINT TAB(X);"  # # #  "
140 PRINT TAB(X);"    #    "
150 PRINT TAB(X);"   # #   "
160 PRINT TAB(X);"  #   #  "
170 PRINT TAB(X);" #     # "
180 PRINT TAB(X);" V     V "
190 FOR D=1 TO 5
200 NEXT D
210 PRINT @0,"";
220 PRINT TAB(X);"    <    "
230 PRINT TAB(X);"  #####  "
240 PRINT TAB(X);" #  #  # "
250 PRINT TAB(X);"#   # #  "
260 PRINT TAB(X);"    #    "
270 PRINT TAB(X);"   # #   "
280 PRINT TAB(X);"    #    "
290 PRINT TAB(X);"   # #   "
300 PRINT TAB(X);"  V   V  "
310 FOR D=1 TO 2
320 NEXT D
330 PRINT @0,"";
340 PRINT TAB(X);"    >    "
350 PRINT TAB(X);"  #####  "
360 PRINT TAB(X);" #  #  # "
370 PRINT TAB(X);"  # #   #"
380 PRINT TAB(X);"    #    "
390 PRINT TAB(X);"    #    "
400 PRINT TAB(X);"    #    "
410 PRINT TAB(X);"    #    "
420 PRINT TAB(X);"   V V   "
430 FOR D=1 TO 2
440 NEXT D
450 NEXT X
460 PRINT @0,"";
470 FOR X=1 TO 9
480 PRINT TAB(53);"         "
490 NEXT X
500 GOTO 30
```

VIC-20/*Jitterman*

```
9 REM --SET SCREEN AND BORDER COLORS--
10 POKE 36879,8
20 PRINT CHR$(5)
30 PRINT CHR$(147)
40 FOR X=1 TO 12
50 PRINT CHR$(19);
100 PRINT TAB(X);"    0    "
110 PRINT TAB(X);"   ###   "
120 PRINT TAB(X);"  # # #  "
130 PRINT TAB(X);"  # # #  "
140 PRINT TAB(X);"    #    "
150 PRINT TAB(X);"   # #   "
160 PRINT TAB(X);"  #   #  "
170 PRINT TAB(X);" #     # "
180 PRINT TAB(X);" V     V "
190 PRINT "----------------------"
200 FOR D=1 TO 35
210 NEXT D
220 PRINT CHR$(19);
230 PRINT TAB(X);"    <    "
240 PRINT TAB(X);"  #####  "
250 PRINT TAB(X);" #  #  # "
260 PRINT TAB(X);"#   # #  "
270 PRINT TAB(X);"    #    "
280 PRINT TAB(X);"   # #   "
290 PRINT TAB(X);"    #    "
300 PRINT TAB(X);"   # #   "
310 PRINT TAB(X);"  V   V  "
320 FOR D=1 TO 28
330 NEXT D
340 PRINT CHR$(19);
350 PRINT TAB(X);"    >    "
360 PRINT TAB(X);"  #####  "
370 PRINT TAB(X);" #  #  # "
380 PRINT TAB(X);"  # #   #"
390 PRINT TAB(X);"    #    "
400 PRINT TAB(X);"    #    "
410 PRINT TAB(X);"    #    "
420 PRINT TAB(X);"    #    "
430 PRINT TAB(X);"   V V   "
440 FOR D=1 TO 28
450 NEXT D
460 NEXT X
470 PRINT CHR$(19);
480 FOR X=1 TO 9
490 PRINT TAB(12);"         "
500 NEXT X
510 GOTO 40
```

RENEGADE ROBOT II

BY JOEY LATIMER



The underground parking lot where you work seems just a little *too* quiet. Of course, you're still a bit edgy after your narrow escape from the *Renegade Robot* (FC, *August 1984, page 74*), but still . . . you have the creepy feeling that you're being watched.

Suddenly, the hot smell of machine oil and the hum of metal wheels confirm your worst suspicions: The renegade robot is back, and it's time for you to *get lost*! But luck's *really* running against you this time—the doors of the parking lot all seem to be locked!

Don't give up hope. One of the doors may still be open. There are six doors around the perimeter of the lot, and you may have to try all of them to find out which one offers you an escape. Jiggling door handles and keeping clear of the renegade robot's steel pincers, however, isn't going to be easy.

You can escape in *Renegade Robot II* using your joystick (port 1) or your keyboard. Use the "U" (up left), "I" (up), "O" (up right), "J" (left), "L" (right), "M" (down left), comma (down), and period (down right) keys to move. To make things more interesting, the longer you remain in the lot (and out of the robot's clutches), the more points you'll gain. Since the robot always heads more or less towards your position, you may be able to use the parked cars to trap him—but watch out! He's smarter than he looks, and may do something unpredictable at any time!

PROGRAM NOTES

What makes the renegade robot such a dangerous opponent, capable of marking your position and moving inexorably toward it, negotiating obstacles in its path? The answer is in a simple routine that controls the way the robot "thinks."

To make the robot track you, the computer begins by subtracting each coordinate of the robot's position (RX and RY) from the corresponding coordinate of your position (PX or PY). The values that result may each be positive, negative, or zero, depending on the robot's position relative to your own; thus the arithmetic *signs* of these values (determined by BASIC's SGN function) each may be 1, 0, or −1. Adding the signs to the coordinates of the robot's current position results in a proposed new position (QX, QY) that will place the robot one step closer to you.

The next step the computer takes is to determine if the robot can move to that new position, or is prevented by some obstacle from doing so. The contents of the screen at the new position are looked at (by a PEEK, LOCATE, SCREEN, or other statement) and analyzed. If the proposed movement will not land the robot on an obstacle, the program continues.

If, on the other hand, an obstacle is encountered, the computer discards the new position and attempts to find a way around the obstacle. It begins by randomly generating a direction, D, which may be −1 or +1. It then generates a new proposed position (QX, QY) by adding this value to either the robot's horizontal coordinate, RX, or its vertical coordinate, RY, depending on the value of a *flag*, F. (A flag is a variable that is given one of two possible values, depending on conditions. Flags are often used when a program must alternate between two possible courses of action, trying first one, then the other.) The value of flag F is changed so that if the proposed position to left or right is found to be blocked, the next position to be tried will be above or below, and vice versa.

By this semi-random process of "controlled blundering," coupled with an inexorable means of tracking your position, the robot will eventually find its way around almost any small obstacle.

CUSTOMIZING THE PROGRAM

Increasing or decreasing the number of obstacles in the robot's path makes *Renegade Robot II* easier or more difficult to play. The variable RV in line 10 controls the random process that places obstacles on the screen. You may adjust gameplay as you like by changing RV to any decimal number between 0 (most obstacles) and 1 (no obstacles).

If you're an ambitious programmer, you might also try to change how frequently the robot moves. We'll leave that one for you to figure out.

ADAM/*Renegade Robot II*

```
10 DIM dr(6,2):rv = 0.5
20 FOR i = 1 TO 9:bl$ = bl$+CHR$(32):NEXT i
30 FOR i = 1 TO 6:READ dr(i,1),dr(i,2):NEXT i
40 HOME:PRINT TAB(8);"RENEGADE ROBOT II"
50 VTAB 5:PRINT "  PRESS LEFT TRIGGER TO BEGIN."
60 IF PDL(7) <> 1 THEN c = RND(1):GOTO 60
70 HOME:GR:COLOR= 9
80 HLIN 0,39 AT 0:HLIN 0,39 AT 1
90 HLIN 0,39 AT 38:HLIN 0,39 AT 39
100 VLIN 2,37 AT 0:VLIN 2,37 AT 1
110 VLIN 2,37 AT 38:VLIN 2,37 AT 39:COLOR= 8
120 FOR i = 1 TO 6:PLOT dr(i,1),dr(i,2):NEXT i
130 FOR i = 3 TO 35 STEP 2:FOR j = 3 TO 36
140 IF RND(1) > rv THEN COLOR= INT(RND(1)*7)+1:PLOT j,
i
150 NEXT j,i
160 VTAB 21:HTAB 11:PRINT "SCORE:"
170 px = INT(RND(1)*10)+2:py = (INT(RND(1)*18)+1)*2
180 rx = INT(RND(1)*10)+26:ry = (INT(RND(1)*18)+1)*2
190 sc = 0:do = INT(RND(1)*6)+1:ts = RND(1)*500+500
200 COLOR= 15:PLOT px,py
210 COLOR= 11:PLOT rx,ry
220 j = PDL(5)
230 nx = px+(j = 2 OR j = 3 OR j = 6)-(j > 6)
240 ny = py+(j = 4 OR j = 6 OR j = 12)-(j = 1 OR j = 3
 OR j = 9)
250 IF px = nx AND py = ny THEN 380
260 IF nx < 1 OR nx > 38 OR ny < 1 OR ny > 38 THEN 490
270 p = SCRN(nx,ny):IF p = 0 THEN 320
280 IF p <> 8 THEN 380
290 VTAB 22:HTAB 1
300 IF nx <> dr(do,1) OR ny <> dr(do,2) THEN PRINT "LO
CKED!":GOTO 360
310 PRINT "UNLOCKED!"
320 COLOR= 8*(px = dr(do,1) AND py = dr(do,2))
330 PLOT px,py
340 COLOR= 15:PLOT nx,ny:px = nx:py = ny
350 IF p <> 8 THEN 380
360 FOR d = 1 TO 200:NEXT d
370 VTAB 22:HTAB 1:PRINT SPC(9)
380 IF sc < ts THEN 480
390 qx = rx+SGN(px-rx):qy = ry+SGN(py-ry):f = 1
400 p = SCRN(qx,qy):IF p = 0 OR p = 15 THEN 450
```

```
410 d = 2*INT(RND(1)*2)-1
420 IF f THEN qx = rx+d:qy = ry:GOTO 440
430 qy = ry+d:qx = rx
440 f = NOT f:GOTO 400
450 COLOR= 0:PLOT rx,ry:COLOR= 11:PLOT qx,qy
460 IF p = 15 THEN 520
470 rx = qx:ry = qy
480 sc = sc+10:HTAB 17:VTAB 21:PRINT sc:GOTO 220
490 TEXT:HOME:FOR i = 1 TO 7
500 PRINT CHR$(7);:FOR d = 1 TO 50:NEXT d,i
510 PRINT "YOU ESCAPED!":GOTO 540
520 TEXT:HOME:PRINT CHR$(7);
530 PRINT "SORRY, YOU WERE CAUGHT!"
540 PRINT:PRINT "YOUR SCORE WAS ";sc
550 IF sc > hs THEN hs = sc
560 PRINT:PRINT "THE HIGH SCORE IS ";hs
570 PRINT:PRINT "PRESS LEFT TRIGGER TO PLAY AGAIN"
580 PRINT "OR RIGHT TRIGGER TO QUIT."
590 IF PDL(7) = 1 THEN 70
600 IF PDL(9) <> 1 THEN 590
610 END
1000 DATA 20,1,38,12,38,26,20,38,1,12,1,26
```

Apple/*Renegade Robot II*

```
10 DIM DR(6,2):RV = 0.5
20 FOR I = 1 TO 6:READ DR(I,1),DR(I,2):NEXT I
30 HOME:PRINT TAB(11);"RENEGADE ROBOT II"
40 VTAB 5:PRINT TAB(9);"PRESS ANY KEY TO BEGIN."
50 POKE -16368,0
60 IF PEEK(-16384) < 128 THEN Q = RND(1):GOTO 60
70 POKE -16368,0
80 PRINT:PRINT TAB(8);"DO YOU WANT TO USE THE"
90 PRINT TAB(4);"<K>EYBOARD OR THE <J>OYSTICK?";
100 GET K$:IF K$ <> "K" AND K$ <> "J" THEN 100
110 KF = (K$ = "K")
120 HOME:GR:COLOR= 9
130 HLIN 0,39 AT 0:HLIN 0,39 AT 1
140 HLIN 0,39 AT 38:HLIN 0,39 AT 39
150 VLIN 2,37 AT 0:VLIN 2,37 AT 1
160 VLIN 2,37 AT 38:VLIN 2,37 AT 39
170 COLOR= 8
180 FOR I = 1 TO 6:PLOT DR(I,1),DR(I,2):NEXT I
190 FOR I = 3 TO 35 STEP 2:FOR J = 3 TO 36
200 IF RND(1) > RV THEN COLOR= INT(RND(1)*7)+1:PLOT J,
I
210 NEXT J,I
220 VTAB 21:HTAB 16:PRINT "SCORE:"
230 PX=INT(RND(1)*11)+2:PY=(INT(RND(1)*18)+1)*2
240 RX=INT(RND(1)*11)+27:RY=(INT(RND(1)*18)+1)*2
250 SC = 0:DO = INT(RND(1)*6)+1:TS = RND(1)*500+500
260 COLOR= 15:PLOT PX,PY
270 COLOR= 11:PLOT RX,RY
280 IF KF THEN 310
290 NY = PY+(PDL(1) > 192)-(PDL(1) < 64)
300 NX = PX+(PDL(0) > 192)-(PDL(0) < 64):GOTO 350
310 K = PEEK(-16384)-128
320 POKE -16368,0
330 NY = PY+(K = 44 OR K = 46 OR K = 77)-(K = 73 OR K
= 79 OR K = 85)
340 NX = PX+(K = 46 OR K = 76 OR K = 79)-(K = 74 OR K
= 77 OR K = 85)
350 IF PX = NX AND PY = NY THEN 470
360 IF NX < 1 OR NX > 38 OR NY < 1 OR NY > 38 THEN 580
370 P = SCRN(NX,NY):IF P = 0 THEN 420
380 IF P <> 8 THEN 470
390 VTAB 21:HTAB 1
400 IF NX <> DR(DO,1) OR NY <> DR(DO,2) THEN PRINT "LO
CKED!":GOTO 450
410 PRINT "UNLOCKED!"
420 COLOR= 8*(PX = DR(DO,1) AND PY = DR(DO,2))
430 PLOT PX,PY:COLOR= 15:PLOT NX,NY:PX = NX:PY = NY
440 IF P <> 8 THEN 470
450 FOR D = 1 TO 200:NEXT D
460 VTAB 21:HTAB 1:PRINT SPC(9)
470 IF SC < TS THEN 570
480 QX = RX+SGN(PX-RX):QY = RY+SGN(PY-RY):F = 1
490 P = SCRN(QX,QY):IF P = 0 OR P = 15 THEN 540
500 D = 2*INT(RND(1)*2)-1
510 IF F THEN QX = RX+D:QY = RY:GOTO 530
520 QY = RY+D:QX = RX
530 F = NOT F:GOTO 490
540 COLOR= 0:PLOT RX,RY:COLOR= 11:PLOT QX,QY
550 IF P = 15 THEN 600
560 RX = QX:RY = QY
570 SC = SC+10:VTAB 21:HTAB 23:PRINT SC:GOTO 280
580 FOR D = 1 TO 50:A = PEEK(-16336):NEXT D
590 TEXT:HOME:PRINT:PRINT "YOU ESCAPED!":GOTO 620
600 TEXT:HOME:PRINT CHR$(7)
610 PRINT:PRINT "SORRY, YOU WERE CAUGHT!"
620 PRINT:PRINT "YOUR SCORE WAS ";SC
630 IF SC > HS THEN HS = SC
640 PRINT:PRINT "THE HIGH SCORE IS ";HS:PRINT
650 PRINT "PRESS <P> OR FIRE BUTTON TO PLAY AGAIN"
660 PRINT "OR <Q> TO QUIT.":POKE -16368,0
670 K=PEEK(-16384)-128
680 IF K = 80 OR PEEK(-16286) > 127 THEN 120
690 IF K <> 81 THEN 670
700 HOME:END
1000 DATA 20,1,38,12,38,26,20,38,1,12,1,26
```

Atari/*Renegade Robot II*

```
10 DIM DR(6,2),BL$(9),BR$(38):RV=0.5
20 OPEN #1,4,0,"K:":OPEN #6,12,0,"S:"
30 BL$=" ":BL$(9)=BL$:BL$(2)=BL$
40 BR$=CHR$(160):BR$(38)=BR$:BR$(2)=BR$
50 FOR I=1 TO 6:READ A,B:DR(I,1)=A:DR(I,2)=B:NEXT I
60 PRINT CHR$(125):POSITION 11,0
70 PRINT "RENEGADE ROBOT II"
80 POSITION 3,5
90 PRINT "DO YOU WANT TO USE THE <K>EYBOARD"
100 POSITION 10,6:PRINT "OR THE <J>OYSTICK?";
110 GET #1,K:IF K<>ASC("K") AND K<>ASC("J") THEN 110
120 KF=(K=ASC("K"))
130 PRINT CHR$(125);:POKE 82,0
140 POKE 752,1:SETCOLOR 1,0,15:SETCOLOR 2,0,0
150 POSITION 1,0:PRINT BR$:POSITION 1,1:PRINT BR$
160 FOR I=2 TO 20
170 POSITION 1,I:PRINT CHR$(160)
180 POSITION 38,I:PRINT CHR$(160)
190 NEXT I
200 POSITION 1,21:PRINT BR$:POSITION 1,22:PRINT BR$
210 FOR I=1 TO 6:POSITION DR(I,1),DR(I,2)
220 PRINT CHR$(35):NEXT I
230 FOR I=3 TO 19 STEP 2:FOR J=3 TO 36
240 IF RND(0)>RV THEN POSITION J,I:PRINT CHR$(219)
250 NEXT J:NEXT I:POSITION 15,23:PRINT "SCORE: 0";
260 PX=INT(RND(0)*10)+2:PY=(INT(RND(0)*9)+1)*2
270 RX=INT(RND(0)*10)+28:RY=(INT(RND(0)*9)+1)*2
280 SC=0:DO=INT(RND(0)*6)+1:TS=RND(0)*500+500
290 POSITION PX,PY:PRINT CHR$(27);CHR$(27)
300 POSITION RX,RY:PRINT CHR$(16)
310 IF KF THEN 360
320 J=STICK(0)
330 NX=PX+(J>=5 AND J<=7)-(J>=9 AND J<=11)
340 NY=PY+(J=5 OR J=9 OR J=13)-(J=6 OR J=10 OR J=14)
350 GOTO 390
360 K=PEEK(764):POKE 764,255
370 NX=PX+(K=0 OR K=8 OR K=34)-(K=1 OR K=11 OR K=37)
380 NY=PY+(K=32 OR K=34 OR K=37)-(K=8 OR K=11 OR K=13)
390 IF PX=NX AND PY=NY THEN 520
400 IF NX=0 OR NX=39 OR NY=0 OR NY=22 THEN 650
410 LOCATE NX,NY,P:POSITION NX,NY:PUT #6,P
420 IF P=32 THEN 470
430 IF P<>35 THEN 520
440 POSITION 0,23
450 IF NX<>DR(DO,1) OR NY<>DR(DO,2) THEN PRINT "LOCKED
!";:GOTO 510
460 PRINT "UNLOCKED!";
470 POSITION PX,PY
480 PRINT CHR$(32+3*(PX=DR(DO,1) AND PY=DR(DO,2)))
```

```
490 POSITION NX,NY:PRINT CHR$(27);CHR$(27):PX=NX:PY=NY
500 IF P<>35 THEN 520
510 FOR D=1 TO 100:NEXT D:POSITION 0,23:PRINT BL$;
520 IF SC<TS THEN 640
530 QX=RX+SGN(PX-RX):QY=RY+SGN(PY-RY):F=1
540 LOCATE QX,QY,P:POSITION QX,QY:PUT #6,P
550 IF P=27 OR P=32 THEN 600
560 D=2*INT(RND(0)*2)-1
570 IF F THEN QX=RX+D:QY=RY:GOTO 590
580 QY=RY+D:QX=RX
590 F= NOT F:GOTO 540
600 POSITION RX,RY:PRINT CHR$(32)
610 POSITION QX,QY:PRINT CHR$(16)
620 IF P=27 THEN 700
630 RX=QX:RY=QY
640 SC=SC+10:POSITION 22,23:PRINT SC;:GOTO 310
650 SOUND 0,121,10,10:SOUND 1,96,10,10
660 SOUND 2,81,10,10
670 FOR D=1 TO 200:NEXT D
680 FOR I=0 TO 2:SOUND I,0,0,0:NEXT I
690 PRINT CHR$(125):PRINT "YOU ESCAPED!":GOTO 730
700 SOUND 0,45,12,10:FOR D=1 TO 200:NEXT D
710 SOUND 0,0,0,0
720 PRINT CHR$(125):PRINT "SORRY, YOU WERE CAUGHT!"
730 PRINT :PRINT "YOUR SCORE IS ";SC;".":PRINT
740 IF SC>HS THEN HS=SC
750 PRINT "THE HIGH SCORE IS ";HS;".":PRINT :PRINT
760 PRINT "PRESS <P> OR THE FIRE BUTTON"
770 PRINT "TO PLAY AGAIN OR <Q> TO QUIT."
780 POKE 764,255
790 IF PEEK(764)=10 OR STRIG(0)=0 THEN POKE 764,255:GO
TO 130
800 IF PEEK(764)<>47 THEN 790
810 POKE 82,2:POKE 764,255:PRINT CHR$(125);:END
1000 DATA 20,1,38,8,38,16,20,21,1,16,1,8
```

Commodore 64/*Renegade Robot II*

Done

