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OCTOBER 1984

VOLUME 2
NUMBER 10

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FAMILY COMPUTING™

SOFTWARE: SPORTS GAMES COME HOME

How to Organize Your Household, Data-Base Style

Barter Your Computer Skills

Learning with Logo

Inside: Original Programs for ADAM, Apple, Atari, Commodore 64 & VIC-20, IBM, TI, Timex, and TRS-80

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OCTOBER
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VOLUME 2
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FAMILY COMPUTING™

FEATURES

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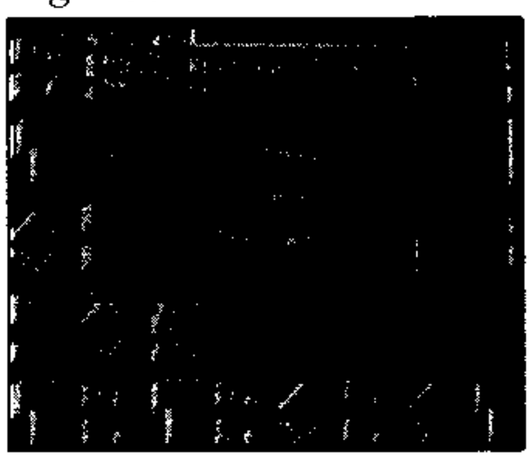

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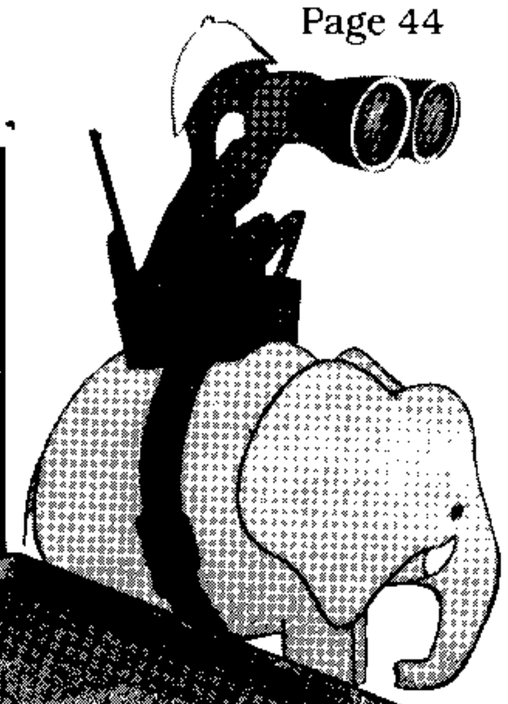

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PROGRAMMING

PRODUCTS

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DEPARTMENTS

COVER PHOTOGRAPH BY JOEL WHITE

LETTERS

PUTTING THE HOME BACK INTO HOME COMPUTERS

I've had a computer and have been reading computer magazines for many years. But, the magazines were very business- or "one brand-" oriented. I was not very satisfied until I spotted a new magazine on the stand—FAMILY COMPUTING. After flipping through it, I immediately bought it, and after reading it at home, I immediately subscribed.

In short, just let me say it's about time someone got it right. I believe that FAMILY COMPUTING has put the *home* back into home computers.

JOHN P. SAURETTE JR.
Fall River, Massachusetts

BELLS OF PRAISE

How can I say how pleased I am with the July issue of FAMILY COMPUTING and especially the Atari *Liberty Bell*! Can hardly wait to show it to my first and second graders.

I'm eagerly awaiting each new issue of FAMILY COMPUTING.

NANCY LYNCH
Vienna, Virginia

IN SEARCH OF A BBS

I would like to know if you could tell me where I could find a bulletin board system for the Commodore 64 or VIC-20?

AARON SMITH, *age 14*
Sikeston, Missouri

EDITOR'S NOTE: *You can get a lengthy list of bulletin board systems by picking up a copy of* Computer Shopper *at your local newsstand (price: $1.95). The list is updated every three months. The People's Message System, Santee, California (619) 561-7277, also provides names and numbers of bulletin boards.*

PLEASED WITH PROGRAMS

I thank you for the information about Texas Instruments. In the May issue, I tried the *Mother's Day Card*. My mom loved it. I thought it was funny. One day when I was by myself, I decided to do the *Father's Day Card*. I just could not wait until my dad came home. I told my dad I did the *Father's Day Card*; he said that he wished I would have waited for him to come home. When I was on line 930 of the *Phone Cost Monitor*, my little sister pressed the quit button. I was so mad, I screamed at her.

