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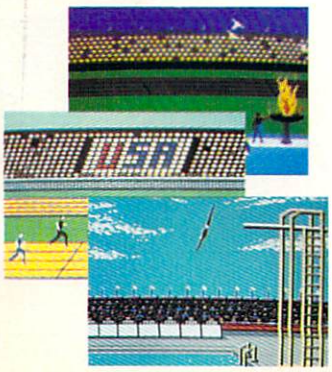

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EPYX™ COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

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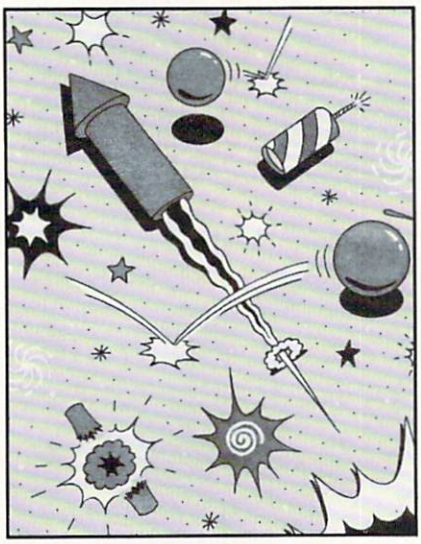

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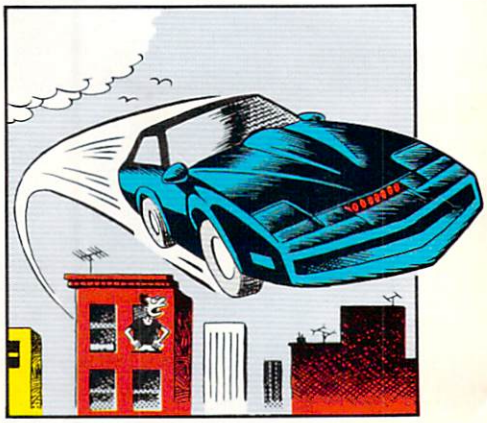

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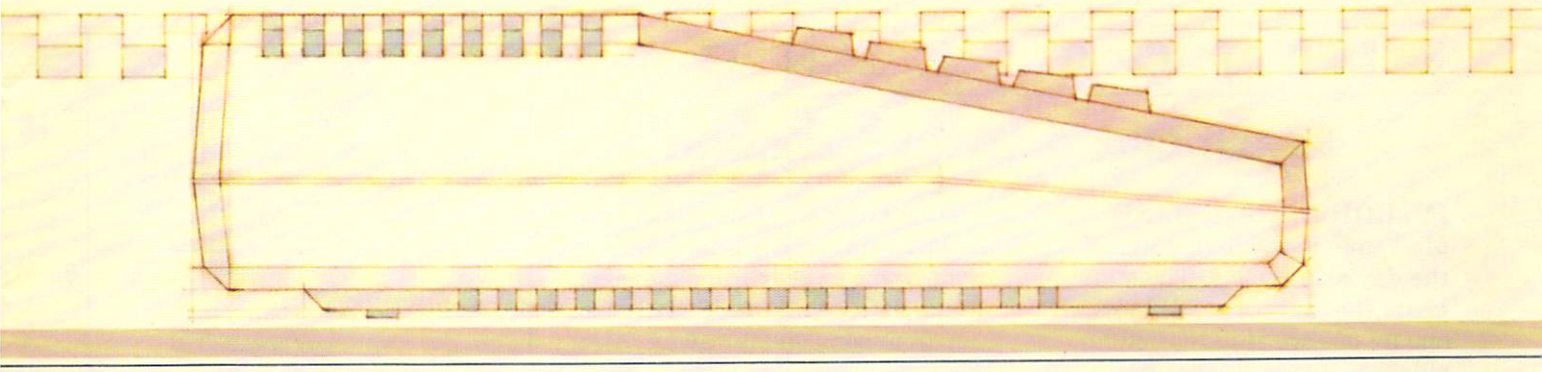

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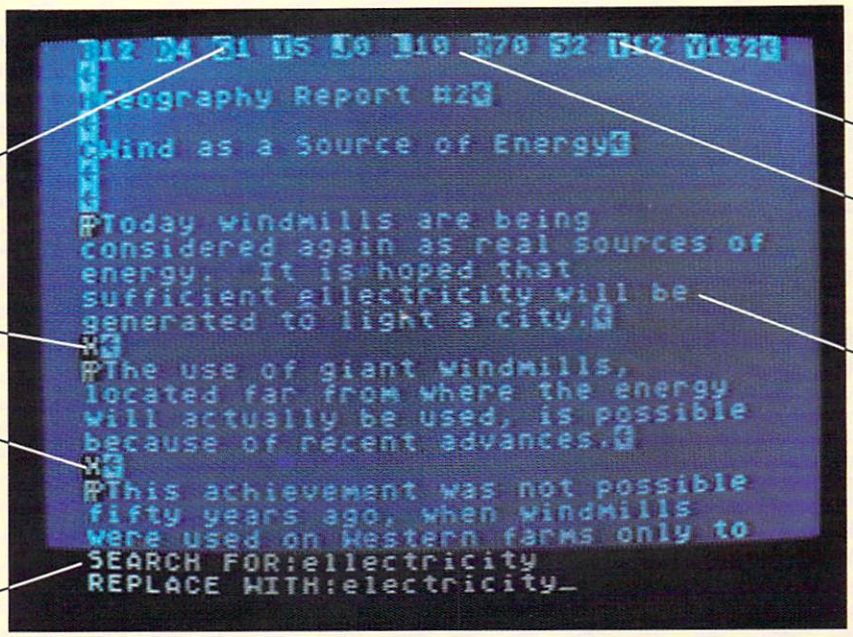

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EDITOR'S NOTE

Reach Out & Write Someone

INTRODUCING K-BASE . . . Mail time is the high point of the day at K-POWER. The staff hears the mail cart roll by, and one by one we slink out of our offices to get at the letters.

Getting to know the many K-POWER readers who've written us or who've entered K-POWER contests has been exciting. We read every letter several times (in fact, we fight over them!). We've noticed that lots of kids want to get to know other computing kids. Well, for all you computer users with an itch to write, we've figured out an exciting way for you to get in touch with other kids from around the country, or from right next door! It's called the K-BASE.

The K-BASE is K-POWER's own data base of computing kids. If you're a hacker in West Virginia who wants to find some advanced BASIC programmers in your area, we'll do our best. If you're a computing novice in California who wants to communicate with other novices your own age in the Midwest, we'll try to make a connection.

Let us know your name, age, sex, address, phone number, what computer you use, and what computing/programming level you're at (novice, intermediate, advanced, expert).

If you're an avid programmer, let us know what languages you work with. And tell us whether you want to hear from someone in a city or state near your own, or from someone far away. Also, let us know if you want to 1) communicate with someone at your own computing level, 2) help someone out who's just learning to compute/program, or 3) get help from a more advanced K-POWER reader. Write us all about any other special interests you have. Mail to K-BASE, c/o K-POWER, 730 Broadway, New York, NY 10003.

MORE PROGRAMMING . . . In this issue, K-POWER introduces more ways for you to enjoy the power of computing. I'm talking about the 16-page Hacker Heaven pullout you'll find in the center of K-POWER in each issue from now on! This section is crammed with ways you can use your computer: There are programs that help you generate computer graphics . . . music programs in Microtones . . . miniprograms in Compucopia—programs for every major computer system! With the hints you can pick up in Hacker Heaven, you'll have the power to program anything!

Anne Krueger

ANNE KRUEGER Editor

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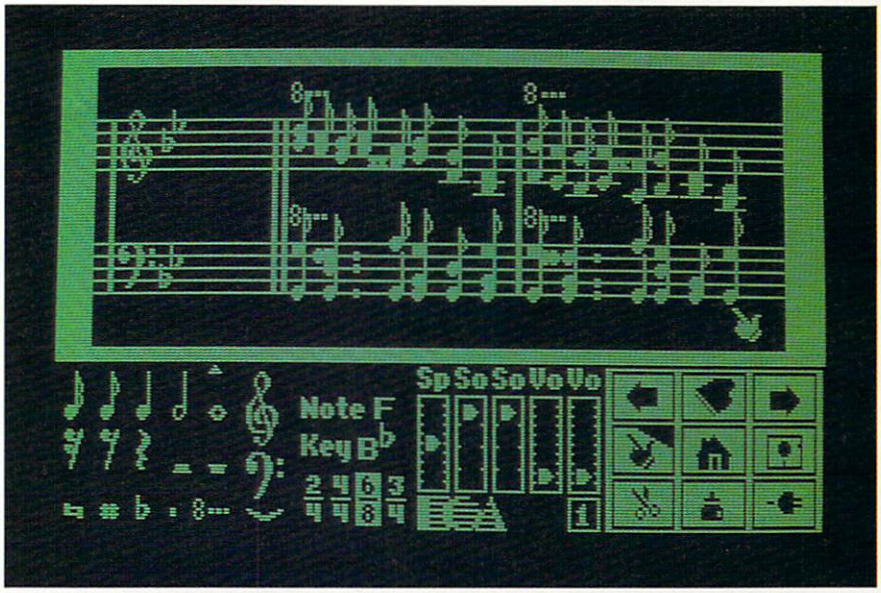
The END of DINKETY-DINK.

Announcing the first computer music program that actually sounds like music.



LET'S FACE IT. Up till now, music programs for your home computer have all sounded, well, pretty lame. There were the ones that resembled little electronic music boxes, remember? And then there were those that sounded like so many burps.

Enter Music Construction Set.™ It's the first music program that really makes use of the power of that machine you've got. If you're a serious student, this means you'll be able to work with an intricacy and range of sound quality you've never heard before on a computer. And if you know nothing about music, you'll find something even more important. Namely, that this thing is simple enough to be a lot of fun.

Take a good look at this screen because it, you, and a joystick are the whole story here.

That's you at the right end of the staff of notes – the little hand. Move the joystick, and you move the hand. Use it to carry notes up to the staff. Lay in rests, signatures, clefs, then point to the little piano in the lower right and listen, because you'll hear the whole thing played back.

Move those little scales in the middle up and down to vary the music's speed, sound quality, and volume. Use the scissors to cut out whole measures, then use the glue pot to paste them in somewhere else. Got a printer? Great. Print the score out and show it off to your friends.

But what if you're not up to writing your own stuff yet? No problem. There are twelve pieces of music already in here, from rock 'n roll to baroque. They're fun to listen to, and even more fun to change. (Apologies to Mozart.)

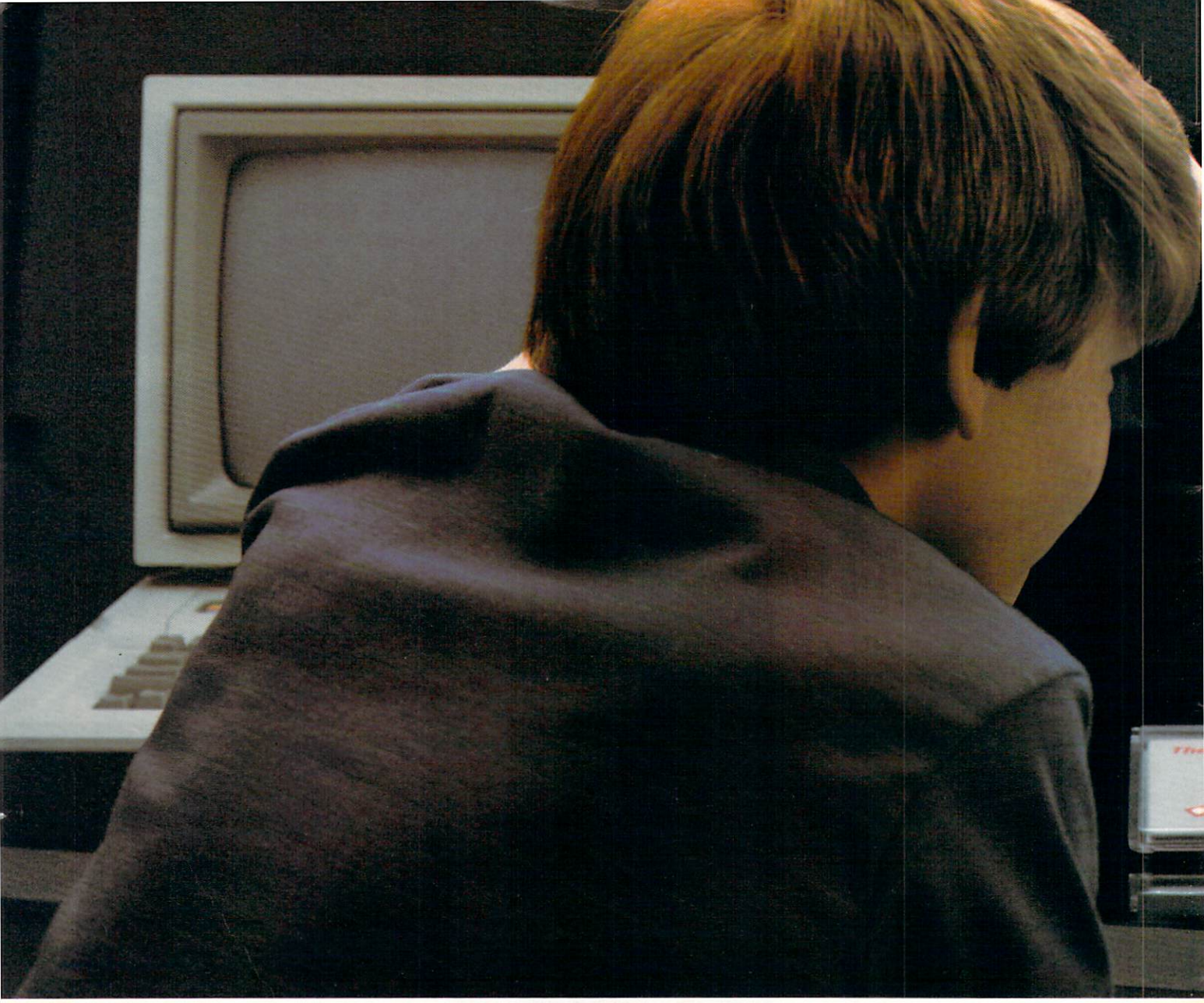
The point is, the possibilities are endless. But if you're still skeptical, visit your nearest Electronic Arts dealer and do the one thing guaranteed to send you home with a Music Construction Set in tow.

Boot one up. Point to the piano. And listen.

NOW AVAILABLE FOR ATARI HOME COMPUTERS AND THE COMMODORE-64

ELECTRONIC ARTS™

MUSIC CONSTRUCTION SET is now available for Apple II, II+, IIe, and Commodore 64 computers. The Apple version, with a Mockingboard,™ plays chords of up to six notes each. The Commodore version plays chords of up to three notes each. Apple is a registered trademark of Apple Computer. Commodore is a registered trademark of Commodore Business Machines, Inc. For more information about Electronic Arts, write us at 2755 Campus Drive, San Mateo, CA 94403 or call (415) 571-7171.



How to talk your parents

There's a new Apple® Personal Computer called the IIc that's so complete and so affordable that getting your parents to buy one should be easier than learning Logo.

If, that is, you know what to say.

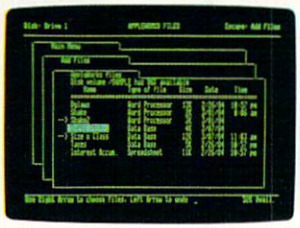
For example, don't tell your parents that the IIc has the first true 128K VLSI motherboard, dual built-in RS-232 ports and a built-in half high disk drive. Or that it has a switchable 80/40 character display and built-in mousetronics so it can use an AppleMouse.

You know that's incredible in an 8 pound* computer, but all those specs may make your parents uncomfortable.

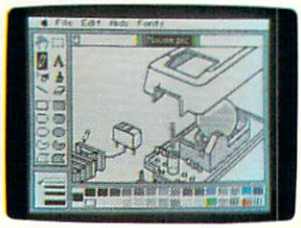
Just tell them that the Apple IIc can run more than 10,000 programs written for the Apple IIe, the most popular computer in education at all levels. And it works just the same as the Apple computers you learn on in school.

You might also mention that it's a bargain. It comes with everything you need to start computing in one box—including an RF modulator that lets you hook it up to your TV the moment you get it home. There's even a free 4-diskette course on computer basics they

The IIc shows off its true colors with SubLogic's Flight Simulator II.



AppleWorks—advanced business software even a parent could love.



With MousePaint, you could become the next Picasso. Or the next Charles Schulz.

into parting with $1300.

can use when you're too busy to show them how.

All for under $1,300.**

Of course, they probably won't want to hear that it runs more games than any other computer in the world except the Apple IIe.

But they might like to know that it also runs advanced business software. Including specialized programs for every profession from doctoring to farming to astronauting. Not to mention personal productivity software to manage their personal finances and taxes.

Speaking of which, they can deduct part of an Apple IIc's price from their taxes if they use it for business.

Even if they always keep it at home.

Don't confuse them right now with the wide array of Apple IIc accessories and peripherals. Like Apple's 1200/300 modems. Or the IIc's low cost full-color graphics/text printer, Scribe.

The IIc Bag has room for a power pack, software, even notebooks. So it's worth a few extra bucks.

But assure them that your IIc can grow just as fast as you do.

Now, if all of these carefully reasoned arguments fall on deaf parental ears, don't despair. There is still one thing more you can do.

Get a paper route.

** The IIc alone weighs just 7.5 pounds. Power packs, monitors, printers, modems and mice can make it as heavy as you'd like. ** Suggested retail price.* *© 1984 Apple Computer, Inc. Apple and the Apple logo are trademarks of Apple Computer, Inc.* *For an authorized Apple dealer nearest you, call* ***(800) 538-9696.*** *In Canada, call* ***(800) 268-7796*** *or* ***(800) 268-7637.***

LOGON

L E T T E R S

TI-99/4A COMPLAINT

I received K-POWER as my birthday present, and I know I will enjoy each of the remaining issues. Much as I enjoy the magazine, I would like to see more programs for the TI-99/4A (without Extended BASIC).

JOSEPH SMITH, *12*
Worcester, Massachusetts

Dear Joseph,

We try our best to offer programs for as many different computers as we can.

You'll find TI programs in every issue. For instance, Pixel That! in June had a TI-99/4A program called Chaos. *In this issue, we have a TI fireworks program. Here's an idea—Hacker Heaven runs reader-written programs. Maybe you, or one of the other two million TI owners, can send us TI programs!*

THE EDITORS

KID'S POINT OF VIEW

Your magazine is good because the articles are from a kid's point of view. The reading is easy to comprehend, not like some complicated business computer magazines.

ROBERT SANFILIPPO, *14*
Orchard Park, New York

MORE FOR BEGINNERS

I own the Atari 800XL. I have just finished reading the Premiere issue of K-POWER and overall I liked it. But it seems that your magazine is aimed at kids who can afford all the possible peripherals for their machines. I would like to see more articles aimed at computer owners who know very little about their equipment but are eager to learn. You could try a pen-pal system to let owners of similar brands communicate, if only to chat about programming techniques.

PHILLIP RUSSELL, *16*
Pekin, Illinois

Dear Philip,

Your letter has very good suggestions. We're listening. Keep reading. I think you'll like what you see. Read about the pen-pal plan we want to try in this issue's Editor's Note.

THE EDITORS

K-POWER'S THE BEST

I bought K-POWER, and decided to enter a subscription. I own an Atari 800. One program was *Symphony in 3-D*. It was great! The best! Please print more such as that! Screening Room is helpful in choosing games.

JOHN HORTON, *11*
Jackson, Mississippi

VIC-20 PROGRAMMER

I own a VIC-20 and have written some good programs for it. One is a telephone directory on which you can save up to 10 numbers on file. It also includes such features as ADD, DELETE, ALPHABETIZE, and SEARCH FILE.

The reason I am writing is because I wished to inquire whether or not you accept unsolicited programs from your readers. If you would reply, I would appreciate it deeply.

EDDY ACCOSTA

Dear Eddy,

We sure do! We're always looking for reader-written programs. Just send us your program on cassette or disk, along with a printout and the instructions. Be sure to include a self-addressed, stamped envelope so we can send it back to you if we can't use it. Mail it to: Hacker Heaven, c/o K-POWER, *730 Broadway, New York, NY 10003. We'll pay you $50 if we run it. If you have any special miniprograms that are 20 lines or less, we'll pay you $20 for each we decide to print, and run them in our special Compucopia section.*

THE EDITORS

OH-Ø

I love your magazine, but I can't tell the difference between the letter "O" and the number "0" (*in your programs*). All other magazines put slashes through the zero (Ø).

JASON NAYLOR
San Clemente, California

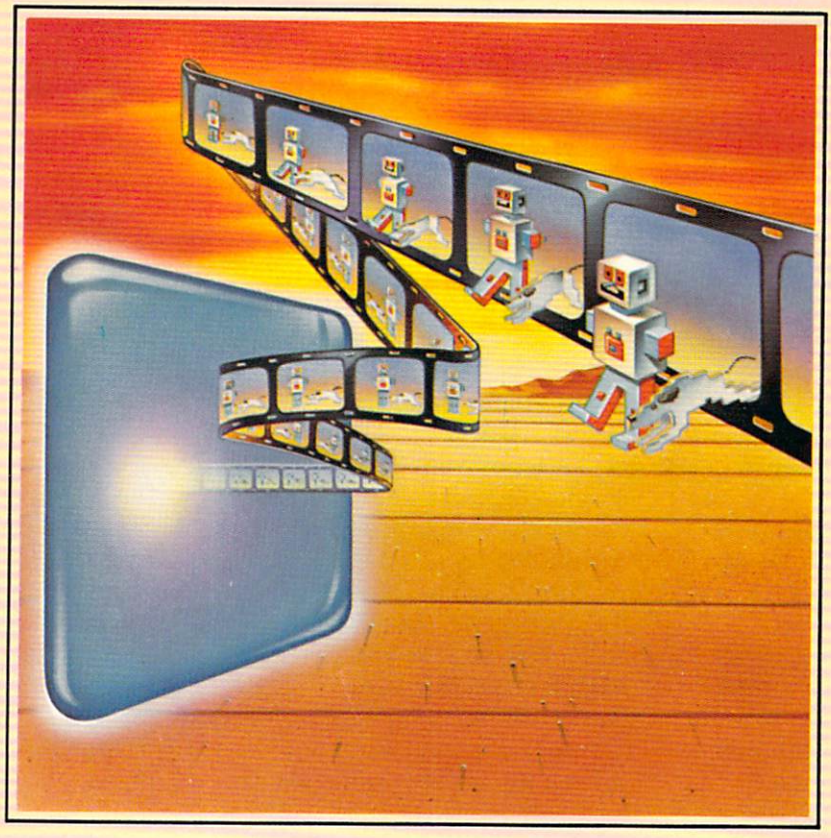
Dear Jason,

We're sorry you and other readers are having trouble with our "Os" and "0s". The printer we use can tell the difference between "0" and "O" so it doesn't use the slash. We're changing to a printer which will print "Ø"s.

THE EDITORS

WE WANT TO HEAR FROM YOU!

Send your letters to LOGON, c/o K-POWER, *730 Broadway, New York, NY 10003. Or, if you're a CompuServe member, you can leave messages for* K-POWER *in care of E-Mail. Our number is 76703,673. And if you're looking for a computer-using pen pal,* K-POWER *is looking for you! Read about* K-POWER'S K-BASE *in the Editor's Note.*



You imagine
and a cast appears on the screen
You compose
and music and sound are heard
You direct
and an original story unfolds
You are a MovieMaker.™

Creative Pastimes.™
Software as unique as you are.

Look for Creative Pastimes Software in your favorite book or computer store. You'll find it's suitable for all ages, and compatible with most popular home computers. For more information call us at (800) 336-0338. Or write Reston Computer Group, A Prentice-Hall Company, 11480 Sunset Hills Road, Reston, Virginia 22090. MovieMaker is a registered trademark of Interactive Picture Systems, Inc.

The Dolphin's Pearl

MovieMaker

Day

Middle of the Road Lizard

COMPUZINE
VOL. 1 NO. 6 JULY/AUGUST

Edited by John Holmstrom

The Billion-Dollar Rip-Off: Piracy

The big cheeses in the computer world recently discussed piracy at a spring *Billboard* video game conference in San Francisco, and at the Softcon Conference in New Orleans.

Steve Wozniak, cofounder of **Apple,** talked at Softcon about the 200,000 pirates who each copy at least 100 programs a year. "At an average cost of 50 bucks apiece," said Steve, "that's a billion-dollar rip-off!"

Steve outlined the pirate code of ethics: "1) We collect everything we can for free, but if we find a high-quality program that's useful, we'll buy it—to get the manual, and because it's the right thing to do. 2) If a program's unprotected, we refuse to pass it on. 3) If a program costs too much, we copy it. But that doesn't mean a lost sale, 'cause we wouldn't buy it anyway."

Steve sympathized with the typical pirate who doesn't have much money: "A lot of them have to scrape around for a year just to get $200 together to buy a modem." He also said the industry tries to blame pirates for every lost software sale instead of admitting there are too many games on the market that aren't worth the asking price.

But "The Woz" said pirates need to understand that "copyright is ownership. The designer puts a lot of work and time into developing a program and needs the royalties from it to survive."

Ken Williams, on the other hand, isn't too concerned about the piracy problem. The president of **Sierra On-Line** pointed out that the software industry is better off than a lot of others. "At least it's possible to put some kind of copy protection on disks, so only real experts can break the system. Records and books have no protection at all." He hopes that as software prices get lower, piracy will diminish.

The price of a disk doesn't matter, according to **Stan Goldberg,** president of **Micro Lab Computer Products.** "Kids pirate because it's easy," Stan said. He told of a kids' computer panel where 10 of the participants owned a copy of *Miner 2049er*—but only two had actually paid for it.

"A few weeks ago," said Stan, "we sent out review copies of *The Heist*. One week later it was discovered on a pirate bulletin board in Texas. It hadn't even been released to the public yet!" Stan thinks piracy like this has forced a lot of smaller software companies out of business.

Education is the key to solving the piracy problem, according to **Sherwin Steffin,** cofounder of **EduWare.** Teachers are frequently the biggest pirates, he said. And because teachers often know so little about computers, they ask their students to pirate for them.

Ihor Wolosenko, president of **Synapse Software,** doesn't think any kind of education or moralizing will solve the problem. "The reason we have locks," said Ihor, "is because of the nature of people."

Ihor offered two possible solutions to the problem. One was to offer extra goodies, like maps and game boards, in the software package. The second solution was to make the price of the programs so low that they're not worth the trouble of copying.

—PAM HOROWITZ

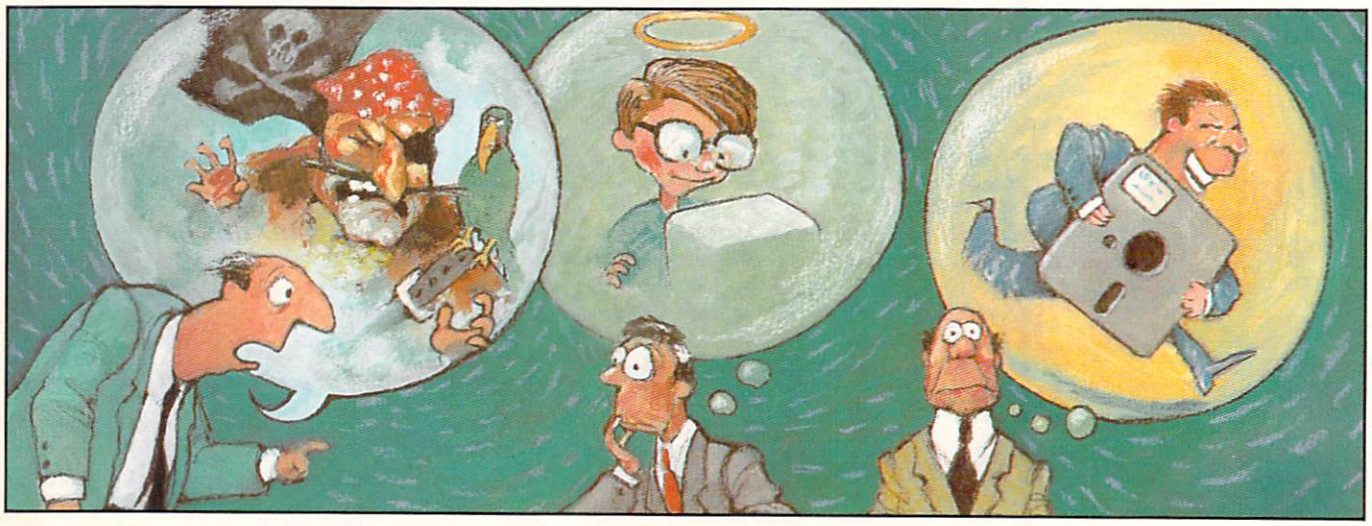


Illustration: Howard Lewis

If your parents complain that this is what all computer games are doing to you, they obviously don't know about Spinnaker.

With most computer games the biggest challenge isn't the game. It's keeping your parents from objecting to it.

Now, Spinnaker has the answer. It's called the Learning Adventure Series, and it's a whole bunch of great games that will challenge and inspire your imagination for hours. But won't inspire hours of complaining from your parents.

Of course, even if they didn't offer this nice little benefit, our games would still be fantastic. Because they've got the kind of built-in, long-lasting excitement and adventure that make great games great. You'll explore, figure, and investigate your way through all kinds of situations. You can bargain with aliens, search a haunted house, even build your own railroad empire. And that's a lot more fun than most games that are "bad" for you.

So the next time your parents complain that computer games are turning you into a vegetable, tell them about Spinnaker's Learning Adventure Series.

Then you can get down to the business of fun and games in peace and quiet.

Spinnaker Learning Adventure games are available for Apple,® Atari,® IBM® and Commodore 64™ home computers.

It's New! TRAINS.™
You're in charge of an old-time railroad – and whether it turns into a bonanza or a bust depends on how well you run it. But either way you'll find that working on this railroad is a challenge – and a lot of fun! **Ages 10-Adult.**

It's New! ADVENTURE CREATOR.™
Design a challenging adventure game that you or a friend can tackle – or let the computer design one for you. It's complex, exciting – utterly addictive! **Ages 12-Adult.**

IN SEARCH OF THE MOST AMAZING THING.™
It isn't easy to find – even in your B-liner. But you'll have help from your Uncle Smoke Bailey as you search the universe to find the Most Amazing Thing. **Ages 10-Adult.**

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We make learning fun.

Disks for: Apple, Atari, IBM, and Commodore 64.
Cartridges for: Atari and Commodore 64 – (ADVENTURE CREATOR only).

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SILICON ALLEY

Check out these clues to the latest computer news!

BUILT-IN SOFTWARE! Tom Restaino, Activision's v.p. of marketing, predicts hardware of the future will have a lot of built-in software. Computer buyers are looking for whatever's easiest and most practical. What could be easier than a ready-made software/hardware combo? . . .

ANOTHER ONE? Yep, *another* TV show about goings-on in Silicon Valley is in the works. This time, it's a TV movie called, of all things, *Silicon Valley*. Actor Mel Ferrer is writing and producing it. It's all about industrial spying and high-tech security systems. . . .