```
10 DIM DR(6,2):S=1024:C=55296:SD=54272:RV=0.5
20 BL$=CHR$(32):FOR I=1 TO 8:BL$=BL$+CHR$(32):NEXT I
30 FOR I=SD TO SD+23:POKE I,0:NEXT I
40 POKE SD+24,15:POKE SD+5,128:POKE SD+6,64
50 POKE 649,1:POKE 53280,12:POKE 53281,1
60 FOR I=1 TO 6:READ DR(I,1),DR(I,2):NEXT I
70 PRINT CHR$(147);TAB(11);CHR$(30);"RENEGADE ROBOT II
"
80 PRINT:PRINT TAB(8);"PRESS ANY KEY TO BEGIN."
90 GET K$:IF K$="" THEN Q=RND(1):GOTO 90
100 PRINT
110 PRINT TAB(8);CHR$(28);"DO YOU WANT TO USE THE"
120 PRINT TAB(5);"<K>EYBOARD OR THE <J>OYSTICK?"
130 GET K$:IF K$<>"K" AND K$<>"J" THEN 130
140 KF=(K$="K")
150 PRINT CHR$(147):FOR I=0 TO 39
160 TB=S+I:BB=TB+920:LS=S+I*40:RS=LS+39
170 POKE TB,160:POKE TB+SD,2
180 POKE TB+40,160:POKE TB+SD+40,2
190 POKE BB,160:POKE BB+SD,2
200 POKE BB+40,160:POKE BB+SD+40,2
210 IF I>1 AND I<23 THEN POKE LS,160:POKE LS+SD,2:POKE
 RS,160:POKE RS+SD,2
220 NEXT I
230 FOR I=1 TO 6:P=DR(I,1)+DR(I,2)*40
240 POKE S+P,102:POKE C+P,0:NEXT I
250 FOR I=3 TO 21 STEP 2:FOR J=2 TO 37
260 IF RND(1)>RV THEN POKE S+J+I*40,160:POKE C+J+I*40,
INT(RND(1)*13)+2
270 NEXT J,I
280 POKE 214,23:PRINT
290 PRINT TAB(15);CHR$(18);CHR$(28);"SCORE: 0";
300 PX=INT(RND(1)*10)+1:PY=(INT(RND(1)*10)+1)*2
310 RX=INT(RND(1)*10)+29:RY=(INT(RND(1)*10)+1)*2
320 SC=0:DO=INT(RND(1)*6)+1:TS=RND(1)*500+500
330 POKE S+PX+PY*40,81:POKE C+PX+PY*40,0
340 POKE S+RX+RY*40,90:POKE C+RX+RY*40,0
350 IF KF THEN 400
360 J=15-(PEEK(56321) AND 15)
370 NX=PX-(J>=8 AND J<=10)+(J>=4 AND J<=6)
380 NY=PY-(J=2 OR J=6 OR J=10)+(J=1 OR J=5 OR J=9)
390 GOTO 420
400 GET K$:NX=PX-(K$="O" OR K$="L" OR K$=".")+(K$="U"
OR K$="J" OR K$="M")
410 NY=PY-(K$="M" OR K$="," OR K$=".")+(K$="U" OR K$="
I" OR K$="O")
420 IF PX=NX AND PY=NY THEN 560
430 IF NX<0 OR NX>39 OR NY<1 OR NY>23 THEN 690
440 P=PEEK(S+NX+NY*40)
450 IF P=32 THEN 510
460 IF P<>102 THEN 560
470 POKE 214,23:PRINT
480 LF=(NX<>DR(DO,1) OR NY<>DR(DO,2))
490 IF LF THEN PRINT CHR$(18);"LOCKED!";:GOTO 540
500 PRINT CHR$(18);"UNLOCKED!";
510 POKE S+PX+PY*40,32-70*(PX=DR(DO,1) AND PY=DR(DO,2)
)
520 POKE S+NX+NY*40,81:POKE C+NX+NY*40,0:PX=NX:PY=NY
530 IF P<>102 THEN 560
540 FOR D=1 TO 200:NEXT D
550 POKE 214,23:PRINT:PRINT CHR$(18);BL$;
560 IF SC<TS THEN 670
570 QX=RX+SGN(PX-RX):QY=RY+SGN(PY-RY):F=-1
580 P=PEEK(S+QX+QY*40):IF P=81 OR P=32 THEN 630
590 D=2*INT(RND(1)*2)-1
600 IF F THEN QX=RX+D:QY=RY:GOTO 620
610 QY=RY+D:QX=RX
620 F=NOT F:GOTO 580
630 POKE S+RX+RY*40,32
640 POKE S+QX+QY*40,90:POKE C+QX+QY*40,0
650 IF P=81 THEN 740
660 RX=QX:RY=QY
670 SC=SC+10:POKE 214,23:PRINT
680 PRINT TAB(21);CHR$(18);SC;:GOTO 350
690 POKE SD+4,33:FOR I=1 TO 5:POKE SD+1,50
700 FOR D=1 TO 50:NEXT D:POKE SD+1,20
710 FOR D=1 TO 50:NEXT D:NEXT I:POKE SD+4,0
720 PRINT CHR$(147):PRINT:PRINT "YOU ESCAPED!"
730 GOTO 790
740 POKE SD+4,33:FOR I=1 TO 20
750 POKE SD,INT(RND(1)*2)+135
760 POKE SD+1,INT(RND(1)*2)+17:NEXT I:POKE SD+4,0
770 PRINT CHR$(147)
780 PRINT CHR$(31);"SORRY, YOU WERE CAUGHT!"
790 PRINT:PRINT CHR$(154);"YOUR SCORE WAS";SC
800 IF SC>HS THEN HS=SC
810 PRINT:PRINT "THE HIGH SCORE IS";HS:PRINT
820 PRINT "PRESS <P> OR FIRE BUTTON TO PLAY AGAIN"
830 PRINT "OR <Q> TO QUIT."
840 GET K$
850 IF K$="P" OR (PEEK(56321) AND 16)=0 THEN 150
860 IF K$<>"Q" THEN 840
870 PRINT CHR$(147);:END
1000 DATA 20,1,39,8,39,16,20,23,0,8,0,16
```

IBM PC w/Color Graphics Adapter & IBM PC*jr*/*Renegade Robot II*

```
9 REM --MAKE SURE YOU'RE IN ALL-CAPS MODE--
10 DIM DR(6,2):RV=.5
20 WIDTH 40:KEY OFF:CLS:SCREEN 0,1:STRIG ON
30 FOR I=1 TO 6:READ DR(I,1),DR(I,2):NEXT I
40 CLS:COLOR 7:PRINT TAB(11);"RENEGADE ROBOT II"
50 LOCATE 5,8,0:PRINT "PRESS ANY KEY TO BEGIN."
60 IF INKEY$="" THEN Q=RND:GOTO 60
70 PRINT:PRINT TAB(8);"DO YOU WANT TO USE THE"
80 PRINT TAB(5);"<K>EYBOARD OR THE <J>OYSTICK?"
90 K$=INKEY$:IF K$<>"K" AND K$<>"J" THEN 90
100 KF=(K$="K")
110 CLS:COLOR 9:PRINT STRING$(80,219);
120 FOR I=1 TO 19
130 PRINT CHR$(219);SPC(38);CHR$(219);
140 NEXT I:PRINT STRING$(80,219);
150 COLOR 8:FOR I=1 TO 6
160 LOCATE DR(I,2),DR(I,1)
```

```
170 PRINT CHR$(178):NEXT I
180 FOR I=4 TO 20 STEP 2:FOR J=3 TO 38
190 IF RND>RV THEN COLOR INT(RND*7)+1:LOCATE I,J:PRINT
 CHR$(148)
200 NEXT J,I
210 LOCATE 23,16:COLOR 7:PRINT"SCORE: 0";
220 PX=INT(RND*11)+2:PY=(INT(RND*10)+1)*2+1
230 RX=INT(RND*11)+29:RY=(INT(RND*10)+1)*2+1
240 SC=0:DO=INT(RND*6)+1:TS=RND*500+500
250 COLOR 15:LOCATE PY,PX:PRINT CHR$(2)
260 COLOR 11:LOCATE RY,RX:PRINT CHR$(15)
270 IF KF THEN 310
280 J0=STICK(0):J1=STICK(1)
290 NX=PX-(J0>72)+(J0<24)
300 NY=PY-(J1>72)+(J1<24):GOTO 340
310 K$=INKEY$
320 NX=PX+(K$="U" OR K$="J" OR K$="M")-(K$="O" OR K$="
L" OR K$=".")
330 NY=PY+(K$="U" OR K$="I" OR K$="O")-(K$="M" OR K$="
," OR K$=".")
340 IF PX=NX AND PY=NY THEN 460
350 IF NX<1 OR NX>40 OR NY<2 OR NY>22 THEN 570
360 P=SCREEN(NY,NX):IF P=32 THEN 410
370 IF P<>178 THEN 460
380 LOCATE 24,1:COLOR 7
390 IF NX<>DR(DO,1) OR NY<>DR(DO,2) THEN PRINT "LOCKED
!";:GOTO 450
400 PRINT "UNLOCKED!";
410 EH=(PX=DR(DO,1) AND PY=DR(DO,2)):COLOR -8*EH
420 LOCATE PY,PX:PRINT CHR$(32-146*EH)
430 COLOR 15:LOCATE NY,NX:PRINT CHR$(2):PX=NX:PY=NY
440 IF P<>178 THEN 460
450 FOR D=1 TO 200:NEXT D:LOCATE 24,1:PRINT SPC(9);
460 IF SC<TS THEN 560
470 QX=RX+SGN(PX-RX):QY=RY+SGN(PY-RY):F=-1
480 P=SCREEN(QY,QX):IF P=32 OR P=2 THEN 520
490 D=2*INT(RND*2)-1:IF F THEN QX=RX+D:QY=RY:GOTO 510
500 QY=RY+D:QX=RX
510 F=NOT F:GOTO 480
520 LOCATE RY,RX:PRINT CHR$(32)
530 COLOR 11:LOCATE QY,QX:PRINT CHR$(15)
540 IF P=2 THEN 600
550 RX=QX:RY=QY
560 SC=SC+10:LOCATE 23,22:COLOR 7:PRINT SC;:GOTO 270
570 FOR S=1 TO 5
580 SOUND 523,1:SOUND 659,1:SOUND 784,1:NEXT S
590 CLS:COLOR 7:PRINT:PRINT "YOU ESCAPED!":GOTO 630
600 FOR I=1 TO 5
610 FOR J=800 TO 400 STEP -10:SOUND J,.2:NEXT J,I
620 CLS:COLOR 7:PRINT:PRINT "SORRY, YOU WERE CAUGHT!"
630 PRINT:PRINT:PRINT "YOUR SCORE IS";SC
640 IF SC>HS THEN HS=SC
650 PRINT:PRINT "THE HIGH SCORE IS";HS
660 PRINT
670 PRINT "PRESS <P> OR FIRE BUTTON TO PLAY AGAIN"
680 PRINT "OR <Q> TO QUIT."
690 K$=INKEY$
700 IF K$="P" OR STRIG(0)=-1 THEN 110
710 IF K$<>"Q" THEN 690
720 CLS:COLOR 7:END
1000 DATA 20,2,40,8,40,16,20,22,1,16,1,8
```

TRS-80 Color Computer/*Renegade Robot II*

```
10 DIM DR(6,2):S=1024:RV=0.4
20 FOR I=1 TO 9:BL$=BL$+CHR$(128):NEXT I
30 FOR I=1 TO 6:READ DR(I,1),DR(I,2):NEXT I
40 CLS:PRINT TAB(7);"RENEGADE ROBOT II"
50 PRINT@68,"PRESS ANY KEY TO BEGIN."
60 IF INKEY$="" THEN Q=RND(1):GOTO 60
70 PRINT:PRINT:PRINT TAB(4);"DO YOU WANT TO USE THE"
80 PRINT " <K>EYBOARD OR THE <J>OYSTICK?"
90 K$=INKEY$:IF K$<>"K" AND K$<>"J" THEN 90
100 KF=(K$="K")
110 CLS
120 FOR I=0 TO 31:TB=S+I:BB=TB+448:LS=S+I*32:RS=LS+31
130 POKE TB,128
140 POKE BB,128:POKE BB+32,128
150 IF I>0 AND I<14 THEN POKE LS,128:POKE RS,128
160 NEXT I
170 FOR I=1 TO 6:P=DR(I,1)+DR(I,2)*32
180 POKE S+P,255:NEXT I
190 FOR I=2 TO 12 STEP 2:FOR J=2 TO 28
200 IF RND(10)>RV*10 THEN POKE S+J+I*32,143+RND(6)*16
210 NEXT J,I:PRINT @491,"SCORE: 0";
220 PX=RND(6):PY=RND(7)*2-1
230 RX=RND(6)+24:RY=RND(7)*2-1
240 SC=0:DO=RND(6):TS=RND(500)+500
250 POKE S+PX+PY*32,106
260 POKE S+RX+RY*32,79
270 IF KF THEN 310
280 J0=JOYSTK(0):J1=JOYSTK(1)
290 NX=PX+(J0<20)-(J0>43)
300 NY=PY+(J1<20)-(J1>43):GOTO 340
310 K$=INKEY$
320 NX=PX-(K$="O" OR K$="L" OR K$=".")+(K$="U" OR K$="
J" OR K$="M")
330 NY=PY-(K$="M" OR K$="," OR K$=".")+(K$="U" OR K$="
I" OR K$="O")
340 IF PX=NX AND PY=NY THEN 460
350 IF NX<0 OR NX>31 OR NY<0 OR NY>14 THEN 570
360 P=PEEK(S+NX+NY*32)
370 IF P=96 THEN 420
380 IF P<>255 THEN 460
390 PRINT @481,"";
400 IF NX<>DR(DO,1) OR NY<>DR(DO,2) THEN PRINT "LOCKED
!";:GOTO 450
410 PRINT "UNLOCKED!";
420 POKE S+PX+PY*32,96-159*(PX=DR(DO,1) AND PY=DR(DO,2
))
430 POKE S+NX+NY*32,106:PX=NX:PY=NY
440 IF P<>255 THEN 460
450 FOR D=1 TO 200:NEXT D:PRINT@481,BL$;
460 IF SC<TS THEN 560
470 QX=RX+SGN(PX-RX):QY=RY+SGN(PY-RY):F=-1
480 P=PEEK(S+QX+QY*32):IF P=106 OR P=96 THEN 530
490 D=2*INT(RND(0)*2)-1
500 IF F THEN QX=RX+D:QY=RY:GOTO 520
510 QY=RY+D:QX=RX
520 F=NOT F:GOTO 480
530 POKE S+RX+RY*32,96:POKE S+QX+QY*32,79
540 IF P=106 THEN 590
550 RX=QX:RY=QY
560 SC=SC+10:PRINT @497,SC;:GOTO 270
570 FOR I=1 TO 40:SOUND I,1:NEXT I
580 CLS:PRINT "YOU ESCAPED!":GOTO 610
590 SOUND 127,10
600 CLS:PRINT:PRINT "SORRY, YOU WERE CAUGHT!"
610 PRINT:PRINT "YOUR SCORE WAS";SC
620 IF SC>HS THEN HS=SC
630 PRINT:PRINT "THE HIGH SCORE IS";HS
640 PRINT:PRINT "PRESS <P> OR FIRE BUTTON TO"
650 PRINT "PLAY AGAIN OR <Q> TO QUIT."
660 K$=INKEY$:IF K$="P" OR PEEK(65280)=254 THEN 110
670 IF K$="Q" THEN END ELSE 660
1000 DATA 16,0,31,3,31,11,16,14,0,3,0,11
```

TRS-80 Model III/*Renegade Robot II*

```
9 REM --THIS VERSION USES KEYBOARD ONLY--
10 DIM DR(6,2):S=15360:RV=0.5:PRINT CHR$(21);
20 FOR I=1 TO 6:READ DR(I,1),DR(I,2):NEXT I
30 CLS:PRINT TAB(25);"RENEGADE ROBOT II"
40 PRINT@342,"PRESS ANY KEY TO BEGIN."
50 IF INKEY$="" THEN Q=RND(0):GOTO 50
60 CLS:FOR I=0 TO 63
70 TB=S+I:BB=TB+896:LS=S+I*64:RS=LS+63
80 POKE TB,191:POKE TB+64,191
90 POKE BB,191:POKE BB+64,191
100 IF I>1 AND I<14 THEN POKE LS,191:POKE RS,191
110 NEXT I
120 FOR I=1 TO 6:P=DR(I,1)+DR(I,2)*64
```

```
130 POKE S+P,128:NEXT I
140 FOR I=3 TO 13 STEP 2:FOR J=2 TO 59
150 IF RND(10)>RV*10 THEN POKE S+J+I*64,7
160 NEXT J,I:PRINT @987,"SCORE: 0";
170 PRINT@864," ";
180 PX=RND(10)+1:PY=RND(6)*2
190 RX=RND(10)+52:RY=RND(6)*2
200 SC=0:DO=RND(6):TS=RND(500)+500
210 POKE S+PX+PY*64,253
220 POKE S+RX+RY*64,254
230 K$=INKEY$
240 NX=PX-(K$="O" OR K$="L" OR K$=".")+(K$="U" OR K$="
J" OR K$="M")
250 NY=PY-(K$="M" OR K$="," OR K$=".")+(K$="U" OR K$="
I" OR K$="O")
260 IF PX=NX AND PY=NY THEN 380
270 IF NX<0 OR NX>63 OR NY<1 OR NY>15 THEN 490
280 P=PEEK(S+NX+NY*64)
290 IF P=32 THEN 340
300 IF P<>128 THEN 380
310 PRINT @962,"";
320 IF NX<>DR(DO,1) OR NY<>DR(DO,2) THEN PRINT "LOCKED
!";:GOTO 370
330 PRINT "UNLOCKED!";
340 POKE S+PX+PY*64,32-96*(PX=DR(DO,1) AND PY=DR(DO,2)
)
350 POKE S+NX+NY*64,253:PX=NX:PY=NY
360 IF P<>128 THEN 380
370 FOR D=1 TO 200:NEXT D:PRINT @962,STRING$(9,191);
380 IF SC<TS THEN 480
390 QX=RX+SGN(PX-RX):QY=RY+SGN(PY-RY):F=-1
400 P=PEEK(S+QX+QY*64):IF P=253 OR P=32 THEN 450
410 D=2*INT(RND(0)*2)-1
420 IF F THEN QX=RX+D:QY=RY:GOTO 440
430 QY=RY+D:QX=RX
440 F=NOT F:GOTO 400
450 POKE S+RX+RY*64,32:POKE S+QX+QY*64,254
460 IF P=253 THEN 500
470 RX=QX:RY=QY
480 SC=SC+10:PRINT @993,SC;:GOTO 230
490 CLS:PRINT:PRINT "YOU ESCAPED!":GOTO 510
500 CLS:PRINT:PRINT "SORRY, YOU WERE CAUGHT!"
510 PRINT:PRINT "YOUR SCORE WAS";SC
520 IF SC>HS THEN HS=SC
530 PRINT:PRINT "THE HIGH SCORE IS";HS
540 PRINT:PRINT "PRESS <P> TO PLAY AGAIN"
550 PRINT "OR <Q> TO QUIT."
560 K$=INKEY$:IF K$="P" THEN 60
570 IF K$="Q" THEN END ELSE 560
1000 DATA 32,1,63,4,63,12,32,14,0,4,0,12
```

PROGRAMMING P.S.

Correction to a previous program

Atari/*Banner* *(April 1985, page 64)*
As published, this program always uses asterisks when it draws the letters in your banner. To make it use the character of your choice, change line 630 to read as follows:

```
630 IF V>=BIN(K) THEN V=V-BIN(K):C$=CH$:GOTO 650
```

Correction to a program from "Helpful Hints"

Kaypro or Other CP/M Machine/*Translate BASIC Programs* *(April 1985, page 51)*
A parenthesis was omitted from the Kaypro equivalent of the Model III statement PRINT@W,... The correct Kaypro substitution for this statement is