Keep coming out with TI information and games, please. Thank you!

JENNIFER NELSON, *age 11*
Houston, Texas

LOOKING FOR A PEN PAL?

Will FAMILY COMPUTING start having programs for TRS-80 MC-10? Are there any MC-10 users who want to correspond? If so, please write. I find your magazine great. Please remember to keep it simple.

JOHN R. DROGO
23 Ware St.
Somerville, MA 02144

EDITOR'S NOTE: *Sorry, unfortunately at this time we have no plans to publish programs for the TRS-80 MC-10. But, we hope some of our readers can help you out.*

THE PERFECT REMEDY

Since I purchased a Commodore 64 computer, disk drive, and printer, I have been looking for a magazine that would help me learn more about the computer. Until a friend of mine recommended FAMILY COMPUTING, I was purchasing other publications that were too technical in their makeup. I find FAMILY COMPUTING is just what the doctor ordered. It is written in a language I can understand, and I recommend it very highly for any computer owner.

GEORGE B. STEWART
Rutland, Vermont

CORRECTIONS

In the August issue's Telecomputing column, we listed an incorrect telephone number for Plume Books, publisher of The Computer Phone Book. *The correct number is: (212) 397-8000.*

In the September "Buyer's Guide to Disk Drives," we inadvertently omitted the price of the Concorde C-321P drive for the Commodore 64. It sells for $389.

FAMILY COMPUTING *looks forward to letters from all our readers. Please direct your correspondence to: Letters to the Editor,* FAMILY COMPUTING, *730 Broadway, New York, NY 10003. Include your name, address, and phone number. We reserve the right to edit your letters for length and clarity.*