SELF-DESTRUCTION! That's what Israel's Weizmann Institute of Science is developing—new disks with "weak bits." These self-destructing disks would stop running or erase themselves after a certain number of plays. (Also, since many disk drives can't copy disks with weak bits, they'd be hard to pirate.)

COMPU-LIMO! That's what Washington's big wheels are cruising around in nowadays. They call Air Brook Limo Service and order a limo with a computer that can also look up Congressmen's biographies, Congressional voting records, or the phone number of the nearest Italian restaurant. . . .

HEY BILL, WHERE'S YOUR FLIGHT SIMULATOR? Bruce Artwick told us this one. He says he and Bill Budge are friendly rivals in the design biz. Bill once took a look at Bruce's *Flight Simulator* and said he was going to tackle a flight simulation program next. Well, Bruce wasn't going to let that one go by—he designed *Night Mission* because Bill had just done *Raster Blaster* (a predecessor to *Pinball Construction Set*). Then, Bruce sat back and waited for Bill's flight program. He's still waiting. Sierra On-Line isn't. The company's new *Stuntflyer* will knock your socks off! We won't leak all the contest fun the company has planned for *Stuntflyer* (for Apple, Atari, C64, and IBM), but look for it on store shelves in the fall! . . .

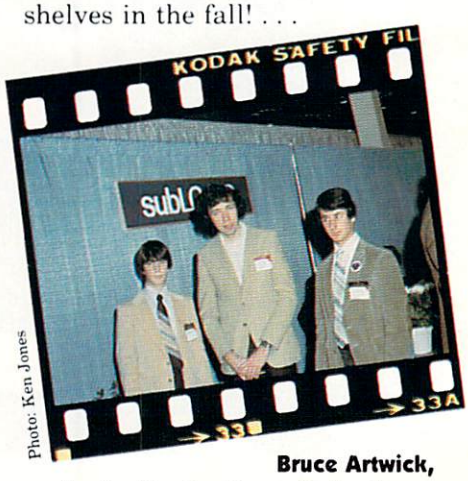


Photo: Ken Jones

Bruce Artwick, flanked by the Horowitz brothers.

SCROLLING IN DOUGH

Waiting for the Dough

By Nikolai Weaver

Nikolai Weaver has his business future all mapped out.

A lot of people dream of starting their own business and making big bucks. I started my own company when I was only 11 years old, but my dreams of wealth haven't come true—yet.

It all started three years ago when school reopened in the fall. That's when I met Steven Grimm, who had an Apple, and was a much better programmer than I was. Once I saw Steve's computer, I started pestering my mother for an Apple of my own. And right before summer vacation, I got it.

That summer, I learned machine language, Pascal, and LISP—so I could start writing games. Steve and I began writing our own programs, and decided to go into business together. That was the birth of Plum Software.

We placed three ads for Plum Software in *InfoWorld* and waited for the money to roll in. And waited, and waited. We didn't expect to be an overnight sensation, but we didn't think we'd flop either. To make a long story short, we sold only eight copies of our programs—six *FileWriters* and two *Modular Graphics* programs, at $25 a shot.

Our business venture wasn't a total washout. In placing the *InfoWorld* ads, we attracted the attention of the media. We made no money but, because of our age, we appeared in several newspapers and magazines, and on TV.

My story may someday have a happy ending. I plan to go to college so I can get a degree in the computer field. Then, Steve and I want to reinstate Plum Software. You see, Plum Software isn't just a dream of two childhood friends. Stephen and I *aren't* friends. We're business partners.

NIKOLAI WEAVER, *14, of Los Gatos, California, is a retired businessman—for now.*

"A BOLD . . . INNOVATIVE . . . ORIGINAL HIT!"

STAR LEAGUE™ BASEBALL
Actual Atari® screens—Other versions may vary.

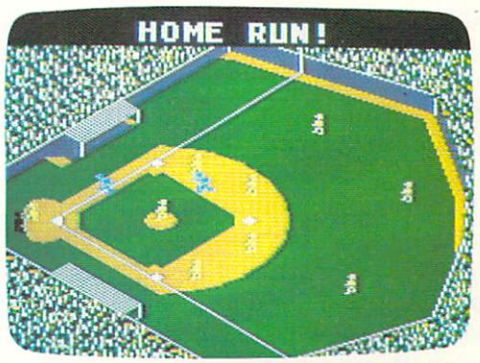
"Rather than adapt and duplicate the same old ballgame, (Gamestar has) made some bold changes. This not only gives its contest heightened playability, but also reassures the public there are still more programmers with originality.

"The first change is in player perspective. In Gamestar's rendition, we're all the way up in the right field bleachers, and wait until you see the action from here. With the pitcher now throwing right to left in 3-D fashion, we can watch the ball (and its shadow) dip and dance at the batter. When contact is made, the ball moves realistically, either bouncing through the infield or sailing with convincing flight toward the warning track.

"The second innovation will become obvious after the ball is hit. The players automatically spring into action. You control their subsequent moves and throws, (which) forces the offense to rely on strategy and skill, rather than on an inexperienced opponent scrambling to activate the correct fielder.

"The game also incorporates other special features to insure a major league quality. You can choose from different line-ups, planning your game around the single hitters or the big boomers. There are different pitchers to start, with a reliever patiently waiting in the bullpen. A lively organist keeps the screaming fans happy while you play against an opponent or computer in a full nine-inning game or simple batting practice."

Mark Cotone
Hi-Res *Magazine*
May/June 1984



STAR LEAGUE™ BASEBALL
Actual Atari® screens—Other versions may vary.

Ask for **STAR LEAGUE™ BASEBALL** at your local software dealer or write: **GAMESTAR, Inc.,** 1302 State Street, Santa Barbara, CA 93101 or call 805-963-3487.

Now Available for Commodore 64™ and Apple IIe®

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DOCTOR KURSOR'S KLINIC

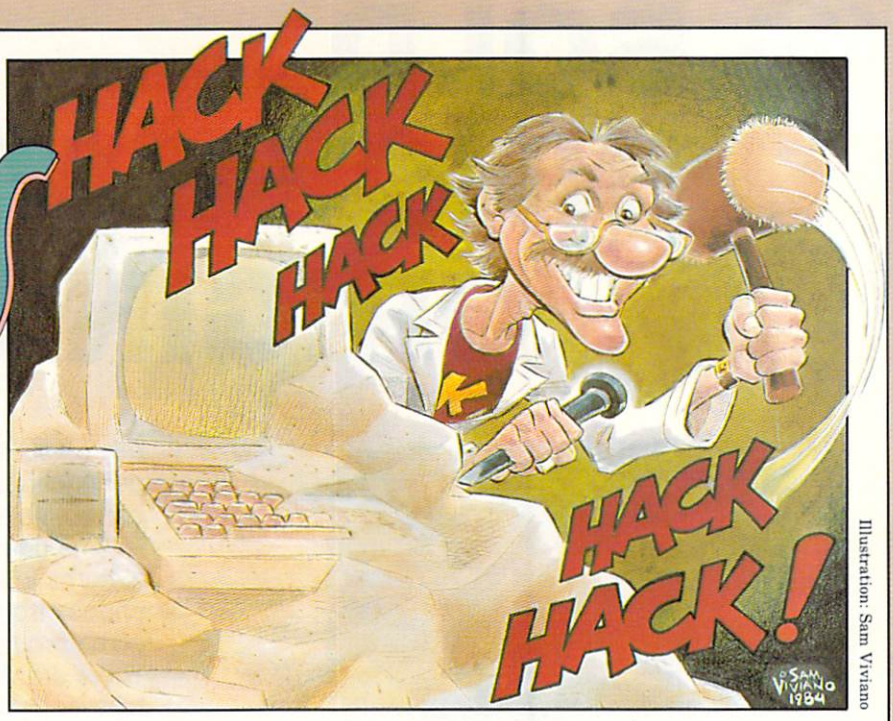


Illustration: Sam Viviano

Where did the word "hacker" come from?

DR. KURSOR: We all know that a hacker is a computer enthusiast: someone who doesn't know the meaning of the word "sleep," survives on potato chips and soda, and can only be separated from a keyboard with a crowbar.

But no one knows for sure why we use that particular word. The original meaning of "hack" is "to cut with crude or inexperienced blows." The dictionary says a "hacker" is "inexperienced or unskilled in a sport."

Back in the early days of computers when everyone worked on large mainframes, programming wasn't always orderly and sophisticated. Some people liked to write unconventional, "quick and dirty" programs with poor documentation. Their programs worked, but no one could ever figure out how. Those people were known as "systems hackers" and are the ancestors of today's computer whizzes.

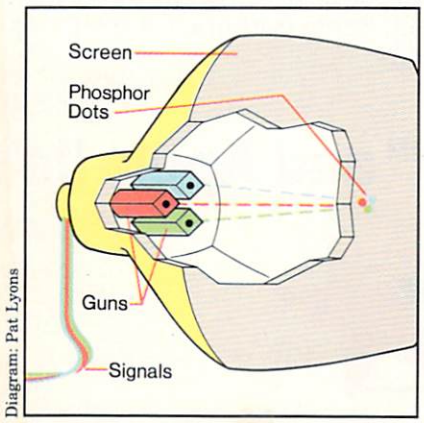


Diagram: Pat Lyons

What is an RGB monitor?

DR. KURSOR: The letters "RGB" stand for Red, Green, and Blue, which are the basic colors all TV sets use to produce a color picture. By mixing them in different combinations, you can make virtually any color.

"Composite" video, the standard TV signal, contains all three colors, which the TV set splits apart. You have to feed an RGB monitor three separate color signals (red, green, and blue) instead of a single composite signal.

Each color signal goes to its own electron gun inside the monitor, which shoots out electrons in the picture tube to illuminate the right red, green or blue phosphor dots on the screen.

Three separate signals can be controlled more precisely than one mixed signal. That's why RGB produces a better picture with more clearly defined images.

There are two types of RGB monitors: analog and digital. The analog RGB system sends the three color signals directly to the electron guns. It can produce an almost unlimited variation of colors and brightness levels.

The digital RGB system (the most common kind), instead of sending the signal directly to the screen, gives coded instructions to a microprocessor, which controls the electron guns. As a result, digital RGB is more restricted in its color range.

Many videocassette recorders and videodisk players come with interfaces for RGB as well as composite video. But most home computers won't work with an RGB monitor. Apple IIs require an RGB card (under $200). More computers, however, are coming out with built-in RGB capability. The new IBM PC*jr* is a notable example. As a result, some monitors and TVs are being produced with a composite/RGB option to allow the use of either system.

Unless it has this option, an RGB monitor can't be used with a tuner to watch television. The signals broadcast from your local TV station to your home are composite video (translated into radio waves at the station and back to composite by your TV).

Just one more reason to buy Scholastic educational software for the Commodore 64.

We really don't want you to buy Wizware™ just for the price. Because too many educational programs come with a great price on the outside and nothing much on the inside.

You—and your kids—won't be disappointed by Wizware. We've put everything we've learned from five generations of kids into our software. And the result is programs that teach and stimulate young minds like no other educational software.

For example, Wizware uses a child's natural curiosity to teach the basics of computer programming and electronic filing systems in programs like **Poster,™ Turtle Tracks,™* Secret Filer™** and **Square Pairs.™** Young kids especially find all four irresistible.

Double Feature Mystery™ and **Double Feature Adventure™** stories let kids choose from alternate twists of the plot. And actually make them want to learn how to read and write.

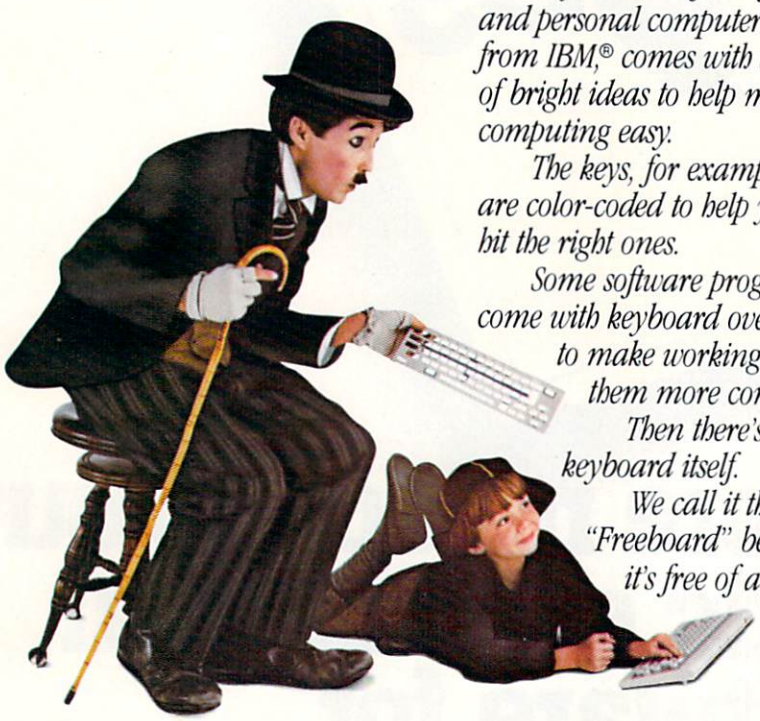
So we'd rather you buy Wizware because of what it does for your children. But, of course, it's always nice to know that Wizware is one of the most affordable families of educational software for the Commodore 64.†

Ask for Wizware wherever you buy your computer software. Or contact Scholastic Wizware, 730 Broadway, New York, NY 10003, 212-505-3000 for the name of your nearest Wizware merchant.

Scholastic™ Wizware

**Turtle Tracks $29.95.*
†Turtle Tracks also available in Atari, Apple and IBM versions. Square Pairs also available in Apple and Atari versions.

Poster, Secret Filer and Double Feature Mystery/Adventure designed and developed by Information Technology Design Associates. Turtle Tracks designed and developed by Thomas R. Smith. Square Pairs designed and developed by Glenn M. Kleiman, Teaching Tools: Software, Inc.



PCjr, the new family and personal computer from IBM,® comes with a lot of bright ideas to help make computing easy.

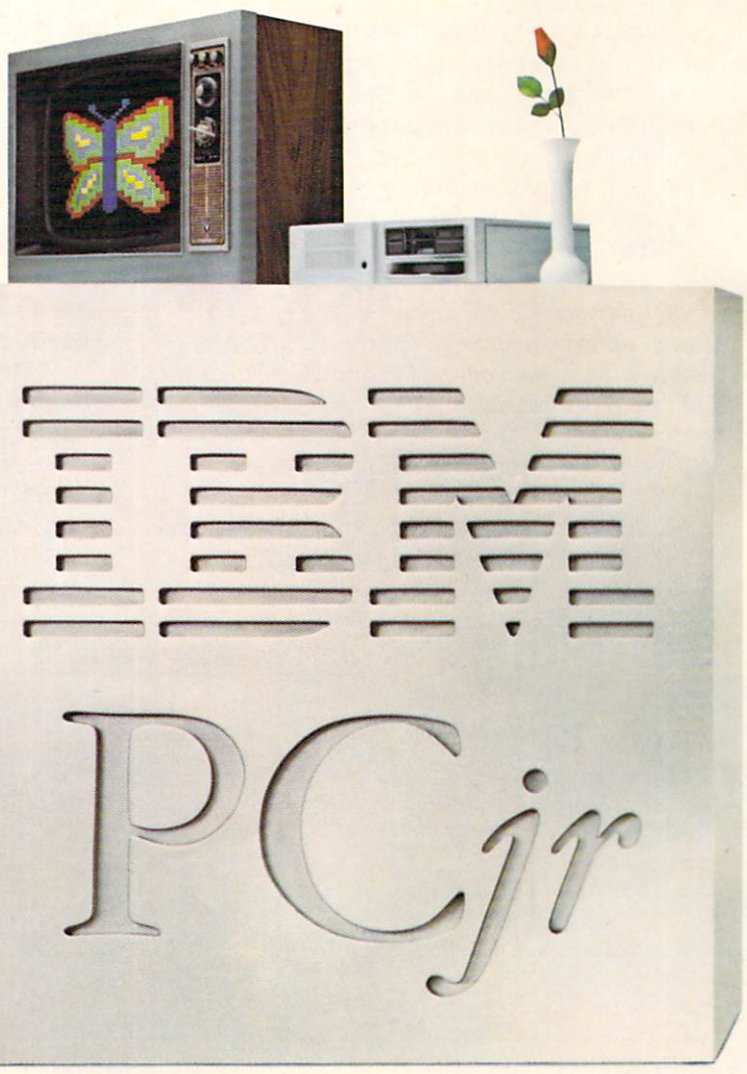
The keys, for example, are color-coded to help you hit the right ones.

Some software programs come with keyboard overlays to make working with them more convenient.

Then there's the keyboard itself.

We call it the IBM "Freeboard" because it's free of a...

connecting cord.



Little Tramp character licensed by Bubbles Inc., s.a.

Plug into K-NET each issue for what's new with K-POWER's national network.

K-NET™

Plus, find out what else is hot in the world of networking!

Congratulations K-NET Winners!!

More than 640 readers competed for a spot on K-POWER's national network. Here are the 10 winners. Next issue, we'll have all 20 K-NETTERs hooked up and ready to go.

Angie Lewis, 13, writes, "I have a TRS-80 Color Computer named Mr. C. He's a 64K and a regular genius." She loves to write programs and plays all the latest games.

David Lee, 13, likes fantasy gaming and karate. An Apple IIe owner, he programs in BASIC and loves everything about computers--especially networking. He writes: "Sometimes at night, I would stare at the ceiling, feeling like I'm never going to meet a computer friend or have a modem."

Jo Anne Sanchez, 13, is the owner of a Commodore 64 and is trying to start up a computer company. She's taken one semester of computer classes and is attending a computer course this summer. Jo Anne writes, "Hook me up, tell me what to do, and watch out!"

Chris Pawlak, 14, is a Commodore VIC-20 owner. He was a computer assistant in school this year and took a computer programming class. Chris writes: "I like cars, drawing, reading classics and modern classics. The two best things of all are "Cartoons Magazine" and programming...I also like full moons and high humidity."

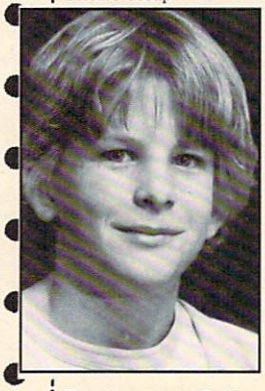
Rodney McCalla, 12, our K-NETTER from Kansas, owns a Commodore VIC-20 and a Timex Sinclair 1000. Rodney has been computing for three years and programs his own games. In his spare time, he teaches young children how to compute.

Stephen Sakach, 14, and Suzanne Sakach, 11, come from an entire family of computer lovers. Stephen knows a lot about computers and is a computer class aid in school. Suzanne is just learning how to program. They own a TRS-80.

Brian Keadle, 13, a proud Commodore VIC-20 owner, is sure that computers are here to stay. He writes: "I know I didn't get my VIC-20 'cause of a fad. I've always been involved with computers."

Peter Green, 16, uses an Apple II

Photo: Joan Youmans Picture Group



Rodney McCalla
Pratt, Kansas

Photo: Richard Derk Picture Group

David Lee
Elmhurst, Illinois

Photo: Joe Cavaretta

Jo Anne Sanchez
El Paso, Texas

Photo: John Hillery Picture Group

Chris Pawlak
Troy, Michigan

Photo: Louie Favorite Picture Group

Angie Lewis
Griffin, Georgia

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FOR THE BEST GAME IN THE GALAXY

Be your best. With the Stickmaster joystick accessory base you can play longer, higher scoring games without the discomfort of wrist and hand cramping. And you can win sitting, standing, or lying down—with *one* hand!

The Stickmaster provides a broad-based stabilizer for your joystick that uses non-skid rubber bumpers. Or Stickmaster can be screwed into place for a permanent "control base".

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The Stickmaster is the perfect accessory for your video game fun and it makes a wonderful gift, too. Stickmaster is not available in stores at this time. So fill out the coupon and order your Stickmaster TODAY!

$8.95 *SINGLE UNIT*

OR $7.50 *each*

FOR TWO OR MORE

Plus $3.00 Shipping and Handling Per Unit

(Texas residents add 5% sales tax: 45¢ single or 38¢ per unit for two or more.)

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Please send me ____ Stickmaster(s) @ $ _____ Unit Price

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The Stickmaster is adaptable for use with *(Please check one)* ☐ Standard Joystick Controller™, ☐ Pfaser 3™, ☐ Gemstik™, ☐ Wico Boss™, ☐ Wico Command Control™ and ☐ Pointmaster™ joysticks.
Please allow 4 to 6 weeks for delivery.
We accept personal checks, money orders, VISA or MasterCard. Sorry, no C.O.D.'s.

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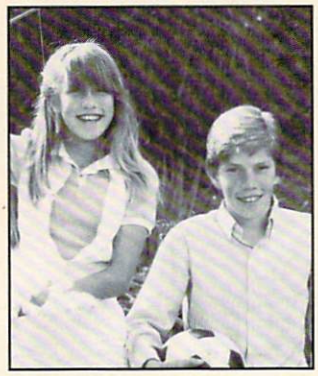
Photo: Rick Browne/Picture Group

Peter Green
Cupertino, California

Photo: Rick Browne/Picture Group

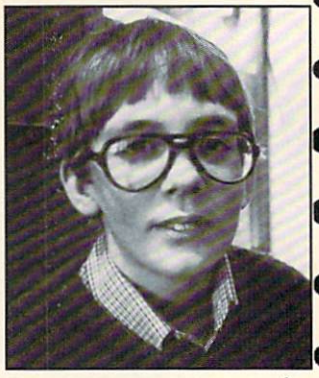


Stephen Sakach
Suzanne Sakach
Dana Point, California

Photo: Jeff Amberg/Picture Group

Brian Keadle
Perry, South Carolina

Photo: Martha Leonard/Picture Group



Tom Spindler
Park Ridge, Illinois

and a new Macintosh (which he's real excited about). He's an intermediate programmer and his favorite hobby is computing. He also plays basketball, and likes to listen to music and write.

Tom Spindler, 11, uses an Apple IIe. Once he gets his modem, he'll be all ready to telecommunicate. He's looking forward to rapping about the latest issues, hardware, games, and peripherals.

How K-NET Works

We've heard a lot about networking, but what does it all mean? How does it work? And what exactly is K-NET? A new basketball team? A brand of fishing gear?

Not exactly. K-NET is a Special Interest Group (SIG) on CompuServe's Information System. The network of kids from 16 locations across the country is a brainstorm of the K-POWER staff. We signed up 10 computing teens and preteens to start K-NET last February, and we've just added the kids introduced in this column. (See contest winners.) Each K-NETTER comes on board for a year. So if you didn't get on this year, don't despair—we'll have a brand-new panel of K-NETTERS next year! And, modem or not, we still want to hear from you! Selecting only nine letters from among the 640 entries was the hardest job K-POWER's encountered yet. We thank you all for writing.

To connect with K-NET, all the members were given Anchor Automation modems, terminal software, and the necessary interfaces. Since commercial services charge an hourly fee, SIG members need a password and a user ID number to telecommunicate. The numbers and passwords also insure that only authorized users can call in. So K-POWER gave its K-NETTERS CompuServe account numbers and some free CompuServe time each month. Once they enter the account number and password, K-NET members can telecommunicate away!

For now, access to the K-NET SIG will be limited. That means members only. K-POWER readers with CompuServe accounts can leave messages for the K-NET or for K-POWER on E-Mail. (E-Mail automatically delivers mail to any subscriber. K-POWER's number is: 76703,673.)

What will K-NET do? For starters, the members will conduct live conferences with computing "stars," review the latest games, preview K-POWER programs, give each other programming advice, discuss hot computing issues, tell bad jokes, make friends, and have fun. In every issue you can read about their networking experiences in this column. Plus, we'll fill you in on other telecommunications news in this space.

How K-NET evolves is up to its members and to you. Even if you don't have a modem, you can contact the K-NET kids—through K-POWER. Send your letters, comments, suggestions, or questions for the whole K-NET or for an individual K-NETTER to Joe Gelman, c/o K-NET, 730 Broadway, New York, NY 10003. Or, try our K-BASE described in the Editor's Note in this issue. It's K-POWER's own data base of "pen pal" computing kids.

—JOE GELMAN

All K-NETTERS received Anchor Automation modems.

JOE GELMAN, *coordinator and sysop (systems operator) for* K-NET, *is a committed Atari owner. And does he have great plans for* K-NET*!!*

Chalk Board™ wants your opinion.

Chalk Board wants you to help direct the company's future. We are beginning a new user input program. If you would like to become part of this innovative new concept, start by filling out the questionaire below.

1. **Are you aware of and familiar with the new peripheral, the Chalk Board PowerPad™ touch-tablet?**
   Yes ☐ No ☐ (You can find out more at your local computer store)

2. **There are many unique features that are offered only on the Chalk Board PowerPad. We would like to know which is the most important to you. (Please rank 1-5)**
   - ☐ Multi-point contact capability
   - ☐ Large active work surface 12″ x 12″
   - ☐ Allows functions that cannot be performed with a keyboard.
   - ☐ Programmable surface
   - ☐ Graphics/Music/Game Design/Versatility

3. **Which of the following uses of the Chalk Board PowerPad that have already been discovered do you think are most important? (Please rank 1-6)**
   - ☐ Graphics
   - ☐ Music composition
   - ☐ Game design
   - ☐ Special effects
   - ☐ Programming
   - ☐ Learning through discovery

4. **Which of the following uses of the Chalk Board PowerPad currently under development do you consider the most important? (Please rank 1-5)**
   - ☐ Free-form game play
   - ☐ Test preparation (SAT, ACT, etc.)
   - ☐ Custom video design
   - ☐ Laser disk control
   - ☐ Artificial intelligence

5. **What other uses can you imagine for the Chalk Board PowerPad.**

   A. _____

   B. _____

Here's how to make your opinion worth $50.

Buy a Chalk Board PowerPad. Use it for a week and complete the questionaire on the warranty card. Send the warranty card with the above questionaire to Chalk Board. Chalk Board will send you a $20 check plus three Opinion Certificates worth $10 each which can be redeemed on future software purchases. Applies only to Apple and IBM.

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Watch for the announcement of Chalk Board's exciting new User Development Program which could make your opinion worth up to $25,000.

$20 check offer effective May 1, 1984 to June 30, 1984. Opinion certificates good through December 31, 1984.

HOW TEEN TYCOONS TA

Young entrepreneurs are determined to take advantage of

Business life in the computer fast lane can be pretty rough. But when you're taking care of business and you're a teen, things can get downright hairy!

Take Mike Abbot, for example. His story sounds glamorous because he's made it big now: He's got thousands and thousands under his belt for designing Electronic Arts' *Hard Hat Mack* game.

But a couple of years ago, as a member of a company called Cavalier Computers, Mike (then 16) had all sorts of unique troubles: the challenges of juggling job and school; communication troubles from working with friends or having to deal with adults who don't take you seriously; and transportation problems—Mike Abbot can tell you all about transportation problems.

Cavalier Computers had a great chance to exhibit at a computer fair, which was 600 miles from Cavalier's home base in San Diego. "No problem," most companies would say. "We'll rent a truck to carry our products to the fair."

No go for Cavalier. "Since no one in the company was over 21 [legal car renting age in California], no one was old enough to rent a truck!" Mike remembers. "It finally ended up that one unfortunate person had to drive 600 miles in a Chevy Chevette crammed with equipment!"

Cavalier folded a few years later. "It was fun while it lasted," Mike says. "But I really got used to spending money!" He's a 20-year-old college student now and usually is too busy to spend long hours programming. But with *Hard Hat Mack* under his belt, and a steady relationship on paper with Electronic Arts, he's still got it made in the shade.

Mike's not the only teen tycoon around. Opportunity has knocked on kids' doors all across the country, and they've been ready for it, armed with dreams of money and fame and a chance to use their brains.

VIEW FROM THE CELLAR

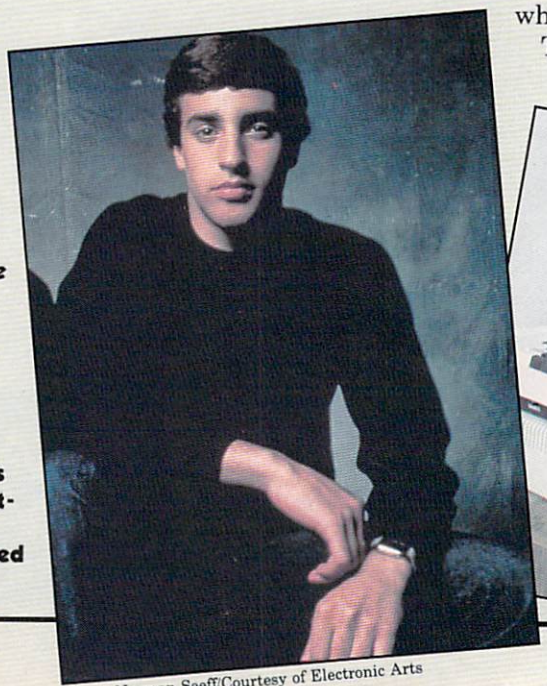
"If this is getting rich quick, I'd hate to get rich slow!" laments Peter Cockcroft, 16. He teamed up with a friend, Justin Greene (also 16), to form a mail-order business called Cellar Software, in New York City. Their catalog currently lists more than 3,000 software titles, from financial packages costing over $1,000 to simple game cartridges, plus peripherals such as joysticks, printers, and power supplies.

It started when Justin and Peter got their hands on a catalog from a software distributor last summer. (A distributor is the middleman between the manufacturer and the computer store down the street.) "We saw their prices and thought it would be great to get the stuff for ourselves," Justin explains. The distributor was selling software to dealers at about 40 percent off retail prices. "But then we found out to get them we'd need a resale number, and to get a resale number we had to be a business . . . so we just decided, 'Why not go for the whole thing?' "

To start off, Peter and Justin borrowed $2,000

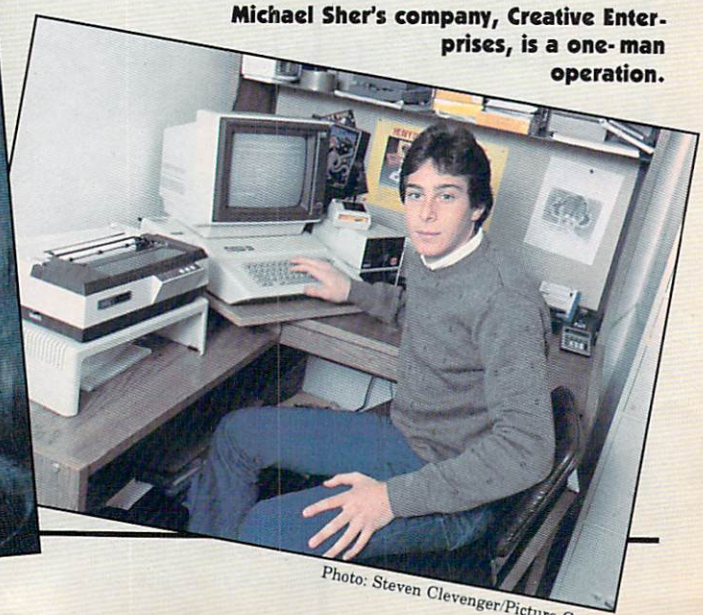
By John Holmstrom

Research: Jenni Stern (Software Cellar), Terri Shapiro (Michael's Creative Enterprises).