```
PRINT CHR$(30);STRING$((W-INT(W/64)*64),12);STRING$(IN
T(W/64),10);...
```

HOME INFORMATION MANAGER For the C 64

PROGRAM BY STEVEN C.M. CHEN
INTRODUCTION BY LANCE PAAVOLA

Does your address book have so many crossouts and erasures that you can hardly read it? Can you tell how many times you've made a casserole by how much of the recipe card is obscured by splotches and spills?

With *Home Information Manager*, you can gather your files onto a slim, neat, portable disk or cassette, yet print out a "hard copy" whenever you want.

Electronic filing programs like this one are very versatile; their use is limited only by your imagination. Some of the most sophisticated file-management programs, called data-base management systems, pack enough power to handle all the computing needs of an entire business. *(See Working at Home, page 12.)*

But if you're not ready yet to buy a commercial program—maybe you're unsure whether storing your records electronically makes sense, or you think all you'll want to computerize is your 100-name Christmas card list—try *Home Information Manager*.

THE FIRST STEPS

Begin by carefully typing in and SAVEing the program. *(See Tips to the Typist, page 53, for help with typing in programs.)* Before you RUN the program, make sure your printer (if you have one) and disk drive or Datassette are connected and turned on.

Don't be discouraged if it doesn't RUN the first time; with such a long program, you're bound to make typing errors. LIST your program to printer and proofread it carefully. When you've got the program running, SAVE it and make a backup.

You can save your own data on the same disk or cassette, but you might want to start right off keeping data on separate disks or tapes. If that's your choice, get a blank tape or disk now, and format the disk. The name of the disk will appear on the screen when you list your fileboxes, so if you're going to have several disks for your data, name each appropriately (e.g., MOM, DAD or FINANCIAL, PERSONAL).

Before you transfer important records to your C 64, try out the program by creating a few sample fileboxes and filling in some info. When you're confident that you've located any remaining typing errors and have a good idea of how the program operates, you're ready to start using it in earnest.

A COMPUTERIZED FILEBOX

To make *Home Information Manager* easy to learn, we've designed it to work just like a recipe box filled with index cards. You can have as many "fileboxes" as will fit on your

disks or cassettes.

Since you'll usually put a different kind of information on each line of each index card, you should assign a name to each line to remind you what goes where. (Choose "1" from the main menu.) For example, for a catalog of your books (or books you've borrowed or lent!), you might label the first line AUTHOR; the second, TITLE; the third, PUBLISHER; the fourth, DATE; the fifth, SUBJECT for general subject area; and the sixth, LOCATION for where it's shelved or who borrowed it.

Once you've typed in the information about your books (choice 2), you can then print out a catalog of your library (choice 4); add new books as you acquire them (choice 2 again) and remove ones you've disposed of (choice 3); change any entry (e.g., change the LOCATION of a book from JOHN to BEDROOM—choice 3 again); or display or print out the information about a particular book or all the books on a given subject (also choice 3).

Choice 6 lets you store the filebox you're working on (all cards and the card format) on disk or tape; bring a new one into memory from disk or tape; and remove (erase) a filebox from disk. Choice 5, available only to disk users, displays the name of your disk and of each filebox you've saved on it.

EASY TO USE

For the most part, it will be obvious how to use the program. Here are some general principles to keep in mind.

1. *When to Press RETURN.* When you see a menu and the SELECTION→ prompt, or when you're asked for a line number, just press the number key for the option or line you want. You'll go directly to the option or line you've chosen and won't have to press RETURN. However, whenever you're asked to type in something that might be longer than just one character—a card number, say, or a line name—the program waits for you to press RETURN to indicate that you're done.

2. *Moving Back Up Through the Menus.* If you ever get lost in the program, decide you don't want the choice you just made after all, or finish with an option, you can always press the C 64's version of the ESCAPE key: the LEFT-ARROW key (found at the upper left-hand corner of the keyboard). This will take you to the previous menu at any time (except when you're reading from or writing onto a disk or tape), even when you're in the middle of typing in a line.

3. *Built-in Editor.* When you see a less-than sign (<) and a blinking cursor, you are using the built-in editor subprogram. That means that you can use several of the familiar Commodore editing keys. You are always in "insert mode"; that is, any character you type will be inserted into the line at the position of the cursor. The left and right cursor controls move the cursor within the line, and the DEL key deletes the character to the left of the cursor.

A FEW HINTS

1. Once you start adding cards to the filebox, you can't add or delete lines without losing all the cards in memory. (You *can* change the names of existing lines, though.)

2. Since there's no sort function to rearrange your cards in alphabetic or numeric order, you should type your information in the order in which you want it to appear. You *can* add a card in the middle, but then you have to wait for the computer to shift all the other cards back.

3. When you choose DISPLAY/CHANGE/REMOVE or PRINT and then WORK WITH (or PRINT) SELECTED CARDS, you're given two choices. MATCH FROM BEGINNING OF LINE checks to see if a line *begins* with the characters you've specified. SEARCH WHOLE LINE looks for those characters *everywhere* within a line, but takes much longer. For example, if you tell the program to look for SMITH, SEARCH WHOLE LINE would find both SMITH, JOE and JOE SMITH; MATCH FROM BEGINNING OF LINE would find only SMITH, JOE.

4. You can change the predefined PRINT format by choosing CHANGE PRINTER OPTIONS from the PRINT CARD(S) menu.

5. Remember to backup your disks frequently—certainly after every session in which you enter a lot of information.

Commodore 64 w/disk drive or Datassette (printer optional) /*Home Information Manager*

```
10 DIM DM$(2),F$(9),M$(7),MI(8),SM$(20),TY$(2),TY(2),Y
$(2700),YN$(1),Z$(9)
20 T=53272:POKE T+8,14:POKE T+9,12:POKE T,21
30 POKE 649,1:LOC=49152
40 E$=CHR$(95):SP$=CHR$(32):RE$=CHR$(13):HM$=CHR$(19)
50 CL$=CHR$(147):BL$=CHR$(144):WH$=CHR$(5)
60 PRINT CHR$(8);WH$;CL$:FT=0:RT=0
70 YN$(0)="N":YN$(1)="Y":LM=0:SP=0:PF=0:HF=1
80 FOR I=49152 TO 49215:READ V:POKE I,V:NEXT I
90 FOR I=1 TO 7:READ M$(I):NEXT I:TEST$="FILEBOX"
100 MI(0)=1:FOR I=1 TO 7:READ T:MI(I+1)=MI(I)+T
110 FOR J=MI(I) TO MI(I+1)-1:READ SM$(J):NEXT J,I
120 TY$(1)="W":TY$(2)="R":TY(1)=1:TY(2)=0
130 FOR I=0 TO 2:READ DM$(I):NEXT I
140 L$=BL$+SP$:FOR I=1 TO 38
150 L$=L$+CHR$(195):NEXT I:L$=L$+WH$
160 PRINT CL$:GOSUB 2600:PRINT HM$;L$
170 PRINT TAB(8);"HOME INFORMATION MANAGER"
180 PRINT L$;RE$:FOR I=1 TO 6
190 PRINT TAB(5);"<";CHR$(I+48);"> ";M$(I);RE$:NEXT I
200 PRINT:PRINT TAB(9);"SELECTION -->";
210 A$="6":GOSUB 2300:MS=VAL(K$):IF K$=E$ THEN MS=7
220 IF (MS<>3 AND MS<>4) OR RT>0 THEN 250
230 GOSUB 3000:PRINT "NO CARDS PRESENT."
240 GOSUB 2100:GOTO 160
250 ON MS GOTO 260,580,920,1040,1360,1530,1980
260 FL=29:GOSUB 3100:IF K$=E$ THEN 160
270 A$=MID$(STR$(FT),2):IF SE>2 OR RT<1 THEN 290
280 GOSUB 3020:GOSUB 2700:ON -(K$=E$) GOTO 260:RT=0
290 IF FT=0 AND SE>1 THEN 460
300 ON SE GOTO 310,390,480,550
310 GOSUB 3200:IF FT<9 THEN 340
320 PRINT "A CARD HAS ONLY 9 LINES!"
330 GOSUB 2100:GOTO 260
340 FT=FT+1:C=FT
350 H$="LINE"+STR$(C)+":":T$=""
360 GOSUB 6000:IF K$=E$ THEN FT=FT-1:GOTO 560
370 F$(FT)=T$:IF FT<9 THEN 310
380 GOSUB 3200:GOTO 330
390 GOSUB 3200:IF FT<1 THEN 470
400 A$=MID$(STR$(FT),2)
410 PRINT "WHICH LINE DO YOU WANT TO DELETE? ";
420 GOSUB 2300:IF K$=E$ THEN 560
430 C=VAL(K$):IF C=FT THEN 450
440 FOR I=C TO FT-1:F$(I)=F$(I+1):NEXT I
450 FT=FT-1:IF FT>0 THEN 390
460 GOSUB 3020
470 PRINT "NO LINES PRESENT.":GOSUB 2100:GOTO 560
480 GOSUB 3200
490 PRINT "CHANGE THE NAME OF WHICH LINE #? ";
500 GOSUB 2300:IF K$=E$ THEN 260
510 PRINT K$:C=VAL(K$)
520 H$="LINE"+STR$(C)+":":T$=F$(C)
530 GOSUB 6000:IF K$=E$ THEN 480
540 F$(C)=T$:GOTO 480
550 GOSUB 3200:GOTO 260
560 MAX=0:IF FT>0 THEN MAX=INT(2700/FT)
570 GOTO 260
580 W$=E$:IF FT>0 THEN 610
590 GOSUB 3000:PRINT "YOU MUST ";M$(1);" (OPTION 1"
600 PRINT "ON MAIN MENU) FIRST.":GOSUB 2100:GOTO 160
610 IF RT=MAX THEN GOSUB 3000:GOTO 670
```

```
620 GOSUB 3100:IF K$=E$ THEN 160
630 GOSUB 3020:FL=38:IF SE=2 THEN 780
640 GOSUB 2900
650 RT=RT+1:IF RT<MAX+1 THEN 680
660 RT=MAX
670 PRINT DM$(2):GOSUB 2100:GOTO 160
680 PRINT TAB(15);"CARD";RT
690 C=RT:FOR L=1 TO FT:GOSUB 3300
700 IF K$<>E$ THEN Y$(T)=T$:GOTO 720
710 L=FT:RT=RT-1
720 NEXT L:IF K$=E$ THEN 620
730 PRINT L$:PRINT DM$(0)
740 POKE 214,19:PRINT:PRINT "CARDS USED:";RT
750 PRINT "CARDS LEFT:";STR$(MAX-RT);SP$
760 GOSUB 2200:ON -(K$=SP$) GOTO 640:GOTO 160
770 GOSUB 3020:IF RT=MAX THEN 670
780 H$="INSERT BEFORE WHICH CARD #?":T$=""
790 FL=39:GOSUB 6000:IF K$=E$ THEN 620
800 GOSUB 3020
810 C=VAL(T$):IF C>0 AND C<RT+1 THEN 830
820 PRINT DM$(1):GOSUB 2100:GOTO 610
830 PRINT TAB(13);"NEW CARD";C
840 FOR L=1 TO FT:GOSUB 3300
850 IF K$=E$ THEN L=FT:GOTO 870
860 Z$(L)=T$
870 NEXT L:IF K$=E$ THEN 620
880 FOR J=RT*FT TO (C-1)*FT+1 STEP -1
890 Y$(J+FT)=Y$(J):NEXT J:RT=RT+1
900 FOR J=1 TO FT:Y$((C-1)*FT+J)=Z$(J):NEXT J
910 GOTO 770
920 F=-1
930 GOSUB 3100:IF K$=E$ THEN 160
940 GOSUB 3020:IF SE=2 THEN 1030
950 H$="START WITH WHICH CARD?":T$="":FL=32
960 GOSUB 6000:IF K$=E$ THEN 930
970 V=VAL(T$):IF V>0 AND V<RT+1 THEN 990
980 PRINT L$:PRINT DM$(1):GOSUB 2100:GOTO 930
990 GOSUB 3900:J=V
1000 W$="":GOSUB 4000:IF W$=E$ THEN 930
1010 J=J+1:IF J<RT+1 THEN 1000
1020 GOSUB 2800:PRINT DM$(2):GOSUB 2100:GOTO 930
1030 GOSUB 5000:GOTO 930
1040 RA$=" (1-"+MID$(STR$(RT),2)+")?"
1050 FL=6:GOSUB 3100:IF K$=E$ THEN 160
1060 GOSUB 3020:ON SE GOTO 1070,1100,1150,1160,1170
1070 PRINT "PRINT WHICH CARD #";RA$
1080 GOSUB 3700:IF RF THEN 1050
1090 R1=T:R2=T:GOSUB 3800:GOTO 1040
1100 PRINT "START WITH WHICH CARD #";RA$
1110 GOSUB 3700:R1=T:IF RF THEN 1050
1120 PRINT "STOP WITH WHICH CARD #";RA$
1130 GOSUB 3700:R2=T:IF RF OR R2<R1 THEN 1050
1140 GOSUB 3800:GOTO 1040
1150 R1=1:R2=RT:GOSUB 3800:GOTO 1040
1160 GOSUB 5000:GOTO 1040
1170 FL=37:VC=3:H$="LEFT MARGIN (0-40):"
1180 T$=MID$(STR$(LM),2)
1190 GOSUB 6000:IF K$=E$ THEN 1040
1200 LM=VAL(T$):IF LM>-1 AND LM<41 THEN 1230
1210 LM=0:YL=VC:BL=1:XL=0:GOSUB 2400
1220 YL=YL-1:GOSUB 2500:GOTO 1180
1230 VC=VC+1:H$="BLANK LINES BETWEEN CARDS (0-66):"
1240 T$=MID$(STR$(SP),2)
1250 GOSUB 6000:IF K$=E$ THEN 1040
1260 SP=VAL(T$):IF SP>-1 AND SP<67 THEN 1290
1270 SP=0:YL=VC:BL=1:XL=0:GOSUB 2400
1280 YL=YL-1:GOSUB 2500:GOTO 1240
1290 H$="PAUSE AFTER EACH CARD (Y/N):":T$=YN$(PF)
1300 GOSUB 6000:IF K$=E$ THEN 1040
1310 PF=-(LEFT$(T$,1)="Y")
1320 H$="PRINT LINE NAMES (Y/N):":T$=YN$(HF)
1330 GOSUB 6000:IF K$=E$ THEN 1040
1340 HF=-(LEFT$(T$,1)="Y")
1350 PRINT L$:GOSUB 2100:GOTO 1040
1360 GOSUB 3000
1370 F=0:C=0:D$="":CLOSE 2:OPEN 2,8,0,"$"
1380 PRINT "DISK NAME: ";
1390 GET#2,N$:IF N$=CHR$(199) THEN 1500
1400 IF N$<>CHR$(34) THEN 1390
1410 GET#2,N$:IF N$=CHR$(34) THEN 1440
1420 GET W$:IF W$=E$ THEN CLOSE 2:GOTO 160
1430 D$=D$+N$:GOTO 1410
1440 IF F=0 THEN PRINT D$:F=1:GOTO 1390
1450 IF LEFT$(D$,4)<>"HIM/" THEN D$="":GOTO 1390
1460 PRINT MID$(D$,5):D$="":F=F+1:C=1:IF F<16 THEN 139
0
1470 F=1:PRINT L$:PRINT DM$(0):GOSUB 2200
1480 IF K$=E$ THEN CLOSE 2:GOTO 160
1490 GOSUB 3000:GOTO 1390
1500 CLOSE 2:PRINT RE$;L$
1510 IF C=0 THEN PRINT "NO FILEBOXES ON THIS DISK."
1520 GOSUB 2200:GOTO 160
1530 FL=35
1540 GOSUB 2600:GOSUB 3100:IF K$=E$ THEN 160
1550 GOSUB 3020
1560 IF (SE<>2 AND SE<>4) OR RT<1 THEN 1580
1570 GOSUB 2700:GOSUB 2900:IF K$=E$ THEN 1540
1580 IF SE>2 THEN 1620
1590 PRINT "POSITION TAPE; THEN PRESS <SPACE BAR>."
1600 GOSUB 2200:IF K$=E$ THEN 1530
1610 OPEN 2,1,TY(SE),"":GOTO 1810
1620 T$="":IF SE=3 THEN H$="STORE UNDER WHAT NAME?"
1630 IF SE=4 THEN H$="GET WHICH FILEBOX?"
1640 IF SE=5 THEN H$="REMOVE WHICH FILEBOX?"
1650 GOSUB 6000:IF T$="" OR K$=E$ THEN 1540
1660 OPEN 2,8,8,PR$+"0:HIM/"+T$+",S,R":CLOSE 2
1670 OPEN 15,8,15:INPUT#15,ER,ER$:CLOSE 15
1680 GOSUB 2900:IF ER<>0 THEN 1700
1690 ON SE-2 GOTO 1780,1800,1780
1700 IF ER=62 AND SE=3 THEN 1800
1710 IF ER=62 THEN PRINT "THAT FILEBOX IS NOT ON THIS
DISK.":GOTO 1740
1720 IF ER<>72 THEN PRINT ER$;".":GOTO 1740
1730 PRINT "SORRY, THIS DISK IS FULL.  TRY ANOTHER."
1740 PRINT L$:GOSUB 2100:GOTO 1540
1750 PRINT "THAT FILEBOX IS ALREADY ON THIS DISK."
1760 PRINT "PRESS <SPACE BAR> TO REPLACE IT."
1770 GOSUB 2200:IF K$=E$ THEN 1540
1780 OPEN 15,8,15:PRINT#15,"S0:HIM/"+T$:CLOSE 15
1790 IF SE=5 THEN 1540
1800 OPEN 2,8,2,"0:HIM/"+T$+",S,"+TY$(SE-2)
1810 PRINT CL$:GOSUB 3020
1820 ON SE GOTO 1830,1880,1830,1880
1830 PRINT#2,"FILEBOX":PRINT#2,FT:PRINT#2,RT
1840 PRINT#2,LM:PRINT#2,SP:PRINT#2,PF:PRINT#2,HF
1850 FOR J=1 TO FT:PRINT#2,F$(J):NEXT J
1860 FOR J=1 TO RT*FT:PRINT#2,Y$(J):NEXT J
1870 CLOSE 2:GOTO 1530
1880 INPUT#2,C$:IF C$=TEST$ THEN 1910
1890 CLOSE2:PRINT "THIS IS NOT A FILEBOX FILE."
1900 GOTO 1960
1910 INPUT#2,FT:INPUT#2,RT:INPUT#2,LM
1920 INPUT#2,SP:INPUT#2,PF:INPUT#2,HF
1930 FOR J=1 TO FT:INPUT#2,F$(J):NEXT J
1940 FOR J=1 TO RT*FT:INPUT#2,Y$(J):NEXT J
1950 CLOSE 2:PRINT "FILEBOX IS NOW IN MEMORY."
1960 GOSUB 2600:GOSUB 2100:GOTO 1540
1980 GOSUB 3100:IF SE=1 OR K$=E$ THEN 160

1990 PRINT CL$:END
2000 GET K$:ON -(K$="") GOTO 2000:RETURN
2100 GOSUB 2000:ON -(K$<>E$) GOTO 2100:RETURN
2200 GOSUB 2000:IF K$<>E$ AND K$<>SP$ THEN 2200
2210 RETURN
2300 GOSUB 2000
2310 IF K$<>E$ AND (K$<"1" OR K$>A$) THEN 2300
2320 RETURN
2400 SYS 49152,YL,BL:RETURN
2500 POKE 214,YL:PRINT:POKE 211,XL:RETURN
2600 XL=0:YL=22:GOSUB 2500:PRINT L$
2610 PRINT TAB(11);"PRESS <";E$;"> TO EXIT.";:RETURN
2700 PRINT "WARNING!  USE OF THIS OPTION WILL ERASE"
2710 PRINT "CONTENTS OF ALL CARDS FROM MEMORY."
2720 PRINT:PRINT DM$(0):GOSUB 2200:RETURN
```