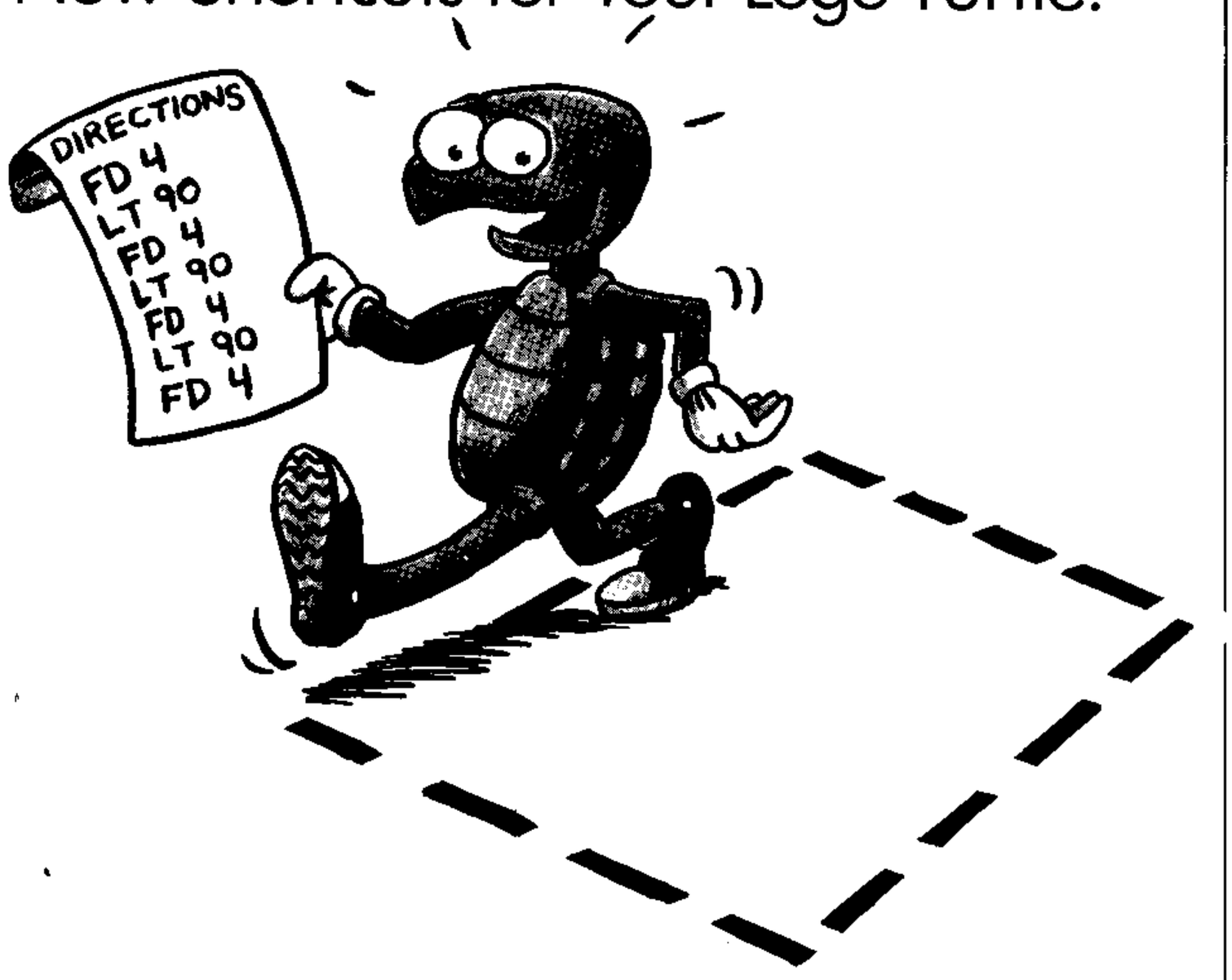
LEARNING LOGO

TOOLS FOR LEARNING (AND DOING)
First, Some Logo Learning Aids Your Family Can Make. Then, Some New Shortcuts for Your Logo Turtle.

BY MINDY PANTIEL AND BECKY PETERSEN

This is the second of six articles on Logo, a computer programming language originally designed for children, but powerful enough for users of all ages. The six-part series includes:

ISSUE	TOPIC
September	Meeting the turtle: seven simple commands.
October	Logo learning aids: turtle shortcuts.
November	Teaching your turtle: debugging and saving.
December	Adding sparkle: programming Logo colors.
January	Variations on a theme: changing sizes and shapes.
February	Advanced Logo: where to find out more.



To learn any programming language, you have to become familiar with a number of very specific commands, and then learn what they do when combined with other commands. Logo is no exception.

Remembering all these new commands and relationships isn't always easy. Youngsters (and adults, too) often need help—either to jog their memories or to visualize how to accomplish the things they want to do. We've come up with some tools that families can use to make learning Logo easier. Creating these tools can be yet another family activity.

HOMEMADE USERS' MANUAL

Write your own users' manual as you go. Writing is an excellent way to reinforce concepts, and it can help you pick out what you don't really understand. More important, a homemade users' manual can be organized to help your family quickly find answers to the questions you ask most often.

Stenographers' notebooks are especially good for this because they can stand up easily on a table, making for convenient reference. We'd suggest that page 1 include a step-by-step outline of how to load your Logo program into the computer. Page 2 might list the seven commands we introduced last month. Then, you can add a page for each new set of commands you learn.

Later on, "hard copies" of your family's favorite Logo programs can be printed out and pasted on back pages.

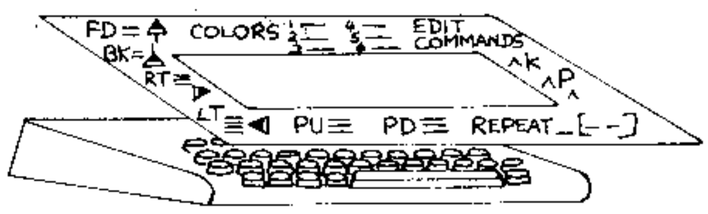
TURTLE TEMPLATE

A "template" is an excellent device for putting information you need at your fingertips. It is an overlay that fits snugly on your computer around the outer edges of your keyboard. You can write all the commands you need on it, and refer to them without even having to look up from your work. (*See Diagram No. 1.*) Almost all home-computer keyboards can accommodate templates.