Mike Abbot got his first job with a software company owned and operated by teenagers.

Photo: Norman Seeff/Courtesy of Electronic Arts



Michael Sher's company, Creative Enterprises, is a one-man operation.

Photo: Steven Clevenger/Picture Group

KE CARE OF BUSINESS

the computer age and earn big bucks . . . before they hit 20!

from family and friends. This initial investment went to advertising, setting up a phone line, filing business papers, and paying an accountant. About 2,000 copies of the catalog cost $1,800.

Catalog requests coming in fast and furious from people who see Software Cellar ads in computer magazines keep Peter and Justin busy. They send out up to 50 catalogs a week.

But Cellar Software is barely making enough money on sales to cover its expenses. "We have very low profit margins," explains Peter. "Sometimes we only get 10 percent of the sale. That's just enough to pay the phone bill."

"When we get a larger volume of sales," he continues, "we'll be able to get the software for less." In the meantime, there are orders to be filled and catalog requests to answer. "I certainly don't want to be filling out forms all my life!" says Peter when asked about his future. "I'll probably still own half of it [Cellar Software], but I won't be doing half the work. I'll be playing executive."

EMPTYING WASTEBASKETS

Michael Sher, 18, is the head of Michael's Creative Enterprises, a corporation in Dallas, Texas, that sells computer software and hardware. Michael decided to go into business at a time when he was using $40 worth of disks every three days. "I tried to figure out a way to get the disks at a cheaper price," Michael recalls. "I ended up calling Leading Edge [a software manufacturing company] and asking what it would take to become a dealer."

The next step came when Michael discovered he had a lot more computer knowledge than the people making money in the electronics business. "I asked questions and had to find the answers myself," he says. This led to talking to a lawyer, choosing a name, and incorporating. Now, Michael heads his own distribution company, which has one employee—himself! "I'm the president," Michael says. "I basically do everything—ordering, delivering, installing, answering questions, writing up order forms, and," he adds, "emptying the wastebaskets."

Right now, Michael is very excited about a new line of home software that his company is going to distribute, called Simple Simon Software. The line will include programs like cookbooks, checkbook balancing, and telephone directories.

"It's simple enough that anyone can use it," Michael says. "At first, I'm going to distribute it myself. Then I'll try to sell it to a software distributor."

QUIT WHILE YOU'RE AHEAD

Roy Niederhoffer and Evan Grossman also started their own business. They made enough money to help pay for their college education, then quit while they were ahead.

It started after Roy sold a game he designed, called *Alien Invasion*, to the TRS-80 Software Exchange. He was 13. "I started to receive royalties—a couple hundred dollars a month. I figured, 'Hey, if Software Exchange can do it, why can't I?' "

Roy Niederhoffer (right) and Evan Grossman (left) started a company that paid for their Harvard educations.

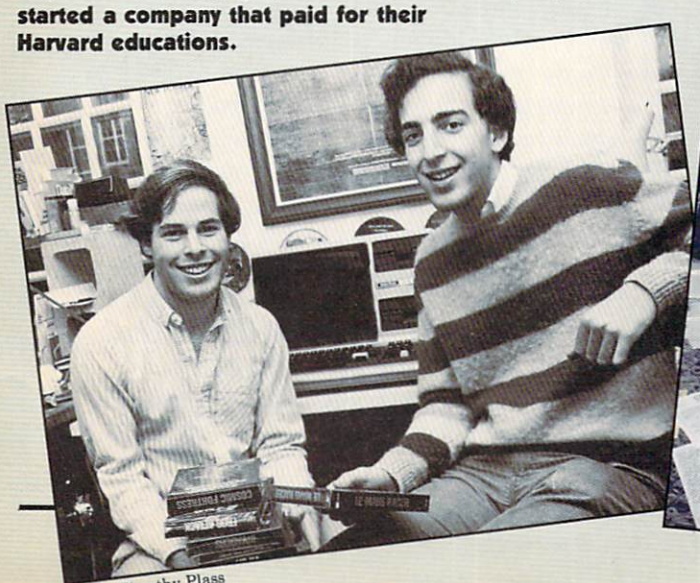


Photo: Timothy Plass

Photo: Nik Kleinberg/Picture Group

Justin Greene (left) and Peter Cockcroft (right) work hard to make Cellar Software a success.

In November of 1979, Roy and Evan borrowed some more money from friends and family, and assembled a catalog for mail orders. They wrote it themselves, and got help at school in laying it out. "With the teacher there, you don't need to pay somebody $50 for help," says Evan. The catalog for their company, Software Innovations, came back from the printer in July, and they mailed it to 1,500 people.

"After the catalog came out, we got a lot of orders. Then we brought out a program called *Name That Song*." It was Software Innovations' swan song. "It bombed," admits Evan.

Just in the nick of time, *Money* magazine published an article about Software Innovations. A record distributor got in touch with them. He wanted 500 computer games. With money coming in for new games, they started Microvations—a new software company.

"We did Microvations a lot more professionally," Evan says. "We had an accountant who made sure we were incorporated properly, that we paid federal, state, and local taxes, that we withheld social security payments, etc. It's hard for a bunch of 17-year-olds to deal with all of that.

"It's very tough to have people working for you who are also your best friends at school," Evan adds. "We couldn't be bosses and tell them, 'Do this or you won't get paid.' And they couldn't understand that we had legal obligations.

"In the end," Evan says, "we produced over 500 games—200 over a period of about three months. We employed about 30 programmers, and four other people who were just writing instructions and descriptions for the outside of the box."

Evan's advice for anyone who wants to start their own computer business is, "Don't spend all your time on a computer. Some of the people who worked with us were—I hate to use the term—nerds!"

Roy agrees: "You can spend too much time with computers. You start losing your friends for the sake of your computer. Your computer becomes your best friend—you have to watch out for that."

Roy added a further warning. "I don't think you could do a company like ours anymore. The computer business has changed too much. We started out with a few hundred dollars and tiny black-and-white ads. Nowadays, you have to have a good program, a good-looking four-color box, and good advertisements.

"More important than making money is the experience," Roy says. "We learned more from starting the first company than the second, even if we did only break even on it. Starting your own company gives you some insight into the real world. It makes you get away from your computer for a while." k

HOW TO START YOUR OWN BUSINESS

Eight tips for running your own computer business.

1 Get a job in a computer store. Learn as much as you can about the business. Ask questions (don't be afraid of asking stupid ones—sometimes they're the best kind). Take notes (so you don't forget the answers). Make business contacts while you're there.

2 Get together $1,000 or $2,000. Spend what you need on inventory, printing, and legal fees. Save some for later when the phone bills start to come in. Pay yourself *last*.

3 You'll need a place to do business. If it's OK with your parents, use your room. Otherwise, find a garage or a barn—someplace cheap.

4 Protect yourself by talking to a lawyer. Contact the Bar Association if you can't find one through family or friends. Tell the lawyer what the goals of your company are, how the company will work, and what you need. Every company has different needs, and has to be constructed differently.

5 If you want to sell to friends and local people, you can get a business license from your town or city government. If you don't, and you're successful, you could end up in big trouble!

6 If you want to do business on a national or international level, you'll have to incorporate. To do that, you'll need someone over 21 to own a controlling interest in the corporation.

7 Don't be modest. Take advantage of any publicity or free advertising you can get. Send your local newspaper a press release, mentioning the fact that a "local whiz kid" is starting a computer business. Promoting yourself and your business can be fun—and very profitable.

8 Advertise your services and goods in cheap magazines and through mailing lists (which you can buy from companies that specialize in selling mailing lists).

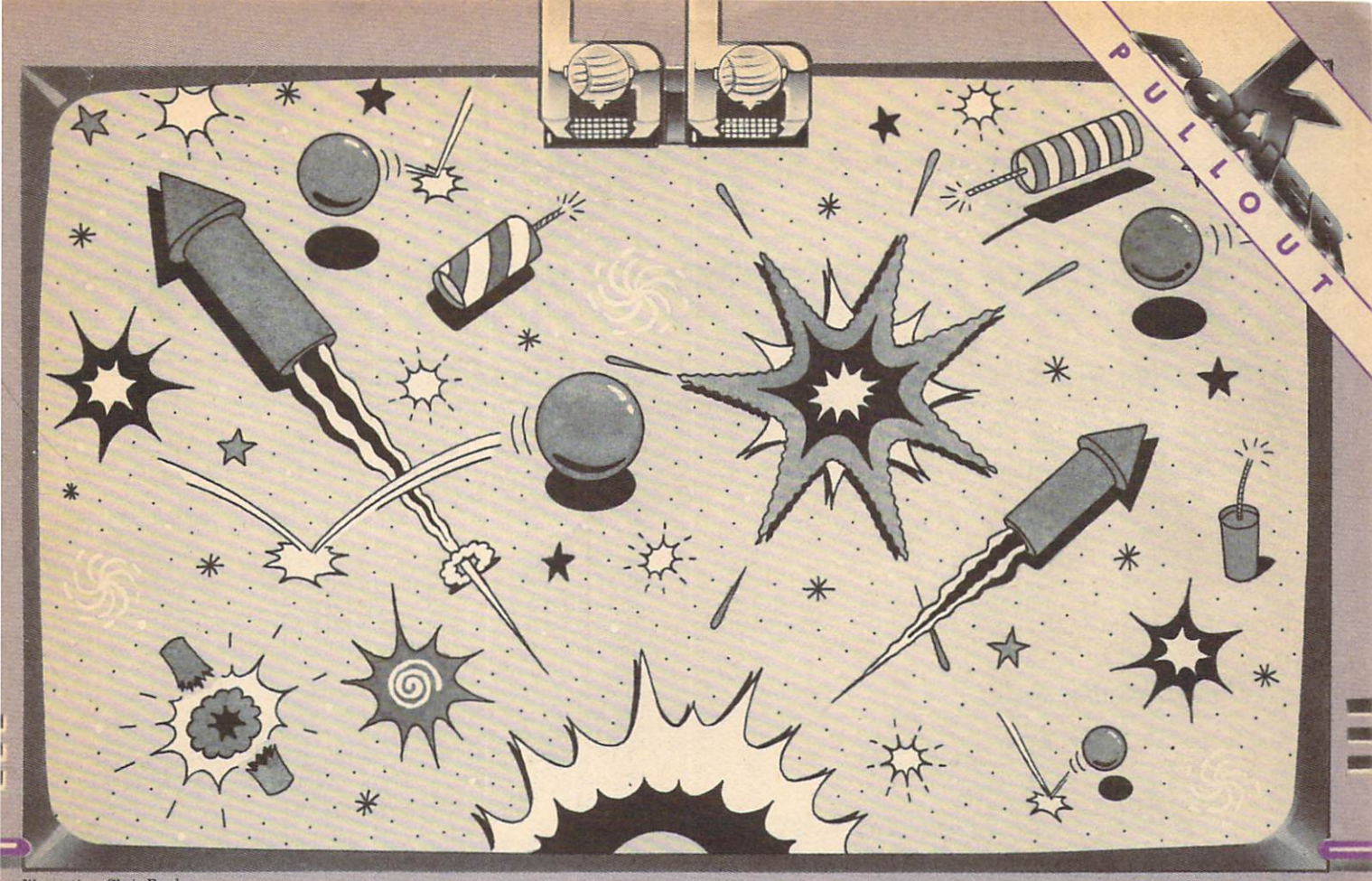


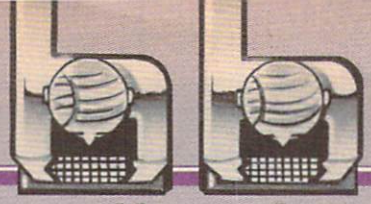
Illustration: Chris Reed

HACKER HEAVEN

JULY / AUGUST

COMPUCOPIA Page 26	MICROTONES Page 28	PROGRAMS Page 33
A bouncing ball. Short, simple, but a great effect.	A computer? Playing the blues? Boy, what'll they think of next?	Fireworks, fireworks, and more fireworks. The only thing missing is the smoke.

Illustration: Jim Cherry III



COMPUCOPIA

A galaxy of microprograms for your microcomputer.

APPLE/*BOUNCING BALL*

II plus, IIe, or IIc • 32K RAM

```
10 HGR2:HCOLOR= 3:HPLOT 0,0 TO 279,0 TO 279,191 TO 0,1
91 TO 0,0
20 Y=0:V=0:Z=0.6*(INT(RND(1)*4)+1)
30 X1=0:X2=279:IF RND(1)>0.5 THEN X1=279:X2=0:Z=-Z
40 HPLOT X1,Y:FOR X=X1 TO X2 STEP Z:Y=Y+V
50 IF Y<=191 THEN V=V+0.1:GOTO 70
60 FOR I=0 TO 3:S=PEEK(-16336):NEXT I:Y=191:V=-V/1.3
70 HPLOT TO X,Y:NEXT X:FOR D=1 TO 200:NEXT D:GOTO 10
```

ATARI/*BOUNCING BALL*

400 or 600XL • 16K RAM

```
10 GRAPHICS 7+16:SETCOLOR 4,0,15
20 SETCOLOR 2,12,2:COLOR 3
30 PRINT #6;CHR$(125):PLOT 0,0:DRAWTO 155,0:DRAWTO 155
,95:DRAWTO 0,95:DRAWTO 0,0
40 Y=0:V=0:Z=0.6*(INT(RND(0)*4)+1)
50 X1=0:X2=155:IF RND(0)>0.5 THEN X1=155:X2=0:Z=-Z
60 PLOT X1,Y:FOR X=X1 TO X2 STEP Z:Y=Y+V
70 IF Y<=95 THEN V=V+0.1:GOTO 100
80 FOR I=0 TO 3:SOUND 0,100,10,14:SOUND 0,0,0,0:NEXT I
90 Y=94:V=-V/1.3
100 PLOT X,Y:NEXT X:FOR D=1 TO 200:NEXT D:GOTO 30
```

800 or 800XL • 32K RAM

```
10 GRAPHICS 8+16:SETCOLOR 1,0,15
20 SETCOLOR 2,12,2:COLOR 1
30 PRINT #6;CHR$(125):PLOT 0,0:DRAWTO 319,0:DRAWTO 319
,191:DRAWTO 0,191:DRAWTO 0,0
40 Y=0:V=0:Z=0.6*(INT(RND(0)*4)+1)
50 X1=0:X2=319:IF RND(0)>0.5 THEN X1=319:X2=0:Z=-Z
60 PLOT X1,Y:FOR X=X1 TO X2 STEP Z:Y=Y+V
70 IF Y<=191 THEN V=V+0.1:GOTO 100
80 FOR I=0 TO 3:SOUND 0,100,10,14:SOUND 0,0,0,0:NEXT I
90 Y=191:V=-V/1.3
100 DRAWTO X,Y:NEXT X:FOR D=1 TO 200:NEXT D:GOTO 30
```

COLECO/*BOUNCING BALL*

ADAM • 80K RAM

```
10 HGR2:HCOLOR= 3
20 HPLOT 0,0 TO 255,0 TO 255,191 TO 5,191 TO 0,0
30 y=0:v=0:z=0.6*(INT(RND(1)*4)+1)
40 x1=0:x2=255:IF RND(1)>0.5 THEN x1=255:x2=0:z=-z
50 HPLOT x1,y:FOR x=x1 TO x2 STEP z:y=y+v
60 IF y<=191 THEN v=v+0.1:GOTO 80
70 PRINT CHR$(7);:y=190:v=-v/1.3
80 HPLOT TO x,y:NEXT x:FOR d=1 TO 200:NEXT d:GOTO 10
```

COMMODORE/*BOUNCING BALL*

Commodore 64

```
10 POKE 53272,PEEK(53272) OR 8
20 POKE 53265,PEEK(53265) OR 32
30 FOR I=17000 TO 17045:READ A:POKE I,A:NEXT I:SYS 170
24
40 SYS 17000:Y=0:V=0:Z=0.6*(INT(RND(0)*4)+2)
50 X1=0:X2=319:IF RND(0)>0.5 THEN X1=319:X2=0:Z=-Z
60 FOR X=X1 TO X2 STEP Z:Y=Y+V
70 IF Y>199 THEN Y=199:V=-V/1.3:POKE 54296,15
80 A=8192+INT(Y/8)*320+INT(X/8)*8+(Y AND 7):B=7-(X AND
 7)
90 POKE A,PEEK(A) OR (2^B):POKE 54296,0
100 V=V+0.1:NEXT X:FOR D=1 TO 300:NEXT D:GOTO 40
1000 DATA 160,31,169,0,162,0,157,0,31,232,208,250
1010 DATA 200,192,64,240,6,140,112,66,76,108,66,96
1020 DATA 173,149,66,162,0,157,0,4,157,0,5,157,0,6
1030 DATA 157,0,7,232,208,241,96,1
```

VIC-20 • 5K RAM

```
10 POKE 36878,10:FOR I=1 TO 21:XD$=XD$+CHR$(29):NEXT I
20 FOR I=1 TO 22:YD$=YD$+CHR$(17):NEXT I
30 PRINT CHR$(147);:Z=0.5*(INT(RND(0)*2)+2):Y=0:V=0
40 X1=0:X2=21:IF RND(0)>0.5 THEN X1=21:X2=0:Z=-Z
50 FOR X=X1 TO X2 STEP Z:Y=Y+V
60 IF Y<22 THEN V=V+1:GOTO 80
70 Y=22:V=-V/1.3:POKE 36877,128:POKE 36877,0
80 PRINT CHR$(19);LEFT$(XD$,X);LEFT$(YD$,Y);CHR$(46);
90 FOR D=1 TO 25:NEXT D:NEXT X
100 FOR D=1 TO 200:NEXT D:GOTO 30
```

IBM/*BOUNCING BALL*

PC or PCjr • 64K RAM • Color Graphics Adapter (PC) • color TV or monitor optional

```
10 KEY OFF:CLS:RANDOMIZE:SCREEN 1,0
20 CLS:Y=0:V=0:Z=.6*(INT(RND*4)+1)
30 C=INT((RND*4)+1):COLOR C:LINE (0,0)-(319,199),C,B
40 X1=0:X2=319:IF RND>.5 THEN SWAP X1,X2:Z=-Z
50 PSET(X1,Y):FOR X=X1 TO X2 STEP Z:Y=Y+V
60 IF Y>198 THEN SOUND 75,3:SOUND 37,0:Y=198:V=-V/1.3
ELSE V=V+.1
70 LINE -(X,Y):NEXT X:FOR D=1 TO 200:NEXT D:GOTO 20
```

RADIO SHACK/*BOUNCING BALL*

TRS-80 Color Computer • 16K RAM • color TV optional • Extended Color BASIC

```
10 PMODE 3,1:SCREEN 1,0
20 PCLS 1:C=RND(3)+1:LINE (0,0)-(255,191),PSET,B
```

```
30 Y=0:V=0:Z=0.5*RND(5)
40 X1=0:X2=255:IF RND(2)>1 THEN X1=255:X2=0:Z=-Z
50 FOR X=X1 TO X2 STEP Z:Y=Y+V
60 IF Y<=191 THEN V=V+0.1:GOTO 80
70 SOUND 1,1:Y=191:V=-V/1.3
80 PSET(X,Y,C):NEXT X:FOR D=1 TO 200:NEXT D:GOTO 20
```

TRS-80 Model III • 16K RAM

```
10 CLS:Y=0:V=0:Z=0.6*RND(4)+1
20 X1=0:X2=127:IF RND(2)>1 THEN X1=127:X2=0:Z=-Z
30 FOR X=X1 TO X2 STEP Z:Y=Y+V
40 IF Y>47 THEN Y=47:V=-V/1.3:GOTO 50 ELSE V=V+0.5
50 SET(X,Y):FOR D=1 TO 6:NEXT D:NEXT X
60 FOR D=1 TO 200:NEXT D:GOTO 10
```

TEXAS INSTRUMENTS/*BOUNCING BALL*

TI-99/4A • 16K RAM

```
10 CALL CHAR(96,"0000183C3C180000")
20 CALL CLEAR
30 Y=1
40 V=0
50 Z=0.5*(INT(RND*2)+2)
60 X1=1
70 X2=30
80 IF RND>0.5 THEN 120
90 X1=30
100 X2=1
110 Z=-Z
120 FOR X=X1 TO X2 STEP Z
130 Y=Y+V
140 IF Y>23 THEN 180
150 V=V+0.5
160 CALL HCHAR(Y,X,96,1)
170 GOTO 220
180 Y=23
190 V=-V/1.3
200 CALL HCHAR(Y,X,96,1)
210 CALL SOUND(1,-7,0)
220 NEXT X
230 FOR D=1 TO 100
240 NEXT D
250 GOTO 20
```

TIMEX SINCLAIR/*BOUNCING BALL*

1000 or 1500 • 2K RAM

```
10 RAND
20 SLOW
30 CLS
40 LET Y=40
50 LET V=0
60 LET Z=0.6*(INT (RND*2)+1)
70 LET A=0
80 LET B=60
90 IF RND>0.5 THEN GOTO 130
100 LET A=60
110 LET B=0
120 LET Z=-Z
130 FOR X=A TO B STEP Z
140 LET Y=Y-V
150 IF Y>0 THEN GOTO 190
160 LET Y=0
170 LET V=-V/1.3
180 GOTO 200
190 LET V=V+0.5
200 PLOT X,Y
210 NEXT X
220 FOR D=1 TO 50
230 NEXT D
240 GOTO 30
```

2068 • 48K RAM

```
10 RANDOMIZE:BORDER 4:INK 0
20 CLS:LET Y=175:LET V=0:LET Z=0.6*(INT(RND*4)+1)
30 LET A=0:LET B=255
40 IF RND>0.5 THEN LET A=255:LET B=0:LET Z=-Z
50 FOR X=A TO B STEP Z:LET Y=Y-V
60 IF Y>=0 THEN LET V=V+0.1:GO TO 80
70 BEEP 0.05,1:LET Y=0:LET V=-V/1.3
80 PLOT X,Y:NEXT X:PAUSE 30:GO TO 20
```

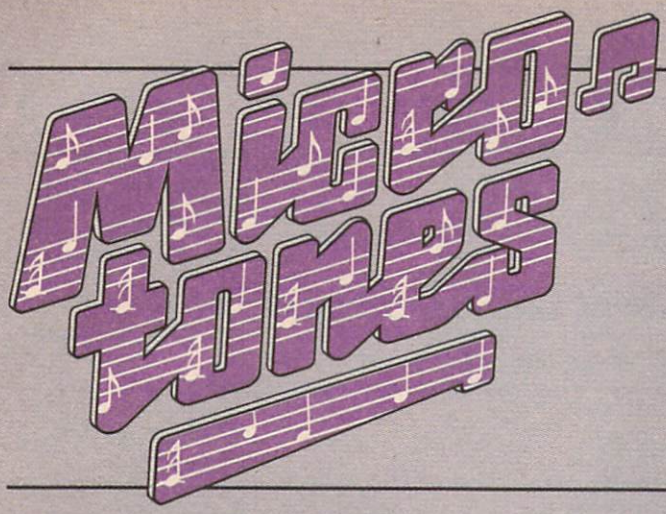

So, we made a few mistakes. We're sorry. Here's where we tell you (and you tell us) how to fix them—and how to make our programs even better.

GET THE MESSAGE

Because the ADAM and the Apple react differently to a PRINT statement that follows a HTAB or VTAB, the *Mysterious Message* (February, page 48) is more mysterious on the ADAM than on the other computers—though, if you play it to the end, you'll still get the message. To add some excitement to the game, you can put a semicolon at the end of line 410. Then use your joystick (not the space bar) to reveal the secret.

The end game display will be prettier if you change line 580 slightly:

```
580 NORMAL:IF d = 12 OR d = 1 THEN dc = -dc
```



'COMPUTER BLUES'

BY JOEY LATIMER

Welcome to Microtones! Every issue I'll venture into the world of computers and music in this column. You can tune in for Micronotes—the latest in computer music products and news—or for the programs—some original creations and some based on popular hits.

This issue's original program is *"Computer Blues"*—a boogie-woogie song Technical Editor John Jainschigg and I wrote. After you type in the program, your computer will boogie out the jazzy beat while the lyrics light up your screen.

HACKER NOTES:

Writing a program that plays music *and* handles text at the same time is like trying to rub your stomach with one hand and pat your head with the other. It's hard to keep the music up to speed and on the beat, and still have enough free time to branch off and handle text when the moment arrives.

If you work in pure machine language, you can write very powerful, fast routines to deal with things like timing, and still have plenty of free processor time to handle text. But if you're trying to manage the different timing requirements of several musical voices in BASIC, like we were, the bookkeeping can become pretty hairy.

Because BASIC runs so slowly, you have to cut back tone and duration processing in the main program loop to a bare minimum, to leave yourself enough time in the loop for printing to the screen.

"Computer Blues"' music data statements are of the form C#,4,F,2,..., where each pitch is paired with a number indicating how long that note should sound. A routine designed to handle this type of information directly would have to keep track of durations with separate counters for each voice. Instead, *"Computer Blues"* preprocesses this music data into a simpler form (which looks like C#,C#,C#,C#,F,F,...) that expresses the duration of a tone by the number of times in a row that tone appears in the table. It then can play the music by taking frequency data from the table at a constant rate. No counters are required. So there's enough time to handle text.

Works pretty well, doesn't it? In upcoming columns, I'll focus on some more complicated ways of doing music and graphics on a micro.

JOEY LATIMER *is* K-POWER's *programming associate. He's a musician and a programming pro.*

I woke up this mornin',

turned my computer on.

One look at the screen and

I knew somethin' was wrong...

ATARI/*"COMPUTER BLUES"*

400, 600XL, 800, or 800XL • 16K RAM

```
10 DIM B$(96),T$(96),S$(96),Q$(128),R$(128),TXT$(800),
PTR(16,2),BL$(32)
20 POKE 752,1:POKE 82,0:PRINT CHR$(125):POSITION 10,8:
PRINT "THE COMPUTER BLUES"
30 POSITION 7,10:PRINT "TUNING UP ... PLEASE WAIT."
40 BL$=" ":BL$(32)=BL$:BL$(2)=BL$
50 FOR X=1 TO 48:READ A:B$(LEN(B$)+1)=CHR$(A):B$(LEN(B
$)+1)=CHR$(A):NEXT X
```

```
60 FOR X=1 TO 63:READ TON,DUR:FOR Y=1 TO DUR:T$(LEN(T$
)+1)=CHR$(TON):NEXT Y:NEXT X
70 FOR X=1 TO 23:READ TON,DUR:FOR Y=1 TO DUR:S$(LEN(S$
)+1)=CHR$(TON):NEXT Y:NEXT X
80 FOR X=1 TO 16:READ R$:Q$=BL$(1,INT((40-LEN(R$))/2)-
1):Q$(LEN(Q$)+1)=R$
90 PTR(X,1)=LEN(TXT$)+1:PTR(X,2)=LEN(TXT$)+LEN(Q$):TXT
$(LEN(TXT$)+1)=Q$:NEXT X:C=1
100 FOR Z=1 TO 96
110 SOUND 0,ASC(B$(Z,Z)),10,10:SOUND 1,ASC(T$(Z,Z)),10
,5:SOUND 2,ASC(S$(Z,Z)),10,5
120 IF Z<>1 AND Z<>32 AND Z<>64 THEN FOR D=1 TO 40:NEX
T D:GOTO 160
130 PRINT CHR$(125):POSITION 0,10:PRINT TXT$(PTR(C,1),
PTR(C,2))
140 PRINT TXT$(PTR(C+1,1),PTR(C+1,2))
150 IF Z<>1 THEN C=C+2:IF C>16 THEN C=1
160 NEXT Z:GOTO 100
1000 DATA 144,114,96,85,81,85,96,114,144,114,96
1010 DATA 85,81,85,96,114,108,85,72,64,60,64,72,85
1020 DATA 144,114,96,85,81,85,96,114,96,76,64,57
1030 DATA 108,85,72,64,72,81,85,91,96,108,114,128
2000 DATA 47,2,53,1,47,1,60,1,72,3,47,2,53,2,60,2
2010 DATA 72,2,57,1,0,1,57,1,0,1,60,1,57,1,0,1,60
2020 DATA 1,57,1,0,1,60,1,57,2,47,1,47,1,47,1,47,2
2030 DATA 53,1,47,1,60,1,72,3,47,2,53,2,60,2,72,2
2040 DATA 57,1,0,1,57,1,0,1,60,1,57,1,0,1,60,1,57
2050 DATA 1,0,1,60,1,57,1,0,1,60,1,53,1,60,1,53,1,0
2060 DATA 1,53,1,60,1,53,1,47,3,47,2,53,1,47,1,60
2070 DATA 1,72,1,0,1,72,2,0,15
3000 DATA 0,18,40,1,0,1,42,1,40,1,0,1,42,1,40,1
3010 DATA 0,1,42,1,40,2,0,21,40,1,0,1,42,1,40,1
3020 DATA 0,1,42,1,40,1,0,1,42,1,40,2,0,35
4000 DATA I WOKE UP THIS MORNIN',TURNED MY COMPUTER ON
4010 DATA ONE LOOK AT THE SCREEN,AND I KNEW THAT SOMET
HIN' WAS WRONG
4020 DATA THE COMPUTER STARTED CRYIN',AND MAKIN' SAD F
ACES AT ME
4030 DATA I SAW LITTLE BLOCKY TEARS,RUNNIN' DOWN MY TV
4040 DATA I SAID 'HEY COMPUTER,WHY ARE YOU SO BLUE?'
4050 DATA 'TELL ME WHAT HAVE I DONE,WHAT HAVE I DONE T
O HURT YOU?'
4060 DATA THE COMPUTER SAID,'WHY YOU TREATIN' ME SO ME
AN?'
4070 DATA 'YOU GET MILK ON MY KEYS,AND PEANUT BUTTER O
N MY SCREEN'
```

COMMODORE/"COMPUTER BLUES"

Commodore 64

```
10 DIM B$(2),T$(2),S$(2),Q$(16)
20 PRINT CHR$(147):POKE 214,10:PRINT:PRINT TAB(10) "TH
E COMPUTER BLUES"
30 PRINT:PRINT TAB(7) "TUNING UP ... PLEASE WAIT."
40 FOR X=1 TO 20:SP$=SP$+" ":NEXT X
50 FOR X=1 TO 96 STEP 2:READ A,B
60 B$(1)=B$(1)+CHR$(A)+CHR$(A):B$(2)=B$(2)+CHR$(B)+CHR
$(B):NEXT X
70 FOR X=1 TO 63:READ TH,TL,DUR:FOR Y=1 TO DUR
80 T$(1)=T$(1)+CHR$(TH):T$(2)=T$(2)+CHR$(TL):NEXT Y:NE
XT X
90 FOR X=1 TO 23:READ SH,SL,DUR:FOR Y=1 TO DUR
100 S$(1)=S$(1)+CHR$(SH):S$(2)=S$(2)+CHR$(SL):NEXT Y:N
EXT X
110 FOR X=1 TO 16:READ Q$(X):Q$(X)=LEFT$(SP$,(40-LEN(Q
$(X)))/2-1)+Q$(X):NEXT X
120 S=54272:FOR E=S TO S+28:POKE E,0:NEXT E:POKE S+24,
15
130 POKE S+3,4:POKE S+5,51:POKE S+6,244:POKE S+4,65
140 POKE S+12,51:POKE S+13,244:POKE S+19,79:POKE S+20,
24
```

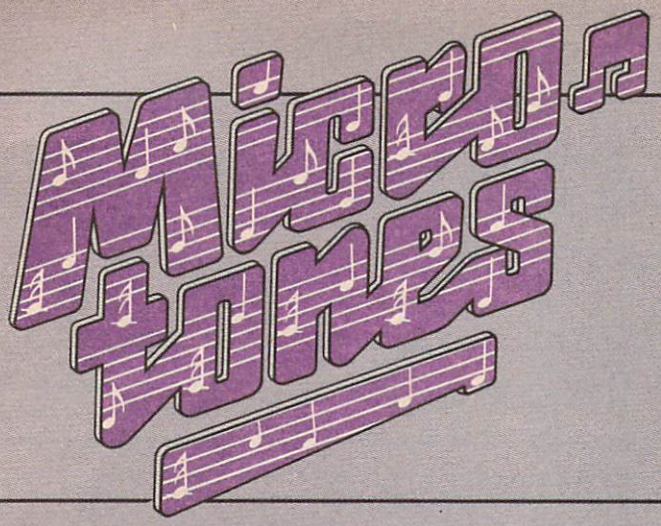
The computer started cryin'

and makin' sad faces at me.