```
2800 SYS LOC,3,20:POKE 214,2:PRINT:RETURN
2900 SYS LOC,3,15:POKE 214,2:PRINT:RETURN
3000 YL=0:BL=23:GOSUB 2400
3010 PRINT HM$;L$:R$=M$(MS):GOTO 3040
3020 YL=0:BL=16:GOSUB 2400
3030 PRINT HM$;L$:R$=SM$(MI(MS)+SE-1)
3040 PRINT SPC((40-LEN(R$))/2);R$:PRINT L$:RETURN
3100 GOSUB 3000:PRINT:FOR I=MI(MS) TO MI(MS+1)-1
3110 PRINT TAB(6);"<";CHR$(I+49-MI(MS));"> ";SM$(I)
3120 PRINT:NEXT I:A$=RIGHT$(STR$(MI(MS+1)-MI(MS)),1)
3130 PRINT:PRINT TAB(10);"SELECTION -->";
3140 GOSUB 2300:SE=VAL(K$):RETURN
3200 GOSUB 3020:IF FT<1 THEN RETURN
3210 FOR I=1 TO FT:PRINT BL$;
3220 PRINT "LINE";STR$(I);": ";WH$;F$(I):NEXT I
3230 PRINT L$:IF MS=3 OR MS=4 THEN RETURN
3240 IF SE=4 THEN GOSUB 2100
3250 RETURN
3300 T=(C-1)*FT+L:H$=F$(L)+":":T$=""
3310 IF W$="C" THEN T$=Y$(T)
3320 GOSUB 6000:RETURN
3400 W$="":PRINT#4,TAB(LM+15);"CARD";J
3410 FOR Z=1 TO FT:T$="":IF HF THEN T$=F$(Z)+": "
3420 PRINT#4,TAB(LM);T$;Y$((J-1)*FT+Z)
3430 GET W$:IF W$=E$ THEN Z=FT:J=R2
3440 NEXT Z:IF W$=E$ THEN RETURN
3450 IF SP=0 THEN 3470
3460 FOR Z=1 TO SP:PRINT#4:NEXT Z
3470 GOSUB 2900:IF PF=0 THEN RETURN
3480 PRINT DM$(0):GOSUB 2200:IF K$=SP$ THEN RETURN
3490 J=R2:RETURN
3500 PRINT TAB(15);"CARD";J:PRINT L$
3510 FOR Z=1 TO FT:PRINT F$(Z);":";Y$((J-1)*FT+Z)
3520 NEXT Z:PRINT L$:RETURN
3600 PRINT "PRESS <SPACE BAR> WHEN PRINTER IS"
3610 PRINT "READY.":GOSUB 2200:RETURN
3700 RF=-1:H$="?":T$="":GOSUB 6000:PRINT L$
3710 IF K$=E$ OR T$="" THEN RETURN
3720 T=VAL(T$):IF T>0 AND T<=RT THEN RF=0:RETURN
3730 PRINT:PRINT L$:PRINT DM$(1)
3740 GOSUB 2100:RETURN
3800 GOSUB 3600:IF K$=E$ THEN RETURN
3810 OPEN4,4:CMD4
3820 FOR J=R1 TO R2:GOSUB 3400
3830 NEXT J:PRINT#4:CLOSE4:RETURN
3900 POKE 214,18:PRINT
3910 PRINT "PRESS <C> TO CHANGE THIS CARD,"
3920 PRINT "PRESS <P> TO PRINT IT,"
3930 PRINT "PRESS <R> TO REMOVE IT, OR"
3940 PRINT "PRESS <SPACE BAR> TO MOVE TO NEXT CARD.":R
ETURN
4000 GOSUB 2900:GOSUB 3500
4010 GOSUB 2000:IF K$=E$ THEN W$=E$:J=RT:RETURN
4020 IF K$=SP$ THEN RETURN
4030 ON -(K$="C") GOTO 4110:IF K$="R" THEN 4170
4040 IF K$<>"P" THEN 4010
4050 GOSUB 2800
4060 IF F THEN GOSUB 3600:IF K$=E$ THEN 4100
4070 F=0:PRINT "NOW PRINTING CARD";J
4080 OPEN4,4:CMD4
4090 GOSUB 3400:PRINT#4:CLOSE4
4100 J=J-1:GOSUB 3900:RETURN
4110 GOSUB 2800
4120 GOSUB 3020:FL=39:PRINT TAB(15);"CARD";J
4130 C=J:W$="C":FOR L=1 TO FT:GOSUB 3300
4140 IF K$=E$ THEN L=FT:GOTO 4160
4150 Y$(T)=T$
4160 NEXT L:J=J-1:GOSUB 3900:RETURN
4170 GOSUB 2800:GOSUB 3500
4180 PRINT "PRESS <SPACE BAR> TO REMOVE THIS CARD."
4190 GOSUB 2200:GOSUB 3900:IF K$=E$ THEN J=J-1:RETURN
4200 IF J=RT THEN 4220
4210 FOR Z=(J-1)*FT+1 TO (RT-1)*FT:Y$(Z)=Y$(Z+FT):NEXT
 Z
4220 RT=RT-1:J=J-1:RETURN
4230 PRINT "<SPACE BAR> TO MOVE TO NEXT CARD.":RETURN
5000 GOSUB 3210:A$=RIGHT$(STR$(FT),1)
5010 W$="":PRINT "SELECT CARDS BY WHICH LINE #?";
5020 GOSUB 2300:IF K$=E$ THEN RETURN
5030 V=VAL(K$):GOSUB 2900
5040 PRINT "WHAT TEXT ARE YOU SEARCHING FOR?"
5050 FL=40:H$="?":T$="":GOSUB 6000
5060 IF K$=E$ OR T$="" THEN RETURN
5070 GOSUB 2400:POKE 214,2:PRINT:PRINT
5080 PRINT TAB(5);"<1> MATCH FROM BEGINNING OF LINE"
5090 PRINT RE$;TAB(5);"<2> SEARCH WHOLE LINE":PRINT
5100 A$="2":PRINT TAB(8);"SELECTION -->";
5110 GOSUB 2300:IF K$=E$ THEN RETURN
5120 GOSUB 2400:SF=0:SR$=T$:LS=LEN(SR$)
5130 J=1:IF K$="2" THEN 5210
5140 POKE 214,2:PRINT
5150 PRINT TAB(10);"CHECKING CARD";J
5160 IF SR$<>LEFT$(Y$((J-1)*FT+V),LS) THEN 5180
5170 SF=1:W$="":GOSUB 3900:GOSUB 4000:GOSUB 2800
5180 GET X$:IF W$=E$ OR X$=E$ THEN RETURN
5190 J=J+1:IF J<=RT THEN 5140
5200 GOTO 5320
5210 Z$=Y$((J-1)*FT+V):LZ=LEN(Z$)
5220 POKE 214,2:PRINT
5230 PRINT TAB(10);"CHECKING CARD";J
5240 IF Z$="" OR LZ<LS THEN 5310
5250 FOR W=1 TO LZ-LS+1
5260 IF SR$<>MID$(Z$,W,LS) THEN 5280
5270 W=256:SF=1:W$="":GOSUB 3900:GOSUB 4000:GOSUB 2800
5280 GET X$:IF W$=E$ OR X$=E$ THEN W=300
5290 NEXT W:IF W=300 THEN RETURN
5300 IF W$=E$ OR X$=E$ THEN RETURN
5310 J=J+1:IF J<RT+1 THEN 5210
5320 GOSUB 2800:IF SF<1 THEN 5340
5330 PRINT "NO MORE CARDS MATCH!":GOSUB 2100:RETURN
5340 PRINT "NO CARDS MATCH!":GOSUB 2100:RETURN
6000 T$=SP$+T$:PRINT H$;
6010 XL=PEEK(211):YL=PEEK(214)-1:PC=2:HL=XL
6020 GOSUB 2500:PRINT T$;"<";SP$;
6030 POKE 214,YL:PRINT:POKE 211,XL+PC-1
6040 POKE 204,0:GET K$:IF K$="" THEN 6040
6050 POKE 204,1:K=ASC(K$):IF K>31 AND K<91 THEN 6120
6060 ER=(K=13)+(K=95):IF ER THEN 6150
6070 CU=-(K=29)+(K=157):IF CU=0 THEN 6090
6080 PC=PC+CU:PC=PC-(PC<2)+(PC>LEN(T$)+1):GOTO 6020
6090 IF PC<3 OR K<>20 THEN 6030
6100 T$=LEFT$(T$,PC-2)+MID$(T$,PC,LEN(T$))
6110 PC=PC-1:GOTO 6020
6120 IF LEN(T$)>FL-XL-1 THEN 6030
6130 T$=LEFT$(T$,PC-1)+K$+MID$(T$,PC,LEN(T$))
6140 PC=PC+1:GOTO 6020
6150 GOSUB 2500:PRINT T$;SP$
6160 T$=MID$(T$,2):RETURN
7000 DATA 32,253,174,32,235,183,134,253,169,0,133
7010 DATA 251,169,4,133,252,166,20,240,16,24,165
7020 DATA 251,105,40,133,251,165,252,105,0,133,252
7030 DATA 202,208,240,166,253,169,32,160,39,145
7040 DATA 251,136,16,251,24,165,251,105,40,133,251
7050 DATA 165,252,105,0,133,252,202,208,231,96
8000 DATA DESIGN CARD FORMAT,ADD CARD(S)
8010 DATA DISPLAY/CHANGE/REMOVE CARD(S),PRINT CARD(S)
8020 DATA LIST FILEBOXES ON DISK
8030 DATA GET NEW/STORE/REMOVE FILEBOX,QUIT
8040 DATA 4,ADD NEW LINES,DELETE LINES
8050 DATA CHANGE NAMES OF LINES,DISPLAY CARD FORMAT
8060 DATA 2,ADD AT END,INSERT BEFORE END
8070 DATA 2,LOOK AT CARDS CONSECUTIVELY
8080 DATA WORK WITH SELECTED CARD(S)
8090 DATA 5,PRINT ONE CARD,PRINT A RANGE OF CARDS
8100 DATA PRINT ALL CARDS,PRINT SELECTED CARD(S)
8110 DATA CHANGE PRINTER OPTIONS,1,DISK
8120 DATA 5,STORE THIS FILEBOX ON TAPE
8130 DATA GET A FILEBOX FROM TAPE
8140 DATA STORE THIS FILEBOX ON DISK
8150 DATA GET A FILEBOX FROM DISK
8160 DATA REMOVE A FILEBOX FROM DISK
8170 DATA 2,RETURN TO MAIN MENU,QUIT
9000 DATA "PRESS <SPACE BAR> TO CONTINUE."
9010 DATA NO SUCH CARD!,NO MORE CARDS!
```

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K-POWER®
FOR THE COMPUTER GENERATION
Edited by Anne Krueger

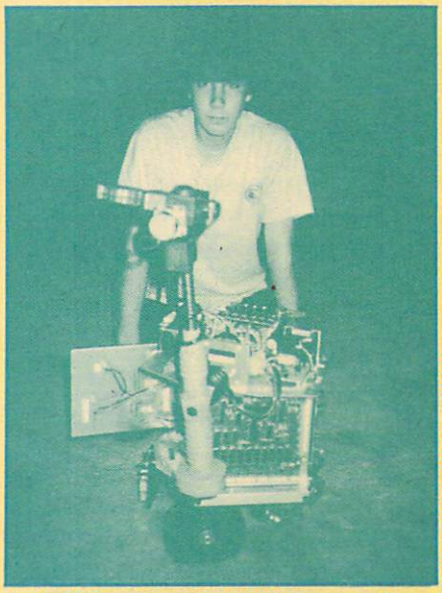
Compucopia! Page 72
Short Joystick Routines

The Making of a Hero

I've been hooked on robots ever since *Star Wars*. After reading everything I could about them, I decided to build one to have around the house. I didn't know how to build a robot from scratch, so I started to look at robotic kits. HERO 1, from Healthkit/Zenith, had everything I wanted in a robot: an arm, a voice, and the ability to sense light, sound, and movement. Plus it included options for expansion.

I came home from vacation, and there it was—four large boxes in the middle of the living room. I couldn't wait to see it when it was finished! Later that night, after I opened the boxes and looked at the thick instruction manuals, I got nervous. I didn't know a lot about electronics, and there was so much to do!

I thought that the circuit boards would be preassembled. But the boxes were filled with thousands of parts and yards of multicolored wire. I could see that building HERO was going to be a full-time job. But I was determined to do it! It actually took me 115 hours over three months. I enjoyed every minute of it. Here's a step-by-step look at what I did.



PHOTOGRAPH BY PAM HOROWITZ

Daniel Horowitz, 16, with his homemade, hi-tech pal, HERO 1.

Week 1. I soldered parts onto a practice circuit board. That's the most important skill because each of the robot's small electronic components has to be soldered onto circuit boards, and each wire has to have a connector soldered to it. At first it seemed impossible! But the step-by-step instructions made it easy. Each step included a diagram showing where a component or wire goes. Also, the parts for each board were packed together. I double-checked each step to make sure it was right.

Week 2. Putting together the sense and motion circuit boards took five days. They control HERO's ability to sense light and sound, and let HERO obey my commands. They

Software Scoop!

Finally! Software that's priced right . . . $9.99! You heard right! **Mastertronic International, Inc.** (an American offshoot of a British company) has introduced a low-cost line of software for the Commodore 64 and Apple computers. Titles include ***Chiller***, ***1985: The Day After***, ***Kikstart***, and ***Challenger***. *Chiller* hit the top of the British best-seller charts and won critical acclaim for its designers **Richard** and **David Darling**. . . . Attention text-adventure fans! **Infocom**'s latest in interactive fiction is ***Wishbringer***. Set in a small, seaside town, *Wishbringer* puts you in a mail clerk's shoes. Your job is to deliver a mysterious envelope to the Olde Magick Shoppe. Once there, you learn that the ancient owner's cat has been kidnapped by "the Evil One," so you set off in pursuit, armed only with a magic stone called (of course) the Wishbringer! This new adventure ($34.95 for Commodore 64 and Atari computers; $39.95 for Apple, IBM, and TRS-80 Model III computers) was written by **Brian Moriarty** and has two levels of difficulty. . . . Other news: K-POWER has heard rumors from overseas that an as-yet-to-be-named software company is thinking of converting **Paul McCartney**'s ***Give My Regards to Broad Street*** movie into a computer game! We'll keep you posted. . . . **First Star Software** has released ***Boulder Dash***, by designer **Peter Liepa**, on a combination-system disk for both Commodore 64 and Atari computers. . . . For the scientist in you, there's ***Temperature Lab*** from **Hayden Software**. *Temperature Lab* is the first in a series of science-lab software from Hayden, and sells for $99.95 (for Apple II and Commodore 64 computers). . . . New from **MicroProse Software** is a **Command Series** of simulation/strategy games based on real battles. ***Crusade in Europe*** is the first in the series and simulates the American and British struggle against Nazi Germany from the D-day invasion to the Battle of the Bulge. Other simulations include ***Decisions in the Desert***, ***Sword of Zion***, ***Blitzkrieg 1940***, and ***Drive on Moscow***. All are available for Atari and C 64 computers, and planned for Apple and IBM, for $39.95.

work with the sonar board to make sure HERO doesn't bump into the dog.

Week 3. The following week I built six more circuit boards: the power board, sonar transmit and receive board, main drive board, arm drive board, and display circuit board. It was fun soldering the circuits.

Week 4. It wasn't long before I could see HERO coming to life. My next step was to put together the remote-control unit, which can be used to program HERO's movements. I spent the next two days installing wires in the remote control unit. The battery charger was next. It took only a few days to build.

Week 5. The next four days were really inspiring! I started building HERO's body. The base assembly was the first thing I built that looked like the robot I imagined. After the torso and base were assembled, I connected a metal side to the base. Next, I attached the CPU circuit board (HERO's brain) to a side panel. My plastic pal was about to become a reality!

Weeks 6, 7, and 8. Now it was time to wire everything together. That was the only boring part of the project. I got confused working on the wiring inside the torso. There were yards and yards of multicolored wires everywhere! But with a little patience, I eventually figured it out.

Week 9. I added the head! Without it, HERO would be a vegetable because the head is where the sonar, motion detector, light and sound detectors, and voice speaker are located. I finished the head and read the manual: "This completes the assembly of your robot." Wow! I had done it!! I had built my very own robot!

Week 10. The moment of truth had come. It was time to test HERO and see if it worked. I held my breath, turned on the power switch, and stood back. The display screen flashed HERO 1.0, and a hyphen moved back and forth across the screen. I couldn't believe my eyes! My work wasn't finished, though. I needed to build the voice circuit board and was surprised when it took less than an hour! I turned HERO on again, and a deep voice said, "Ready!"

Week 11. To get HERO to move, I plugged in the remote-control unit. I turned the dial to "Head" and pulled the trigger. HERO's head came to life immediately and began to rotate from side to side. I felt like a proud father!

Week 12. I started programming HERO to walk my dog, bring me a drink, keep my brother (who actually turned out to be *impressed* by HERO) out of my bedroom, and wake me up in the morning. By building HERO, I learned more than I ever could by just reading a book about robotics. HERO and I are just getting to know each other, but I can tell we have the beginnings of a very hi-tech friendship!—DANIEL HOROWITZ

It's 2010: Do You Know What Your Computer's Doing?

Let the trumpets sound, let the cries of joy be heard, for the winners of K-POWER's What's It For Contest shall now be known! Hundreds of entrants told us what they thought computers would be used for in the year 2010. Ten winners were randomly selected by the Special Ks. Here are the winners and their opinions:

Mark Gornik, 11, of Duluth, Minnesota, hoped to see computers replacing teachers. **Kristina Hechel**, 12, of Appleton, Wisconsin, felt that computers would be used in architecture. **Dennis Schardt Jr.**, 17, of Saltsburg, Pennsylvania, saw the computers of 2010 being used for "running factories, teaching students, and saving lives." **Greg Waldruff**, 14, of Shelby, Ohio, said that "there will be no money; you will use your Social Security number to pay for things." **Alexandra Dick**, 11, of the Bronx, New York, felt that by the year 2010, computers will "do all the work for humans." **Jimmy Meeks**, 12, of Georgetown, Kentucky, said that

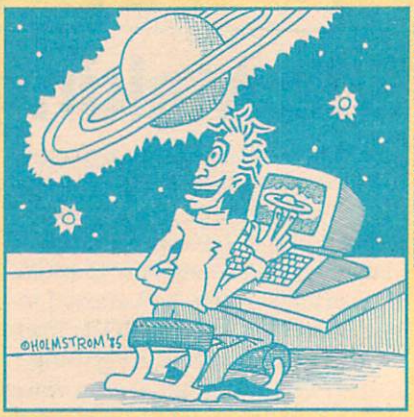


ILLUSTRATION BY JOHN HOLMSTROM

computers will be used for "just about everything." **Matthew Zulaznick**, 11, of N. Miami Beach, Florida, felt that computers would be used for "fun and business." **Mark Wu**, 13, of Los Angeles, California, saw the computers of the future being used for "space investigation and exploring." **Jeff Regnier**, 13, of Seal Beach, California, predicted that computers would be used for "running the household and doing things for a business." Finally **Minya De Johnette**, 10, of Willow, New York, said that the computers of 2010 will be used for "putting rings around planets without rings."

Each of the winners will be receiving surprise software packages, compliments of K-POWER magazine. Congratulations to all!

LOGON LETTERS

HINT HELPLINE!

In your Hint Hotline (January 1985 FAMILY COMPUTING) there was a tip on *Spare Change* that didn't work on my Franklin, I was really disgusted that it didn't work. I typed it exactly according to directions and it just wouldn't work. Please check the statement and if it works on all computers. TRAVIS ZEPP

Hanover, Pennsylvania

Dear Travis,

The Spare Change *hint in the January issue was designed to work on Apple computers. (The computer system(s) that a hint works for is/are always listed in parentheses in Hint Hotline.) If you used the Apple version of* Spare Change *with your Franklin computer, it should work!* K-POWER's Special Ks *retested the hint on an Apple in our office, and it's A-OK.* THE EDITORS

DOCTOR KURSOR'S KLINIC

ILLUSTRATION BY SAM WHITEHEAD

Is there any way to lock my (Atari 400) programs so the BREAK key is disabled?

—JOHN WRAY STEWART JR.
Fort Atkinson, Wisconsin

I need the POKE statement that disables the RESTORE key on the (C 64) keyboard.

—JONATHAN LAMB
Salt Lake City, Utah

DR. KURSOR: Sometimes when I'm playing a game fast and furious, my finger strays and . . . OUCH! I've hit the BREAK key by accident! Now *nobody's* going to believe that high score I'd racked up!

Normally, you can rely on the BREAK key (the RESET key on Apples; the RUN/STOP and RESTORE keys on Commodores) to stop your program. But some commerical software "turns off" that key so that you can't stop the program in the middle without turning off the computer. That way, it's harder to find out how the program works.

Here's how to use the same technique to save yourself from my accidental-stop dilemma.

Apple: Peter Cockcroft came up with this routine. Put it at the beginning of your BASIC program:

```
10 FOR I=768 TO 781:READ X:POKE I,X
:NEXT I
20 DATA 165,121,133,184,165,122,
133,185,166,248,154,76,210,215
30 A1=PEEK(1010):A2=PEEK(1011):
A3=PEEK(1012)
```

Then, to disable the RESET key,

```
POKE 1010,0:POKE 1011,3:POKE
1012,166
```

To reenable it,

```
POKE 1010,A1:POKE 1011,A2:POKE
1012,A3
```

(This doesn't work under ProDOS.)

Atari: Two POKEs are all you need to disable the BREAK key:

```
POKE 16,64:POKE 53774,64
```

To turn it back on again, use

```
POKE 16,192:POKE 53774,247
```

But watch out! Every time you execute a screen-mode statement (like GRAPHICS 2 or OPEN #1,8,0,"S:"), the BREAK key is reenabled and you have to turn it off again.

If you have any but one of the oldest Ataris, there's a better way! On the XL and XE series, a simple POKE 566,158 turns BREAK off for good; POKE 566,146 turns it on again.

On most 800s, POKE 566,96 disables and POKE 566,84 enables. To find out if this'll work on your 800, type in PRINT PEEK (58383). If 0 is printed on your screen, use the two-POKE method.

Commodore: Here you've got two choices! To prevent the RUN/STOP key from stopping your program, use POKE 808,239 on the C 64 turn it back on with POKE 808,237.

Or you can keep even the RUN/STOP–RESTORE combination from working: POKE 808,225:POKE 818,32 on the C 64; POKE 808,100:POKE 792,90: POKE 793,203 on the VIC. Bring things back to normal with POKE 808,237:POKE 818,237 on the C 64; for the VIC it's POKE 808,112:POKE 792,173:POKE 793,254.

IBM: This one's from the IBM PC (PRO) SIG on CompuServe.

Once you've typed in the following subroutines, a GOSUB 1000 will disable BREAK, and GOSUB 2000 will reenable it.