Start by placing a large sheet of paper over your keyboard. With a magic marker, outline the perimeter of the key area. Draw a new line 3 inches outside the first. If your keyboard doesn't extend 3 inches in all directions, just outline its perimeter. Now, cut along both the interior and exterior lines you've made. This frame is the pattern for your template. Trace the pattern onto a piece of heavy white cardboard. Cut out the template with a pair of sturdy scissors or a utility knife.

With a fine-tip marking pen, write all the Logo commands you want to keep handy onto the template. Someone with a fairly steady hand should be put in charge of this task, and should leave space for lots of new commands.

Diagram No. 1 (Template)



TURTLE COMPASS

Young children often have difficulty determining just how far they want the turtle to turn, and they

ILLUSTRATION BY BOB SUPINA

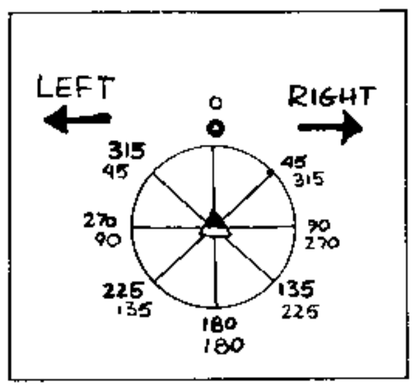
MINDY PANTIEL *and* BECKY PETERSEN *of Niwot, Colorado, are contributing editors for* FAMILY COMPUTING. *Both are experienced Logo instructors.*

sometimes forget the difference between right and left. A turtle compass can help them.

On a piece of heavy cardboard, draw a circle and divide it into eight equal pie-shaped parts. Label the circle in 45-degree divisions. You'll have to do it twice: first going clockwise from 0 to 360, and then, using a different color marker, going counterclockwise. Include an explanatory key. (*See Diagram No. 2.*)

Now make a large, triangular turtle, just like the one on the screen. It should have a "head" to indicate the direction it is going in. Punch a hole in both the turtle and the center of the compass circle, and hook them together in a way that permits the turtle to turn in any direction.

Diagram No. 2 (Compass)



AND . . . A MASCOT

If you have very young children, you might also want to make, or buy, a stuffed turtle (the kind you'd get from a toy store, not a taxidermist). Attach a felt or paper arrow to the turtle's back to help young children associate the direction of the arrow with the direction of the turtle's head. This tool can help little ones practice moving the turtle before they're ready to work on the computer.

A QUICK REVIEW

Here's a quick review of last month's lesson. First, we taught you to "call up" the turtle by typing DRAW (or, in some cases, SHOWTURTLE). We taught you to move the turtle forward by typing FD along with the number of "turtle steps" you want it to move (e.g. FD 50). To go backwards, you type BK plus the number of steps. To turn the turtle, type LT or RT and the number of the angle you want it to turn—from 0 to 360 degrees. To send the turtle back to the middle of the screen, type HOME. Finally, to start a new drawing, type CS (or CLEARSCREEN). With these commands, you can move the turtle anywhere on the computer screen. Certain versions of Logo may call for slightly different commands.

THE FAMILY CHALLENGE

Using some of the shortcuts and the new commands you've just learned, have everyone draw their own initials with the turtle. This is a task that can be adapted to the various age levels and abilities of everyone in your family.

Think out the problem before you sit down at the keyboard. Older learners might use pencil and paper to plot out the angles and lengths their initials will require. For younger learners, the stuffed turtle can help. Remember that you'll need to use the PU and PD commands to move the turtle to each new initial so turtle tracks don't connect them.

Younger children who've only gotten as far as understanding turtle turns of 90 degrees can make their initials using right angles (with the commands RT 90 and LT 90). Older children can experiment with turns of different sizes. Generally, 45-degree turns work well for beginners.

More advanced learners can try making letters with smaller angles and shorter forward lines. They'll be rewarded with a more realistic looking set of initials.

THIS MONTH'S LOGO LESSON

Now let's look at a few shortcuts to help you move the turtle a bit more efficiently.