I saw little blocky tears

runnin' down my TV...

```
150 POKE 53280,0:POKE 53281,0:POKE S+18,17:POKE S+11,3
3:C=1
160 FOR Z=1 TO 96
170 POKE S,ASC(MID$(B$(2),Z,1)):POKE S+1,ASC(MID$(B$(1
),Z,1))
180 POKE S+7,ASC(MID$(T$(2),Z,1)):POKE S+8,ASC(MID$(T$
(1),Z,1))
190 POKE S+14,ASC(MID$(S$(2),Z,1)):POKE S+15,ASC(MID$(
S$(1),Z,1))
200 IF Z<>1 AND Z<>32 AND Z<>64 THEN FOR D=1 TO 30:NEX
T D:GOTO 230
210 PRINT CHR$(147);CHR$(5):POKE 214,10:PRINT:PRINT Q$
(C):PRINT Q$(C+1)
220 IF Z<>1 THEN C=C+2:IF C>16 THEN C=1
230 NEXT Z:GOTO 160
1000 DATA 3,155,4,139,5,103,6,16,6,108,6,16,5,103
1010 DATA 4,139,3,155,4,139,5,103,6,16,6,108,6,16
1020 DATA 5,103,4,139,4,208,6,16,7,53,8,23,8,147,8
1030 DATA 23,7,53,6,16,3,155,4,139,5,103,6,16,6,108
1040 DATA 6,16,5,103,4,139,5,103,6,206,8,23,9,21,4
1050 DATA 208,6,16,7,53,8,23,7,53,6,108,6,16,5,185
1060 DATA 5,103,4,208,4,139,4,12
2000 DATA 21,154,2,19,63,1,21,154,1,17,37,1,14,107
2010 DATA 3,21,154,2,19,63,2,17,37,2,14,107,2,18,42
2020 DATA 1,0,0,1,18,42,1,0,0,1,17,37,1,18,42,1,0,0
2030 DATA 1,17,37,1,18,42,1,0,0,1,17,37,1,18,42,2,21
2040 DATA 154,1,21,154,1,21,154,1,21,154,2,19,63,1
2050 DATA 21,154,1,17,37,1,14,107,3,21,154,2,19,63
2060 DATA 2,17,37,2,14,107,2,18,42,1,0,0,1,18,42,1
2070 DATA 0,0,1,17,37,1,18,42,1,0,0,1,17,37,1,18,42
2080 DATA 1,0,0,1,17,37,1,18,42,1,0,0,1,17,37,1,19
2090 DATA 63,1,17,37,1,19,63,1,0,0,1,19,63,1,17,37
2100 DATA 1,19,63,1,21,154,3,21,154,2,19,63,1,21,154
2110 DATA 1,17,37,1,14,107,1,0,0,1,14,107,2,0,0,15
3000 DATA 0,0,18,51,97,1,0,0,1,48,127,1,51,97,1
3010 DATA 0,0,1,48,127,1,51,97,1,0,0,1,48,127,1,51
3020 DATA 97,2,0,0,21,51,97,1,0,0,1,48,127,1,51,97
3030 DATA 1,0,0,1,48,127,1,51,97,1,0,0,1,48,127,1
3040 DATA 51,97,2,0,0,35
4000 DATA I WOKE UP THIS MORNIN',TURNED MY COMPUTER O
N
4010 DATA ONE LOOK AT THE SCREEN,AND I KNEW THAT SOME
```




```
THIN' WAS WRONG
4020 DATA THE COMPUTER STARTED CRYIN',AND MAKIN' SAD
FACES AT ME
4030 DATA I SAW LITTLE BLOCKY TEARS,RUNNIN' DOWN MY T
V
4040 DATA I SAID 'HEY COMPUTER,WHY ARE YOU SO BLUE?'
4050 DATA 'TELL ME WHAT HAVE I DONE?,WHAT HAVE I DONE
 TO HURT YOU?'
4060 DATA THE COMPUTER SAID,'WHY YOU TREATIN' ME SO M
EAN?'
4070 DATA 'YOU GET MILK ON MY KEYS,AND PEANUT BUTTER
ON MY SCREEN'
```

I said, "Hey, computer,

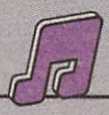
why are you so blue?

Tell me what I have done,

what have I done to hurt you?"

VIC-20 • 5K RAM

```
10 DIM Q$(24)
20 PRINT CHR$(147):POKE 214,9:PRINT:POKE 211,2:PRINT
"THE COMPUTER BLUES"
30 PRINT TAB(3) "NOW TUNING UP ..."
40 PRINT TAB(5) "PLEASE WAIT."
50 FOR X=1 TO 20:SP$=SP$+" ":NEXT X
60 FOR X=1 TO 48:READ A:B$=B$+CHR$(A)+CHR$(A):NEXT X
70 C=1:FOR X=1 TO 63:READ A,DUR:FOR Y=1 TO DUR:T$=T$+
CHR$(A):T=T+1:NEXT Y:NEXT X
80 C=1:FOR X=1 TO 23:READ A,DUR:FOR Y=1 TO DUR:S$=S$+
CHR$(A):NEXT Y:NEXT X
90 FOR X=1 TO 24:READ Q$(X):Q$(X)=LEFT$(SP$,INT((22-L
EN(Q$(X)))/2))+Q$(X):NEXT X
100 C=1:V=36878:S1=36874:S2=36875:S3=36876:POKE V,5
110 PRINT CHR$(147):FOR Z=1 TO 96
120 POKE S1,ASC(MID$(B$,Z,1)):POKE S2,ASC(MID$(T$,Z,1
)):POKE S3,ASC(MID$(S$,Z,1))
130 IF Z<>1 AND Z<>32 AND Z<>64 THEN FOR D=1 TO 75:NE
XT D:GOTO 180
140 PRINT CHR$(147):POKE 214,9:PRINT:PRINT Q$(C)
150 PRINT Q$(C+1):PRINT Q$(C+2)
160 IF Z<>1 THEN C=C+3:IF C>24 THEN C=1
170 FOR D=1 TO 40:NEXT D
180 NEXT Z:GOTO 110
1000 DATA 183,199,207,212,215,212,207,199,183,199,207
1010 DATA 212,215,212,207,199,201,212,219,223,225,223
1020 DATA 219,212,183,199,207,212,215,212,207,199,207
1030 DATA 217,223,227,201,212,219,223,219,215,212,209
1040 DATA 207,201,199,191
1050 DATA 231,2,228,1,231,1,225,1,219,3,231,2,228
2000 DATA 2,225,2,219,2,226,1,0,1,226,1,0,1,225,1
2010 DATA 226,1,0,1,225,1,226,1,0,1,225,1,226,2,231
2020 DATA 1,231,1,231,1,231,2,228,1,231,1,225,1,219
2030 DATA 3,231,2,228,2,225,2,219,2,226,1,0,1,226
2040 DATA 1,0,1,225,1,226,1,0,1,225,1,226,1,0,1,225
2050 DATA 1,226,1,0,1,225,1,228,1,225,1,228,1,0,1,228
2060 DATA 1,225,1,228,1,231,3,231,2,228,1,231,1,225
2070 DATA 1,219,1,0,1,219,2,0,15
3000 DATA 0,18,231,1,0,1,230,1,231,1,0,1,230,1,231,1
3010 DATA 0,1,230,1,231,2,0,21,231,1,0,1,230,1,231,1
3020 DATA 0,1,230,1,231,1,0,1,230,1,231,2,0,35
4000 DATA WOKE UP THIS MORNIN',AND I TURNED,MY COMPUT
ER ON
4010 DATA LOOKED AT THE SCREEN,AND I KNEW THAT,SOMETH
IN' WAS WRONG
4020 DATA THE COMPUTER STARTED,CRYIN' AND MAKIN',SAD
FACES AT ME
4030 DATA I SAW LITTLE,BLOCKY TEARS RUNNIN',DOWN MY T
V
4040 DATA I SAID 'HEY COMPUTER,WHY ARE YOU,SO BLUE?'
4050 DATA 'TELL ME WHAT HAVE I,DONE? WHAT HAVE I,DONE
 TO HURT YOU?'
4060 DATA THE COMPUTER SAID,'WHY YOU TREATIN' ME,SO M
EAN?'
4070 DATA 'YOU GET MILK ON MY,KEYS AND PEANUT,BUTTER O
N MY SCREEN'
```



The computer said,

"Why you treatin' me so mean?

You get milk on my keys and

peanut butter on my screen."

RADIO SHACK/*"COMPUTER BLUES"*

TRS-80 Color Computer • 16K RAM

```
10 CLEAR 1000:DIM A(70,2),Q$(16)
20 CLS:PRINT @199,"THE COMPUTER BLUES"
30 PRINT @228,"TUNING UP ... PLEASE WAIT."
40 FOR X=1 TO 70:READ A(X,1),A(X,2):NEXT X
```

```
50 FOR X=1 TO 16:READ Q$(X):Q$(X)=STRING$(INT((32-LEN(
Q$(X)))/2),32)+Q$(X):NEXT X
60 C=1:CLS
70 FOR Z=1 TO 70
80 SOUND A(Z,1),A(Z,2)*2
90 IF Z<>1 AND Z<>25 AND Z<>49 THEN FOR D=1 TO 5:NEXT
D:GOTO 120
100 CLS:PRINT @256,Q$(C):PRINT Q$(C+1)
110 IF Z<>1 THEN C=C+2:IF C>16 THEN C=1
120 NEXT Z:GOTO 70
1000 DATA 193,2,185,1,193,1,176,1,159,3,193,2,185,2
1010 DATA 176,2,159,2,180,1,255,1,180,1,255,1,176,1
1020 DATA 180,1,255,1,176,1,180,1,255,1,176,1,180,1
1030 DATA 255,1,193,1,193,1,193,1,193,2,185,1,193,1
1040 DATA 176,1,159,3,193,2,185,2,176,2,159,2,180,1
1050 DATA 255,1,180,1,255,1,176,1,180,1,255,1,176,1
1060 DATA 180,1,255,1,176,1,180,2,176,1,185,1,176,1
1070 DATA 185,1,255,1,185,1,176,1,185,1,193,3,193,2
1080 DATA 185,1,193,1,176,1,159,1,159,1,159,1,159,2
1090 DATA 147,2,140,2,133,2,125,2,108,2,99,2,78,2
2000 DATA I WOKE UP THIS MORNIN',TURNED MY COMPUTER ON
2010 DATA ONE LOOK AT THE SCREEN,AND I KNEW SOMETHIN'
WAS WRONG
2020 DATA THE COMPUTER STARTED CRYIN',AND MAKIN' SAD F
ACES AT ME
2030 DATA I SAW LITTLE BLOCKY TEARS,RUNNING DOWN MY TV
2040 DATA I SAID 'HEY COMPUTER,WHY ARE YOU SO BLUE?'
2050 DATA 'TELL ME WHAT HAVE I DONE?,WHAT HAVE I DONE
TO HURT YOU?'
2060 DATA THE COMPUTER SAID,'WHY YOU TREATIN' ME SO ME
AN?'
2070 DATA 'YOU GET MILK ON MY KEYS,AND PEANUT BUTTER O
N MY SCREEN'
```

I woke up this mornin',

turned my computer on.

One look at the screen and

I knew somethin' was wrong...

TEXAS INSTRUMENTS/*"COMPUTER BLUES"*

TI-99/4A • 16K RAM

```
10 DIM B(96),T(96),S(96),Q$(16)
20 CALL CLEAR
30 PRINT TAB(5);"THE COMPUTER BLUES"
40 PRINT TAB(8);"TUNING UP ..."
50 PRINT TAB(8);"PLEASE WAIT."
60 C=1
70 FOR X=1 TO 96 STEP 2
80 READ A
90 B(X)=A
100 B(X+1)=A
110 NEXT X
120 C=1
130 FOR X=1 TO 63
140 READ N,D
150 FOR Y=1 TO D
160 T(C)=N
170 C=C+1
180 NEXT Y
190 NEXT X
200 C=1
210 FOR X=1 TO 23
220 READ N,D
230 FOR Y=1 TO D
240 S(C)=N
250 C=C+1
260 NEXT Y
270 NEXT X
280 FOR X=1 TO 16
290 READ Q$(X)
300 NEXT X
310 C=1
320 FOR Q=1 TO 4
330 CALL CLEAR
340 FOR R=1 TO 2
350 PRINT Q$(C)
360 PRINT Q$(C+1)
370 PRINT
380 NEXT R
390 PRINT Q$(C+2)
400 PRINT Q$(C+3)
410 C=C+4
420 IF C<=16 THEN 440
430 C=1
440 FOR Z=1 TO 96
450 CALL SOUND(170,B(Z),1,T(Z),1,S(Z),5)
460 NEXT Z
470 NEXT Q
480 GOTO 320
1000 DATA 110,139,165,185,196,185,165,139,110,139,165
1010 DATA 185,196,185,165,139,147,185,220,247,262,247
1020 DATA 220,185,110,139,165,185,196,185,165,139,165
1030 DATA 208,247,277,147,185,220,247,220,196,185,175
1040 DATA 165,147,139,123
2000 DATA 659,2,587,1,659,1,523,1,440
2010 DATA 3,659,2,587,2,523,2,440,2,554,1,40000,1,554
2020 DATA 1,40000,1,523,1,554,1,40000,1,523,1,554,1
2030 DATA 40000,1,523,1,554,2,659,1,659,1,659,1,659
2040 DATA 2,587,1,659,1,523,1,440,3,659,2,587,2,523
2050 DATA 2,440,2,554,1,40000,1,554,1,40000,1,523,1
2060 DATA 554,1,40000,1,523,1,554,1,40000,1,523,1
2070 DATA 554,1,40000,1,523,1,587,1,523,1,587,1
2080 DATA 40000,1,587,1,523,1,587,1,659,3,659,2
2090 DATA 587,1,659,1,523,1,440,1,40000,1,440,2
2100 DATA 40000,15
3000 DATA 40000,18,1568,1,40000,1,1480,1,1568,1
3010 DATA 40000,1,1480,1,1568,1,40000,1,1480,1
3020 DATA 1568,2,40000,21,1568,1,40000,1,1480,1
3030 DATA 1568,1,40000,1,1480,1,1568,1,40000,1
3040 DATA 1480,1,1568,2,40000,35
4000 DATA I WOKE UP THIS MORNIN',TURNED MY COMPUTER ON
4010 DATA ONE LOOK AT THE SCREEN,I KNEW SOMETHIN' WAS
WRONG
4020 DATA THE COMPUTER STARTED CRYIN',AND MAKIN' SAD F
ACES AT ME
4030 DATA I SAW LITTLE BLOCKY TEARS,RUNNIN' DOWN MY TV
4040 DATA I SAID 'HEY COMPUTER,WHY ARE YOU SO BLUE?'
4050 DATA 'TELL ME WHAT HAVE I DONE?,WHAT'VE I DONE TO
 HURT YOU?'
4060 DATA THE COMPUTER SAID 'WHY YOU,TREATIN' ME SO ME
AN?'
4070 DATA 'YOU GET MILK ON MY KEYS AND,PEANUT BUTTER O
N MY SCREEN'
```

MICRONOTES

Check out this space in each issue for what's hot in the computer/music biz, and for the latest in computer/music products.

What's new? Computers and laserdisks may revolutionize the rock video scene! **The Turtles** (alias **Flo and Eddie**, or **Mark Volman** and **Howard Kaylan**) have recorded the soundtrack for the first animated home videodisk fantasy game, called *Thayer's Quest*. Mark and Howard started out as the Turtles in the '60s. Since then, they've had a successful career as a duo, and worked with a zillion other rockers, including **Frank Zappa**, **T. Rex**, and **Alice Cooper**.

The *Thayer's Quest* soundtrack was entirely generated by computer technology. The Turtles recorded it on a 360 system—a brand-new music synthesizer that records instrument sounds on computer chips. It was hard work . . . nine minutes of completed sound took a week to create!

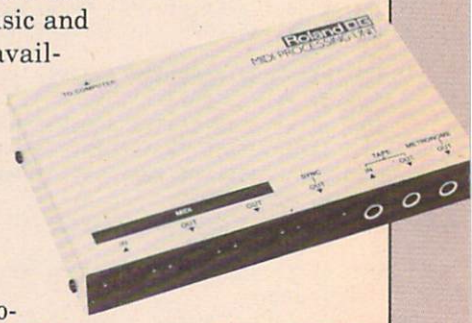
The genius behind the game is **Rick Dyer**, who created *Dragon's Lair*. Nearly $2 million has gone into research and development for the videodisk system. Rick also is hunting for a group to record the soundtrack for his next videodisk effort, a horror-movie game that will use live footage. . . .

In other videodisk/music news, a live-action disk, called *Artdisc*, is being launched by **Romulus Productions, Inc. Laurie Anderson**, best known for her hit record "Superman," is one artist who'll be participating in the project. . . .

Laurie Anderson

Summer of 1984 is proving to be a great season for micromaestros because established micro music hardware and software companies are improving their products and slashing prices. Many companies are entering the market for the first time, with options previously not available to the consumer. . . .

One company, called the **Alien Group** (27 W. 23rd St., New York, NY 10010), has released a singing—that's right—a SINGING speech synthesizer for the C 64. The Voice Box, priced at $129, plugs directly into the C 64's user port and has an unlimited vocabulary, a built-in speaker, and volume and pitch controls. Programs for a high-res talking human face and a comprehensive music and singing system are available on a separate disk or cassette for $30. . . .



The **Roland DG Corporation** (7200 Dominion Circle, Los Angeles, CA 90040) recently introduced the MPU-401 MIDI Processing Unit. MIDI stands for Musical Instrument Digital Interface. Two programs, one for the IBM PC and one for the Apple II, work with the MPU-401 MIDI to control the performance of up to eight different musical instruments by one computer. The unit costs less than $300.

The MIDI synchronizes the musical instruments and, while the music is playing, lets the computer perform other functions such as load, save, or display screen graphics. . . .

For microminstrels on the move, **Casio, Inc.** (15 Gardner Road, Fairfield, NJ 07006) is shipping its new KX-101 computerized audio system which, in their words, "has packed a complete audio entertainment center into 16 portable pounds of state-of-the-art wizardry." The $499 system has an AM/FM stereo radio, detachable speakers, a cassette player/recorder, a polyphonic keyboard, and a mini recording studio. The brain of the KX-101 is an on-board microcomputer capable of nine different automatic scanning functions. It lets you program and play back your tapes in a variety of ways. From the back, the unit looks like a portable stereo. But, a gaze at its front prompted one of my music industry friends (who's a veteran of the '60s' folk music days) to swear that the portable microcomputer-based Casio will become the folk instrument of the '80s. . . .

A Parade of Programs for the Fourth of July

It all started a few months ago. Some of K-POWER's "Resident Hackers" were hanging out in the lab very late one night polishing up a program when Peter Cockcroft (the guy with the "K" on his shirt) walked in, pulled a disk from his coat pocket, and loaded it into a nearby computer.

After a few moments weird, colorful shapes began to fill the screen and strange sounds hummed from the speaker. The folks in the lab quickly gathered around to see.

A few minutes later someone said, "Hey, it's like the Fourth of July!"

"That's the idea," said Peter.

Before long, everyone in the lab was busily typing away at their own Fourth of July program. It turned into a contest of sorts, each programmer trying to take full advantage of his or her computer. Some tried flags. Some tried exploding rockets. Some tried music. Some tried combinations of all of these.

As you can imagine, the lab was a pretty noisy place for a while. Ideas were thrown around, tips on how to achieve the best explosion were exchanged, and arguments were waged over which tune was the most patriotic.

When it was all over, we had a wild assortment of some of the noisiest, most colorful, exciting, and original programs K-POWER has ever done.

So, when Independence Day rolls around, have one of these holiday programs all ready to go and join in on the festivities!

1. Mark Prenty 2. Gary Lee 3. Al Drayton 4. Roland Thomas
5. Peter Cockcroft 6. Ruth Nebbia 7. Adam Schussheim
8. Alex Shakar 9. Justin Greene 10. Joe Gelman

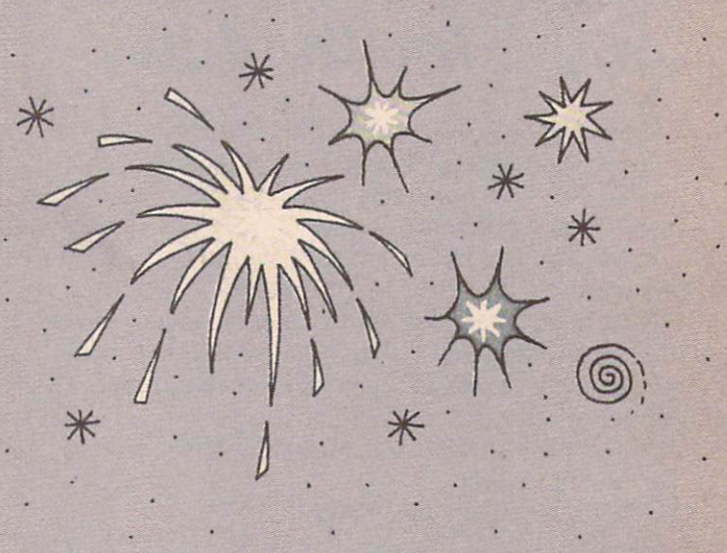
Illustration: Chris Reed

APPLE/*BURSTS AND SPARKS*

II plus, IIe, or IIc • 32K RAM • color TV or monitor optional

```
10 DIM A(32),L(10),S(10)
20 TEXT:HOME:POKE 232,0
30 FOR I = 1 TO PEEK(78) + PEEK(79):X = RND(1):NEXT I
40 FOR I = 0 TO 10:READ L(I),S(I):S = S + L(I) + S(I):
NEXT I
50 FOR I = 1 TO 101:READ A:S = S + A:POKE 767 + I,A:NE
XT I
60 IF S <> 14869 THEN PRINT "YOU HAVE MADE A TYPING ER
ROR IN LINES   1000-1090.":END
70 HGR2
80 FOR Q = INT(RND(1) * 50) + 2 TO INT(RND(1) * 50) +
75:POKE 6,3:POKE 8,Q:CALL 840:NEXT Q
90 Z = INT(RND(1) * 11):SCALE= S(Z) + INT(RND(1) * 2)
- 1
100 POKE 233,L(Z)
110 X = INT(RND(1) * 120) + 69:Y = INT(RND(1) * 50) +
75
120 FOR R = 0 TO 64 STEP 2
130 C = INT(RND(1) * 6) + 1:IF C = 4 THEN 130
140 ROT= R:HCOLOR= C:DRAW 0 AT X,Y:A = PEEK(-16336)
150 NEXT R:IF RND(1) > 0.6 THEN 90
160 CALL 768:GOTO 70
1000 DATA 247,4,229,6,231,5,233,4,238,2,237,2,228,3
1010 DATA 219,2,214,2,249,3,6,2,160,32,132,255,160,0
1020 DATA 132,254,132,7,132,8,177,254,240,15,69,6,133
1030 DATA 6,201,130,176,2,169,0,145,254,76,48,3,165,7
1040 DATA 24,105,1,133,7,165,8,105,0,201,31,240,25,133
1050 DATA 8,230,254,208,216,164,6,173,48,192,136,208
1060 DATA 250,230,255,165,255,201,64,208,200,76,0,3,96
1070 DATA 165,8,74,133,10,164,8,173,48,192,136,234
1080 DATA 234,208,251,165,7,56,229,10,133,7,176
1090 DATA 237,198,6,208,233,96
```

—BY PETER COCKCROFT

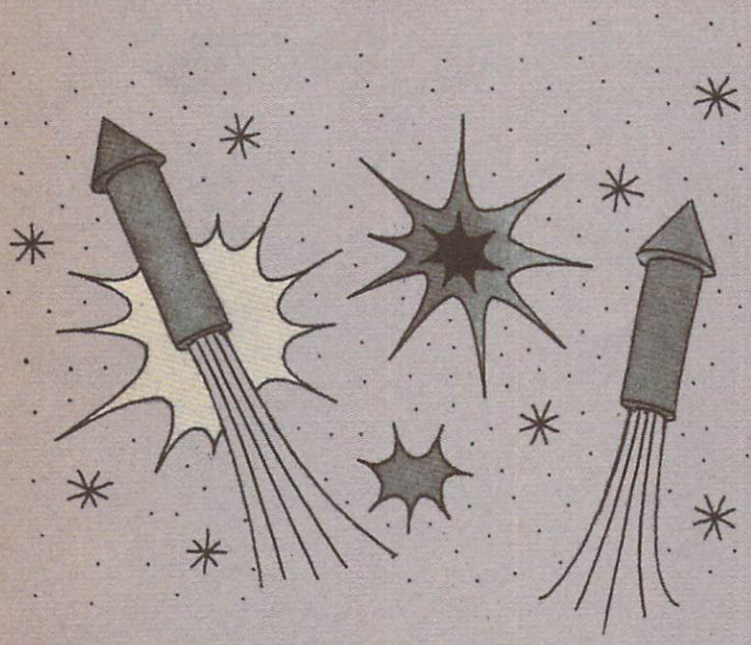


ATARI/*YANKEE DOODLE*

400, 600XL, 800, or 800XL • 16K RAM • color TV or monitor optional

```
10 DIM MSSG$(45),MUSIC$(128),CODE(9),T$(50)
20 FOR X=0 TO 8:A=0:FOR Y=0 TO 7:READ T:A=A+T:POKE 153
6+Y+X*8,T:NEXT Y:READ T
30 IF T<>A THEN PRINT "YOU HAVE MADE A TYPING ERROR IN
 DATA  STATEMENT #";1000+X*10;".":END
40 NEXT X:LMEM=PEEK(740)-4:POKE 106,LMEM-1:NWCSET=LMEM
*256:GRAPHICS 0
50 X=USR(1536,NWCSET+8,PEEK(756)*256,NWCSET):POKE 756,
LMEM
60 FOR X=0 TO 16:A=0:FOR Y=0 TO 7:READ T:A=A+T:POKE NW
CSET+776+Y+X*8,T:NEXT Y:READ T
70 IF T<>A THEN PRINT "YOU HAVE MADE A TYPING ERROR IN
 DATA  STATEMENT #";2000+X*10;".":END
80 NEXT X:A=0:FOR X=0 TO 9:READ T:A=A+T:CODE(X)=T:NEXT
 X:READ T
90 IF A<>T THEN PRINT "YOU HAVE MADE A TYPING ERROR IN
 DATA  STATEMENT #3000.":END
100 FOR X=1 TO 4:READ T$:MUSIC$(LEN(MUSIC$)+1)=T$:NEXT
 X
110 FOR X=1 TO LEN(MUSIC$):MUSIC$(X,X)=CHR$(CODE(VAL(M
USIC$(X,X)))):NEXT X
120 DL=PEEK(560)+PEEK(561)*256:POKE DL+3,68
130 POKE 708,13:POKE 709,52:POKE 710,154:POKE 82,0
140 MSSG$="XXXXXX1OXXXXFXHX9X4AXXJTPX8UHPXXLXYX4YXXXXX
XX"
150 FOR X=DL+6 TO DL+28:POKE X,4:NEXT X
160 FOR X=1 TO 33 STEP 8:FOR Y=0 TO 15 STEP 3
170 POSITION X,Y:PRINT "aabbb":POSITION X,Y+1:PRINT "b
bbbb"
180 NEXT Y:NEXT X
190 FOR V=1 TO 5 STEP 4:FOR X=V TO 33 STEP 8:FOR Y=17
TO 3 STEP -1
200 POSITION X,Y:PRINT " cde "
210 POSITION X,Y+1:PRINT " fgh "
220 POSITION X,Y+2:PRINT " ijk "
230 POSITION X,Y+3:PRINT " lmn "
240 POSITION X,Y+4:PRINT " opq "
250 POSITION X,Y+5:PRINT " ! ! "
260 IF Y=17 THEN FOR D=10 TO 15 STEP 0.6:SOUND 1,200,8
,D:T=1^1:NEXT D:GOTO 300
270 SOUND 1,170+Y/4,8,Y-2
280 IF Y>12 OR Y<3 OR Y/2<>INT(Y/2) THEN 300
290 T=INT(X/4)*5+7-Y/2:POSITION X+2,Y+6:A=ASC(MSSG$(T)
):PRINT CHR$(A-(A=88)*56);
300 NEXT Y:NEXT X:NEXT V
310 FOR X=DL+15 TO DL+21 STEP 2:POKE X,5:NEXT X
320 FOR Y=1 TO 2:FOR X=1 TO LEN(MUSIC$)
330 T=ASC(MUSIC$(X)):SOUND 0,T,10,10:SOUND 1,T+1,10,6
340 FOR D=1 TO 18:NEXT D:NEXT X:NEXT Y:SOUND 0,0,0,0:P
RINT CHR$(125):GOTO 150
999 REM --MACHINE-LANGUAGE ROUTINE--
1000 DATA 104,104,133,204,104,133,203,104,1089
1010 DATA 133,213,104,133,212,104,133,215,1247
1020 DATA 104,133,214,162,4,160,0,177,954
1030 DATA 212,145,214,200,208,249,230,213,1671
1040 DATA 230,215,202,208,240,162,6,160,1423
1050 DATA 46,169,7,76,92,228,162,42,822
1060 DATA 165,20,172,10,210,16,2,162,757
1070 DATA 106,142,64,6,160,7,145,203,833
1080 DATA 106,136,16,250,76,98,228,0,910
```

Illustrations: Chris Reed



```
1999 REM --CUSTOM CHARACTERS--
2000 DATA 238,187,238,187,238,187,238,187,1700
2010 DATA 170,85,170,85,170,85,170,85,1020
2020 DATA 0,0,0,0,0,0,15,15,30
2030 DATA 40,40,60,60,255,195,195,0,845
2040 DATA 0,0,0,0,0,0,240,240,480
2050 DATA 13,13,13,13,61,60,61,253,487
2060 DATA 85,64,64,64,85,0,5,4,371
2070 DATA 112,48,48,48,124,60,124,127,691
2080 DATA 253,253,253,252,253,252,12,12,1540
2090 DATA 4,4,84,0,84,17,16,17,226
2100 DATA 127,127,127,63,63,63,112,48,730
2110 DATA 13,12,15,63,243,195,195,255,991
2120 DATA 84,0,0,0,0,102,153,102,441
2130 DATA 48,48,240,252,207,195,195,255,1440
2140 DATA 0,0,0,0,2,8,41,166,217
2150 DATA 170,170,170,170,0,0,153,102,935
2160 DATA 0,0,0,0,128,32,168,102,430
2999 REM --MUSIC DATA--
3000 DATA 0,91,96,108,121,128,144,162,182,193,1225
3010 DATA 4044332244223377404433224440555040443322 1
3020 DATA 1223344557766554440444066656677665544667 7
3030 DATA 767788999977776665667766554466774455 33
3040 DATA 44404440
```