```
1000 DIM OLD%(4):DEF SEG=0
1010 FOR I=&H6C TO &H6F
1020 OLD%(I-&H6C)=PEEK(I):NEXT I
1030 POKE &H6C,&H53:POKE &H6D,&HFF
1040 POKE &H6E,&H0:POKE &H6F,&HF0
1050 DEF SEG:RETURN
2000 DEF SEG=0:FOR I=&H6C TO &H6F
2010 POKE I,OLD%(I-&H6C)
2020 NEXT I:DEF SEG:RETURN
```

PC*jr* owners with Cartridge BASIC, check out page 4-155 of your BASIC manual for an easier, more powerful method.

TRS-80 Models III & 4: In Model III BASIC, POKE 16396,175:POKE 16397,201 disables the BREAK key, and a simple POKE 16396,201 reenables it.

In Model III *Disk* BASIC, the statements CMD "B","OFF" and CMD "B","ON" turn the BREAK key off and on. If you're using TRSDOS 6.0 on your Model 4, you use SYSTEM "SYSTEM (BREAK=OFF)" and SYSTEM "SYSTEM (BREAK=ON)".

I hope you have fun with this info. As always, be super-careful with all POKE statements; one mistyped digit can send your computer off into never-never land and completely crash the whole system. And remember to include some kind of *legal* exit from your program, or you'll have to turn off the computer to get control back.

So, until next month . . . happy BREAKin'!

Need an answer to a hi-tech question?
Send your questions to Dr. Kursor's Klinic, c/o K-POWER, 730 Broadway, New York, NY 10003.

STRATEGY

TIPS, TRICKS, AND HINTS

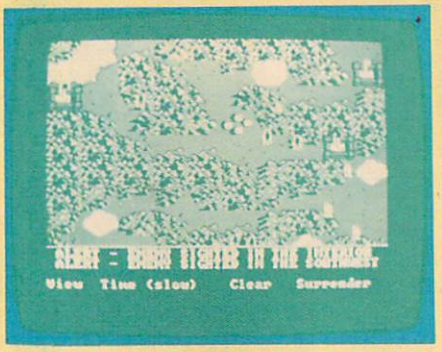
THE ANCIENT ART OF WAR

Broderbund. Tactics and strategy. Your mission: To defeat the enemy army by whatever means you can, be it brute force, clever maneuvering, or a combination of both. In addition to fighting battles, you also can create your own scenarios. (Hints and games for IBM PC/PC*jr*)

The first thing you must always do is check the formations of your troops. Make sure your archers are in back; and your knights and barbarians are where you want them (generally in the front).

Although the longest, sieging usually is the best way to take an enemy fort. This way, when you fight him, he'll be in such bad shape you will be able to mop him up without problem. And if he leaves the fort to attack you, try detaching a small group (preferably archers) and sneak them into the empty fort, then wait for the enemy to engage your main force.

Archers are your most important troops. One or two of them can take out five or six times their number or even a whole squadron. Simply keep them all the way in the back and have them all continue attacking until danger approaches (arrows or men), and then have them retreat. Repeat this process as many times as you can for best results. This works for 14 men as well as one.



Against Geronimo, it's best to keep most of your men in one fort and improve your condition. Wait for him to come to you.

You can pull men out who are stuck in water or in the mountains by moving a squad up next to them (keep them on the land) and "J"oining the two together.

"D"etach men as often as possible within a fort. If you have few small squads rather then a couple of large ones, you'll regain men much faster. Also, if you do it fast enough, the enemy won't be able to detach his own men, since there can be a maximum of 20 squads on the board at once.

If archerless enemy troops attack one of your forts that contain archers, and you "Z"oom, you'll kill one or two of the enemy and the rest will retreat, escaping complete defeat. Let the computer take the fight instead, and you should be able to wipe out the whole enemy contingent. Occasionally the computer will win (as it can climb walls if you don't "Z"oom), but if your men are in decent shape, this won't happen too often.

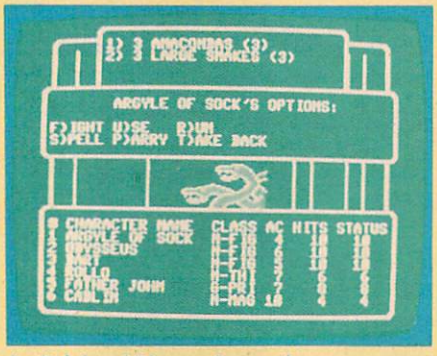
In the "Custer's Last Stand" scenario, wait for Geronimo to lead all his troops to your fort. When they attack the fort, retreat as much as you can, delaying the enemy. Meanwhile, have your squad across the river from the enemy villages approach at a fast march. You'll probably be able to capture them all before the enemy can get to you. For safety, you can bring a squad down from the north to help out. —SPECIAL Ks

KNIGHT OF DIAMONDS AND LEGACY OF LLYLGAMYN

Sir-tech Software. Role-playing adventure. Your mission: *In Knight of Diamonds* (*K.O.D.*), to collect the ancient Knight's sword and all the pieces of his armor. Using these, get the Staff of Gnilda. In *Legacy*, using the descendants of the heroes who beat Werdna and got the Staff of Gnilda, to retrieve the Orb of Earithin to save Llylgamyn from impending doom. (Hints and games for Apple, IBM PC/PC*jr*)

K.O.D.: This is a listing of the coordinates for the armor and sword, relative to the stairs leading into the dungeon. Armor: 0 down, 15 east, 2 north. Helmet: 3 down, 10 east, 4 north. Gauntlets: 4 down, 10 east, 9 north. Hrathnir (sword): 2 down, 14 east, 13 north. The shield's coordinates are 1 down, 2 east, 6 north; however you may not teleport here as you'll bounce back to your starting place.

K.O.D.: Once you have all the pieces of armor, you must equip one character with all pieces, and send him alone into the dungeon. Then go to the center of the first level where Gnilda is (9 east, 10 north).



In *Knight of Diamonds*, continue your quest with your characters from *Wizardry I*. Then, in *Wizardry III*, use their descendents to save Llylgamyn again.

Legacy: Once you have both crystals, give them to someone who is either good or evil and have them invoke the one of corresponding alignment. You'll now possess a Neutral crystal, which is necessary to solving the game.

Legacy: For a quick exit from the dungeon, try using a staircase of the wrong alignment. This is especially useful on higher levels when you're in bad shape and have a long way to get home.

The best mapping technique is first to get a piece of graph paper and sketch a 20 by 20 box, and label it 0 to 19 on the vertices (the size of a level). Second, cast a Milwa or Lomilwa before entering the dungeon (to spot secret doors). Last, map as best you can setting one move forward equal to one box. If you get lost, cast a Dumapic spell to get your bearings, and continue mapping from there. Beware of one-way doors and teleporters!!!—SPECIAL Ks

HITCHHIKER'S GUIDE TO THE GALAXY

Infocom. Text adventure. Your mission: As Arthur Dent, use all of your rather limited faculties to survive *the* most bizarre Thursday since your Aunt gave you the thing, though you don't know what it is. (Hints and game for most computers)

Before you become a stick-in-the-mud, take everything you come across that's not nailed down.

A little sense will help you see the light.

To get the Babel fish, hang your gown on the hook, put the towel over the drain, the satchel in front of the panel, and put something useless on the satchel.

To get by the door in the Heart of Gold, you must remove the common sense particle from your brain and then hold tea and no tea.

The engine room isn't as dangerous as it sounds. Be persistent.

With name spoken, and towel upon thy head, carve thy name, and he'll think you're dead.

The putrid-looking snack obtained at the bar may not look interesting to a human, but for man's best friend it proves a delicious repast.

Steamed Fluff-plant will provide the fruit of knowledge.

Don't panic!!!—DAN LEVIN, *11, Burlington, Vermont*; KEITH FOGG, *14, Virginia Beach, Virginia*; ROBERT LEE, *12, Narragansett, Rhode Island*; MARK ABBOTT, *12, Springfield, Massachusetts*; AARON LLOYD, *15, Brooklyn, New York*; PAT WILSEY, *19, Grand Island, Nebraska*

HINT HOTLINE

CONAN, Datasoft (Apple). Arcade adventure. Your mission: To invade the evil wizard Volta's stronghold, make your way past his fiends, and rid the world of him.

On the first level, climb to the top of the castle without killing the bat, and jump onto the tree below. After you land, slowly walk left until you fall down a little, and then go as far right as you can. Below you, there is an invisible ladder. If you go down this, you'll receive a free life. —BRIAN HINKEN, *14, Cooper City, Florida*

SPY VS. SPY, First Star (Apple, Atari, C 64) Strategy/arcade. Your mission: To be the first spy to gather the necessary money and loot, stash it in your case, and leave the embassy in an awaiting airplane.

If you're playing against the computer, try playing a hard version but don't play with the hidden airport. Find the airport and water trap all the entrances. Then, simply wait there for the computer to collect everything. When it has it all, it'll go for the airport only to be killed by the trap. Simply search the nearby furniture, grab the briefcase, and split.—CHRIS DALTON, *13, Canon City, Colorado*

TEMPLE OF APSHAI, Epyx (Apple). Role-playing adventure. Your mission: To delve deep into the dark, dank dungeon, destroy the dastardly denizens, and get their dinero.

After you boot the game, answer "nay" to the Innkeeper's first two questions, and create a character as usual, complete with magical gear and healing salves. Then, when the Innkeeper asks what level you would like to explore, press CONTROL-OPEN APPLE-RESET to reboot the game. This will cause a drastic change in your character. He will retain any equipment that you gave him, but his ability scores will be 37s and 39s, and he'll have upwards of 36 of each treasure type.—JOE BEZDEK, *12, San Antonio, Texas*

SPY HUNTER, Sega (C 64 cartridge). Arcade/skill. Your mission: Race along hazardous highways and rapid rivers eliminating enemy cars, boats, and helicopters before they can eliminate you.

When the truck drops you off on the side of the road, you can maneuver the car to the black strip on the far right of the screen. There, you'll be impervious to most damage, and able to rack up points indefinitely.

When traveling by river in the advanced game, slow down enough to let the boats pass you from behind and destroy everything that gets in front of you. This reduces the number of mines in front of you, and eventually only the large boats (worth 1,500 each) will approach. Also, if you can stay to the left, you won't be forced back on land, and probably will obtain more points.

Resting an object on the "Ø" key throughout your game might make it easier to use oil and smoke.—SPECIAL Ks

TAIPAN, Avalanche Productions (Apple). Financial/strategy. Your mission: To set out with your ship to trade commodities throughout various Japanese ports, fight pirates, and try to become a millionaire.

When repaying money to Elder Brother, pay back more than you owe. This way he'll start paying you interest, and at about 10 percent a turn, you'll rack up quite a fortune in no time.—ROY LIU, *13, Belleville, Illinois.*

FLIGHT SIMULATOR AND FLIGHT SIMULATOR II, Microsoft (IBM) and subLogic (Apple, C 64, Atari). Simulation. Your mission: To learn to take off, fly, and land a small plane.

E. R. Martin recently has released a five-page booklet on the basics of using these two highly sophisticated programs. The booklet tells everything you need to know to go from takeoff to a simple landing. To get a copy of this manual, send $5 to E. R. Martin, 6351 Lynwood Hill, McLean, VA 22101.

HELP FOR ADVENTURERS

Questbusters, The Adventurer's Newsletter, is an excellent publication for those of you who love adventure games. Features include excellent reviews of both text and graphic adventures, book reviews, a swap shop, and much more. Subscriptions are $15 for 12 issues. To order, send your name, full address, and computer brand to *Questbusters*, 202 Elgin Ct., Wayne, PA 19087.

MICRO TONES

MUSIC PROGRAMS

BY JOEY LATIMER

Going out to the baseball game is one of America's favorite summer pastimes. For old and young fans alike, one of the greatest parts of the game is the "seventh-inning stretch" when spectators rise and belt out "Take Me Out to the Ball Game."

In this month's Microtones, we've programmed a version of this famous song for those of you who don't make it out to the ballpark. For baseball fans who view the action on the tube and get cheated out of the "stretch" by commercials, this one's for you!

HACKER NOTES: John Jainschigg, FAMILY COMPUTING's technical editor, has arranged a wonderful four-voice version for Atari computers. Due to hardware limitations, the programs for the rest of the machines were arranged for three parts. The song contains a rolling bass, a syncopated rhythm part (Atari has two rhythm parts), and a melody line riding on top of the mix.

The notes and durations for each voice are read into arrays from DATA statements. If an error message appears when you run the program, or if you find the computer playing strange notes, the first places to look for typing errors should be the DATA statements. Check each line of data for missing or extra commas, or incorrectly typed numbers.

ATARI/*TAKE ME OUT TO THE BALL GAME*

```
10 DIM A(96),B(96),C(96),D(96)
20 POKE 752,1:PRINT CHR$(125)
30 POSITION 8,10:PRINT "TUNING UP ... PLEASE WAIT."
40 C1=1:FOR I=1 TO 63:READ A,B
50 FOR J=1 TO B:A(C1)=A:C1=C1+1:NEXT J:NEXT I
60 FOR I=1 TO 94 STEP 3:READ A,B
70 B(I)=0:C(I)=0
80 B(I+1)=A:C(I+1)=B
90 B(I+2)=A:C(I+2)=B
100 NEXT I
110 C1=1:FOR I=1 TO 68:READ A,B
120 FOR J=1 TO B:D(C1)=A:C1=C1+1:NEXT J:NEXT I
130 PRINT CHR$(125)
140 POSITION 5,10:PRINT "TAKE ME OUT TO THE BALL GAME"
150 FOR I=1 TO 96
160 SOUND 0,A(I),10,8
170 SOUND 1,B(I),10,5
180 SOUND 2,C(I),10,5
190 SOUND 3,D(I),10,8
200 FOR D=1 TO 50:NEXT D
210 SOUND 1,0,0,0:SOUND 2,0,0,0
220 NEXT I:GOTO 150
1000 DATA 121,2,60,1,72,1,81,1,96,1
1010 DATA 81,3,108,3,121,2,60,1,72,1
1020 DATA 81,1,96,1,81,6,72,1,76,1
1030 DATA 72,1,96,1,91,1,81,1,72,2
1040 DATA 91,1,108,3,72,1,72,1,72,1
1050 DATA 72,1,64,1,60,1,53,1,64,1
1060 DATA 72,1,81,1,96,1,108,1,121,2
1070 DATA 60,1,72,1,81,1,96,1,81,3
1080 DATA 108,3,121,2,108,1,96,1,91,1
1090 DATA 81,1,72,4,72,1,64,1,60,1
1100 DATA 0,2,60,1,0,2,60,1,64,1
1110 DATA 72,1,81,1,86,1,81,1,72,3
1120 DATA 64,3,60,4,0,2
2000 DATA 60,47,60,47,53,45,53,45,60,47,60
2010 DATA 47,53,45,53,45,56,47,56,40,53,45
2020 DATA 53,45,53,42,53,42,64,40,64,45,60
2030 DATA 47,60,47,53,45,64,45,60,47,68,47
2040 DATA 72,45,72,45,72,45,60,42,60,47
2050 DATA 56,40,60,42,64,45,60,47,64,45
3000 DATA 121,3,162,3,128,2,144,1,162,1
3010 DATA 144,1,128,1,121,3,162,3,162,1
3020 DATA 144,1,136,1,128,1,144,1,162,1
3030 DATA 144,3,193,2,204,1,217,3,144,3
3040 DATA 217,1,193,1,182,1,173,1,193,1
3050 DATA 217,1,162,1,144,1,136,1,128,1
3060 DATA 144,1,162,1,121,3,162,3,128,2
3070 DATA 144,1,162,1,144,1,128,1,121,2
3080 DATA 136,1,162,1,173,1,162,1,182,1
3090 DATA 144,1,121,1,182,3,182,3,173,3
3100 DATA 162,1,173,1,162,1,144,1,162,1
3110 DATA 193,1,217,1,193,1,173,1,162,1
3120 DATA 144,1,128,1,121,1,193,1,144,1
3130 DATA 162,1,182,1,217,1
```

COMMODORE 64/*TAKE ME OUT TO THE BALL GAME*

```
10 DIM A(96,2),C(96,2),D(96,2)
20 S=54272:PRINT CHR$(147):POKE 53281,0
30 POKE 214,8:PRINT
40 PRINT TAB(8);"TUNING UP ... PLEASE WAIT."
50 FOR I=0 TO 23:POKE S+I,0:NEXT I:POKE S+24,15
60 POKE S+5,48:POKE S+6,204:POKE S+12,71
70 POKE S+13,116:POKE S+19,48:POKE S+20,204
80 C1=1:FOR I=1 TO 63:READ H,L,N
90 FOR J=1 TO N:A(C1,1)=H:A(C1,2)=L:C1=C1+1
100 NEXT J:NEXT I
110 FOR I=1 TO 94 STEP 3:READ H,L:C(I,1)=0:C(I,2)=0
120 C(I+1,1)=H:C(I+1,2)=L:C(I+2,1)=H:C(I+2,2)=L
130 NEXT I
140 C1=1:FOR I=1 TO 68:READ H,L,N
150 FOR J=1 TO N:D(C1,1)=H:D(C1,2)=L:C1=C1+1
160 NEXT J:NEXT I
170 PRINT CHR$(147):POKE 53280,2
180 POKE 214,8:PRINT
190 PRINT TAB(6);"TAKE ME OUT TO THE BALL GAME"
200 POKE S+4,33:POKE S+11,33:POKE S+18,33
210 FOR I=1 TO 96
220 POKE S+1,A(I,1):POKE S,A(I,2)
230 POKE S+8,C(I,1):POKE S+7,C(I,2)
240 POKE S+15,D(I,1):POKE S+14,D(I,2)
250 FOR D=1 TO 100:NEXT D
260 POKE S+8,0:POKE S+7,0
270 NEXT I:GOTO 210
1000 DATA 16,195,2,33,135,1,28,49,1,25,30,1,21,31,1,25
```

```
1010 DATA 30,3,18,209,3,16,195,2,33,135,1,28,49,1,25
1020 DATA 30,1,21,31,1,25,30,6,28,49,1,26,156,1,28,49
1030 DATA 1,21,31,1,22,96,1,25,30,1,28,49,2,22,96,1,18
1040 DATA 209,3,28,49,1,28,49,1,28,49,1,28,49,1,31
1050 DATA 165,1,33,135,1,37,162,1,31,165,1,28,49,1,25
1060 DATA 30,1,21,31,1,18,209,1,16,195,2,33,135,1,28
1070 DATA 49,1,25,30,1,21,31,1,25,30,3,18,209,3,16,195
1080 DATA 2,18,209,1,21,31,1,22,96,1,25,30,1,28,49,4
1090 DATA 28,49,1,31,165,1,33,135,1,0,0,2,33,135,1,0,0
1100 DATA 2,33,135,1,31,165,1,28,49,1,25,30,1,23,181
1110 DATA 1,25,30,1,28,49,3,31,165,3,33,135,4,0,0,2
2000 DATA 42,62,42,62,44,193,44,193,42,62,42,62,44,193
2010 DATA 44,193,42,62,50,60,44,193,44,193,47,107,47
2020 DATA 107,50,60,44,193,42,62,42,62,44,193,44,193
2030 DATA 42,62,42,62,44,193,44,193,44,193,47,107,42
2040 DATA 62,50,60,47,107,44,193,42,62,44,193
3000 DATA 16,195,3,12,143,3,15,210,2,14,24,1,12,143,1
3010 DATA 14,24,1,15,210,1,16,195,3,12,143,3,12,143,1
3020 DATA 14,24,1,14,239,1,15,210,1,14,24,1,12,143,1
3030 DATA 14,24,3,10,143,2,9,247,1,9,104,3,14,24,3,9
3040 DATA 104,1,10,143,1,11,48,1,11,218,1,10,143,1,9
3050 DATA 104,1,12,143,1,14,24,1,14,239,1,15,210,1,14
3060 DATA 24,1,12,143,1,16,195,3,12,143,3,15,210,2,14
3070 DATA 24,1,12,143,1,14,24,1,15,210,1,16,195,2,14
3080 DATA 239,1,12,143,1,11,218,1,12,143,1,11,48,1,14
3090 DATA 24,1,16,195,1,11,48,3,11,48,3,11,218,3,12
3100 DATA 143,1,11,218,1,12,143,1,14,24,1,12,143,1
3110 DATA 10,143,1,9,104,1,10,143,1,11,218,1,12,143,1
3120 DATA 14,24,1,15,210,1,16,195,1,10,143,1,14,24,1
3130 DATA 12,143,1,11,48,1,9,104,1
```

IBM PC*jr* w/CARTRIDGE BASIC & TV OR MONITOR w/SPEAKER/*TAKE ME OUT TO THE BALL GAME*

```
10 DIM N$(3)
20 CLS:WIDTH 40:KEY OFF:SOUND ON
30 FOR I=1 TO 3:N$(I)="":FOR J=1 TO 4
40 READ A$:N$(I)=N$(I)+A$:NEXT J:NEXT I
50 LOCATE 10,5:PRINT "TAKE ME OUT TO THE BALL GAME"
60 PLAY N$(1),N$(2),N$(3):GOTO 60
1000 DATA V10MF03L4CO4L8CO3AGEL4G.D.L4CO4L8CO3AGE
1010 DATA L2G.L8AG#AEFGL4AL8FL4D.L8AAAAB04CD03BA
1020 DATA GEDL4CO4L8CO3AGEL4G.D.L4CL8DEFGL2AL8AB
1030 DATA O4L8CP4CP4CO3BAGF#GL4A.B.O4L2C
2000 DATA V803L8P8EEP8EEP8FFP8FFP8EEP8EEP8FFP8FF
2010 DATA P8GGP8GGP8FFP8FFP8F#F#P8F#F#P8GGP8FF
2020 DATA P8EEP8EEP8FFP8FFP8EEP8EEP8FFP8FFP8AA
2030 DATA P8D#D#P8EEP8GGP8F#F#P8FFP8EEP8FF
3000 DATA V802L4C.O1G.BL8AGABO2L4C.O1G.L8GAA#BAG
3010 DATA L4A.EL8D#L4D.A.L8DEFF#EDGAA#BAG
3020 DATA O2L4C.O1G.BL8AGABO2L4CO1L8A#GF#GFAO2CO1L4F.
3030 DATA F.F#.L8GF#GAGEDEF#GABO2CO1EAGFD
```

TI-99/4A/*TAKE ME OUT TO THE BALL GAME*

```
10 DIM AN(96),CN(96),DN(96)
20 CALL CLEAR
30 PRINT "TUNING UP ... PLEASE WAIT."
50 CT=1
60 FOR I=1 TO 63
70 READ A,B
80 FOR J=1 TO B
90 AN(CT)=A
100 CT=CT+1
110 NEXT J
120 NEXT I
130 FOR I=1 TO 94 STEP 3
140 READ B
150 CN(I)=40000
160 CN(I+1)=B
170 CN(I+2)=B
180 NEXT I
190 CT=1
200 FOR I=1 TO 68
210 READ A,B
220 FOR J=1 TO B
230 DN(CT)=A
240 CT=CT+1
250 NEXT J
260 NEXT I
270 CALL CLEAR
280 PRINT "TAKE ME OUT TO THE BALL GAME"
290 FOR X=1 TO CT-1
300 CALL SOUND(200,AN(X),0,CN(X),5,DN(X),3)
310 NEXT X
320 GOTO 290
1000 DATA 262,2,523,1,440,1,392,1,330,1,392,3
1010 DATA 294,3,262,2,523,1,440,1,392,1,330,1
1020 DATA 392,6,440,1,415,1,440,1,330,1,349,1
1030 DATA 392,1,440,2,349,1,294,3,440,1,440,1
1040 DATA 440,1,440,1,494,1,523,1,587,1,494,1
1050 DATA 440,1,392,1,330,1,294,1,262,2,523,1
1060 DATA 440,1,392,1,330,1,392,3,294,3,262,2
1070 DATA 294,1,330,1,349,1,392,1,440,4,440,1
1080 DATA 494,1,523,1,40000,2,523,1,40000,2
1090 DATA 523,1,494,1,440,1,392,1,370,1,392,1
1100 DATA 440,3,494,3,523,4,40000,2
2000 DATA 659,659,698,698,659,659,698,698,659
2010 DATA 784,698,698,740,740,784,698,659,659
2020 DATA 698,698,659,659,698,698,698,740,659
2030 DATA 784,740,698,659,698
3000 DATA 262,3,196,3,247,2,220,1,196,1,220,1
3010 DATA 247,1,262,3,196,3,196,1,220,1,233,1
3020 DATA 247,1,220,1,196,1,220,3,165,2,156,1
3030 DATA 147,3,220,3,147,1,165,1,175,1,185,1
3040 DATA 165,1,147,1,196,1,220,1,233,1,247,1
3050 DATA 220,1,196,1,262,3,196,3,247,2,220,1
3060 DATA 196,1,220,1,247,1,262,2,233,1,196,1
3070 DATA 185,1,196,1,175,1,220,1,262,1,175,3
3080 DATA 175,3,185,3,196,1,185,1,196,1,220,1
3090 DATA 196,1,165,1,147,1,165,1,185,1,195,1
3100 DATA 220,1,247,1,262,1,165,1,220,1,196,1
3110 DATA 175,1,147,1
```

MICRONOTES

Bet you *never* thought you could make music with a 2K Timex-Sinclair computer! Well, it's a cinch with Simulsion's ***The Fantastic Music Machine and Light Show***, a cassette with two special-effects programs for only $9! "Music Composer" makes your keyboard a 3-octave musical instrument, which plays music through your radio as you press the keys. It lets you store, edit, and play back up to 400 notes. With "The Light Show," which animates a kaleidoscopic pattern, you can accompany your music with your own patterns or computer-generated random effects. (Simulsion, Box 894, Lemon Grove, CA 92045.)

Good news for **Mockingboard** owners! You'll never again need to open your Apple to control the Mockingboard's volume if you get **A-Max** ($49), a self-contained pair of speakers with an earphone jack and individual amplifiers. A-Max will give your Apple II/II plus/IIe or IBM PC (the IBM adapter costs $8) stereo sound even if you don't have a Mockingboard. Available from Sweet Micro Systems, 50 Freeway Drive, Cranston, RI 02920; (800) 341-8001.

(For more music/computer news, check out this month's Buyer's Guide.)

—LINDA WILLIAMS

COMPUCOPIA

SHORT PROGRAMS BY JOHN JAINSCHIGG

JOYSTICK ROUTINES

A lot of hackers out there have written us lately, asking how to use a joystick to move objects around on the computer screen. We've put together a bunch of joystick routines for all our favorite computers to show you how it's done. Just type them in, hook up a joystick to the main joystick port of your machine (usually labeled something like port 1), and type RUN.

There are three main parts to each version of *Joystick Demo*. The *joystick read routine* starts at line 100. This routine reads the signals coming from the joystick and fire button(s) and assigns them to variables. A single variable, JS, holds the single value returned by the eight-position joystick used with Atari and Commodore computers. Two variables, HS and VS, are assigned to hold the separate horizontal and vertical signals returned by the potentiometer-type joysticks of the Apple, IBM, and TRS-80 CoCo. The button signal is assigned to variable B1 if the joystick has more than one independent button, the second button's signal is assigned to variable B1. If the joystick has more than one independent button, the second button's signal is asable(s) and turns it into a pair of numbers that can be used to control the movement of an object on the screen. For eight-position joysticks the pair of numbers (CH and CV, each of which can be −1, 0, or 1) indicate horizontal and vertical direction of movement. For potentiometer-type joysticks the pair of numbers (H and V) are the coordinates of an absolute screen position produced by scaling HS and VS to fit on the screen. The *movement routine* at line 300 then takes these numbers and uses them to move a character around, keeping it on the screen and doing other housekeeping as necessary. The character changes from an asterisk (*) to an exclamation point (!) whenever the joystick's main fire button is pressed. If the stick has two independent buttons (Apples and IBMs do), pressing the second one causes a beep.

APPLE/*JOYSTICK DEMO*

```
10 X = 20:Y = 11:HL = 6.6:VL = 10.7
20 HOME
100 HS = PDL(0):VS = PDL(1)
110 B1 = PEEK(-16287)
120 B2 = PEEK(-16286)
200 H = INT(HS/HL)+1
210 V = INT(VS/VL)+1
300 CR$ = "*":IF B1 > 127 THEN CR$ = "!"
310 IF B2 > 127 THEN PRINT CHR$(7);
320 VTAB V:HTAB H:PRINT CR$;
330 IF X = H AND Y = V THEN 100
340 VTAB Y:HTAB X:PRINT " ";
350 X = H:Y = V:GOTO 100
```

ATARI/*JOYSTICK DEMO*

```
10 DIM CR$(1):X=20:Y=11
19 REM --"POKE 752,1" TURNS OFF THE CURSOR--
20 PRINT CHR$(125):POKE 752,1
100 JS=STICK(0)
110 B1=STRIG(0)
200 CH=(JS>=5 AND JS<=7)-(JS>=9 AND JS<=11)
210 CV=(JS=5 OR JS=9 OR JS=13)-(JS=6 OR JS=10 OR JS=14
)
300 NH=X+CH:NV=Y+CV
310 CR$="*":IF B1=0 THEN CR$="!"
320 IF NH<1 OR NH>38 OR NV<0 OR NV>23 THEN NH=X:NV=Y
330 POSITION NH,NV:PRINT CR$;
340 IF NH=X AND NV=Y THEN 100
350 POSITION X,Y:PRINT " ";
360 X=NH:Y=NV:GOTO 100
```

COMMODORE 64/*JOYSTICK DEMO*

```
10 X=20:Y=11
20 PRINT CHR$(147)
100 JS=15-(PEEK(56321) AND 15)
110 B1=PEEK(56321) AND 16
200 CH=(JS>=4 AND JS<=6)-(JS>=8 AND JS<=10)
210 CV=(JS=1 OR JS=5 OR JS=9)-(JS=2 OR JS=6 OR JS=10)
300 NX=X+CH:NY=Y+CV
310 CR=42:IF B1=0 THEN CR=33
320 IF NX<0 OR NX>39 OR NY<0 OR NY>24 THEN NX=X:NY=Y
330 POKE 1024+NX+NY*40,CR
340 IF X=NX AND Y=NY THEN 100
350 POKE 1024+X+Y*40,32
360 X=NX:Y=NY:GOTO 100
```

IBM PCs/*JOYSTICK DEMO*

```
10 X=20:Y=11:HL=3.2:VL=5.1
20 WIDTH 40:KEY OFF:CLS
29 REM --ACTIVATE JOYSTICK BUTTONS--
30 STRIG ON
100 HS=STICK(0):VS=STICK(1)
110 B1=STRIG(0):B2=STRIG(4)
200 H=INT(HS/HL)+1:V=INT(VS/VL)+1
300 IF B1=-1 THEN CR$="!" ELSE CR$="*"
310 IF B2=-1 THEN SOUND 440,1
320 LOCATE V,H:PRINT CR$;
330 IF H=X AND V=Y THEN 100
340 LOCATE Y,X:PRINT " ";
350 X=H:Y=V:GOTO 100
```

TRS-80 COLOR COMPUTER/*JOYSTICK DEMO*

```
10 X=16:Y=8:HL=1.97:HV=4.5
20 CLS
100 HS=JOYSTK(0):VS=JOYSTK(1)
110 B1=PEEK(65280) AND 1
200 H=INT(HS/HL)
210 V=INT(VS/HV)
300 IF B1=0 THEN CR$="!" ELSE CR$="*"
310 PRINT@H+V*32,CR$;
320 IF X=H AND Y=V THEN 100
330 PRINT@X+Y*32," ";
340 X=H:Y=V:GOTO 100
```

VIC-20/*JOYSTICK DEMO*