—BY JOE GELMAN

COLECO/*ROCKETS*

ADAM • 80K RAM • color TV or monitor optional

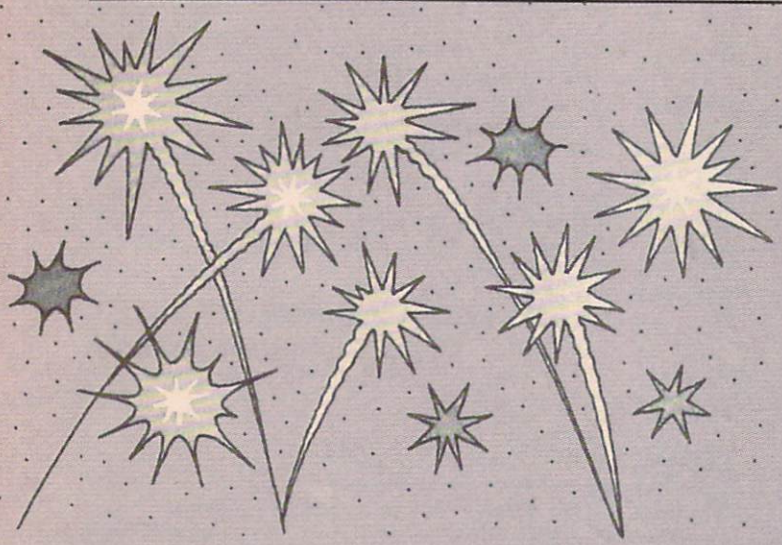
```
9 REM -- when program pauses, press any key to continu
e --
10 HGR2
20 FOR t = 1 TO 5
30 READ ua,la,ub,lb
40 x1 = INT((ua - la + 1) * RND(1) + la):x2 = x1
50 y1 = INT((ub - lb + 1) * RND(1) + lb):y2 = y1
60 GOSUB 1000:HPLOT 128,191 TO x1,y1
70 FOR r = 1 TO 15
80 x1 = x1 - 1:x2 = x2 + 1:y1 = y1 - 1:y2 = y2 + 1
90 xa = INT((x2 - x1 + 1) * RND(1) + x1):xb = INT((x2
- x1 + 1) * RND(1) + x1)
100 ya = INT((y2 - y1 + 1) * RND(1) + y1):yb = INT((y2
 - y1 + 1) * RND(1) + y1)
110 GOSUB 1000:HPLOT x1,ya:HPLOT x2,yb
120 GOSUB 1000:HPLOT xa,y1:HPLOT xb,y2
130 NEXT r:NEXT t
140 GET a$:RESTORE:GOTO 20
1000 hc = INT(RND(1) * 15) + 1:IF hc = 4 THEN 1000
1010 HCOLOR= hc:RETURN
2000 DATA 170,85,80,20,105,20,145,80,230,105
2010 DATA 145,80,85,20,80,20,240,170,80,20
```

—BY GARY LEE

COMMODORE/*KABOOM TUNE*

Commodore 64 • color TV or monitor optional

```
10 DIM CS(49)
20 PRINT CHR$(147);:POKE 53281,6
30 FOR X=0 TO 49:READ CS(X):NEXT X
40 FOR X=0 TO 49:C=0:FOR Y=1 TO 12:READ T:C=C+T:NEXT Y
50 IF CS(X)<>C THEN PRINT "TYPING ERROR IN DATA LINE #
";2000+X*10:END
60 NEXT X:RESTORE:FOR X=0 TO 49:READ T:NEXT X
70 FOR X=1 TO 39:BAR$=BAR$+CHR$(160):NEXT X
80 S$=CHR$(5)+"*"+CHR$(31)+" "
90 STAR$(1)=S$+S$+S$+S$+S$+S$:STAR$(2)=" "+S$+S$+S$+S$
+S$+" "
100 FOR X=832 TO 896:READ A:POKE X,A:NEXT X
110 FOR X=0 TO 3:POKE 2040+X,13:NEXT X
120 V=53248:POKE V+28,255:POKE V+23,255
130 POKE V+37,143:POKE V+38,42:POKE V+39,36:POKE V+40,
76:POKE V+41,23
140 POKE V,150:POKE V+2,75:POKE V+4,225:POKE V+21,7
150 FOR X=1 TO 35:READ HI,LO,DUR:FOR Y=1 TO DUR
160 A$(1)=A$(1)+CHR$(HI):A$(2)=A$(2)+CHR$(LO):NEXT Y:N
EXT X
170 FOR X=1 TO 38:READ HI,LO,DUR:FOR Y=1 TO DUR:B$(1)=
B$(1)+CHR$(HI)
```



```
180 B$(2)=B$(2)+CHR$(LO):NEXT Y:NEXT X
190 FOR X=1 TO 39:READ HI,LO,DUR:FOR Y=1 TO DUR
200 C$(1)=C$(1)+CHR$(HI):C$(2)=C$(2)+CHR$(LO):NEXT Y:N
EXT X:PRINT CHR$(19);
210 FOR X=1 TO 13:PRINT CHR$(18);CHR$(-5*(X/2=INT(X/2)
)-28*(X/2<>INT(X/2)));
220 PRINT CHR$(29);CHR$(29);LEFT$(BAR$,35):NEXT X
230 PRINT CHR$(19);:FOR X=1 TO 9:PRINT CHR$(31);
240 PRINT CHR$(29);CHR$(29);STAR$(1-(X/2=INT(X/2))):NE
XT X
250 FOR X=54272 TO 54296:POKE X,0:NEXT X
260 FOR X=54276 TO 54290 STEP 7:POKE X+1,16:POKE X+2,1
6:POKE X,33:NEXT X
270 POKE 54296,15
280 FOR Q=1 TO 2:L=253:FOR X=1 TO LEN(A$(1))
290 POKE 54273,ASC(MID$(A$(1),X,1))
300 POKE 54272,ASC(MID$(A$(2),X,1))
310 POKE 54280,ASC(MID$(B$(1),X,1))
320 POKE 54279,ASC(MID$(B$(2),X,1))
330 POKE 54287,ASC(MID$(C$(1),X,1))
340 POKE 54286,ASC(MID$(C$(2),X,1))
350 L=L-3:POKE V+1,L:POKE V+3,L:POKE V+5,L
360 FOR D=1 TO 90:NEXT D:NEXT X:NEXT Q
370 FOR X=253 TO 4 STEP -1:POKE 54273,X:POKE V+1,X:NEX
T X:POKE V+1,0
380 FOR X=1 TO 20:POKE 54276,129:POKE 53281,INT(RND(0)
*15)+1:NEXT X
390 PRINT CHR$(147);:POKE 54277,8:POKE 54278,0:POKE 53
281,0
400 FOR P=1 TO 65:READ X,Y,Y2
410 FOR T=Y TO Y2:POKE 54276,129:FOR D=1 TO 5:NEXT D:P
OKE 54276,0
420 Q=X+T*40:POKE Q+1024,81
430 POKE Q+55296,INT(RND(1)*15)+1
440 NEXT T:NEXT P:POKE 54296,0
450 GOTO 450
1000 DATA 0,485,1020,1150,900,849,901,280,880,633
1010 DATA 376,449,455,468,758,641,746,426,652,778
1020 DATA 701,607,787,755,365,528,434,324,615,505
1030 DATA 592,525,366,173,81,88,103,110,122,140
1040 DATA 129,152,179,201,212,184,206,214,246,169
2000 DATA 0,0,0,0,0,0,0,0,0,0,0,0
2010 DATA 0,40,0,0,40,0,0,150,0,2,125,128
2020 DATA 2,125,128,2,125,128,2,125,128,2,125,128
2030 DATA 2,125,128,2,85,128,10,170,160,10,170,160
2040 DATA 10,60,160,10,60,160,8,60,32,41,195,104
2050 DATA 171,0,234,0,0,16,195,2,16,195,2,18
2060 DATA 209,2,15,210,3,16,195,1,18,209,2,21
2070 DATA 31,2,21,31,2,22,96,2,21,31,3,18
2080 DATA 209,1,16,195,2,18,209,2,16,195,2,15
2090 DATA 210,2,16,195,6,25,30,9,22,96,1,21
2100 DATA 31,2,22,9,9,21,31,1,18,209,2,21
2110 DATA 31,2,22,96,1,21,31,1,18,209,1,16
2120 DATA 195,1,21,31,3,22,96,1,25,30,2,28
2130 DATA 49,1,22,96,1,21,31,2,18,209,2,16
2140 DATA 195,6,12,143,2,12,143,2,11,218,2,12
2150 DATA 143,3,14,24,1,15,210,2,16,195,2,16
2160 DATA 195,2,18,209,2,16,195,3,13,78,1,14
2170 DATA 24,2,11,48,2,12,143,4,10,143,6,21
2180 DATA 31,9,18,209,1,16,195,2,12,143,2,14
2190 DATA 24,2,14,239,2,15,210,3,14,239,1,15
2200 DATA 210,2,16,195,1,15,210,1,14,24,1,12
2210 DATA 143,1,11,48,1,11,218,1,12,143,3,15
2220 DATA 210,1,16,195,2,22,96,1,18,209,1,16
2230 DATA 195,2,15,210,2,16,195,6,8,97,2,7
2240 DATA 12,2,5,237,2,6,71,3,7,12,1,7
2250 DATA 233,2,8,97,2,7,12,2,5,152,2,6
2260 DATA 71,3,6,167,1,7,12,2,5,152,2,6
2270 DATA 71,4,4,48,6,8,97,3,6,71,1,5
2280 DATA 71,1,5,210,1,6,71,1,5,237,1,6
2290 DATA 71,1,7,233,1,8,97,2,6,71,4,4
2300 DATA 180,2,6,71,3,5,237,1,6,71,2,8
2310 DATA 97,1,7,233,1,7,12,2,5,152,2,6
2320 DATA 71,4,8,97,2,7,12,1,5,152,1,6
2330 DATA 71,4,4,48,6,7,2,6,8,4,4,9
2340 DATA 4,4,10,2,6,12,4,6,13,3,3,14
2350 DATA 2,2,15,3,3,16,4,6,13,5,5,14
2360 DATA 5,5,15,5,5,18,2,6,19,2,2,19
2370 DATA 4,4,20,2,2,20,4,4,21,2,4,23
2380 DATA 2,6,24,2,2,24,4,4,25,2,2,25
2390 DATA 4,4,26,2,4,28,2,3,29,4,4,30
2400 DATA 4,6,31,4,4,32,2,3,8,12,14,9
2410 DATA 14,14,10,14,14,11,9,14,14,9,14,15
2420 DATA 14,14,16,14,14,17,14,14,18,9,14,21
2430 DATA 9,14,22,14,14,23,14,14,24,14,14,25
2440 DATA 14,14,27,9,11,28,12,12,29,12,14,30
2450 DATA 12,12,31,9,11,9,20,20,10,19,20,11
2460 DATA 18,18,11,20,20,12,17,21,13,20,20,16
2470 DATA 17,17,17,17,17,18,17,21,19,17,17,20
2480 DATA 17,17,23,17,21,24,19,19,25,19,19,26
2490 DATA 19,19,27,19,19,28,17,21,0,0,0,0
```

—BY ADAM SCHUSSHEIM

COMMODORE/*STARS AND STRIPES*

VIC-20 • 5K RAM • color TV or monitor optional

```
10 DIM T(23),MUSIC$(2)
20 V=36878:S2=36875:S1=36876:N=36877:PRINT CHR$(147);
30 FOR I=0 TO 23:READ T(I):NEXT I
40 IC=13:FOR I=0 TO 23:S=0:IF I=23 THEN IC=3
50 FOR J=0 TO IC:READ C:S=S+C:NEXT J
60 IF S=T(I) THEN 100
70 PRINT "YOU HAVE MADE A TYPING";
80 PRINT "ERROR ON LINE";1000+INT(I/8)*10
90 PRINT "OR LINE";2000+I*10:END
100 NEXT I
```

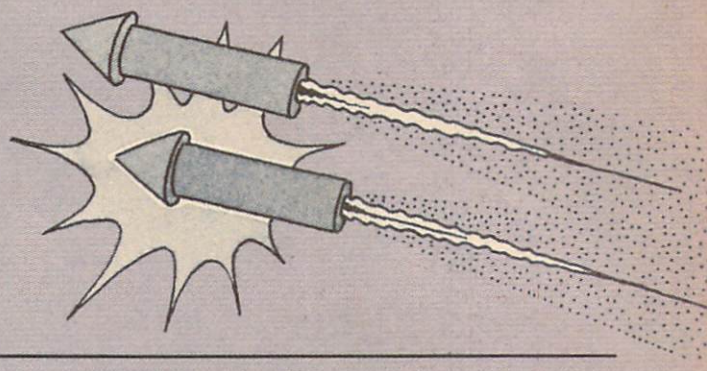
```
110 RESTORE:FOR I=1 TO 24:READ D:NEXT I
120 FOR X=1 TO 89:READ A,B:FOR Y=1 TO B
130 MUSIC$(1)=MUSIC$(1)+CHR$(A):NEXT Y:NEXT X
140 FOR X=1 TO 74:READ A,B:FOR Y=1 TO B
150 MUSIC$(2)=MUSIC$(2)+CHR$(A):NEXT Y:NEXT X
160 FOR I=1 TO 22
170 A$=A$+CHR$(162):B$=B$+" ":C$=C$+CHR$(184):NEXT I
180 D$=CHR$(18)+CHR$(159)+B$:S$="* * * * * *"
190 S1$=CHR$(18)+CHR$(31)+S$
200 S2$=CHR$(18)+CHR$(31)+" "+LEFT$(S$,10)
210 AL$=LEFT$(A$,11):BL$=LEFT$(B$,11):CL$=LEFT$(C$,11)
220 PRINT CHR$(147);S1$;CHR$(28);BL$;
230 PRINT S2$;CHR$(28);AL$;S1$;CHR$(28);CL$;
240 PRINT S2$;CHR$(28);BL$;S1$;CHR$(5);BL$;
250 PRINT S2$;CHR$(28);BL$;S1$;CHR$(28);AL$;
260 PRINT S2$;CHR$(28);CL$;S1$;CHR$(28);BL$;
270 PRINT CHR$(5);B$;CHR$(28);B$;A$;C$;B$;
280 PRINT CHR$(5);B$;CHR$(28);B$;B$;
290 FOR I=1 TO 5:PRINT D$;:NEXT I:PRINT LEFT$(D$,23);
300 POKE 8185,160:POKE 38905,3:POKE V,5
310 FOR X=1 TO LEN(MUSIC$(1))
320 POKE S1,ASC(MID$(MUSIC$(1),X,1))
330 POKE S2,ASC(MID$(MUSIC$(2),X,1))
340 FOR D=1 TO 100:NEXT D:NEXT X
350 POKE V,0:FOR D=1 TO 1500:NEXT D:GOTO 220
1000 DATA 1016,1125,1161,775,1105,1072,1269,1173
1010 DATA 1090,1364,1179,1416,1234,1300,1072,1055
1020 DATA 1409,1286,1267,1410,1447,1216,1341,395
2000 DATA 175,2,159,1,135,3,159,3,175,3,195,5,0,1
2010 DATA 207,2,201,1,195,3,159,3,170,3,175,5,0,1
2020 DATA 175,1,0,1,175,1,207,5,201,1,195,3,191,5
2030 DATA 0,1,184,2,191,1,195,2,0,1,195,2,0,1
2040 DATA 175,3,159,3,135,3,207,1,0,1,207,1,207,3
2050 DATA 210,3,215,3,215,3,0,3,210,1,0,1,207,1
2060 DATA 202,3,207,3,210,3,210,3,0,3,210,3,207,5
2070 DATA 201,1,195,3,191,3,0,3,184,2,191,1,195,3
2080 DATA 159,3,170,3,175,5,0,1,175,3,195,3,195,3
2090 DATA 195,2,192,1,183,3,183,3,183,3,201,3,210,2
2100 DATA 207,1,201,2,195,1,195,3,191,2,0,4,175,2
2110 DATA 175,1,195,5,201,1,207,2,210,1,215,6,195,2
2120 DATA 201,1,207,3,210,3,201,3,195,6,0,6,195,3
2130 DATA 191,3,183,6,179,2,159,1,183,3,183,3,201,3
2140 DATA 175,6,0,3,195,5,175,1,159,2,169,1,175,6
2150 DATA 175,3,195,3,195,3,175,3,159,3,135,3,0,3
2160 DATA 195,3,201,3,207,9,201,2,195,1,191,3,195,3
2170 DATA 201,3,175,6,191,3,195,5,175,1,159,2,169,1
2180 DATA 175,6,163,3,159,2,175,1,195,3,201,3,175,6
2190 DATA 175,3,195,6,207,2,195,1,209,3,209,3,199,3
2200 DATA 201,2,199,1,201,2,207,1,209,2,201,1,215,5
2210 DATA 0,4,215,2,210,1,207,2,201,1,195,2,175,1
2220 DATA 195,2,201,1,207,6,183,2,179,1,175,3,183,3
2230 DATA 191,3,195,6
```

—BY ALEX SHAKAR

IBM/NIGHT FLIGHT

PC • 64K RAM • Color Graphics Adapter • color TV or monitor optional • Advanced BASIC

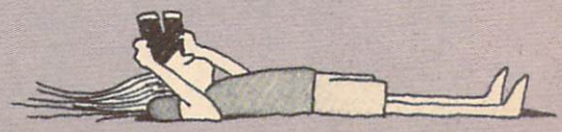
Use the IBM PCjr version, omitting lines 260 and 270.

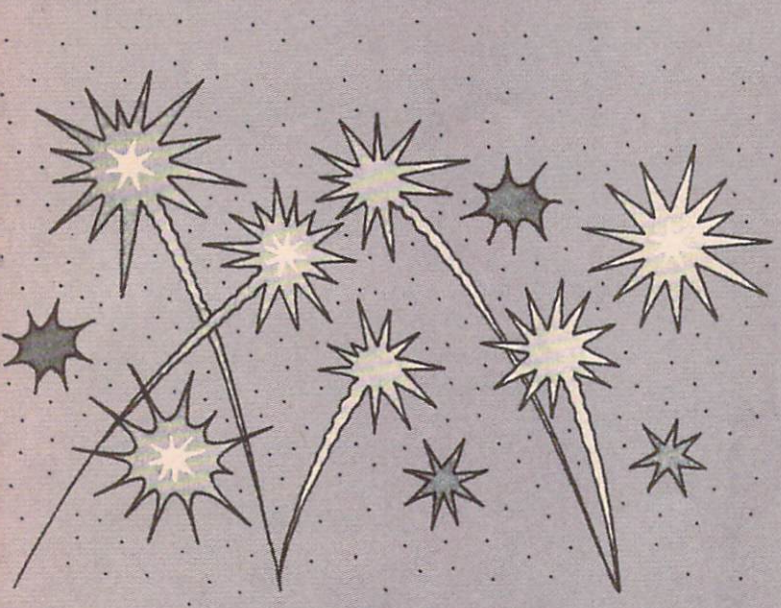


PCjr • 64K RAM • color TV or monitor optional • Cartridge BASIC

```
10 KEY OFF:SCREEN 1,0:COLOR 0,1
20 CLS:RANDOMIZE TIMER
30 DIM MVE(400),CLR$(3),SCL$(5),P$(5),RX(5),RY(5),YET(
5)
40 CLR$(1)="C1":CLR$(2)="C2":CLR$(3)="C3"
50 FOR X=4 TO 8:SCL$(X-3)="S"+STR$(X):NEXT X
60 ROCKET$="C3F2L4E2F2L4D8R4U8D16BU9BL2;P2,3;BU8;P2,3"
70 BOOM$="U5E5G3U2D3R2"
80 FOR I=1 TO 5:READ P$(I):NEXT I
90 L=0:FOR I=1 TO 8:LINE (0,163+L)-(319,163+L),3:L=L+I
:NEXT I
100 FOR I=1 TO RND*20+30:X=RND*319:Y=RND*120
110 PSET(X,Y),INT(RND*3):NEXT I
120 FOR I=1 TO 5:RY(I)=126:YET(I)=1
130 RX(I)=53*I+INT(RND*40)-20
140 PSET(RX(I),RY(I)),0:DRAW SCL$(5)+ROCKET$:NEXT I
150 FOR I=1 TO 5
160 PLAY P$(I)
170 Q=INT(RND*5)+1:IF YET(Q)=0 THEN 170
180 YET(Q)=0:C=5:FOR Y=122 TO 22 STEP -20
190 PSET(RX(Q),Y),0:DRAW SCL$(C)+ROCKET$
200 GET (RX(Q)-7,Y)-(RX(Q)+7,Y+40),MVE
210 PUT (RX(Q)-7,Y),MVE,XOR:C=C-1:NEXT Y
220 FOR M=1 TO INT(RND*3)+1
230 G$=SCL$(INT(RND*5)+1)+CLR$(INT(RND*3)+1)
240 FOR Z=0 TO 360 STEP 30:PSET(RX(Q),22),0
250 COLOR 0,0:DRAW G$+"TA"+STR$(Z)+BOOM$:COLOR 0,1:NEX
T Z
260 FOR S=1 TO 40:SOUND RND*120+37,10
270 FOR D=1 TO RND*12:NEXT D:SOUND 37,0:NEXT S
280 NEXT M
290 GET (RX(Q)-30,0)-(RX(Q)+30,60),MVE
300 PUT (RX(Q)-30,0),MVE,XOR
310 NEXT I
320 LINE (0,0)-(319,126),0,BF:GOTO 100
1000 DATA MB04L8CCDECED03G04CCDEL4C03B
1010 DATA L804CCDEFEDC03BGABL404CC
1020 DATA L803A.L16BL8AGAB04C03AL8G.L16AL8GFL4EG
1030 DATA L8A.L16BL8AGAB04C
1040 DATA 03AG04C03B04DL4CC
```

—BY ROLAND THOMAS

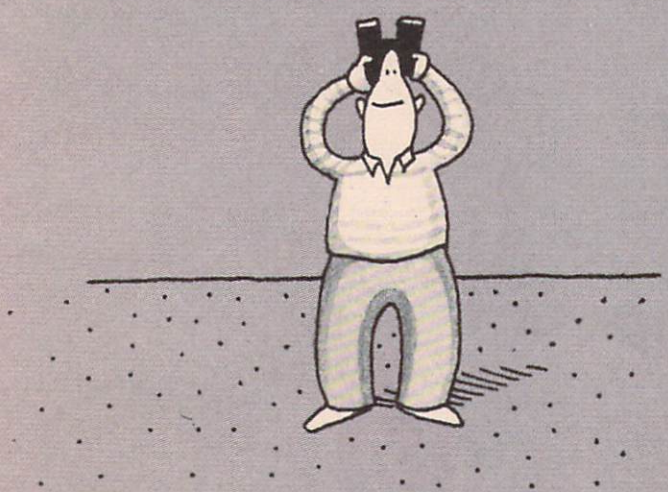




RADIO SHACK/*ECSTATIC EAGLE*

TRS-80 Color Computer • 16K RAM • color TV optional

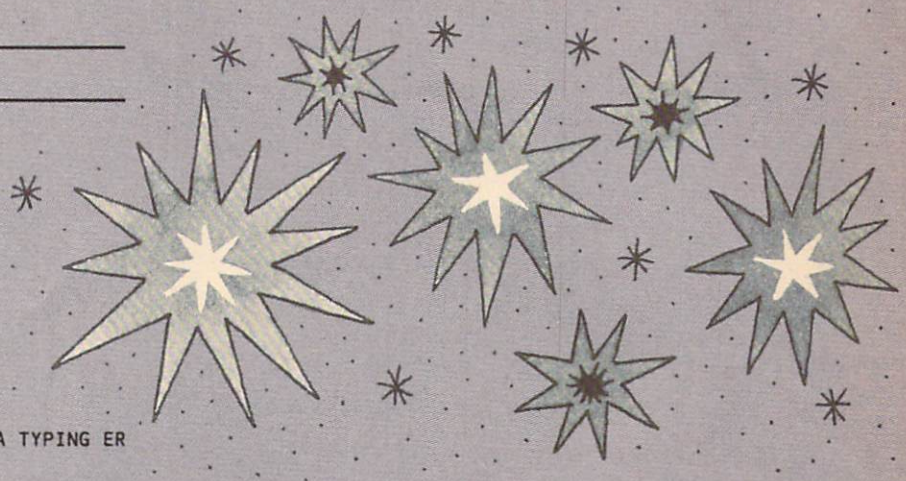
```
9 REM --DURING THE FIREWORKS DISPLAY, PRESS ANY KEY FO
R A SURPRISE--
10 CLEAR 1000:DIM E$(16),A(7),CK(27)
20 CLS(0):PRINT @ 232,"IT'S JULY 4TH!";
30 FOR X=0 TO 27:READ CK(X):NEXT X
40 FOR X=0 TO 27:C=0:FOR Y=1 TO 10:READ W:C=C+W:NEXT Y
:IF C<>CK(X) THEN CLS:PRINT "YOU HAVE MADE A TYPING ER
ROR IN LINE";1000+INT(X/10)*10;"OR LINE";2000+X*10:END
 ELSE NEXT X
50 RESTORE:FOR X=0 TO 27:READ W:NEXT X
60 FOR X=0 TO 7:READ A(X):NEXT X:READ W:READ W
70 P=1:FOR X=1 TO 15:FOR Y=1 TO 5:READ A,B:FOR Z=1 TO
A:E$(P)=E$(P)+CHR$(A(B)):IF LEN(E$(P))=31 THEN P=P+1
80 NEXT Z:NEXT Y:NEXT X
90 FOR X=16 TO 27:FOR Y=1 TO 10:READ A:M$=M$+CHR$(A):N
EXT Y:NEXT X
100 CLS(0):FOR Y=255 TO RND(15)+230 STEP -1:SOUND Y,1:
NEXT Y
110 Z=RND(9)+6:X=RND(63-2*Z)+Z:X2=RND(31-2*Z)+Z
120 CO=RND(7)+1:FOR Y=0 TO Z
130 IF Y=Z THEN 170
140 SET(X-Y,X2-Y,CO):SET(X-Y,X2+Y,CO)
150 SET(X+Y,X2+Y,CO):SET(X+Y,X2-Y,CO)
160 IF Y=1 OR (Y>0 AND Y/2=INT(Y/2)) THEN 190
170 SET(X,X2+Y,CO):SET(X,X2-Y,CO)
180 SET(X+Y,X2,CO):SET(X-Y,X2,CO)
190 NEXT Y:FOR Y=1 TO 5:SOUND 1,1:SOUND 2,1:NEXT Y
200 IF RND(7)<>3 THEN 250
210 FOR Y=1 TO RND(20)+20
220 SET(RND(63),RND(31),RND(7)+1)
230 FOR D=1 TO 5:NEXT D:CLS(0)
240 SOUND 7,1:NEXT Y
250 A$=INKEY$:IF A$<>"" THEN 270
260 IF RND(3)=2 THEN 100 ELSE 110
270 CLS(6):C=1:FOR X=0 TO 14 STEP 2
280 PRINT @ X*32,E$(X);:PRINT @ (X+1)*32,E$(X+1);
290 IF MID$(M$,C,1)=CHR$(0) THEN C=C+1:GOTO 310
300 SOUND ASC(MID$(M$,C,1)),ASC(MID$(M$,C+1,1)):C=C+2:
GOTO 290
310 NEXT X
320 K$=INKEY$:IF K$="" THEN 320 ELSE 100
999 REM --CHECKSUM DATA. BE CAREFUL!--
1000 DATA 1390,77,56,52,59,52,104,57,61,54
1010 DATA 52,60,44,58,44,55,916,885,738,937
1020 DATA 879,695,804,809,579,814,836,547
1999 REM --PICTURE AND MUSIC DATA BEGIN HERE--
2000 DATA 149,128,154,175,191,163,207,223,0,0
2010 DATA 14,7,4,5,17,7,5,6,5,7
2020 DATA 6,3,5,7,5,6,3,7,8,6
2030 DATA 4,7,4,3,4,7,8,6,2,7
2040 DATA 10,6,3,7,4,3,3,7,10,6
2050 DATA 1,7,10,6,2,7,6,4,2,7
2060 DATA 10,6,7,7,30,6,1,7,30,6
2070 DATA 1,7,7,6,1,7,14,6,1,7
2080 DATA 7,6,1,7,7,6,2,7,12,6
2090 DATA 2,7,7,6,1,7,5,6,6,7
2100 DATA 8,6,6,7,5,6,1,7,2,4
2110 DATA 10,7,6,6,10,7,2,4,1,7
2120 DATA 1,4,11,7,2,4,2,7,2,4
2130 DATA 11,7,1,4,13,7,2,4,2,7
2140 DATA 2,4,12,7,12,1,3,0,2,1
2150 DATA 3,2,11,1,31,7,0,0,0,0
2160 DATA 176,2,176,2,185,2,193,2,176,2
2170 DATA 193,2,185,2,147,2,0,176,2,176
2180 DATA 2,185,2,193,2,176,4,170,4,0
2190 DATA 176,2,176,2,185,2,193,2,197,2
2200 DATA 193,2,185,2,176,2,0,170,2,147
2210 DATA 2,159,2,170,2,176,4,176,4,0
2220 DATA 159,3,170,1,159,2,147,2,159,2
2230 DATA 170,2,176,4,0,147,3,159,1,147
2240 DATA 2,133,2,125,4,147,4,0,159,3
2250 DATA 170,1,159,2,147,2,159,2,170,2
2260 DATA 176,2,0,159,2,147,2,176,2,170
2270 DATA 2,185,2,176,4,176,2,0,0,0
```