```
10 X=11:Y=11
20 PRINT CHR$(147)
30 POKE 38653,6
99 REM --TURN KEYBOARD OFF, JOYSTICK ON--
100 POKE 37139,0:POKE 37154,0
110 JS=(PEEK(37137) AND 28)/4
120 JS=JS+(PEEK(37152) AND 128)/16
129 REM --TURN KEYBOARD ON, JOYSTICK OFF--
130 POKE 37139,128:POKE 37154,255
140 B1=PEEK(37137) AND 32
200 CH=(JS>8 AND JS<12)-(JS>4 AND JS<8)
210 CV=(JS=6 OR JS=10 OR JS=14)-(JS=5 OR JS=13 OR JS=9
)
300 NX=X+CH:NY=Y+CV
310 CR=42:IF B1=0 THEN CR=33
320 IF NX<0 OR NX>21 OR NY<0 OR NY>22 THEN NX=X:NY=Y
330 POKE 7680+NX+22*NY,CR
340 IF X=NX AND Y=NY THEN 100
350 POKE 38400+NX+22*NY,6
360 POKE 7680+X+22*Y,32
370 X=NX:Y=NY:GOTO 100
```

WHAT'S IN STORE

NEW HARDWARE*/MARKET UPDATE

BY NICK SULLIVAN

COMPUTERS

Kaypro 2000

MANUFACTURER: Kaypro, 533 Stevens Ave., Solana Beach, CA 92075; (619) 481-4300

PRICE: $1,995

Kaypro, which made its name as the manufacturer of the no-nonsense, good-value Kaypro 2 (now 2X) transportable computer, has brought these same qualities to its new Kaypro 2000 laptop computer. "We're the Volkswagen of computer manufacturers," says David Kay, vp-marketing.

The 2000 is IBM-compatible, has 256K RAM (expandable to 768K), an 80 by 25 (character by line) screen display, and comes with *WordStar* and *CalcStar* software on disk, and 720K of disk storage on one 3.5-inch internal drive. A second 3.5-inch drive may be added; for those who want to

use a 5.25-inch disk drive, Kaypro sells a Disk Adapter. Keep in mind that there is now little IBM software available in the 3.5-inch disk format.

The keyboard is detachable, and has flip-out feet to adjust the slope angle. The LCD (liquid crystal display) screen, while better than that on many other more expensive laptops, still takes getting used to.

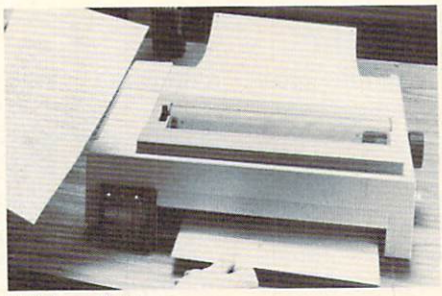
PRINTERS

IBM Proprinter
IBM Color Jetprinter

MANUFACTURER: IBM Information Systems Group, 900 King St., Rye Brook, New York 10573; (914) 934-4822

PRICE: $549 (Proprinter); $745 (Jetprinter)

IBM has introduced two advanced, and reasonably priced, printers. The dot-matrix Proprinter, which prints



IBM Proprinter

in three speeds, accepts both continuous-form and single-sheet paper. The single sheets and envelopes are fed in through the front, even while the continuous form paper is in place. Being able to switch between the two types of paper with "no fuss" will be a significant advantage.

The Proprinter can produce drafts at an extremely fast 200 characters per second (cps); it prints in near-letter-quality mode at 40 cps. It can print graphs, charts, or drawings with as many as 1,280 dots per square inch.

The IBM Color Jetprinter, designed primarily for office use, is significant in that IBM's entry to the field should legitimize color printing and spur sales of all such printers. The Jetprinter contains both a black cartridge and one with seven colors that squirt ink onto paper to produce 62 hues. The inks stored in easy-to-change cartridges flow onto the paper through four ink-jet nozzles. The Jetprinter also prints high-resolution graphics, and near-letter-quality text at a top speed of 33 cps.

MISCELLANEOUS

X-10 Powerhouse

MANUFACTURER: X-10 USA, 185A LeGrand Ave., Northvale, NJ 07647; (201) 784-9700

PRICE: $125

The X-10 Powerhouse home-control device, which connects to the serial port of the Apple IIe or IIc (and is planned for the Commodore 64), can be configured to control lights and appliances around your house. The system works by sending signals over existing house wiring. Each light or appliance that you wish to control must be connected to modules, which accept the signals from the computer. The modules ($99) are available at Sears and Radio Shack outlets. In addition, the X-10 unit is sold by Radio Shack under the name "Plug 'n Power," and by Sears as the "Sears Home Control System." The connecting cable costs $25.

The included software graphically steps you through each room of your house in vivid color, and prompts you to use the joystick to select lights, TVs, stereos, etc. that you wish to control, and the times you want them on or off. After installation and programming are completed, the Powerhouse unit may be disconnected from the computer, which may be turned off or used for other tasks.

MARKET UPDATE

Commodore Business Machines has reorganized its customer-service and support systems to give customers faster product service and access to information on new products. The new network of national service centers includes more than 1,000 locations. RCA provides service at 160 of these centers. In addition, a new hot line, (800) 247-9000, will handle hardware and software questions, and inquiries about dealer locations from 9 a.m. to 12 midnight Eastern time, weekdays.

Votrax has added an internal speaker to its Type-N-Talk Speech Synthesizer ($265). The "talking computer peripheral," which connects to the RS-232C port of any computer, converts text into conversational English. It also has an external speaker jack.

**These products have been announced by manufacturers, but are not necessarily in the stores yet. Some products may still be under development, and others may be in test markets only. Call or write the manufacturer for expected date of delivery.*

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. Unless otherwise noted, all programs are in disk format.

Here's a rundown of the rating categories and what they mean: **O** = 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 O	D	EH	GQ	EU	V
APPLEWORKS Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010 $250 ©1984	Three-in-one package combines word processor, data-base manager, and spreadsheet in an easy-to-use, thorough, "integrated" tool—useful for many small businesses and homes.† —FLESCHER	Apple IIe/IIc, 64K.	90-day warranty.	★★★★	★★★★	★★★★	★★★★	A	★★★★
I KNOW IT'S HERE SOMEWHERE! Hayden Software 600 Suffolk St. Lowell, MA 01854 (800) 343-1218 $59 ©1984	Wrestle unwieldy files and records into submission with data-management program. Fine for most home applications—auto- (and health-) record maintenance, mailing lists, and more.† —AKER	Apple Macintosh, 128K.	90-day warranty; $10 fee thereafter, if user-damaged, or for backup.	★★★★	★★★★	★★★★	N/A	E	★★★★
MAGIC SLATE Sunburst Education 39 Washington Ave., Room AB Pleasantville, NY 10570 (800) 431-6616 $69 ©1985	Write and rewrite easily with word processor that features three different typefaces for use with different age groups. Young kids use picture menu, while older users have full-fledged, powerful package.† —SOLOMON	Apple II series, 48K (64K or 128K required for some features).	90-day warranty.	★★★★	★★★★	★★★★	N/A	A	★★★★
MASTERTYPE'S FIGURES + FORMULAS Scarborough Systems 55 S. Broadway Tarrytown, NY 10591 (914) 332-4545 $39 ©1985	Convert measurements; figure amount of paint, wallpaper, etc. needed for specified area; find the time around the world; and more in good, fun-to-use conversion tool. —BUMGARNER	Reviewed on C 64. Also for Apple II series, 48K.	30-day warranty (includes user-damaged); $5 fee thereafter.	★★★	★★★★	★★★★	N/A	A	★★★
TEAM-MATE Tri Micro 10472 Stratton Way Santa Ana, CA 92705 (714) 832-6707 $49 ©1984	Manipulate and merge data in "integrated" word processor/ electronic-file system/ spreadsheet most suitable for simple tasks: short notes, mailing lists, family budgets, checkbook. Includes graphing program.† —AMATO	C 64.	90-day warranty; $5 fee thereafter or for backup.	★★★	★★	★★★	★★	A	★★★
THE NEWSROOM Springboard Software 7807 Creekridge Circle Minneapolis, MN 55435 (800) 328-1223 $49 ©1985	Create your own newsletter, complete with banners and illustrations in versatile, fun, useful tool for all in the family, ages 8+.† —FRANK	Apple II series, 64K. Version planned for IBM PC/PCjr.	$5 fee for user-damaged and defective disks; $12 for backup; 30-day refund if not satisfied.	★★★★	★★★★	★★★	★★★★	A	★★★★

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

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THE COMPUTER.

For business, education and home use! Thousands of programs are available.

Snap-on computer! 64K RAM, 20K ROM. Full-size typewriter keyboard. Upper and lower case letters, numerals, symbols, reverse characters. 2 cursor control keys, 4 function keys, programmable to 8. Music synthesizer with 3 independent voices, each with 9 octave range. Input/output ports accommodate . . . user, serial, ROM cartridge, joysticks, external monitor, phone modem.

Built-in disk drive! Intelligent high speed unit with 5¼" floppy disk recorder. 170K formatted data storage; 35 tracks. 16K ROM. Uses single sided, single density disk. Serial interface. Second serial port to chain second drive or printer.

Built-in color monitor! Displays 40 columns x 25 lines of text on 5" screen. High resolution. 320 x 200 pixels. 16 background, character colors.

Built-in ROM cartridge port! Insert ROM program cartridge. Multitude of subjects available in stores across the nation!

THE PRINTER.

Graphics quality 6 x 7 dot matrix printer. An ideal "fit" for this system . . . and included in the astonishingly low package price below!

Print method: Bi-directional impact dot matrix.
Character matrix: 6 x 7 dot matrix.
Characters: Upper and lower case letters, numerals and symbols. All PET graphic characters.
Graphics: 7 vertical dots — maximum 480 columns. Dot addressable.
Character codes: CBM ASCII code.
Print speed: 60 characters per second.
Maximum columns: 80 columns.
Character spacing: 10 characters per inch.
Line feed spacing: 6 lines per inch in character mode or 8 lines per inch selectable. 9 lines per inch in graphics mode.
Line feed speed: 5 lines per second in character mode. 7.5 lines per second in graphics mode.
Paper feed: friction feed. (Tractor feed optional.)
Paper width: 4.5" to 8.5" width. Up to 10" with optional tractor feed.
Multiple copies: Original plus maximum of two copies.
Dimensions: 13"W x 8"D x 3¼"H. **Wt.:** 6½ lbs. **Power:** 120V AC, 60 Hz.

THE SOFTWARE.

"Easy Script" One of the most powerful word processors at any price! Cut re-typing, create documents from standard paragraphs, do personalized letters, see and change a document before it is printed. Instruction manual has extensive training section that simplifies use . . . even for someone who has never used a computer or word processor before!

"The Manager" A sophisticated database manager for business or home use. Business uses: accounts payable/receivable, inventory, appointments, task manager. Home uses: mailing lists, home inventory, recipes, collection organizer, investment tracking, checkbook balancing. School uses: research article index, gradebook.

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Compatible with Commodore Computer Systems (Not included in package price.)

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Give you the fun of playing a wide selection of games.

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Item H-556-63622-01, S/H: $6.00 pr.

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Access new worlds of information with your computer.

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Item H-556-63646-00, S/H: $4.00

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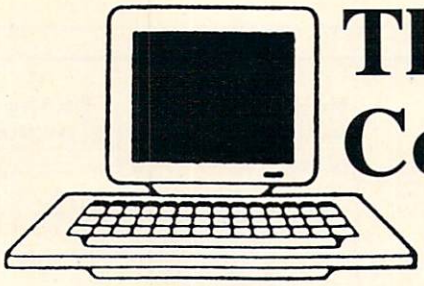
WHAT'S IN STORE
SOFTWARE GUIDE

EDUCATION/FUN LEARNING

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
FACTOR BLAST Hayden Software 600 Suffolk St. Lowell, MA 01854 (800) 343-1218 $19 ©1983	Take on the computer or a friend and out-factor your foe in a riveting little game that tests strategy as well as factoring skills. For kids ages 10+. —MORRIS	Reviewed on Apple II plus/IIe, 48K. Also for Atari, 48K; C 64; IBM PC (w/color graphics card)/ PC*jr*. Joystick optional.	90-day warranty; $10 fee thereafter, if user-damaged, or for backup.	★★★	★★★	★★★	★★★	E	★★★★
FAY'S WORD RALLY Didatech Software 810 W. Broadway, Suite 549 Vancouver, B.C. V5Z 4C9 (604) 687-3468 $29 ©1984	Early readers, ages 5+, drive around a race course, finding words that fit clues provided along the way. Parents may use the 80 nine-word sets provided on disk, and readjust the point system, car speed, and more. —BUMGARNER	Reviewed on Apple II series, 48K. Also for C 64.	90-day warranty; $10 fee for backup.	★★★	★★★	★★★★	★★★	D	★★
MYSTERY SENTENCES Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3567 $39 ©1984	Kids, ages 8+ (adults, too), complete sentences displayed with all or some letters missing. Entrancing game beefs up knowledge of sentence structure, parts of speech, and spelling.† —BUMGARNER	Apple II series, 48K.	60-day warranty; $5 fee thereafter.	★★★★	★★★★	★★★★	N/A	E	★★★★
PRESIDENT'S CHOICE Spinnaker Software One Kendall Square Cambridge, MA 02139 (617) 494-1200 $39 ©1984	As the chief executive trying to keep your seat at the polls, you make political decisions in response to national events, adviser recommendations, etc. For ages 12+, program captures frustrations and flavor of presiding.† —BUMGARNER	IBM PC/PC*jr*, 128K. Versions planned for Apple II series; C 64.	30-day warranty; $5 fee thereafter.	★★★	★★★★	★★★★	★★	A	★★★
PROBLEM-SOLVING STRATEGIES MECC 3490 Lexington Ave. N. St. Paul, MN 55112 (612) 481-3500 $29 ©1983	Different ways to solve problems introduced in this well-organized but dry and somewhat limited package developed for schools, and just released for the home. For ages 9–14. —MORRIS	Apple II series, 48K.	Unlimited warranty.	★★	★	★★	★★★	★★	★★
SMARTLOGO Coleco Industries 999 Quaker Lane S. West Hartford, CT 06110 (800) 842-1225 $75 ©1984	Excellent implementation of Logo, the famous learning language, features great graphics and documentation. Kids, 5+, learn basics of programming and early geometric principles while exploring freely. Fun for everyone. —DAVENPORT	Coleco ADAM.	90-day warranty.	★★★★	★★★★	★★★★	★★★★	E	★★★★
THE MILLENIUM ALMANAC: 1985 Millennium Group Inc. 24 E. 22nd St. New York, NY 10010 (212) 674-0040 $49 ©1985	A computer compendium packed with information—both trivial and useful. Includes daily entries which you tailor for your own use, plus a few extras, such as checkbook. Unusual application for junior high and up. —BUMGARNER	Reviewed on Apple II series, 48K. Also for IBM PC/PC*jr*, 128K.	60-day warranty; $3.50 thereafter or if user-damaged.	★★★	★★★	★	★★★	A	★★★
THE SEA VOYAGERS CBS Software 1 Fawcett Place Greenwich, CT 06836 (203) 622-2500 $39 ©1984	Leaf through this electronic guide to the explorers. Learn their dates, sponsoring nations, and expedition routes. Then test your knowledge with three game-like quizzes. For ages 8+.† —MORRIS	Reviewed on Apple II series, 48K. Also for C 64; IBM PC (w/ graphics card), 64K.	90-day warranty.	★★★	★★★★	★★★	★★★	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



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SOFTWARE GUIDE

GAMES REVIEWS BY JAMES DELSON

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	PS	GQ	EU	V
ADVENTURE MASTER CBS Software 1 Fawcett Place Greenwich, CT 06836 (203) 622-2500 $44 ©1984	Detailed text- and text/graphic-adventure building set requires hundreds of hours to learn, plan out, and execute full-fledged games. For many, ages 12+, it'll be worth the effort.†	Reviewed on C 64. Also for Apple II series, 48K; Atari, 48K; IBM PC/PCjr, 128K.	90-day warranty; $5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★	★ ★	A	★ ★ ★
DAM BUSTERS Coleco Industries 999 Quaker Lane S. West Hartford, CT 06110 (800) 842-1225 $30 ©1985	Choose a route to the famous Ruhr river dams that supply electric power to Nazi factories. Fight enemy planes and avoid antiaircraft in your attempt to seek out and destroy dams. For ages 12+.	Coleco ADAM.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★	A	★ ★ ★
HELLFIRE WARRIOR Epyx, Inc. 1043 Kiel Court Sunnyvale, CA 94089 (408) 745-0700 $29–$35 ©1985	Fourth in *Apshai* role-playing adventure series features more combat options, an apothecary, and an armory for player use. Still one of the best adventure series around for ages 12+.	Reviewed on Apple II series, 48K. Also for Atari, 32K (d. and cass.).	30-day warranty; $10 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	★ ★	A	★ ★ ★ ★
JURY TRIAL II Navic Software Box 14727 N. Palm Beach, FL 33408 (305) 627-4132 $49 ©1984	Entertaining multiplayer or solitaire game lets you take on the role of defense or prosecuting attorney in various criminal cases. Different sort of party game for ages 12+.	Reviewed on Apple II series, 48K. Also for C 64; IBM PC/PCjr, 64K.	Unlimited warranty (includes user-damaged); $7.50 fee for backup.	★ ★ ★	★ ★	★ ★ ★	N/A	A	★ ★
KAMPFGRUPPE Strategic Simulations 883 Stierlin Rd., Bldg. A- 200 Mountain View, CA 94043 (415) 964-1353 $59 ©1985	One or two players or teams select their own units or use computer-supplied forces to fight out historical or imaginary scenarios. Construction-set features allow for great variety for advanced players, 12+.	Reviewed on Apple II series, 48K. Also for Atari, 48K; C 64.	30-day warranty; $10 fee thereafter, if user-damaged, or for backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★	D	★ ★ ★
MAIL-ORDER MONSTERS Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 $32 ©1985	Strategy/arcade game, with role-playing elements, enables you to build a stable of your very own fighting creatures, outfit and arm them as you see fit, and send them into combat. For ages 10+.†	C 64 (d.). Joystick.	30-day warranty; $5 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★	A	★ ★ ★ ★
REFORGER '88 Strategic Simulations 883 Stierlin Rd., Bldg A- 200 Mountain View, CA 94043 (415) 964-1353 $59 ©1984	Exciting, frighteningly realistic simulation of potential Warsaw Pact invasion of NATO-defended Germany. For one-to-two intermediate or advanced players, ages 12+.†	Reviewed on Atari, 48K. Also for Apple II series, 48K.	30-day warranty; $10 fee thereafter, if user-damaged, or for backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★	★ ★	D	★ ★ ★
SARGON III Hayden Software 600 Suffolk St. Lowell, MA 01854 (800) 343-1218 $49 ©1984	Play solitaire against computer in variety of skill levels, alter. setup, study selection of championship games, and practice different tactics. For ages 10+.†	Reviewed on Apple II series, 48K. Also for Macintosh; C 64; IBM PC/PCjr, 128K.	90-day warranty; $10 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★	A	★ ★ ★ ★
SWORD OF KADASH Penguin Software P.O. Box 311 Geneva, IL 60134 (312) 232-1984 $34 ©1985	Travel through a vast dungeon, fighting monsters, accumulating experience points to develop skills. Find and escape with the Sword of Kadash. Fast-moving solo play for ages 12+.	Reviewed on Apple II series, 48K. Also for C 64.	60-day warranty (includes user-damaged); $5 fee thereafter.	★ ★ ★	★ ★	★ ★ ★	★ ★	D	★ ★ ★
TYCOON Blue Chip Software 6740 Eton Ave. Canoga Park, CA 91303 (818) 346-0730 $39–$59 ©1984	Speculate on future values of crude oil, gold, pork bellies, and more. Takes time to learn, but this complex, challenging financial game for ages 12+ has a long shelf life.	Reviewed on Apple II series, 48K. Also for Macintosh; C 64; IBM PC/PCjr, 128K (double-sided disk drive).	90-day warranty (includes user-damaged); $5 fee thereafter; $15 for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★	D	@

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; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart; @ ★★ to ★★★, depending on price

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 74 for information such as backup policies and addresses of software manufacturers.

HOME BUSINESS/ HOME MANAGEMENT

AppleWorks

HARDWARE REQUIREMENTS: Apple IIe/IIc, 64K (128K recommended).
MANUFACTURER: Apple Computer
PRICE: $250

Integrated software packages are two- or three-in-one combinations that let users switch back and forth between assorted applications. *AppleWorks* is a data base/spreadsheet/word processor team that will come in handy for most small business and home needs.

Tutorial disks and easy-to-read documentation make for a painless introduction to the program. With the spreadsheet, also known as an, electronic worksheet (*see* FAMILY COMPUTING*'s May cover story "Tools for Decision-Making"*), I can keep track of all my tax deductions, formulate my family and classroom budgets, and do cost analyses of the savings to be had at various sales around town. I can sort, arrange, and find my favorite recipes or the magazine articles I keep for reference. I track information about my students and their performance with the file program, and then compose individualized reports on the word processor. Tests, surveys, lists, and administrative paperwork—*AppleWorks* helps me master all of them, letting me switch between applications with ease.

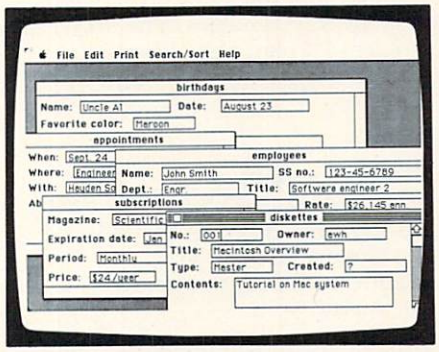
One of the package's few flaws is its omission of a mail-merge feature, which I could use to blend addresses automatically from my files into form letters I'd send out to, say, parents of students. Also, for the package to run most effectively, you'll want to have the following: an extended 80-column card for the Apple IIe (so that you have enough memory to handle both the program and more than a few pages' or files' worth of information simultaneously); and a two-disk drive system (to cut down on disk-swapping).