—BY RUTH NEBBIA

RADIO SHACK/*FLASHING FLAG*

TRS-80 Model III • 16K RAM



```
10 CLEAR 5000:DIM S$(9),SUM(5)
20 ST$="*     "
30 FOR X=1 TO 9
40 IF X/2=INT(X/2) THEN S$(X)="   "
50 FOR Y=1 TO 6
60 S$(X)=S$(X)+ST$
70 NEXT Y
80 NEXT X
90 FOR C=0 TO 5:READ SUM(C):NEXT C
100 FOR C=0 TO 5:S=0
110 FOR I=1 TO 12:READ A
120 S=S+A:NEXT I
130 IF S<>SUM(C) THEN PRINT "YOU HAVE MADE A TYPING ER
ROR ON LINE 2000 OR LINE";3000+10*C:END
140 NEXT C
150 RESTORE:FOR I=1 TO 6:READ A:NEXT I
160 FOR X=32000 TO 32071
170 READ A:POKE X,A
180 NEXT X
190 DEF USR 0=32000
200 CLS:FL=-1
210 FOR X=16383 TO 15552 STEP -64
220 IF FL=-1 THEN POKE 16383,65:FOR Y=0 TO 63:POKE X-Y
,PEEK(16383):GOSUB 1000:NEXT Y:GOTO 240
230 POKE 16256,191:FOR Y=63 TO 0 STEP -1:POKE X-Y,PEEK
(16256):GOSUB 1000:NEXT Y
240 FL=NOT FL:NEXT X
250 FOR X=1 TO 9:PRINT @128+X*64,LEFT$(S$(X),31);:NEXT
 X
260 GOSUB 1000:GOTO 260
1000 Z=USR 0((RND(26)+64)*256+((RND(26)+129) AND 207)+
1):RETURN
2000 DATA 627,1046,740,1191,974,1223
3000 DATA 205,127,10,34,70,125,6,0,14,3,33,0
3010 DATA 60,126,254,33,32,5,62,42,119,24,35,254
3020 DATA 42,32,5,62,33,119,24,26,254,65,56,22
3030 DATA 254,91,48,6,58,71,125,119,24,12,254,129
3040 DATA 56,8,254,192,48,4,58,70,125,119,5,35
3050 DATA 120,254,0,32,204,177,200,13,24,199,0,0
```

—BY JUSTIN GREENE

TEXAS INSTRUMENTS/*OLD GLORY*

TI-99/4A • 16K RAM • color TV or monitor optional • TI Extended BASIC

```
10 DIM NOTE(16):: CALL CLEAR :: CALL SCREEN(2):: TEMPO
=300
20 FOR X=1 TO 16 :: READ NOTE(X):: NEXT X
30 FOR X=1 TO 4 :: READ A$ :: MUSIC$=MUSIC$&A$ :: NEXT
 X
40 A$=RPT$("F",16):: CALL CHAR(40,A$)
50 CALL CHAR(48,A$):: CALL CHAR(56,A$)
60 CALL CHAR(64,"FFFFFFFFFFFF0000")
70 CALL CHAR(64,"FFFFFFFFFFFF0000")
80 CALL CHAR(72,"FFFFFFFF00000000")
90 CALL CHAR(80,"FFFF000000000000")
100 CALL CHAR(88,"FFFF000000000000")
110 CALL CHAR(96,"FFFFFFFFFFFF0000")
120 CALL CHAR(104,"18187EFF7E3C6681")
130 CALL CHAR(112,"80402010080400FF000005091121418182
848890A000003F00201008040201"):: CALL MAGNIFY(4)
140 CALL COLOR(2,7,7):: CALL COLOR(3,16,16)
150 CALL COLOR(4,5,5):: CALL COLOR(5,7,16)
160 CALL COLOR(6,16,7):: CALL COLOR(7,7,16)
170 CALL COLOR(8,5,16):: CALL COLOR(9,7,2)
180 CALL COLOR(10,16,5)
190 FOR X=1 TO 12 :: CALL HCHAR(X,1,56,16):: NEXT X
200 CALL HCHAR(13,1,88,16)
210 X=1 :: A=17 :: B=16 :: GOSUB 1000
220 FOR X=8 TO 15 STEP 7
230 A=1 :: B=32 :: GOSUB 1000
240 NEXT X
250 CALL HCHAR(22,1,40,32)
260 CALL HCHAR(23,1,96,32)
270 A=2 :: B=10 :: GOSUB 2000
280 A=3 :: B=9 :: GOSUB 2000
```

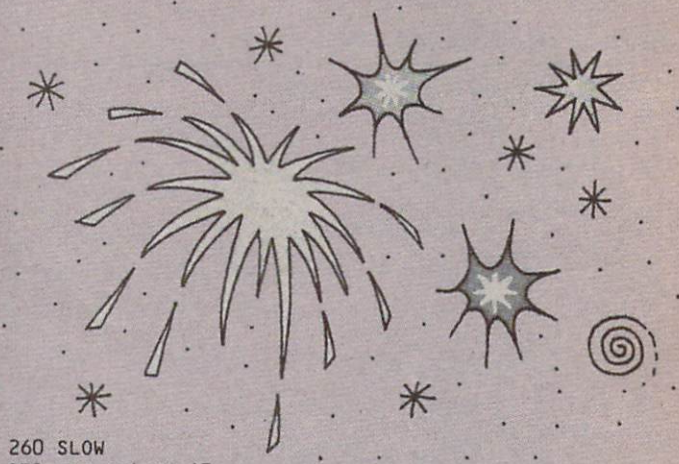
```
290 FOR X=1 TO 28
300 CALL SPRITE(#X,112,INT(RND*16)+1,INT(RND*192)+1,IN
T(RND*256)+1):: NEXT X
310 FOR INDEX=1 TO LEN(MUSIC$)-3 STEP 4
320 DR=VAL(SEG$(MUSIC$,INDEX,1))*TEMPO
330 TN1=NOTE(ASC(SEG$(MUSIC$,INDEX+1,1))-64)
340 TN2=NOTE(ASC(SEG$(MUSIC$,INDEX+2,1))-64)
350 TN3=NOTE(ASC(SEG$(MUSIC$,INDEX+3,1))-64)
360 CALL SOUND(DR,TN1,4,TN2,4,TN3,1)
370 NEXT INDEX
380 FOR T=1 TO 1000 :: NEXT T :: CALL DELSPRITE(ALL)::
 GOTO 290
1000 IF X=8 THEN Y=17 :: Z=16 ELSE Y=A :: Z=B
1010 CALL HCHAR(X,Y,40,Z):: CALL HCHAR(X+1,Y,64,Z)
1020 CALL HCHAR(X+2,Y,48,Z):: CALL HCHAR(X+3,Y,72,Z)
1030 CALL HCHAR(X+4,Y,40,Z)
1040 CALL HCHAR(X+5,A,80,B):: CALL HCHAR(X+6,A,48,B)
1050 RETURN
2000 FOR X=A TO B STEP 2 :: FOR Y=A+1 TO B+3 STEP 2
2010 CALL HCHAR(X,Y,104,1)
2020 NEXT Y :: NEXT X :: RETURN
3000 DATA 196,247,262,277,294,311,330,349
3010 DATA 370,392,440,494,523,554,587,659
4000 DATA 2BEJ3CGJ1ACG2ACG2DGJ3EHJ1ABE2ABE2ABG2BEH2BEJ
2EHK2FJL2CGJ2DGJ2EHJ
4010 DATA 2BEJ3CGJ1ACG2ACG2CGJ3BEJ1ABE2ABE2EJO2EJN2EJO
2KMP2EIK2JLO2ILO2HLO
4020 DATA 2EHJ3JMP1JMP2JMO2GJM3EHM1EHL2EHL2GJM2ELO2GJL
2EHK2EHJ2GJM2HJM2JJM
4030 DATA 2GJM3HKM1CHK2CHK2EHM3GJM1CGJ2CGJ2JJJ2KKK2MMM
2JJJ2JLO6CGM
```

—BY MARK PRENTY

TIMEX SINCLAIR/*DECORATION OF INDEPENDENCE*

1000 or 1500 • 16K RAM

```
9 REM --THE ORIGINAL 13 COLONIES APPEAR IN THE ORDER T
HAT THEY ENTERED THE UNION, FOLLOWED BY THE FLAG OF TH
E 13 COLONIES. PRESS ANY LETTER TO SEE IT ALL AGAIN.--
10 FAST
20 DIM B$(30)
30 DIM G$(30)
40 DIM S$(12)
50 DIM C$(13,14)
60 LET C$(1)="DELAWARE"
70 LET C$(2)="PENNSYLVANIA"
80 LET C$(3)="NEW JERSEY"
90 LET C$(4)="GEORGIA"
100 LET C$(5)="CONNECTICUT"
110 LET C$(6)="MASSACHUSETTS"
120 LET C$(7)="MARYLAND"
130 LET C$(8)="SOUTH CAROLINA"
140 LET C$(9)="NEW HAMPSHIRE"
150 LET C$(10)="VIRGINIA"
160 LET C$(11)="NEW YORK"
170 LET C$(12)="NORTH CAROLINA"
180 LET C$(13)="RHODE ISLAND"
190 FOR F=1 TO 30
200 LET B$(F)=CHR$ 128
210 LET G$(F)=CHR$ 8
220 NEXT F
230 FOR F=1 TO 12
240 LET S$(F)=CHR$ 128
250 NEXT F
```



```
260 SLOW
270 FOR F=1 TO 13
280 PRINT AT 21,10;C$(F)
290 LET R=RND*20+5
300 FOR H=20 TO 5 STEP -1
310 PRINT AT H,R;CHR$ 133;AT H,R;CHR$ 0
320 NEXT H
330 PRINT AT 4,R;CHR$ 128;AT 3,R-1;CHR$ 134;AT 5,R-1;C
HR$ 6;AT 3,R+1;CHR$ 6;AT 5,R+1;CHR$ 134
340 CLS
350 NEXT F
360 PRINT AT 5,0;
370 FOR F=1 TO 6
380 PRINT B$
390 PRINT G$
400 NEXT F
410 PRINT B$
420 PRINT AT 6,0;
430 FOR F=1 TO 6
440 PRINT S$
450 NEXT F
460 PRINT AT 5,6;CHR$ 155;AT 5,5;CHR$ 155;TAB 7;CHR$ 1
55;AT 6,4;CHR$ 155;TAB 8;CHR$ 155;AT 7,3;CHR$ 155;TAB
9;CHR$ 155;AT 8,3;CHR$ 155;TAB 9;CHR$ 155;AT 9,4;CHR$
155;TAB 8;CHR$ 155;AT 10,5;CHR$ 155;TAB 7;CHR$ 155
470 PRINT AT 21,7;"HAPPY FOURTH OF JULY"
480 IF INKEY$="" THEN GOTO 480
490 CLS
500 GOTO 270
```

—BY AL DRAYTON

ATTENTION, PROGRAMMERS!

Aching to share your latest and greatest program with the rest of the world? Well then, send it along to K-POWER*! If we like it, we'll publish it and send you $50 for programs between 10 and 50 lines, and $20 for those under 10 lines. Send a disk or tape containing two copies of your program(s), plus a printout to: Hacker Heaven, c/o* K-POWER*, 730 Broadway, New York, NY 10003. We also need your name, address, age, phone number, computer model, program title with brief description, computer language, and the memory required. If you want your program returned, enclose a stamped, self-addressed mailer.* K-POWER *can't assume responsibility for the loss of, or damage to, any unsolicited materials.*

Illustration: Gene Williams

Photo: Courtesy of SELF Magazine

COMPUTERS HELP ATHLETES GO FOR THE GOLD

When Olympic athletes thank their coaches for strong leadership, they could be thanking a computer, too!

BY BOB CONDOR

Photo: Tony O'Brien/Picture Group

Rebecca Twigg started cycling for the fun of it. And Becky Liggett took up archery at the age of 9 to keep her dad company on bow-hunting trips. Back then, neither of these athletes thought the Olympics *or* computers would be part of their future. But they are!

Rebecca and Becky aren't alone. Computers and a technique called "digitization" have popped up all over the Olympic scene. Many athletes participating in the XXIII Olympic games in Los Angeles have adjusted their dive, altered their spike style, or changed their stride on a computer's advice. We asked Rebecca and Becky to tell us what computers have done for them.

Photo: Joseph Daniel

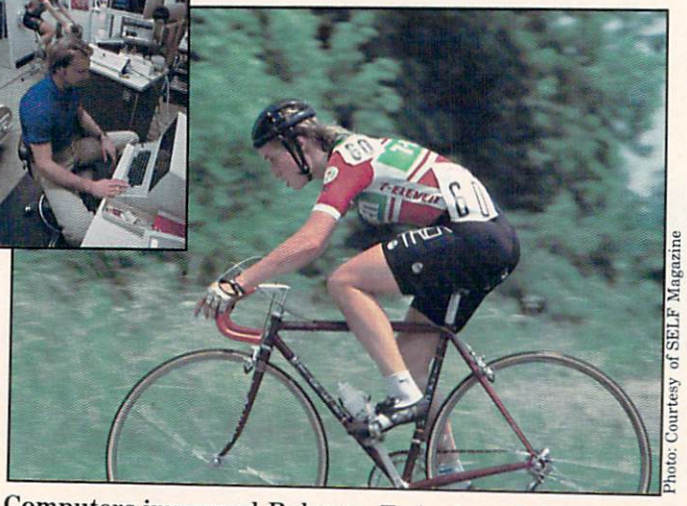


Photo: Courtesy of SELF Magazine

Computers improved Rebecca Twigg's pedal power!

One day, Rebecca Twigg realized she could ride her bike faster than anybody in her Seattle neighborhood. In fact, she'd race passing cars to see if she could keep up! (She could.) At 14, she borrowed a racing bike and won two state titles in the intermediate class. A star was born. (The star didn't know anything about computers—yet.)

In the summer of 1981, 18-year-old Rebecca stunned the bicycle-racing world when she beat three-time champion Connie Carpenter in the finals at the National Cycling Championships. In '82, she took two national titles in the U.S. and won a Gold Medal at the World Championships in England.

Then in early '83, Rebecca started working with a computer. Researchers at Penn State University and sports biomechanist (and former racing cyclist) Peter R. Cavanagh used digitization and a specially designed laboratory bicycle to analyze Rebecca's cycling style.

Digitization combines high-speed film and computer graphics to analyze precise human movement *(see "How Digitization Works").* Force-sensitive pedals measured the size and direction of Rebecca's foot strokes. (The wired pedals, equipped with "potentiometers" to measure pedal angles, cost $2,000

apiece and feed more than 2,000 bits of information per second into the computer terminals.)

These computerized methods gave Rebecca printouts and screen displays that showed how she'd do in a simulated race. The computer showed that her left leg was about 20 percent stronger than her right leg. Based on the results, Rebecca adjusted where she put her cleated feet and began weight training to correct her pedaling.

Rebecca didn't mind having a computer coach her a bit. "In this day and age an athlete would be making a mistake not to take advantage of computer analysis," she said. "I don't think it can take the place of a coach because there's so much mental preparation in cycling. But I do think the computer can help pinpoint problems."

The coachlike qualities of computer analysis also helped 19-year-old archer Becky Liggett identify some flaws in her shot. Like Twigg, Becky is hopeful the computer's adjustments will help her bring home some heavy metal from L.A.

Becky was something of a teenage phenomenon in Muncie, Indiana. She started competing when she was 9 years old and won five national junior titles before she was 18. In her first year of seniors competition, Becky finished second at the Championships of the Americas meet and was ranked third nationally.

But then Becky stopped winning consistently. In 1983 she didn't make the national team. So, early this year she turned to a computer for help at a pre-Olympic training camp.

At the camp, Becky was tested on a "force platform" during target practice. The platform used computerized sensors and a series of high-speed cameras to measure Becky's horizontal and vertical movement during the final second before a shot. Feedback from the computer showed Becky how well she was able to hold a steady and true aim at the bull's-eye—an important moment for an archer.

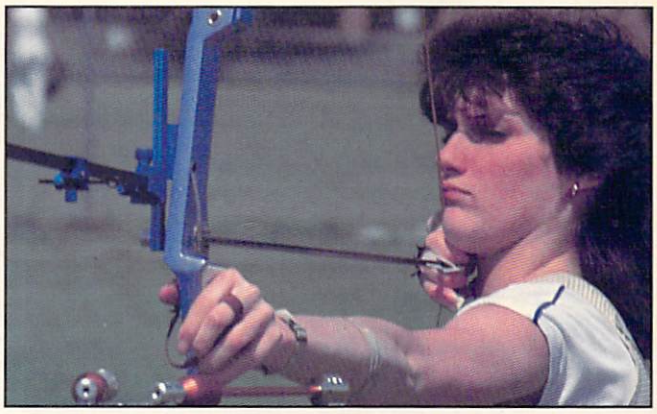


Photo: Tony O'Brien/Picture Group

Archer Becky Liggett takes aim.

"A person just trying to stand still moves more than we do when we aim!" Becky said. "So it's helpful to have the computer detect minor deviations." After each shot, the computer would churn out data telling Becky whether she leaned forward, backward, or sideways.

"There's no way to see such weight distribution on film or even feel it yourself," Becky explains. "The naked eye simply can't detect it. The computer showed me how I was doing and I worked at being more consistent at my best weight distribution.

"Before computers were used for archery, everybody looked at your form. If you didn't shoot a certain way, then you weren't shooting 'right.' And my style varies from the conventional archer's form. But today the emphasis is on consistency, something the computer can show us." **k**

BOB CONDOR *is managing editor of* Sportswise *magazine. He wrote "Break into the Big Leagues" for the May* K-POWER.

How Digitization Works

We won't know until the summer Olympics are over whether the popular new sports trio—athletes, coaches, and computers—has what it takes to go for the Gold. What we do know is many Olympic teams—including the American women's volleyball team—swear by digitization.

Here's how it works:

1. The athlete's motions are recorded by high-speed cameras placed at different angles. Film speeds range from 100 to 10,000 frames per second.

2. The computer records all the info generated by the motion and translates it onto the screen.

3. The digitizer (which uses electromagnetics), microphones, and sonic pens create a stick-figure graphic of the athlete in motion.

4. Trained researchers manipulate the stick figure until it moves without a flaw. Then the athlete is shown how to move to come as close to achieving this perfection as possible.

—BECKY PETERSEN AND MINDY PANTIEL

GET FIT WITH A DISK

While Olympic superstars break world records, score perfect 10s, and flex muscles, what will you do? You could lie in front of the TV with a box of fudge cookies and a bag of Fritos, and watch the fit Olympians. Or, you could use your computer to work out. Here are some software packages promising to transform your junk-food body into tomorrow's Bruce Jenner.

Aerobics: Jump into shape with an animated instructor who leads you through a real workout.
MANUFACTURER: Spinnaker Software, (617) 868-4700
HARDWARE REQUIREMENTS: Atari Home Computers, 48K (disk); Commodore 64 (disk). Versions planned for Apple and IBM.
SUGGESTED RETAIL: $44.95

The Aerobics Master: Log your exercise habits onto this program and find out how to get the most out of your workouts. This program can analyze running, walking, bicycling, swimming, racquet sports, and jumping rope.
MANUFACTURER: Free Lance Ink, (313) 280-2634
HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk).
SUGGESTED RETAIL: $24.95

The Fitness Game: Monitor your pulse or count each step of your run with a heart/exercise module attachment.
MANUFACTURER: BioTechnology, (800) 327-1033
HARDWARE REQUIREMENTS: Apple II/II plus/IIe/III, 64K (disk); TI-99/4A, 64K (disk). Versions planned for Commodore and IBM.
SUGGESTED RETAIL: $99.95 (extra module $49.95)

The Running Log: Run around the track, then dash home to plug your running log into your computer. Log up to 14 different factors onto this program, and it will analyze your progress.
MANUFACTURER: Marathon Software, (406) 933-5783
HARDWARE REQUIREMENTS: IBM PC/PC*jr*, 64K (disk).
SUGGESTED RETAIL: $39.95

The Running Program: Determine your current physical fitness level with extensive tests, and this program will prescribe a personalized running schedule for you.
MANUFACTURER: Micro Educational Corp. of America (MECA), (203) 222-1000
HARDWARE REQUIREMENTS: IBM PC, 128K (disk).
SUGGESTED RETAIL: $79.95

RATE THE OLYMPIANS

If you want to compare the performances of athletes, nations, or hot dog vendors at the Olympics, give one of these bar graph programs a try.

COMMODORE/*RATE THE OLYMPIANS*

Commodore 64 • color TV or monitor optional

```
10 DIM A$(10),S(10),C(6):POKE 53281,0:POKE 53280,0
20 C(1)=5:C(2)=28:C(3)=30:C(4)=156:C(5)=158:C(6)=159
30 PRINT CHR$(147);"HOW MANY COUNTRIES, ATHLETES, ETC.
,":PRINT "(UP TO 10) DO";
40 INPUT " YOU WANT TO CHART";N:IF N<1 OR N>10 THEN 20
50 FOR X=1 TO N:PRINT CHR$(147);"INPUT NAME OF ENTRANT
 #";X:INPUT A$(X)
60 PRINT "INPUT SCORE FOR ENTRANT #";X:INPUT S(X)
70 NEXT X:MX=S(1):FOR X=2 TO N:IF S(X)>MX THEN MX=S(X)
80 NEXT X
90 PRINT CHR$(147);:PRINT TAB(10);"SCALE: FROM 0 TO";M
X:PRINT:FOR X=1 TO N
100 PRINT CHR$(5);LEFT$(A$(X),10);TAB(10);CHR$(18);CHR
$(C(X+(X>6)*6));
110 IF S(X)>0 THEN FOR Y=1 TO INT(S(X)/MX*28):PRINT "
";:NEXT Y
120 PRINT CHR$(146):PRINT:NEXT X:END
```

TEXAS INSTRUMENTS/*RATE THE OLYMPIANS*

TI-99/4A • 16K RAM • color TV or monitor optional • TI Extended BASIC

```
10 DIM A$(10),S(10):: FOR X=9 TO 14 :: CALL CHAR(24+8*
X,RPT$("F",16)):: CALL COLOR(X,2*X-14,1):: NEXT X
20 CALL CLEAR :: PRINT "HOW MANY COUNTRIES,","ATHLETES
, ETC., (UP TO 10)","DO YOU WANT TO CHART";:: INPUT N
30 IF N<1 OR N>10 THEN 20
40 FOR X=1 TO N :: CALL CLEAR :: PRINT "INPUT NAME OF
ENTRANT #";X :: INPUT A$(X):: PRINT "INPUT SCORE ";
50 PRINT "FOR ENTRANT #";X :: INPUT S(X):: NEXT X
60 MX=S(1):: FOR X=2 TO N :: IF S(X)>MX THEN MX=S(X)
70 NEXT X :: CALL CLEAR :: CALL SCREEN(16)
80 PRINT TAB(6);"SCALE: FROM 0 TO";MX :: PRINT
90 FOR X=1 TO N :: PRINT SEG$(A$(X),1,5);TAB(7);:: IF
S(X)<=0 THEN 110
100 FOR Y=1 TO INT(S(X)/MX*22):: PRINT CHR$(88+X*8+(X>
6)*48);:: NEXT Y
110 PRINT :: PRINT :: NEXT X
120 GOTO 120
```

K-POWER PICKS

SUMMER GAMES FOR JOYSTICK JOCKS

If Jim McKay and all the commercials get on your nerves during this summer's Olympic coverage, why not switch your TV to computer mode and boot up the next best version of the real thing? *Hes Games '84* by HesWare and *Summer Games* by Epyx are blazing trails in sports simulation.

K-POWER got a close up look at preview versions of the Olympic games and gave them high scores for terrific graphics, quick action, and thrills. They're truly a joystick jock's delight.

Hes Games '84 covers six events: weight lifting, archery, the 100-meter sprint, the long jump, springboard diving, and the 100-meter hurdles. We took a shot at a couple of them. The challenge in each of these activities is to beat preset records or the scores set by your fellow Olympians.

In weight lifting, you control one of five different athletes and perform two lifts—the clean and jerk, and the two-hand snatch. There's more to this brawny sport than brute strength. Just like real life, timing is the trick.

The archery event has you looking through the eyes of one of five different archers. Aim at four targets placed at various distances.

The 100-meter sprint is a real wrist blisterer. Snap your joystick left to right over and over again to keep your runner dashing down the track. You might even work up a sweat. Heavy-duty joysticks are definitely a must.

All of the *Hes Games* we sampled had great graphics and many details that really added to the overall feel and authenticity. In weight lifting, for instance, the weights actually grow in size as you add to the amount your lifter is pressing.

Talk about great graphics—*Summer Games'* events are so realistic it's almost like watching them on TV! And there's something for everyone.

Like *Hes Games*, you barely have to touch the keyboard at all in *Summer Games*. The joystick is key. The high dive is a special treat. Push the joystick in any of four directions, and your diver will do a somersault, half-pike, pike, or straighten out. Try a few directions, and he'll try to pull off a tricky combination. Seven picky judges rate your performance, and the computer totals your final score, even calculating the degree of difficulty of the dives you've attempted. You'll howl in agony as your athlete tries his first few dives and winds up doing a nasty belly-flop.

The disk is stuffed with other events. There's a four-man relay in which your joystick controls the amount of energy each runner puts out. In a gymnastics event you try to vault over a horse. Skeet shooting tests your aim and timing like a first-rate arcade game. There's also a swimming sprint, swimming relay, pole-vault, and 1200-meter dash.

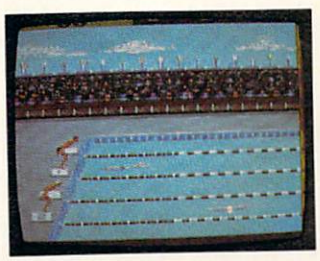
Both Olympic-simulation programs are classy products—sure to steal a few fans from the real thing—at least during the commercial breaks.

Hes Games '84 is available for Commodore 64 (disk) from HesWare: (415) 468-4111. $39.95.
Summer Games is available for Commodore 64 (disk), and Apple II/II plus/IIe, 48K (disk). Versions planned for Atari 400/800/XL series, 32K (disk); Coleco ADAM (cartridge); and IBM PC/PC*jr*, 64K (disk). Contact Epyx, (408) 745-0700. Approx. $40. k

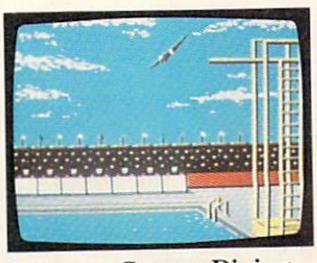
—JOHN WALLACE AND MICHAEL TUOMEY

Hes Games '84: **Weight lifting**

Hes Games '84: **Archery**



Summer Games: **Swimming Relay**



Summer Games: **Diving**

Screen Shots: William Gallagher

IBM PC*jr*:

A HANDS-ON REVIEW

BY KAARE CHRISTIAN

PC*jr* may be smaller and lower priced than its big PC brother, but IBM has packed a lot of computing power into its compact shell. The expanded version, with a suggested retail price of $1,269, gives you what amounts to a petite PC, with sharp graphics and sound capabilities, and sizable memory—all for about $1,000 less than the PC.

The entry-level PC*jr* has a $669 price tag. It's equipped with two cartridge slots, a keyboard, a central processing unit, and 64K of memory. You have to pay another $600 to store your programs on a disk drive, and run many of the sophisticated software packages available. This review is based on the more advanced expanded version.

GETTING DOWN TO THE BASIC

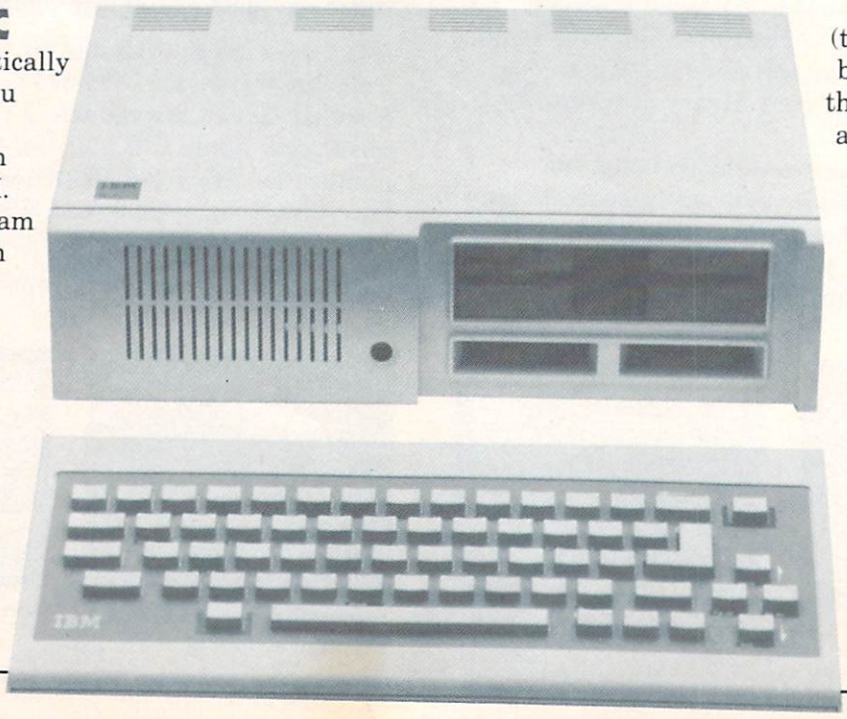
BASIC is automatically operational when you power up the PC*jr*, because it's stored in the computer's ROM. You're able to program simple graphics such as lines, points, rectangles, and sounds (you can determine frequency, duration, and volume), and store them on cassette.

For an extra $75, the Cartridge BASIC lets you use the disk drive to store programs that are a lot more sophisticated. (You only can use a cassette with the built-in BASIC.) Sophisticated commands like PAINT and CIRCLE let you take full advantage of the *jr*'s impressive graphics and sound capabilities.

Serious programmers definitely should buy the extra-powerful Cartridge BASIC.

One of PC*jr* Cartridge BASIC's unique offerings is its TERM (terminal emulation) statement. Type in TERM and you can enter a simple telecommunications mode that lets you communicate with other computers through an internal modem. The modem costs an extra $199. A simple telecommunications program on the PC sampler disk that comes with the computer also lets you hook up to bulletin boards and friends' computers.

The expanded PC*jr*: system unit with disk drive and 128K RAM, plus detachable keyboard.



A HOLE IN THE NEW MACHINE

Though its BASIC may be beautiful, the PC*jr* keyboard just doesn't quite cut it.

The concept of a remote-control keyboard is a good one. In theory, you're supposed to be able to type in a program from the comfort of your couch. But when it comes right down to it, you'll miss lines and get glitches unless you make sure the keyboard is aimed directly at the infrared optical outlet. I preferred to use the connector cable—that way I didn't have to worry about making sure the keyboard was in the direct line of the computer's "vision."

As for the keyboard itself—if you'd spent only $99 on the PC*jr*, you might expect its cheap-feeling "Chiclet"-style keys. But this is IBM!!

When you switch software, you replace overlays (templates) on the keyboard to indicate what the keys' new functions are. The templates are meant as a convenience, but I found the markings, located above each key (and often hidden from view), difficult to read and practically illegible in dim light.

Unlike the PC's, the *jr*'s keyboard doesn't have enough keys to generate all of the different codes and functions. You'll often have to

press one or two extra keys in order to produce some of the commands and codes available on the PC. Touch typists, or programmers who like to key in their creations at lightning-quick speed, may not like the added keystrokes, or the sluggish feel.

Third party manufacturers have already come out with their own PC*jr* keyboards, which should do away with these key concerns.

PICTURE (AND SOUND) PERFECT

I've connected a lot of home computers to my eight-year-old color TV over the past few years. The *jr*'s picture was the best of the lot. The TV output and antenna switch are well designed so there's no display noise and interference. I preferred the 40-column display, although the 80-column display (available with expanded memory) was clear, too. Don't try setting your monitor or TV on top of the base unit. The only thing you'll get will be one of those frustrating disk error messages.

ALL IN ALL

With a few exceptions (such as the weird problem about monitor placement and the toylike keyboard), both entry-level and expanded versions of the PC*jr* are good, extremely well-engineered machines.

The entry-level model doesn't have that much to offer now. You can't do a whole lot without a disk drive. Also, at last count, there were only four game cartridges available (*Mouser*, in particular, is excellent!), although more software companies are sure to join in the fun.