—ERIC FLESCHER

I Know It's Here Somewhere!

HARDWARE REQUIREMENTS: Apple Macintosh.
MANUFACTURER: Hayden Software
PRICE: $59

Everyone has a few filing tasks just waiting for the computer to put in order. Many electronic filing programs, however, require so much time to learn and set up, and entering information is so tedious, that the promise of organized video collections and car-maintenance records quickly loses its appeal.

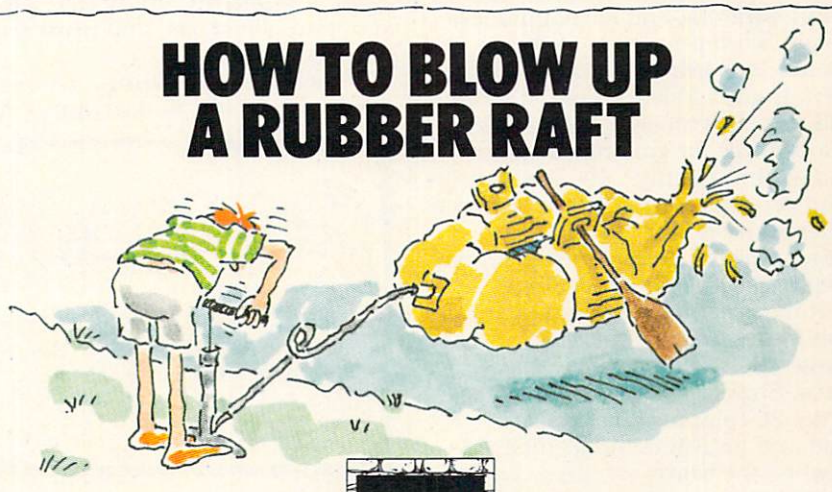


I Know It's Here Somewhere! is perfect for those "littler" filing jobs. It's a breeze to set up and use. Designing your system is a matter of dragging a few boxes around the design window. Each box represents a field, into which you enter the names of the people on your mailing list, or remarks about a TV show you've taped. There's practically no limit to the size of each field, so long as you don't have more than 20 fields and labels on one record. (Labels are the names or categories you assign to a field or set of fields.)

With your data base designed and information entered, you can search for items by any number of criteria. When looking for the phone number of someone whose name you're hazy about—was it Johnson or Johanson?—*I Know It's Here Somewhere!* lets you search for a record that matches any information you furnish, no matter how sketchy or detailed.

The program has its limits. You can sort information only alphabetically. Numerical sorts work only if you've entered information with the same number of digits—143 and 004, for instance. Also, the package does not do calculations within fields. You can't total or subtotal

HOW TO BLOW UP A RUBBER RAFT



First, you need a reason to use a rubber raft. (That's a snap if you've got ZORK® I, the classic fantasy story from Infocom's interactive fiction line. Because you'll be hunting twenty fabulous treasures while dodging every kind of evil under the earth.)

Next, type in your command: BLOW UP THE RUBBER RAFT WITH THE AIR PUMP... But watch it, or you might just blow up the raft until you blow yourself to smithereens!

There's no telling what will happen next in ZORK I—because, like all of Infocom's interactive fiction, ZORK's designed so that whatever *you* choose to do makes the next thing happen. And you won't run out of things to do, either. The underground empire of ZORK is so huge, your adventure can last for weeks or even months.

So if you want the closest thing on a disk to really exploring an underground world, get ZORK I*. But brace yourself for the action—it'll blow you away!

INFOCOM™

*It's compatible with almost every popular home computer. ZORK is a registered trademark of Infocom, Inc.

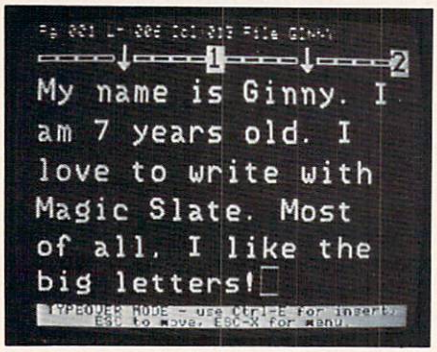
numbers from record to record or within records, which makes the package inappropriate for, say, checkbook balancing.

Nevertheless, for anyone with a lot of little piles in need of organization, *I Know It's Here Somewhere!* is a perfect program.

—SHARON ZARDETTO AKER

Magic Slate

HARDWARE REQUIREMENTS: Apple II series, 48K (64K or 128K for some features).
MANUFACTURER: Sunburst Communications
PRICE: $69



Besides being invaluable for writers, administrators, and small-business people, word-processing software is a marvelous learning tool for children. It gives kids freedom to write and rewrite with ease. *Magic Slate* is a package for children, students, and adults. Twenty-, 40-, and 80-column versions display letters in three different sizes.

Five-year-old Erica, a visitor to our house, liked using the beginner level. A menu let her select an operation from a series of pictures or icons representing the basic features. She also found the large type of the 20-column version easy to read and unintimidating. Using almost all the words she knew how to spell (and many she didn't), Erica drafted a note to her parents.

Eight-year-old Peter quickly learned the commands of the 40-column version. (Deleting, inserting, moving, and more are accomplished by keystrokes that you can memorize or refer to on the command card.)

My 12-year-old daughter, Debbie, used the 80-column version (which incorporates features requiring more memory) to write a fairy tale for school. She used the advanced level's window feature to keep an outline on the bottom half of the screen while she composed her story on the top half. She could easily switch between the two writing areas to compose her story and update her outline. With the fancy typestyles she could incorporate into her document, she had a snazzy-looking final product.

Magic Slate is a bit tough for young children Erica's age. They may need some help getting used to the commands. Still, it offers plenty of pluses not found in other comparably priced packages. The only problem I'd plan ahead for is juggling who gets to use it, and when.

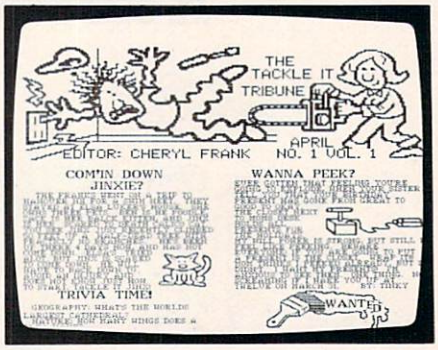
—GWEN SOLOMON

The Newsroom

HARDWARE REQUIREMENTS: Reviewed on Apple IIe. Also for IIc, 64K. Planned for IBM PC/PC*jr*.
MANUFACTURER: Springboard
PRICE: $49

Wanted: Birthday Presents! Good gifts only. Deadline: March 31. Contact: Cheryl Frank.
That was just one of several ads that appeared in the premiere issue of the *Tackle It Tribune*, produced a week before my daughter Cheryl's 10th birthday. She used *The Newsroom*, a wonderful utility that lets you write, illustrate, and print out your own newsletter.

Newspaper publishing involves five steps. First, you design the title



banner. You can use or alter any of the shapes—maps, animals, kids, and more—stored on the package's "Clip Art" disk. A "Photo Lab" lets you create and save pictures for use with columns. The *Tackle It Tribune* recently featured an article on springtime in northern Vermont (where our family lives)—"To Bud or Not to Bud." It was illustrated with a map of New England covered with snowflakes. If the picture library doesn't meet your needs, use the drawing program to execute your own. At the "Copy Desk," you write your stories with a limited word processor; moving into the "Layout Work Area," all is pasted up. With a modem and a friend with a compatible system, you can even "wire" your paper to your friend's computer!

Icons help you get around the package fairly easily, and the manual is excellent; it includes a neat introduction to the world of newspaper publishing. An excessive amount of disk-swapping and some slow cursor movement in the graphics-making part of the program add to the already lengthy time required for the newspaper printing. Still, my kids, ages 10 and 12, learned how to churn out papers all by themselves. And the end result is so pleasing.

I enjoyed writing a "Special Birthday Edition" for my 10-year-old. In fact, both my daughters are expecting a family newsletter when they head off for camp this summer!

—CATHY FRANK

Team-Mate

HARDWARE REQUIREMENTS: C 64/128.
MANUFACTURER: Tri Micro
PRICE: $49

To many people's dismay, a computer is usually a multipurchase process. Simple thank-you letters require a word processor. Number crunching? Check out an electronic spreadsheet. Filing? You'll need a data-base manager or electronic filing system. And if you want to combine information—use some numerical data in your written report, for instance—that means still more software, more money, more to learn, and more work. *Team-Mate* solves all these problems as one of the first integrated packages for C 64 owners.

Although it's not recommended for more than casual home use, the package pulls together the three main productive computer applications: word-processing, creating spreadsheets, and filing. An additional program that you must load separately will graph your data, too. Once loaded, the various applications can be used virtually simultaneously. The price you pay for this flexibility is applications that are much less powerful than those of packages you might purchase for individual tasks.

You can word-process only 99 lines of text per file. For instance, one long letter I wrote recently required three separate files linked together! The spreadsheet portion of the program also is abbreviated, with only 17 columns across and 50 rows down. Still, this should accommo-

date most family budgets and numerical record-keeping.

The primary question to ask yourself with this product is how serious you are about each of the applications it covers. For limited home use—perhaps some letters and notes, mailing lists, checkbook upkeep, health-record maintenance—*Team-Mate* covers lots of territory.

—FRANCIS AMATO

EDUCATION/ FUN LEARNING

Mystery Sentences

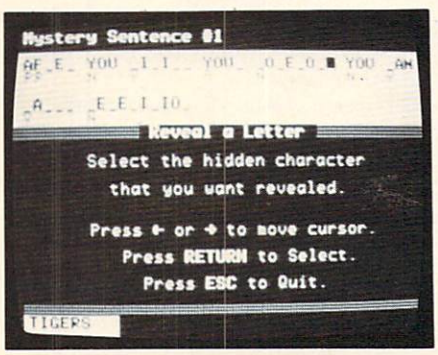
HARDWARE REQUIREMENTS: Apple II series.
MANUFACTURER: Scholastic Software
PRICE: $39
MANUFACTURER'S SUGGESTED AGE: 8+

Mystery Sentences has my family hooked. With the holding power of Hangman, it never fails to keep us at the keyboard for longer than we intend.

Alone or with an opponent, you must figure out sentences presented with all or most of the letters missing; every word is marked for its part of speech. In each turn, players can opt to guess a word, reveal a letter, or get a hint about the sentence.

My seventh-grade daughter, Doña, and I started out with the "Animal Facts" category. Presented with a screen full of vowels, Doña asked for a clue. THE WORKERS ARE THE ONES THAT GIVE THIS LIVELY PERFORMANCE, we were told. "Bees," Doña exclaimed, and we were off on a consonant hunt.

Nine-year-old John found the vowel-only game tough, so we changed the setup to reveal all the other words. (A third option, too tough for us at this point, allowed for blanks only.) After guessing his sentence, A GILA MONSTER IS A POISONOUS LIZARD WITH POWERFUL JAWS AND A FAT TAIL, John wanted more.



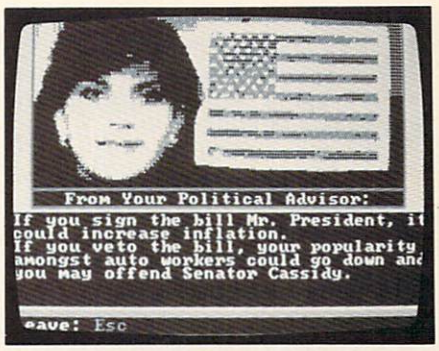
Nine categories' worth of sentences come with the package. I like the feature that lets me write new sentences for the children. One morning I left a coded message on the screen (*see photo below left*). Both kids raced through their breakfasts for a chance to decode the sentence before school, and I garnered many boos when they succeeded. (My breakfast message to the kids was: AFTER YOU FINISH YOUR HOMEWORK YOU CAN WATCH TELEVISION.)

—MARLENE ANNE BUMGARNER

President's Choice

HARDWARE REQUIREMENTS: IBM PC/PC*jr*. Planned for Apple II series, C 64.
MANUFACTURER: Spinnaker Software
PRICE: $39
MANUFACTURER'S SUGGESTED AGE: 12+

If your family congregates around the TV set to watch and discuss the evening news, you'll probably enjoy *President's Choice*. There's a lot to absorb. The first sitting scared off some folks (including me), particularly some uninterested junior-high-schoolers. But after a session or two,



the game's implications became clearer and the fun began.

President's Choice puts you at the nation's helm, as a Democratic or Republican president (the choice is yours). Your term is punctuated by news events and requests for decisions on all sorts of social and economic issues. You'll have to prepare the budget and face public opinion and press response. You'll want to review such economic indicators as unemployment, interest rates, and the progress of the GNP. For guidance, you'll rely on a briefing book, a team of advisers, and tables and graphs to chart the course of the affairs of state.

HOW TO PUT A PLATYPUS UNDER YOUR SPELL

No one loves getting wet more than a duck-billed platypus. (That's pronounced 'plat-i-pùs.) So if you want to make a platypus happy in WISHBRINGER,™ Infocom's amazing interactive magic adventure, just type in a magic spell: PICK UP THE MAGIC ROCK AND THE UMBRELLA. OPEN THE UMBRELLA, THEN WISH FOR RAIN.

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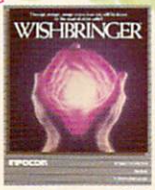

kidnappers, even a stone that grants its owner's every wish. In fact, there's so much action, your adventure can last for weeks or even months.

Get the closest thing on a disk to real magic. Get WISHBRINGER.* It's a great adventure—and a great way to learn how to spell platypuses.

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WHAT'S IN STORE
SOFTWARE REVIEWS

When your term's up, the nation shows its approval or disapproval in the form of a general election. Winners stick around for another term. Losers look for a job.

This program is extra tough, even for junior-high and high-school students. Adults may find it entertaining once or twice, or as something to work on with the kids. Still, don't expect apolitical or unmotivated family members to flock to this one.

In many ways, the game is bleakly realistic. Some of the media responses to events and decisions are as frustrating as they must be to elected officials. After succumbing to pressure from advisers, one president was berated for pushing through private interest legislation. Also realistic, but irritating to players, was the predictability of certain press and adviser responses and positions. Several different scenarios exist on an accompanying data disk, and can be loaded into the program when the existing series of situations grows stale.

A few flaws interfered with our enjoyment of the package. News flashes scrolled far too quickly for some, too slowly for others. Spelling errors irked me.

Unfortunately, the scenarios tend towards the "cute" side, making the game lose credibility as a realistic simulation. Nevertheless, this simulation is a good concept that will open young players' eyes to the interaction of industry, the economy, and politics. One of the package's most educational features is the painfully obvious inability of the president to please everyone.

—MARLENE ANNE BUMGARNER

The Sea Voyagers

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for C 64; IBM PC (w/graphics card).
MANUFACTURER: CBS Software
PRICE: $39
MANUFACTURER'S SUGGESTED AGE: 8+

Verrazano and Vespucci, Cabrillo and Cabral: No, these aren't famous law firms. They're six of 30 legendary explorers whose exploits are described in *The Sea Voyagers*.

Like a great computerized encyclopedia of exploration, this package provides the birth, death, nationality, sponsoring country, dates of sail, and other pertinent facts about each explorer. Also included is a map, etched with the explorers' travel routes. A keyboard overlay makes reference to travelers easy. The written documentation provides additional facts, as well as a bibliography which points scholars young and old to more comprehensive books.

Once you've mastered the basic facts, you can try your luck on one of the three simple games, playing against the computer or with a friend.

The value of this package lies not

in the games, but in the information provided and the program's well-executed format. Our kids found it to be a solid, enjoyable package.

—TONY MORRIS

GAMES

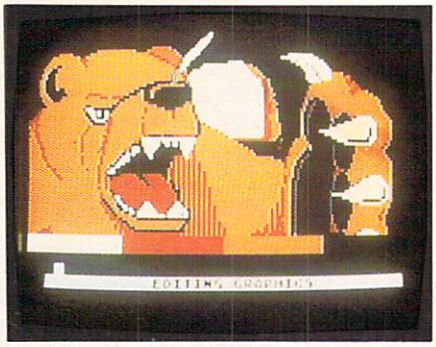
Adventure Master

HARDWARE REQUIREMENTS: Reviewed on C 64. Also for Apple II series; Atari; IBM PC/PC*jr*.
MANUFACTURER: CBS Software
PRICE: $44
CRITIC'S SUGGESTED AGE: 12+

Ground-breaking software always is welcome at my playtesting tables. *Adventure Master* offers text and text/graphic adventurers the ability to write their own stories with friends and families as characters.

It's a detailed construction set requiring many hours of work to fully exploit. In addition to straightforward text descriptions of people, places, and objects, you can include usable clues and artifacts, map out rooms and environments, and even enhance the adventure with a built-in, if limited, graphics generator.

If you're dedicated enough to spend hundreds of hours familiarizing yourself with the set's many features, planning out, and finally building your own adventure creation, this package could provide endless hours of pleasure. However, be sure to weigh its complex nature against the attention spans of potential gamers. Most users tend to



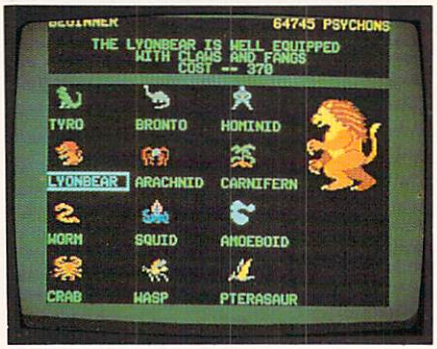
prefer playing to creating.

The program's only real drawback is its crude graphics. The joystick controls all graphic input, which means you can't execute finely detailed work. But even with this and other, less serious limitations—e.g. finite numbers of rooms, characters, and objects—it's a worthwhile tool with a fine payoff in personal achievement, perfect for budding game designers.

Mail-Order Monsters

HARDWARE REQUIREMENTS: C 64. Joystick.
MANUFACTURER: Electronic Arts
PRICE: $32
CRITIC'S SUGGESTED AGE: 10+

Few strategy/arcade games can match *Archon* and its sequel, *Archon II*, for excitement and action. Make that past tense . . . few could, until *Mail-Order Monsters*. It's a monster-building package that lets you create an unlimited variety of



creatures for an unlimited number of face-offs—against the computer or another player.

Three levels of play usher newcomers into the program. Use the "Free Trial Offer" (or beginner level) to take one of 12 different creatures out for a spin. Get a feel for the strengths and weaknesses of the brontosaurus or the tree-being. Soon you'll move on to the intermediate level and more complex decisions, such as which weapons and

equipment to buy for combat.

The biggest thrill awaits you at the "Tournament Level." You start out with few points to buy and equip creature types. Each victory in the arena brings funds to develop more effective warriors. With many battles and victories under your belt, you'll have won enough money to build up a stable of monsters.

Mail-Order Monsters is one of the year's best so far. Its play and combat system and concept won approval from a wide range of playtesters. A few warnings, however: Be sure to practice against the computer. If you only take on friends, you might face a beast of unknown powers when you finally do fight the computer. Also, build a stable of champions. If one of your prized beasts dies, that's it forever.

Reforger '88

HARDWARE REQUIREMENTS: Reviewed on Atari. Also for Apple II series.
MANUFACTURER: Strategic Simulations
PRICE: $59
CRITIC'S SUGGESTED AGE: 12+

Strategic Simulations' newest game about potential Warsaw Pact/NATO confrontations is an exciting and frighteningly realistic simulation of the opening week of a Soviet invasion of NATO-defended Germany.

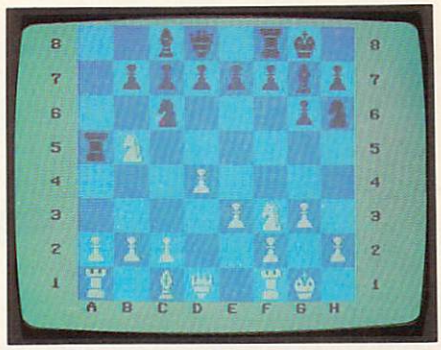
One to two players or teams engage ground troops, airplanes, and state-of-the-art weapon systems against one another in a nonnuclear conflict. Outnumbered NATO forces fend off powerful Warsaw Pact columns while trying to win air supremacy and build up reserves to fend off the enemy advance. The Soviet-controlled forces, using airborne troops, outlawed chemical weapons, and more, must break through NATO lines to seize the strategic airbase at Frankfurt. The game accurately reflects the state of modern war and some of its more terrifying implications.

The rules in *Reforger* are complex and the assortment of units each force may use are more varied than in most wargames. But the game's streamlined play system proved easy to use after about four hours of practice. The game is a step forward for intermediate to advanced wargame players. Even newcomers with reasonable strategic thinking skills can jump right in, thanks to the game's straightforward play system.

Sargon III

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for Macintosh; C 64; IBM PC/PC*jr*.
MANUFACTURER: Hayden Software
PRICE: $49
CRITIC'S SUGGESTED AGE: 10+

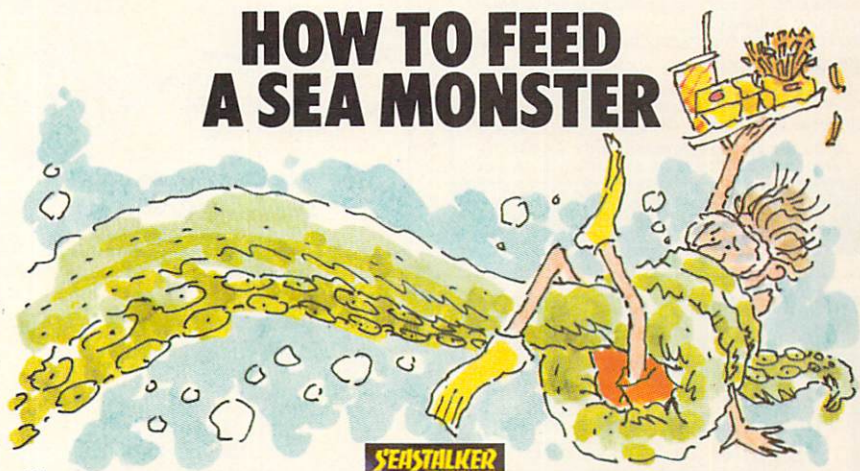
This is the finest chess program on the market. Its superiority derives from its tremendous flexibility. You can engage the computer opponent in a variety of skill levels; ask for potential moves, in effect, "feeling your way" through a game. You may take back moves and even alter the board setup midgame. If you find the computer moving too slowly (and therefore making more advanced moves) you can shorten its time limit. Switch sides if the computer's clobbering you and you want to know what it feels like to be on top. You can use the computer as a referee in two-player games, replay contests, print out moves, and save games in progress.

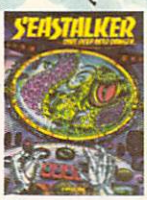


All this flexibility makes *Sargon III* a great and patient opponent, and a fine tutor, as well. Both new and experienced players can study a wide selection of championship matches. Follow along to a point, then dive in, solve problems, and move tactically according to your own judgement.

—GAME REVIEWS BY JAMES DELSON

HOW TO FEED A SEA MONSTER





First, locate a sea monster. (The best place to find one is in SEASTALKER,™ the brand-new undersea story from Infocom's interactive fiction line.)

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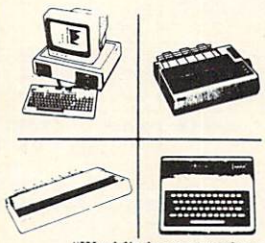
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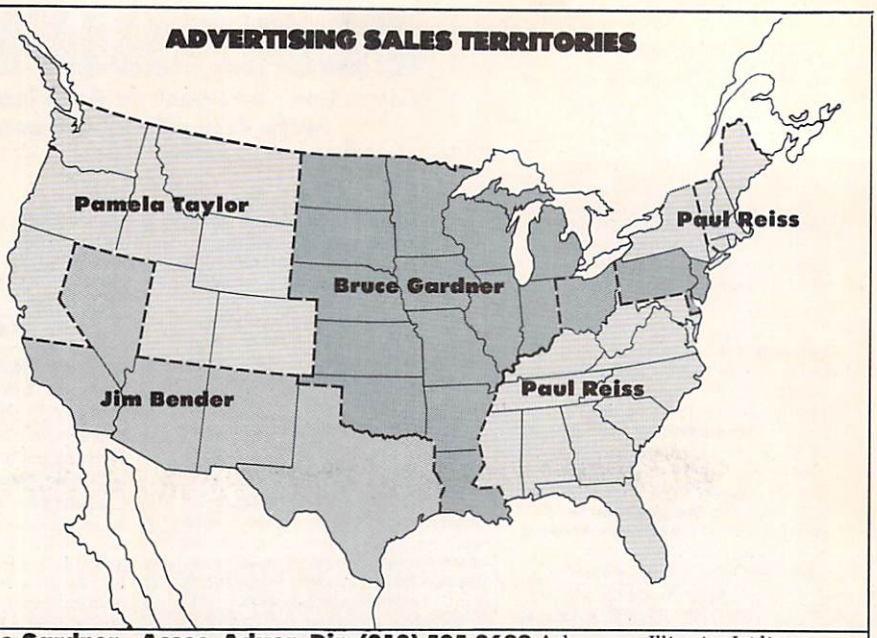

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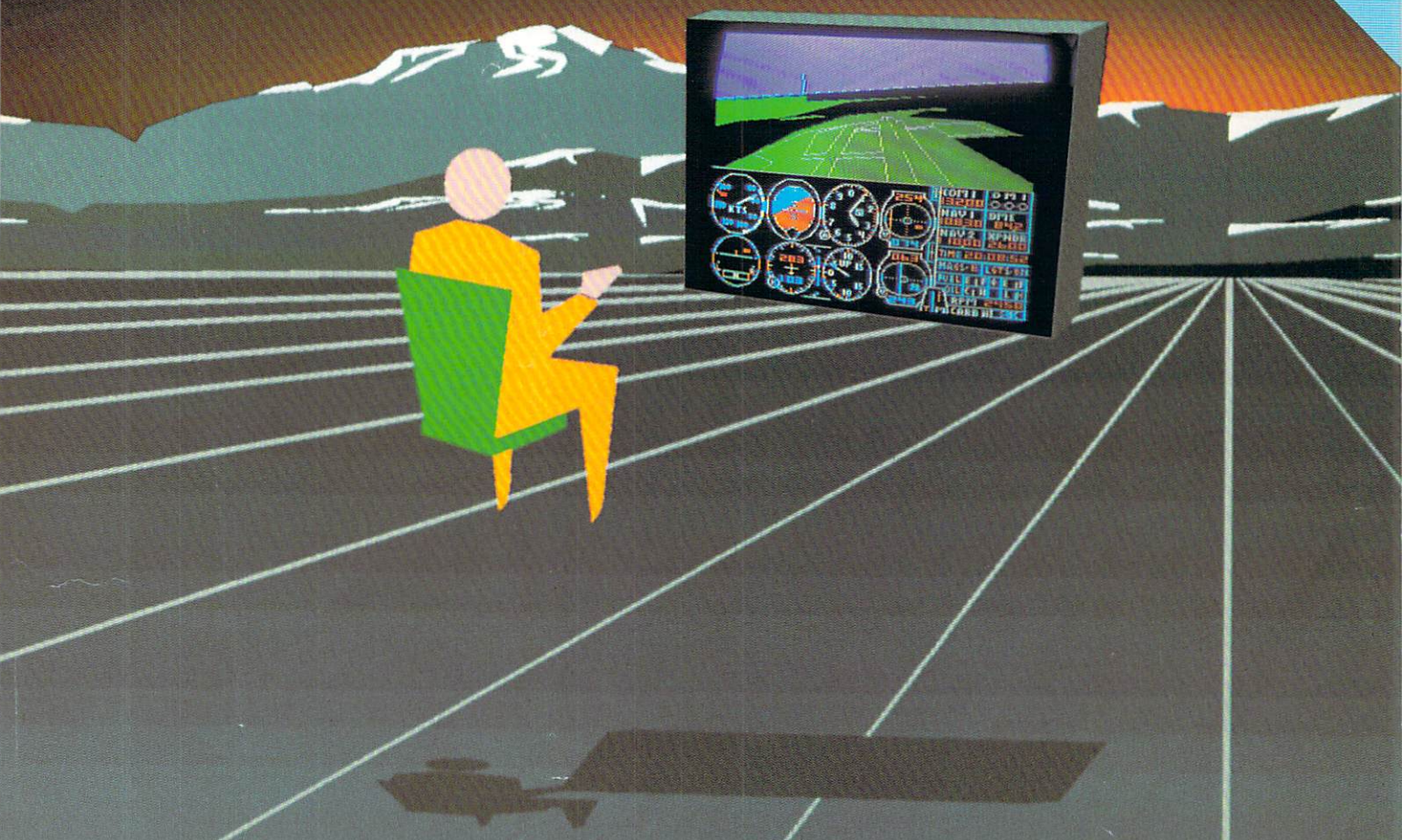

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