The expanded version's another story. With it, you can use the powerful disk operating system, DOS 2.1, which is made by IBM, and you can run many of the programs created for the PC as long as they meet *jr*'s memory and disk-drive requirements. You can program in rich color and sound. Plus, Big Blue (as IBM is sometimes called) has lined up companies like Sierra On-Line and Spinnaker to publish additional software. k

KAARE CHRISTIAN *is a programmer and computer scientist at Rockefeller University in New York City.*

FOR HACKERS ONLY

From a technical standpoint, the original IBM PC was hot, thanks to the ideas that IBM lifted from the rest of the industry. It borrowed the idea of open hardware architecture, popularized by Apple. And it adapted Digital Research's 8-bit CP/M operating system. It was a blend of the best ideas from early micros and those famous three initials that made for a big hit.

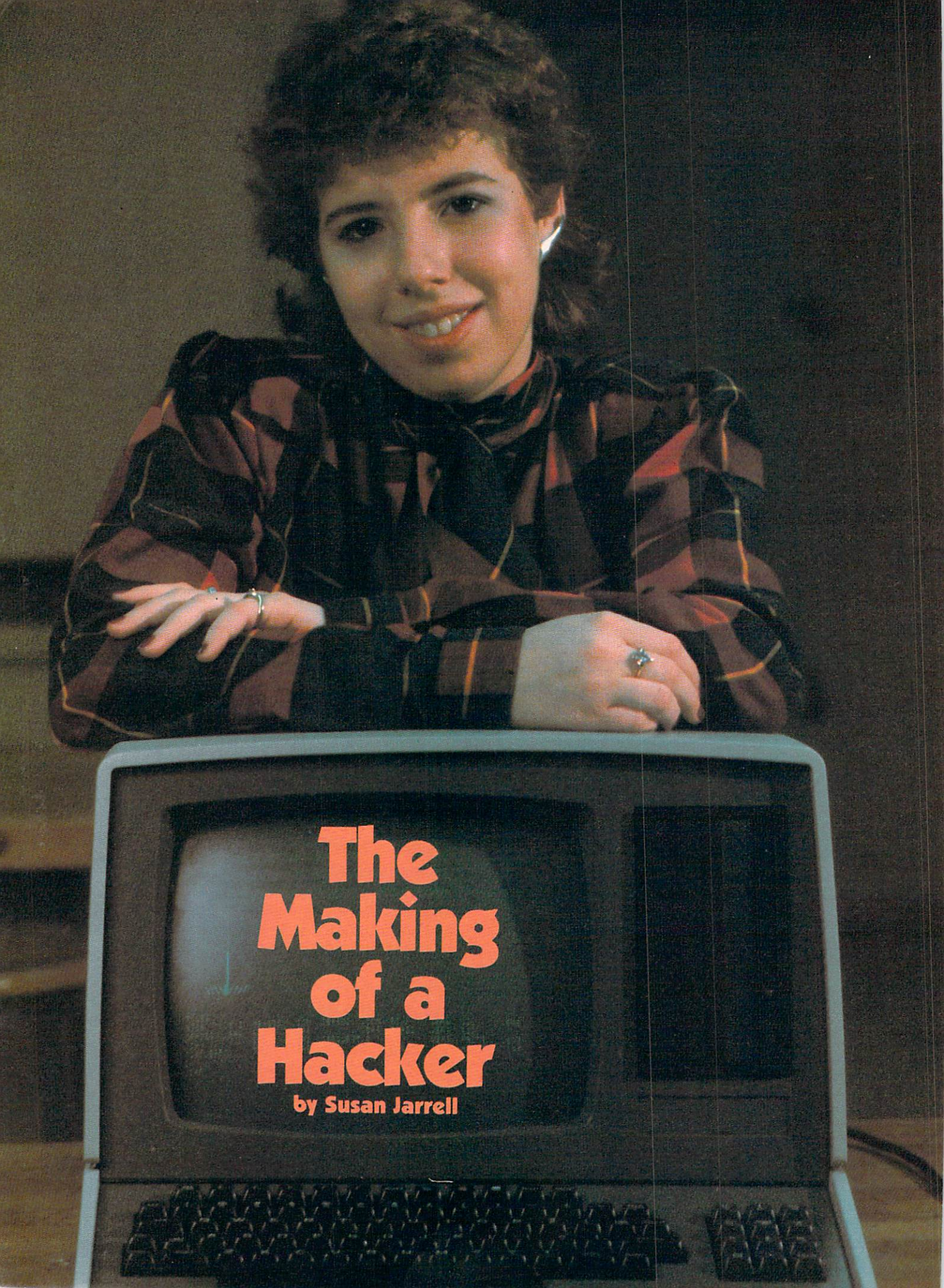
When it comes right down to it, the PC*jr*'s a more revolutionary machine than the PC. The cordless keyboard, though it still needs a little work, has never been tried out on a computer for family use.

At the heart of the *jr* is the same Intel 8088 microprocessor chip found inside the PC. Because of its 16-bit ALU (arithmetic/logic unit), it can perform arithmetic calculations faster than other chips such as the 6502 used in the C 64 and Atari computers. That makes it a better chip (and the *jr* a better machine) for programming, too. The 8088 can handle up to 640K of memory. At this point, *jr* can't handle any more than 128K. But you can bet that there will be third-party manufacturers vying to come out with ways to expand the system further.

As for speed, using the potential memory will be faster thanks to the 20-bit addressing capacity of the 8088. After keying in a few demo programs, I estimated that the *jr* runs about 20 percent slower than the PC, but outpaces the other home computers on the market. IBM reports that programs in ROM function slightly faster than those for the senior PC. Because the disk drive is a higher density machine than the Atari, Commodore, and Apple drives, floppy operations are a lot faster, too.

VITAL STATS:

MEMORY: 64K RAM (entry-level model); 128K RAM (expanded version)
USER MEMORY AVAILABLE IN BASIC: 44K (entry-level model); 64K (expanded version)
VIDEO DISPLAY: TV, Composite Video, RGB monitor
DISPLAY MODES:
TEXT: 40 characters (80 with 128K RAM) × 25 lines
GRAPHICS: 160 × 200/16 colors (w/Cartridge BASIC); 320 × 200/4 colors (16 w/128K RAM & Cartridge BASIC); 640 × 200/2 colors (4 w/128K RAM and Cartridge BASIC)
SOUND: 3 voices (7 octaves, 16 volume levels), 1 beep channel, 1 noise channel
KEYBOARD: 62 "Chiclet" keys, unmarked
SUGGESTED RETAIL PRICE: $669 (entry-level model); $1,269 (expanded version)



The Making of a Hacker

by Susan Jarrell

A computer illiterate enrolls in a high school computer program and turns into a full-fledged hacker.

Talk about a nontechnical person: Three years ago, Andrea Leptich could barely change a light bulb! Today, at 18, she's building, operating, and repairing computers—and loving it!

Andrea's metamorphosis began when she enrolled in the Computer Centered Technology (CCT) program at Roosevelt High School in Chicago, Illinois. She was in ninth grade and didn't know the first thing about computers. After a teacher suggested the class, she decided to give it a shot. "I remember regretting signing up for CCT on my first day of class," Andrea says. "As my footsteps were echoing down the long corridor, I was thinking, 'Oh, no! What have I gotten myself into?' "

But Andrea's first-day jitters were also her last. Today she's still in the program and has managed to sift through almost four years of technical information.

Books and Blips

Andrea began her computer education at the very beginning. She learned about computer switching mechanisms, memory banks, programming, and data processing. Although Andrea has tackled Ohm's Law and some very technical terms, she still calls herself "a typical student." She says, "I don't catch on fast, but I also don't forget. Electronics is not a natural talent, although some people are more inclined than others to grasp ideas fast. The field is always changing. Even Mr. Olson, my CCT instructor, has to constantly read and study to keep up with the field."

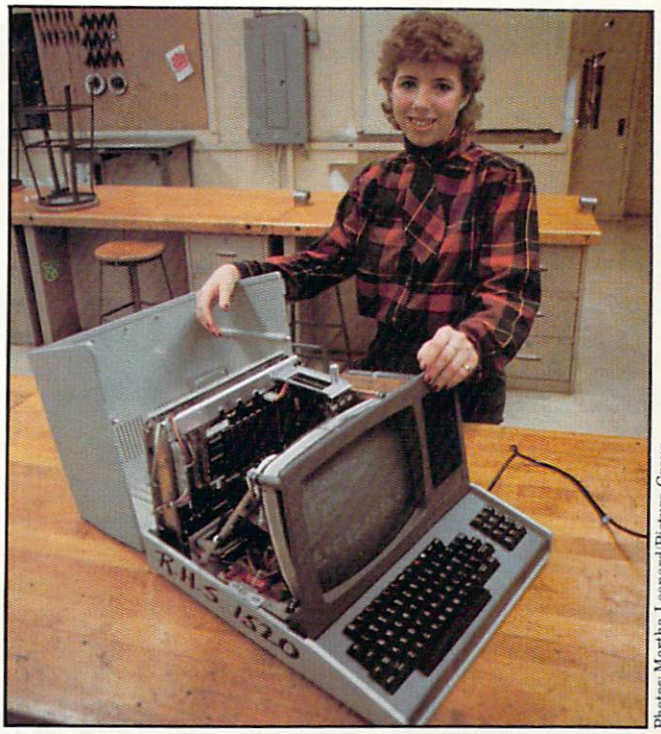
Learning about computers has helped Andrea in other subjects, too. "I've learned how to find answers on my own. I really think that anyone can learn about computers if they try," she says.

Andrea's dad, who repairs elevators, also recognizes that the electronics field is always changing. "My dad and I have a game where we quiz each other and compare elevator parts to computer parts. This game helps us both brush up on new systems," Andrea points out.

Hacker Helper

Last year, Andrea and her class partner built a Heathkit/Zenith 89, an integrated 50 model with a terminal, disk drive, and video monitor in one unit. It took Andrea's classmates up to 100 hours to build each Heathkit.

But building the computers wasn't just an exercise in technology. The computers are helping Roosevelt High School save money and are being used in business education for word processing, in classrooms, in counseling offices, and in the teachers' lounge for grade handling. In fact, Andrea plans to loan the computer she built to a former science teacher.



Photos: Martha Leonard/Picture Group

Andrea shows off the computer she built.

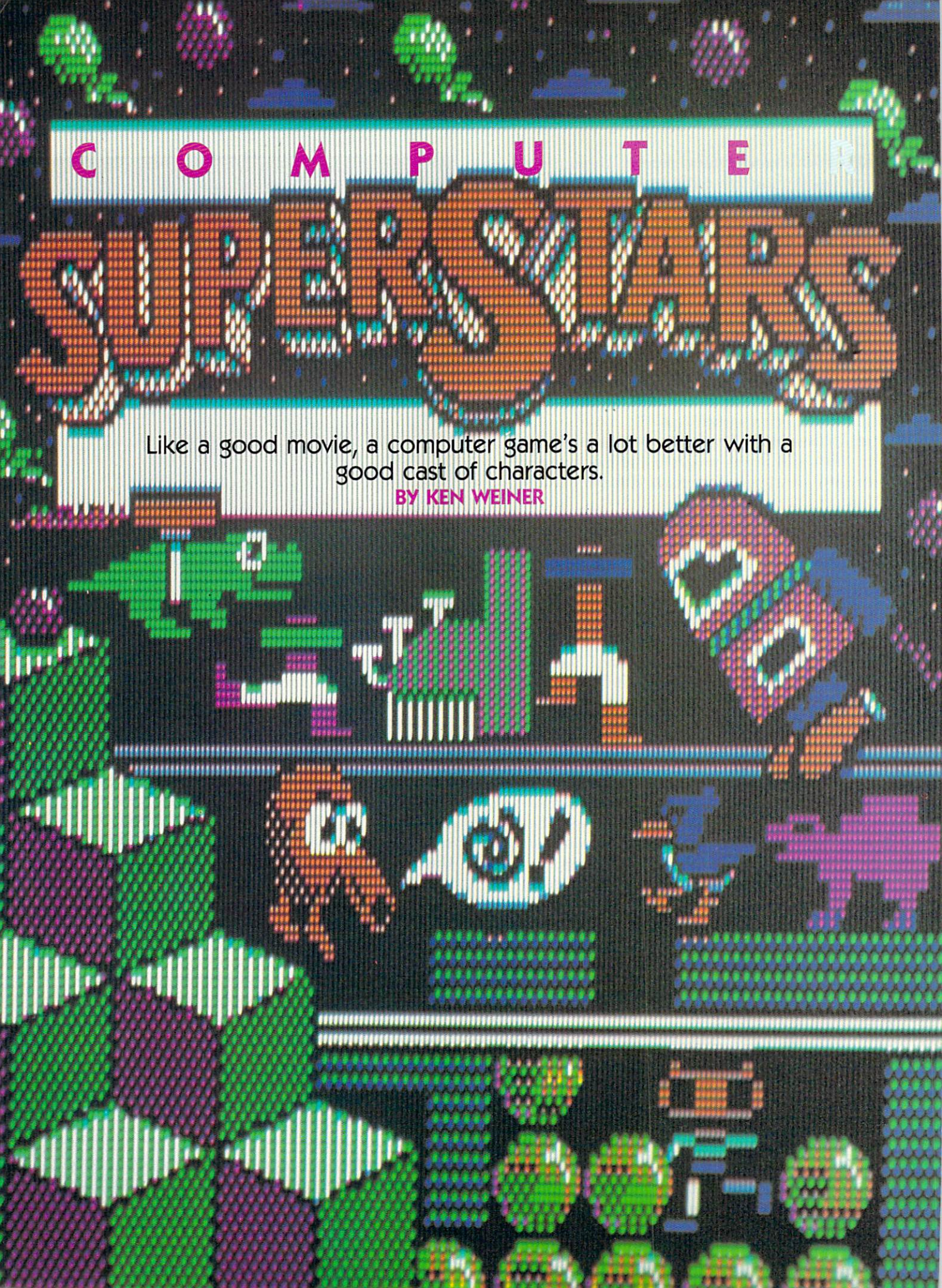
The school administrators at Roosevelt High School are thrilled with Andrea and her class. It costs $1,200 to make a Heathkit computer and $2,600 to buy a similar one. Multiply that savings by the 30 computers the CCT students have built, and add the $7,000 the students have saved the school in service charges so far. You can see why the administrators are happy. Andrea's class has saved the school almost $50,000!

Eye-Opening Class

"The class has opened my eyes to technology," says Andrea. "I used to take it for granted, but now I walk by hall switches and strands of Christmas-tree lights and wonder how they work."

A funny thing happened along the way. Since starting the computer program, Andrea has been going into computer stores and shocking salespeople by talking like a hacker. Now she has realized something. She isn't just talking like a hacker—she *is* a hacker. And she plans to remain one.k

SUSAN JARRELL *has written about computers for* Electronic Learning *and other Scholastic publications.*



Like a good movie, a computer game's a lot better with a good cast of characters.

BY KEN WEINER

You'll probably think I'm a little strange, but I really identify with the characters in computer games. When *Pac-Man* arrived, I gained 20 pounds. After playing *Donkey Kong* a while, I grew a moustache, wore suspenders, and hung out at the zoo. Don't get me wrong. I'm not just weird. Fact is, I score a lot higher when I believe it's *me*—and not just some two-dimensional pixel pattern on the screen—fleeing the falling rocks, death rays, fanged beasts, and other computer-game dangers.

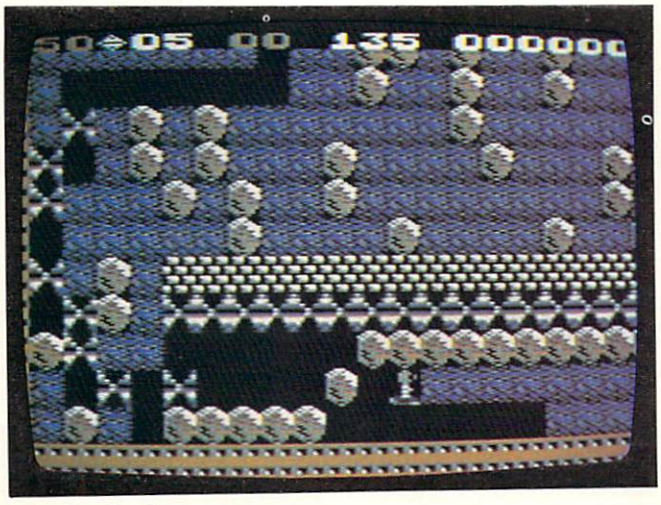
Computer games have come a long way since those classics. Now my imagination doesn't have to work so hard. Graphics and sound effects have become more complex. So have the characters. Like a good movie, a computer game with outstanding characters gets you personally involved.

CELEBRITY STATUS

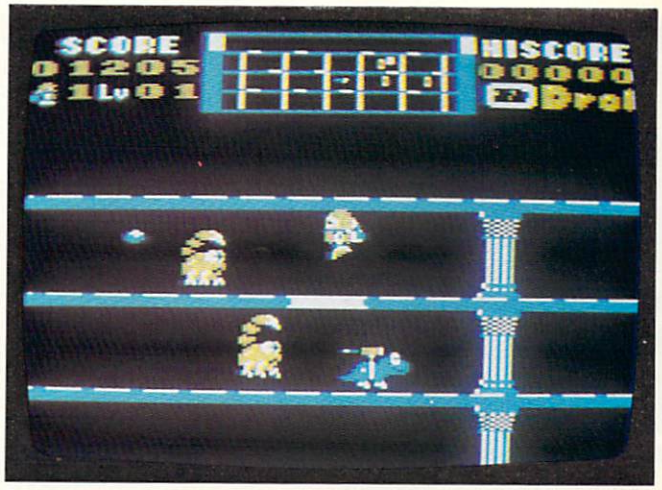
Some characters are so real you could swear they have lives of their own. Some even develop cult followings and show up on all sorts of buttons and T-shirts. Pac-Man, of course, was the first popular computer game personality. At first, he was only a simple yellow shape with a huge appetite. But people wanted more, so he was given a personality in his very own cartoon series. Next came a cereal named after him, and even (so I'm told) a home in Beverly Hills!

The folks behind computer games soon realized what a good character could do for a game. Take Q*bert. He could have been a boring geometric shape and the game would have been just as challenging. Instead, someone decided he should have two big feet, look cute like a koala bear, and swear when something runs into him. It may not be much, but it's enough to give the game a whole added dimension—*Q*bert* comes alive.

It's even fun to imagine what Q*bert does when



Boulder Dash



Drol

he's not flying around on pizzas or being chased by nasty coiled snakes. Does he live in a cave? Does he have a family? Maybe there's even a tribe of Q*berts living in the jungles of Guatemala, climbing Mayan pyramids!

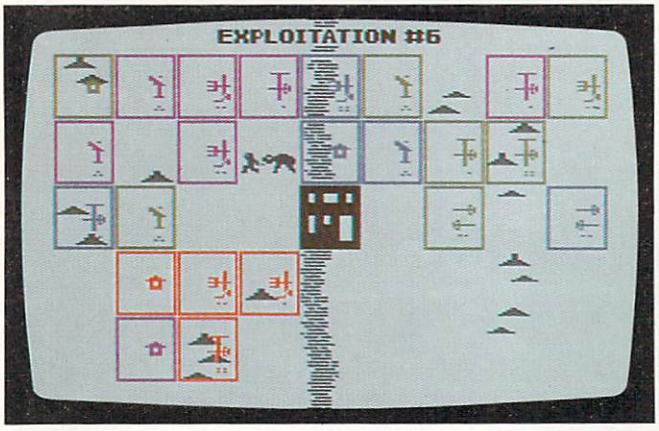
HEROES AND VILLAINS

A lot of people are raving about a game called *Boulder Dash*. It's got hot arcade-quality graphics, great sound effects, a lot of action and (best of all!) Rockford. Rockford's a funny-looking little bug who's crazy about jewels. He tears through all sorts of trouble to get them. You can't help but get a kick out of him. Besides, who could fail to identify with a little guy who races through dirt, dodging falling boulders and killer insects as if he were late for class? He's even restless. Delay moving your joystick too long and he blinks his eyes and taps his foot impatiently.

Some game characters are true heroes. Take the astronaut in the arcadestyle game *Drol*, for instance. With the help of a jetpack, he flies through a maze trying to rescue a family from the clutches of an evil Witch Doctor and his henchmen. What a guy! The family he's trying to save completely ignores him and even bungles his rescue attempts. Still he searches on, firing away at the hideous assortment of deadly creatures that roam the hallways in front of him. They don't make heroes like *that* anymore.

Then there are the bad guys. The "Zerks" in *Spare Change* are actually stupid, silly, clumsy goons. As the owner of an arcade, you've got your hands full trying to keep these nuts from stealing all your tokens. They just can't resist talking on the phone, eating popcorn, and dancing to a nearby jukebox. You're forced to subsidize their bad habits in order to keep them from stealing your money.

Computer-Generated Art: Lauretta Jones



M.U.L.E.

It's nothing short of blackmail! You may start out amused by their cute antics (they juggle tokens, dance, bump into each other and fall down, etc.), but as the game goes on, you learn to hate these obnoxious, fun-loving nitwits more than mosquitoes.

FUNNY MONEY

So who says business games don't have personality? I've played a game called *M.U.L.E.* and it's got plenty. It reminds me of that nightclub scene in *Star Wars*. There are aliens all over the place. You're a colonist trying to develop the resources of a distant planet, and you have to compete and deal with a whole variety of bizarre fellow businessmen, from Bonzoids to Leggites to Flappers.

The game's not named *M.U.L.E.* for nothing. To help you with your farming, mining, and other manual labors, there's a stableful of mechanical M.U.L.E.s. But they're not just simple robots. These machines are as stubborn and difficult as their namesakes on earth. No one steals the show, but *M.U.L.E.* has enough funny characters to make it much more than a simple economics game.

PERSONALITY IN PRINT

Text games have their personalities, too. The science-fiction game *Planetfall* has the most memorable character, a cross-eyed robot named Floyd. As a marooned astronaut on a distant planet, you stumble upon this mechanical misfit in an underground ruin. You'll soon find out he is more than just a machine. He's like a combination of R2-D2 and Dennis the Menace: helpful, but often obnoxious. He just can't help playing games, like "hider-and-seeker," in the most desperate situations. You can even talk with him. In fact, communicating with Floyd is almost like playing the game with another person.

Game designers have just scratched the surface. We'll be seeing more and more complex, unpredictable characters like Floyd, or lovable but loathsome twerps like the Zerks. I'm just waiting for the next *Time* magazine Man of the Year. Rockford's got my vote. k

KEN WEINER *creates his own characters when he's not writing about them. He's a full-time cartoonist and illustrator.*

WHERE THE STARS HANG OUT

BOULDER DASH
Atari, 32K (disk and cassette), 16K (cartridge); Commodore 64 (disk, cassette, and cartridge); IBM PC*jr*, 64K (disk). First Star Software, (212) 889-1073.
$39.95 (cartridge); $29.95 (disk and cassette)

M.U.L.E.
Atari, 48K (disk); Commodore 64 (disk). Electronic Arts, (415) 571-7171.
$40

Q*BERT
Atari Home Computers (cartridge); Coleco ADAM (cartridge); Commodore 64 (cartridge); VIC-20 (cartridge); TI-99/4A (cartridge). Parker Brothers, (617) 927-7600.
$25–$30

PLANETFALL
Apple, 32K (disk); Atari, 32K (disk); Commodore 64 (disk); IBM PC/PC*jr*, 48K (disk); TI-99/4A, 32K (disk); TRS-80 Models I/III/4, 32K (disk). Infocom, Inc., (617) 492-1031.
$49.95

DROL
Apple, 48K (disk); Atari, 48K (disk); Commodore 64 (disk). Broderbund Software, Inc., (415) 479-1170.
$34.95

SPARE CHANGE
Apple, 48K (disk); Atari, 48K (disk); Commodore 64 (disk). Broderbund Software, Inc., (415) 479-1170.
$34.95

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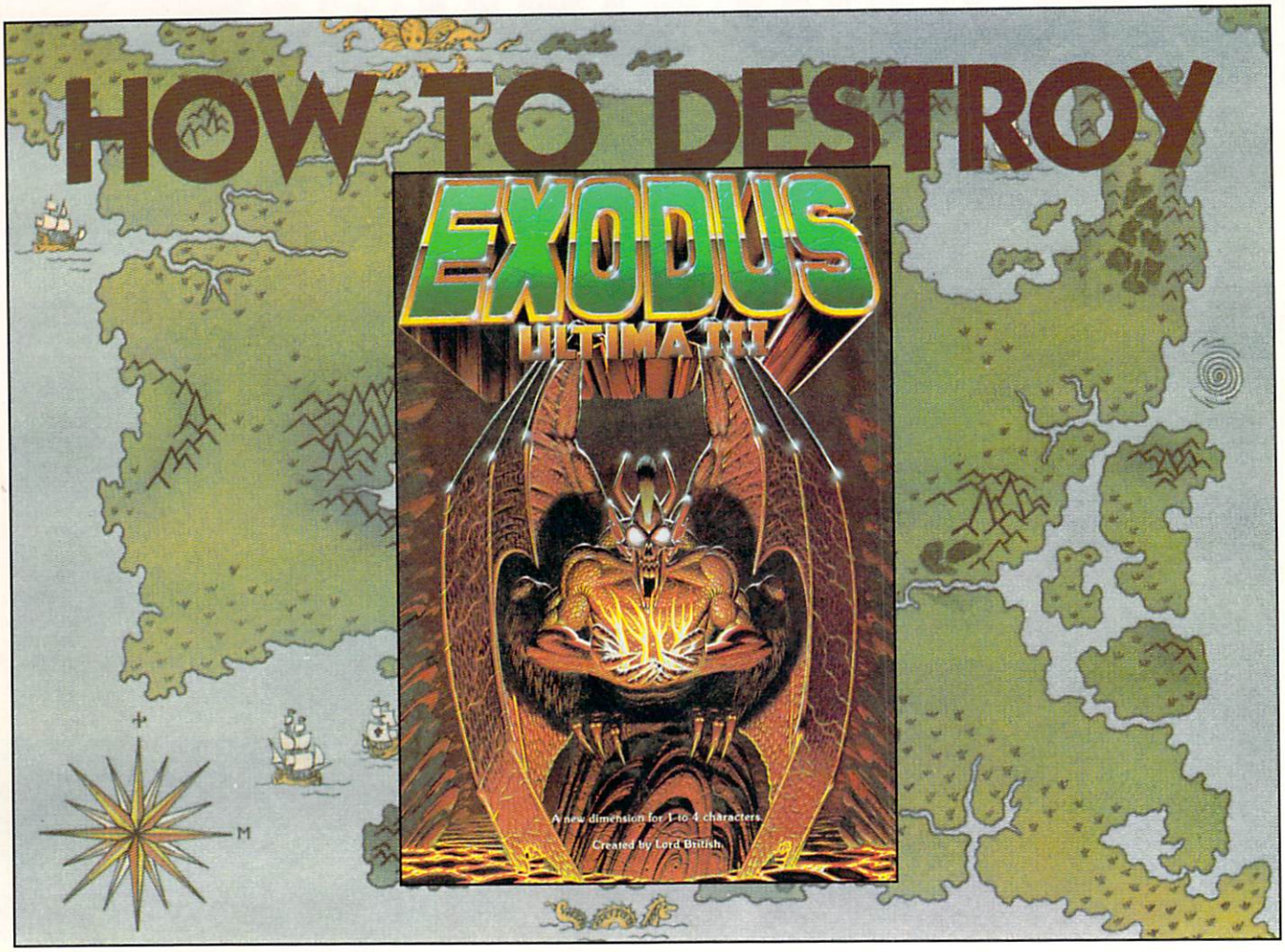
HOW TO DESTROY



Sosaria is overrun with monsters of every description. Here's how to stop their ruler!

By Scorpia

Designer Richard Garriott (alias Lord British) has taken another great leap forward in his *Ultima* series with *Exodus: Ultima III*. *Ultima III* is one of the finest fantasy/role-playing games around. It plays better and is more exciting than its predecessors.

Ultima III lets you roam an entire planet instead of just underground hallways. There *are* plenty of dungeons. But as you search for the omnipotent Exodus, the game's hi-res graphics and smooth scrolling also let you wander through a vast landscape of grasslands, mountains, oceans, forests, and cities.

To begin your quest, organize a band of four warriors. A menu lists a wide variety to choose from: crafty Elves, mighty Dwarves, versatile Humans, devout Bobbits, and magical Fuzzies, each with unique attributes and powers. Eleven professions are also up for grabs. They fall into four main classes: Fighters, Thieves, Clerics, and Wizards.

Once you've formed a party, you equip and arm each member with supplies purchased at a nearby town. Then you're off. Mysteries need to be solved and many items must be found before the final showdown. Meanwhile, droves of monsters lie in your path just itching for combat.

The battle is the most exciting part of the game.

Both your band and the troops of enemies you encounter are represented by single figures on the screen. But during a face-off, the screen changes from a scrolling-map view to a closeup overview of the battleground. Each of your party members then appears at the bottom of the screen, while each of the attacking monsters can be seen at the top. Combat proceeds in turns, one character at a time. First you choose your moves, then the monsters choose theirs.

Through skillful play, your characters become stronger and better equipped. They'll explore the depths of dungeons, sail the oceans to gather information, and finally enter the Castle of Death. There they'll face Exodus in a grand finale. Success goes to those who play their cards right, so here are a few hints.

PREPARATION

- Equip your frontline fighters with distance weapons like bows and slings. Arm other characters with daggers, which can be thrown. It's safer to kill monsters from a distance.

- Make sure your band includes one character who can cast some Clerical spells, especially the healing kind. Another member should have some de-trapping skills, and a third character should be able to cast Wizard spells.

- Fighters should get the best armor you can afford for them, since they usually bear the brunt of the battle.

THE BATTLEFIELD

- Monsters tend to move toward the center and then spread out as they approach you. If you position your players right, you can get the monsters to line up in two columns, so you can deal with them one at a time.

- Try not to use spells during dungeon battles. It's a lot slower to regain magic points *in* the dungeon than outside. Save spells for monsters—such as dragons—with long-distance attacks.

- Magic powders are very helpful in combat, but save them for the really nasty monsters.

DUNGEONS

- Peer into magic gems whenever possible to see a map of the level you're on. This will help you plan the best route to the stairs leading down (or up).

- Some dungeons may have more than one rod (branding irons that give warriors painful but necessary "Marks" required to complete the quest). Check out the entire level to make sure the one you want isn't there.

- The monsters in dungeons are really nasty, so don't enter any dungeons until you need your first "Mark." By then, you should be strong enough.

THE CASTLE OF DEATH

- Once inside, getting out alive again is pretty tough. Be sure you're prepared for the encounters with Exodus and his subjects before you enter.

- As you go farther inside, you'll find other monsters who'll attack you. Try to avoid these guys whenever possible. Your chances for success are better if you're on horseback, so figure out a way to bring horses in with you.

- Your most dangerous foes are the four sets of killer floors (yes, floors!). They're difficult because they're almost unnoticeable. But they move just like other monsters and can be killed the same way, too. The best way to deal with them is to have all members of your party in a line, attacking with "exotics."

GENERAL TIPS

- Keep an eye on your food supply. Use spare cash to keep your party well-stocked.

- Locate a Thieves' Guild as soon as possible, so you can start buying torches, powders, and gems.

- When in town, remember that the best information usually comes from people in out-of-the-way places.

- Try to find your way to the towns of Devil Guard or Dawn as quickly as possible. Only there can you buy horses, which can insure your survival.

Exodus: Ultima III is available on disk for Apple, 48K; Atari, 48K; Commodore 64; and IBM PC/PC*jr*, 64K. $59.95. Origin Systems, Inc., 1545 Osgood St., Suite #7, N. Andover, MA 01845; (617) 681- 0609.

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SCORPIA *is a sysop (Systems Operator) on CompuServe's Game SIG (Special Interest Group).*

SCREENING ROOM

THE RATING GAME

SPACE TAXI

Reviewed on Commodore 64 (disk). Joystick required. Muse Software, 347 N. Charles St., Baltimore, MD 21201; (301) 659-7212. $29.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

Screen Shot: William Gallagher

You're the driver of a space-age taxi and you have to fly passengers through the bizarre landscape of a 23rd-century city. Fly well and you'll rake in a lot of cash. Fly sloppily and you're dead.

Your cab has rockets to move you in four directions: up, down, left, and right. You'll need good hand-eye coordination because there's a lot of tricky maneuvering involved. Each screen has a different number of landing pads. One at a time, little men suddenly appear and call to you in low, gravelly voices. (Yes, they actually talk!) Guide your cab to the proper pad, lower the landing gear, and pick the men up. They tell you which pad to take them to. If the ride is fast and smooth, you receive a good tip and a polite "Thanks!" If you accidentally hit anything on the screen, you plummet to the bottom in the form of space dust.

Each of the 25 different screens is a separate and exciting adventure. Travel through a regular cityscape, wild mazes with moving gates, or a giant summer beach scene in which you can land on a lawn chair. Some screens are fairly easy to master. Others are almost impossible. You can choose to start at any of five difficulty levels. If you want, you can start off on the easiest and tackle them one by one up to the toughest. Or you can jump directly to the most difficult level.

Muse really didn't miss a thing with this game. Every vital aspect of a super action game is here. Graphics, sound, color, action—all are outstanding. Most of all, addiction to *Space Taxi* is inevitable. I couldn't wait to see what the next screen would look like. This game should be in the arcades, no doubt about it.

MIKE ROBB, *13*
Mooresville, Indiana

THE RATINGS

Software is rated on a scale of one to five in each of six categories.

- POOR
- FAIR
- GOOD
- VERY GOOD
- EXCELLENT

NOT APPLICABLE = N/A

GRAPHICS: The quality and sophistication of the graphics given the computer's capabilities.

EXCITEMENT: The pace, pulse, and action of the game.

ORIGINALITY: The degree to which it's a trailblazer.

EASY OF USE: Its boot-up playability and simplicity. A low rating doesn't mean it's a poor game.

CHALLENGE: This speaks for itself.

SHELF LIFE: Its ability to maintain interest over time and not grow stale.

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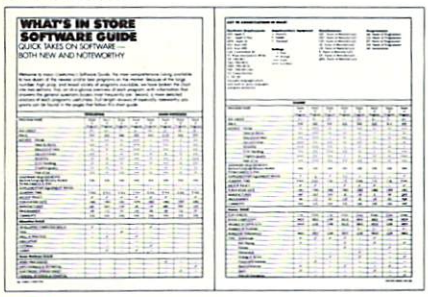

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RATING GAME

WING WAR

Reviewed on Coleco ADAM (cartridge). Also available for TI-99/4A, 16K (cartridge). Version planned for Atari. Joystick required. Imagic, 981 University Ave., Los Gatos, CA 95030; (408) 399-2200. $39.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

Become a dragon. Breathe fireballs on all sorts of creatures, such as bats, bees, spiders, and a rock demon. Fly through caverns and hop across islands that float in the sky. Sound like fun? It is.

Wing War is another game that borrows from the arcade classic *Joust*. What sets it apart from the other clones is its variety. Instead of simply dueling in the sky, you have to fly through

twisting caverns and different skyscapes. You battle an assortment of enemies along the way.

As in *Joust*, you have to flap your way through the game. This would be tiring if there weren't plenty of ledges to rest on. To get points, you breathe fireballs on your enemies. They come from every corner of the screen so you have to keep really alert. A quick eye and good coordination are essential.

Wing War is more than just a simple shoot-'em-up. You can't just fly around blasting away at anything that moves. You have to keep gathering a supply of super crystals, which you use to build your resistance to attack, and replenish your fireballs. With its combination of strategy and action, *Wing War* is a game that'll keep you interested for quite a while.

TONY HARRIS, *13*
Glencoe, Illinois

CODENAME: DEADZONE

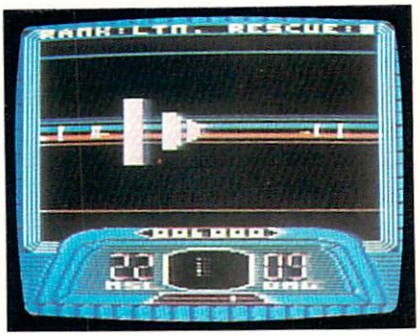
Reviewed on VIC-20, 5K (cartridge). Joystick required. Tymac, Inc., 129 Main St., Franklin, NJ 07416; (201) 827-4050. $34.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

When you turn on *Codename: Deadzone*, you're seated at the controls of a fast, high-powered hovercraft. Your mission is to rescue scientists from enemy territory. But the secret police know you're there, so it won't be any joyride.

At the start, your craft is equipped with 99 torpedoes. Every time you get kamikazied by one of the police ships, or run into one of the many columns that are scattered across the landscape, you get one damage point. Fifteen damage points and your ship explodes.

On the first level, you have to find three scientists and pick them up. (An instrument on your dashboard will give you their general location.) As you move to higher levels, the enemy ships move faster and you have



to rescue more scientists. You also move up in rank. From the starting rank of lieutenant, you can move all the way up to general.

This is a very simple game. To maneuver, you simply move your joystick forward to move forward, left for left, right for right, and back to brake. A tap on the action button fires torpedoes. To pick up scientists, you just have to get close to one, stop, and watch him run to your ship. If you like to turn off your brain and play a shoot-'em-up, this game will do.

But even though the game speeds up from level to level, there just wasn't enough variety to keep me interested for a long time. Still, for the VIC the graphics are very good (sort of like the 3-D visuals in Synapse's *Encounter!*) and the sound is decent.

One special touch worth mentioning is the speech built into the game. When you get danger-

ously close to a column, a little voice yells, "Look out!"

SOREN KAPLAN, *15*
Walnut Creek, California

DIMENSION X

Reviewed on Atari, 48K (disk). Also available on 16K (cassette). Joystick required. Synapse Software, 5221 Central Ave., Richmond, CA 94804; (415) 527-7751. $34.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

You may feel kind of dizzy after a few hours with this game. Thanks to a new technique called "altered-perspective scrolling," *Dimension X* gives you the illusion of actually being in the cockpit of a spacecraft hovering over the checkerboard surface of a distant planet.

Your mission is to destroy invading saucers from the Rigillian nation as you zip across the landscape of the man-made planet Jaraloba. Hunting down your enemies isn't easy. For one thing, they shoot back. For another, they split up into bunches of smaller saucers, which then split up into even smaller squads, and so on.

You've got plenty of ammo to wipe out the entire fleet, but you'll have to refuel once or twice. The refueling sector (one of 64 different sectors in the game) is where you can fill up, repair damaged shields, and get your craft checked out. We couldn't figure out exactly what

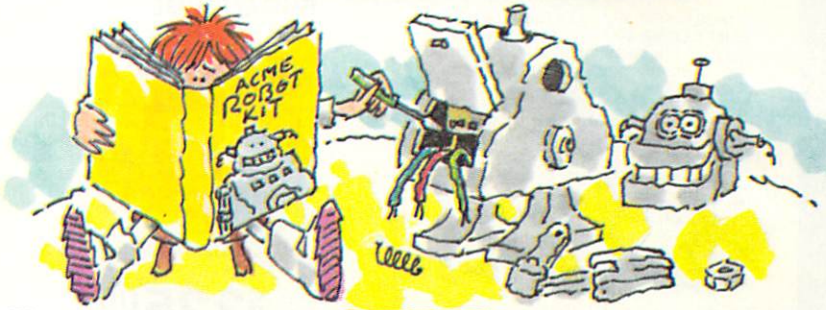
was happening when we got our "ion pressure hookup" checked, though.

Another exciting part of the game is traveling through the tunnels to get from sector to sector. You have to dodge different barriers that block your path. Some stretch like walls across the bottom of the tunnels, and some across the top. You have to race up and down like a roller-coaster to avoid them. If you hit the barriers, your shields get damaged. Too much damage and you're dead.

Overall, the game is well done, especially the sound and graphics. But it seems to lack something. After being pleasantly surprised by the graphics, you expect a lot more from the actual play of the game. But what you get is action a lot like *Encounter!*, one of Synapse's previous releases. What the game lacks in play originality, though, it makes up for in the fresh new look it brings to the *Battlezone* genre.

ERIC SABERHAGEN, *13*
TOM SABERHAGEN, *12*
Albuquerque, New Mexico

HOW TO MAKE FRIENDS ON OTHER PLANETS



First, go to another planet. (That's easy if you're traveling through space in PLANETFALL, the great science fiction comedy from Infocom's interactive fiction line.)

Next, find a robot nobody's using. Then, to make him start up, type in your command: TURN ON THE MULTIPLE PURPOSE ROBOT... You've just made a robot friend who'll follow you anywhere.

And you'll be glad you have a faithful follower—there's no telling what will happen next in PLANETFALL. Because, like all of Infocom's interactive fiction, PLANETFALL's designed so that whatever *you* choose to do affects what will happen next. And there'll be plenty happening—it's an adventure filled with everything from dread diseases to mutant monsters, and it can last for weeks or even months.

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*It's compatible with almost every popular home computer. PLANETFALL is a trademark of Infocom, Inc.

RATING GAME

BRUCE LEE

Reviewed on Atari, 32K (disk). Also available on 16K (cassette) and Commodore 64 (disk and cassette). Joystick required. Datasoft, Inc., 19808 Nordhoff Place, Chatsworth, CA 91311; (800) 423-5916. $34.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

Playing *Bruce Lee* is like being in an interactive movie. If you've ever wanted to be a black belt in karate, here's your chance to chop, kick, climb, duck, or leap through 20 deadly chambers in a menacing Chinese fortress. Each room you pass through has more death traps than the last.

Your task is to grab flickering lanterns and open secret doors that lead to the other chambers. If you survive to enter the Wizard's chamber, you must avoid his shooting fireballs and try to destroy him. If you succeed, there's no time to celebrate. More difficult challenges await you as you go back through the menacing fortress.

Besides the deadly spikes and electric bolts that lie throughout the chambers, you have to deal with two opponents: the Green Yamo (a big fat Sumo wrestler) and the Ninja (a nasty little man with a stick). All the chopping, jumping, and running is controlled with a joystick. If you play alone, you must be Bruce. If you want to play against a friend, one can be Bruce and the other the Green Yamo, or both

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can take turns as Bruce, and fight against the Yamo and Ninja. But if you feel like cheating, you can have a friend (as the Yamo) beat up the Ninja while you run through the chambers. The Ninja isn't programmed to fight the Yamo, so he always loses.

Bruce Lee is really one of the most thrilling games around. It combines action and strategy with excellent graphics and sound to make a game that's hard to stop playing. With a little imagination, and a few sessions with *Bruce Lee*, you'll be a black belt in no time.

DAN HOROWITZ, *14*
Westport, Connecticut

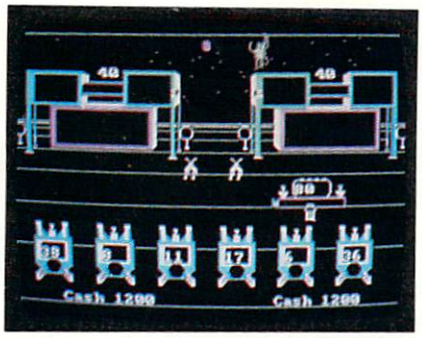
RUN FOR THE MONEY

*Reviewed on IBM PC, 64K (disk). Also available for PC*jr, *64K (disk). Versions planned for Atari, 48K (disk) and Commodore 64 (disk). Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, NY 10591; (914) 332-4545. $49.95*

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

Two traveling Bizlings have just crash-landed on Planet Simian. Their spaceships' protective shields are badly stripped of paint. Unless they repaint the shields, they don't stand a chance of taking off successfully.

Luckily for them, there's a paint salesman nearby. But paint is expensive and neither Bizling has enough cash on hand to cover the cost. Bizlings are among the wisest businessmen in the universe. They compete



with each other to manufacture synthetic bananas (synannas) to sell to the local Simians. It takes effective bargaining for raw materials, just the right amount of advertising, and a good product to outsell the competition. The first Bizling to rake in enough cash to buy the right amount of paint and ensure a safe departure wins.

Though the setting and characters may be a little bizarre, it's really a typical business situation. Many of the strategies used by the biggest industries can be applied here. The manual tells about 12 of them, including "The Bargain Basement Strategy" (which means buy cheap and sell quantity, not quality).

If you've never played a business game before, don't be turned off or think they're just boring. I like this game because it taught me a few things about business while I was having fun.

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!

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a.) yes b.) no

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JULY/AUGUST

RATING GAME

There's excitement here, too. But the pace isn't *too* hectic. You have time to think and plan while you're playing.

JASON LEFORGEE, *15*
Twin Falls, Idaho

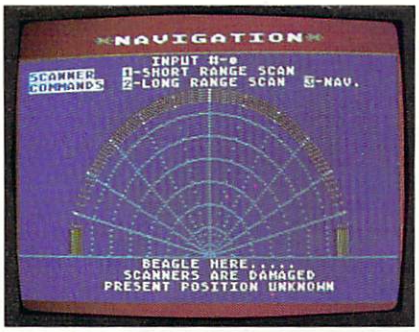
JUPITER MISSION 1999

Reviewed on Atari, 48K (disk). (Atari XL models require translator disk.) Version planned for Commodore 64 (disk). Joystick required. Avalon Hill Microcomputer Games, 4517 Harford Road, Baltimore, MD 21214; (301) 254-5300. $50

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

You're dragged out of bed by a group of mysterious men and told you'll be on a ship to Jupiter in five minutes. Their explanation: Your country needs you. During the flight you're told that strange signals have been coming from somewhere near the Jovian system and it's up to you to investigate. After that introduction, the game begins.

Jupiter Mission 1999 is a gigantic (four-disk) space fantasy. It combines role-playing and arcadestyle action. The game begins after your ship's been hit by a large asteroid. All other crew members have died, and the computerized blaster guidance and navigation systems have been damaged. From this point on, you have to manually shoot your way through the asteroid

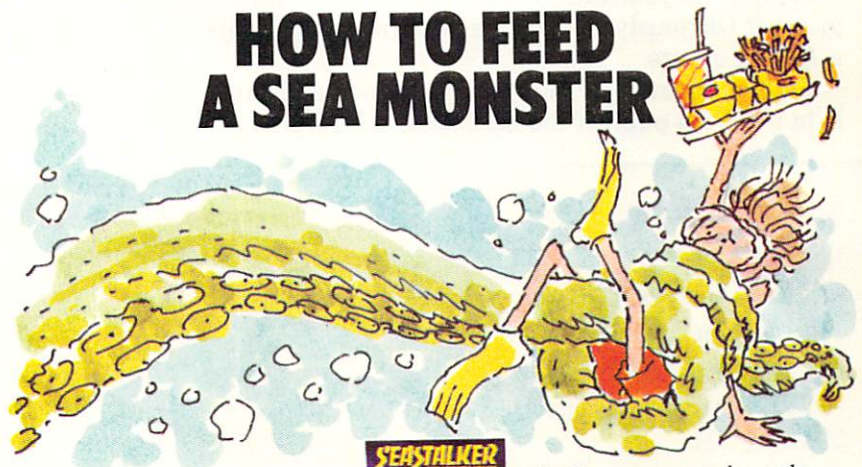


belt, repair your ship, and plot the correct course to Jupiter. During the year-long flight, you must also figure out (with the aid of robot probes) which of Jupiter's 14 moons is sending the mysterious signals.

The game is realistic and the plot is very interesting. But some of the game's elements aren't quite up to par. The graphics in the beginning of the game (in the asteroid blasting sequence, for instance) aren't as good as they could have been. And the manual, though it claims to be complete, lacks sufficient information. I found it frustrating because it leaves a lot for the player to figure out about certain stages of the game. Overall, I think the game could have been better. The concept *does* have potential—the combination of arcade aspects with a good space-adventure story line is an excellent idea. Hopefully, in the sequel that's promised, Avalon Hill will iron out the game's few flaws.

DAVID LANGENDOEN, *15*
New York, New York

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.)

Next, type in your command: GET OUT OF THE SUBMARINE AND FEED THE CATALYST CAPSULE TO THE MONSTER. Then, swim for your life! Because the trouble with feeding sea monsters is, the monster might decide to feed on you!

There's no telling what will happen next in SEASTALKER. Because, like all of Infocom's interactive fiction, SEASTALKER's designed so that what happens next depends on what *you* decide to do. And you'll be doing plenty, too—your voyage can last for weeks or even months.

So get the closest thing on a disk to going on a real-life sea adventure. Sink your teeth into SEASTALKER*. But when you do—watch out!—or you might just find out somebody has a sweet tooth for you!

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CONTEST

WHAT'S K.I.T.T. SAYING?

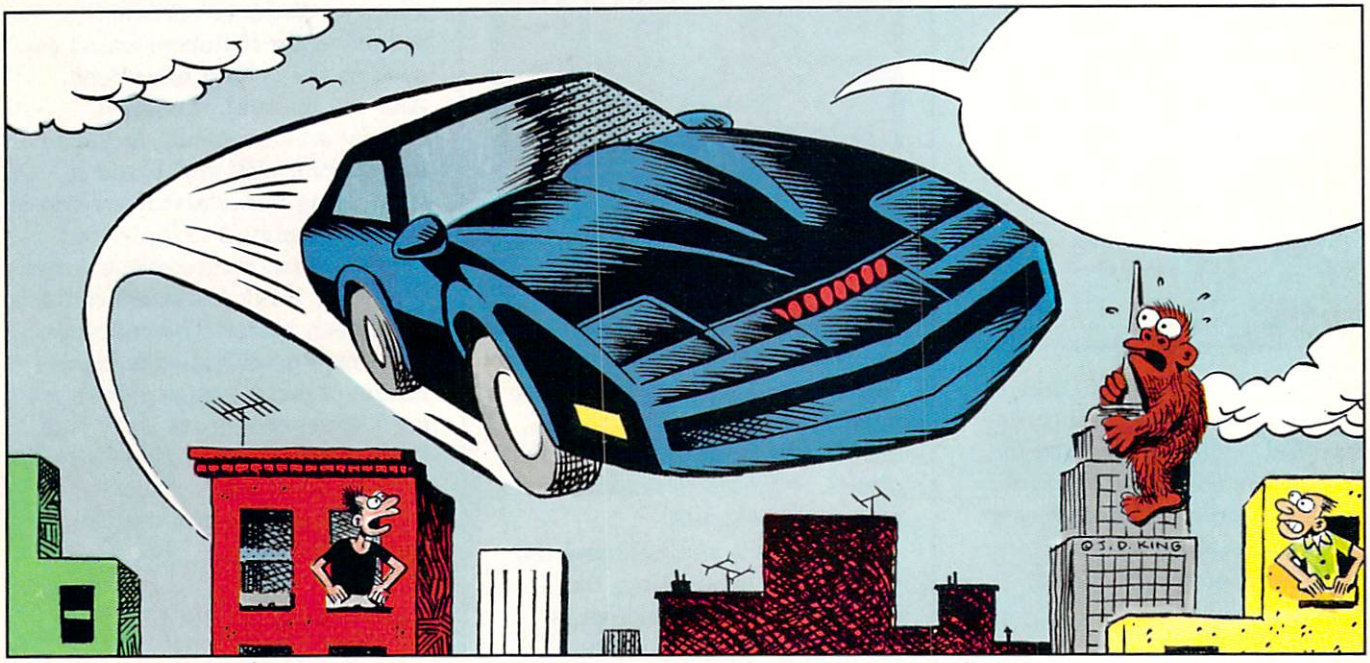

Illustration: J.D. King

You probably know that K.I.T.T., the supercar from NBC's hit show "Knight Rider," can talk.

So what do you think K.I.T.T. is saying in this picture? Obviously, K.I.T.T. is performing one of its awesome stunts.

Got any ideas? Fill in the word balloon and send it to us. We'll publish the best ones in a future issue of K-POWER. Winners will become proud owners of K-POWER T-shirts. So go ahead, complete the questionnaire below, and mail everything to:

K.I.T.T. CONTEST
c/o K-POWER, 730 Broadway
New York, NY 10003

All entries must be received by Aug. 24, 1984.

K.I.T.T. CONTEST

1. I am male ___ female ___. Age ___.

2. I got this K-POWER from:
subscription ___ book club ___
newsstand ___ other ___.

3. Is this your first copy of K-POWER?
Yes ___ No ___

4. Please rate all of the features in this issue of K-POWER. Use the following rating system.

4 = Excellent
3 = Good
2 = Not bad
1 = Not very good
0 = Didn't read it

a) ___ Editor's Note
b) ___ Logon
c) ___ Compuzine
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e) ___ Scrolling in Dough
f) ___ Dr. Kursor
g) ___ K-NET
h) ___ How the K-NET Works
i) ___ How Teen Tycoons Take Care of Business
j) ___ Comic Strip
k) ___ Computers Go for the Gold
l) ___ Test Run IBM
m) ___ Andrea Leptich: The Making of a Hacker
n) ___ Computer Superstars
o) ___ Programs
p) ___ Microtones
q) ___ K-Bloopers
r) ___ The Rating Game
s) ___ Strategy—*Ultima III*
t) ___ K.I.T.T. Contest

5. What was your favorite article? _____

_____

6. What kind of computer(s) do you have? _____

_____

7. Other comments about K-POWER:

_____

_____

Name _____
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T-shirt size: S M L XL (circle one)

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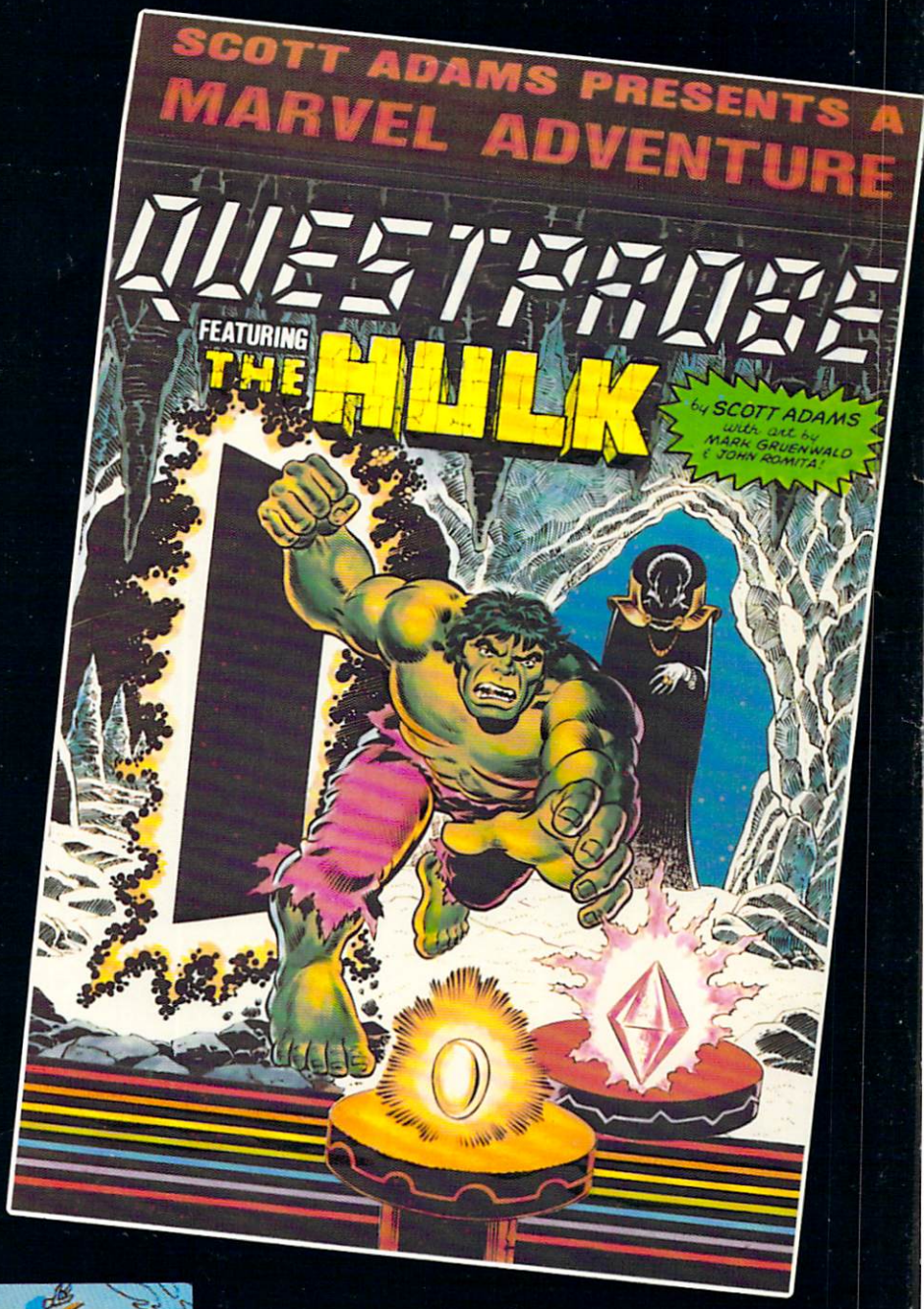
TANGLE WITH THE HULK.™



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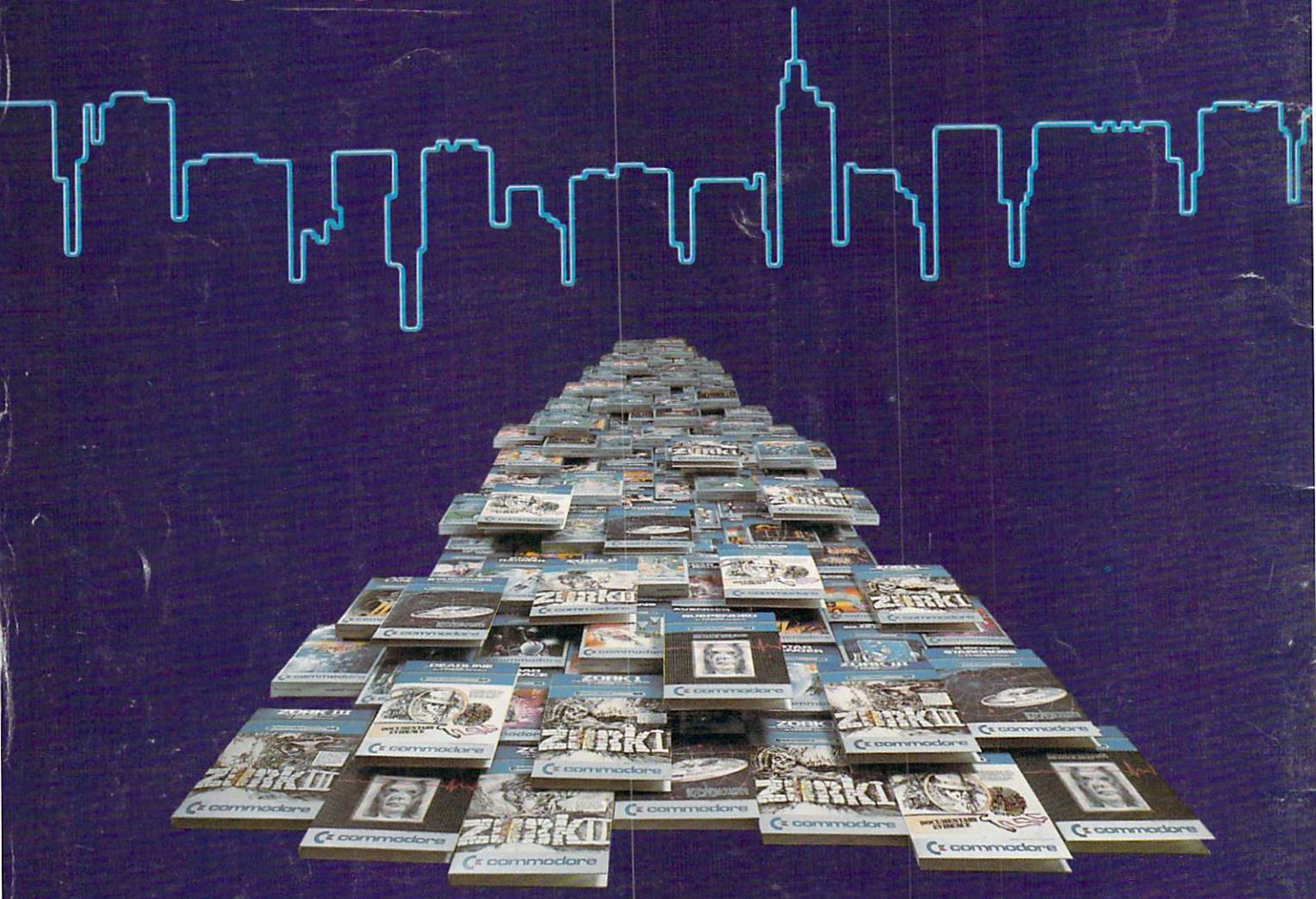

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FOR THE COMPUTER GENERATION

K POWER™

PUBLISHED BY SCHOLASTIC INC.

Dear Reader,

K-POWER brings you important changes with this issue. Starting this month, K-POWER goes to a bimonthly publishing schedule (plus a bonus Holiday issue).

Here's a list of issue dates and when you can expect to receive them:

ISSUE:	LOOK FOR IT IN:
July/August	mid-June
September/October	mid-August
November/December	mid-October
Bonus Holiday Issue	mid-November
January/February	mid-December
March/April	mid-February
May/June	mid-April

Despite this change in how often your K-POWER arrives, you'll still receive all the copies you ordered.

K-POWER also has incorporated MICROKIDS—another publication for kids who love computers—into our magazine. This move promises to give K-POWER readers even more computing power! In fact, talk about K power—you'll *really* have it now! K-POWER will have more programs than ever!

You'll see what we mean when you turn to this issue's Hacker Heaven. You'll find K-POWER's programming section in a new spot. It's now a 16-page pullout located in the center of each issue. It's loaded with more computer programs for every popular computer system!

Plus, K-POWER has added Microtones to Hacker Heaven! It's a great new section that gives you the power to program your computer to play computerized versions of popular tunes and original music! (If you want to hear your computer wail the blues, pull out this issue's Hacker Heaven and power up!)

Besides more programs and programming techniques, you'll find more computer-game reviews and strategy tips in each new issue of K-POWER. And more stories about kids like you who are doing fun and interesting things with their computers.

These important changes will make K-POWER stronger, more exciting, and more useful to you—the computer generation!

Anne Krueger

Anne Krueger, Editor

Shirrel Rhoades

Shirrel Rhoades, Publisher