• The first shortcut is very simple. Instead of typing each separate command into the computer and waiting for the turtle to move before you type in another one, type several at once. Logo can process a string of commands just as easily as it can process single entries. For example, this series of commands creates a square:

```
FD 30
RT 90
FD 30
RT 90
FD 30
RT 90
FD 30
RT 90
```

But you can type all that in one long line:

```
FD 30 RT 90 FD 30 RT 90 FD 30 RT 90 FD 30 RT 90
```

In the first example, the turtle follows your instructions as you type them in, one line at a time. In the second example, the turtle creates the whole square at once.

• **REPEAT**. If within a series of commands there are smaller groups that are repeated, as in this case FD 30 RT 90, there's an even quicker shortcut: the REPEAT command. This line does the same thing as the ones shown above:

```
REPEAT 4 [FD 30 RT 90]
```

The REPEAT command has three parts. The first part is the word REPEAT, which must be correctly spelled out in full. The second part tells the turtle how many times to repeat the steps you're about to describe (in our example, the turtle is to repeat the steps four times). The final part, contained in brackets, tells the turtle exactly what steps are to be repeated.

(Note: The square brackets used with the REPEAT *command are not the parentheses on your keyboard. Some computers have specific left- and right-bracket keys; others use a combination of two or more keys to create brackets. Check your users' manual.)*

Try it out on your computer. Use the REPEAT 4 [FD 30 RT 90] command to combine several squares into simple drawings like windows and ladders. Then experiment with repeating other number values and commands.

Later in the series, we'll show you how to invent your own commands and teach them to the turtle. It will then be even simpler to make your square—and other figures too.

MAKE YOUR TURTLE JUMP

• **PENUP**. What if you want to draw a box on the left side of your screen and a box on the right side, without having them connected? You'll need to move your turtle across the screen without leaving turtle tracks behind. The command for this is **PU** (or PENUP). For example, PU FD 100 would move the turtle 100 steps forward without leaving turtle tracks.

• **PENDOWN**. When you want your turtle to start leaving tracks again, type **PD** (PENDOWN). This simply undoes the PENUP command. To have the turtle stop leaving footprints for 100 turtle tracks, and then start leaving them again, you'd type PU FD 100 PD.

Add these new Logo commands to your homemade users' manual or template, so family members can refer to them whenever questions come up. Then, try our suggested exercise, "The Family Challenge." FC

COMPUTING CLINIC

SAVING PROGRAMS • DATA STATEMENTS • LONG PROGRAM LINES • WHAT'S A MOUSE? • TI EXTENDED BASIC

BY JEFFREY BAIRSTOW

I have an Atari 800XL computer with a cassette recorder. When entering long programs, can I type in part of the program and store it on tape? Can I then reload the partial program, finish typing it in, and record it over the same part of the tape?

JOSEPH PJURA
Ozone Park, New York

You can store an incomplete program on a cassette and reload it later to finish the program. The completed program can then be stored on the tape in place of the old part of the program. Your cassette recorder merely stores any program in memory at the time of recording, irrespective of its completeness.

However, I would suggest you record the revised program on a new section of tape. If a mistake is made in recording you will at least still have part of the program intact, whereas if you record over the old program, you erase it from the tape. Save the program before running it, since a single typing error can cause whole programs to disappear.

Why does this program return the error statement * DATA ERROR IN 10?

```
10 READ ROW, COL
20 CALL HCHAR(ROW,COL,42)
30 GOTO 10
40 END
50 DATA 12,16,11,15,10,14
```

The program is intended to put asterisks in the locations specified by the DATA statement (on the TI-99/4A).

JOHN SCOTT
Gardnerville, Nevada

This is a common problem for novice programmers. You have an endless loop in statements 10–30 caused by the GOTO in 30. The READ statement forces the computer to keep checking for data in line 50 even though there are only six coordinates. Limit the loop by using FOR . . . NEXT statements, such as:

```
10 FOR N=1 TO 3
20 READ ROW,COL
30 CALL HCHAR(ROW,COL,42)
40 NEXT N
50 DATA 12,16,11,15,10,14
```

If you use more than three pairs of coordinates in your DATA statement, change the upper limit number (here it's 3) for the loop in line 10. Try to avoid the use of GOTO statements—they make for messy programs!

When I try to use a program line that is longer than two lines on my Commodore 64, I get a SYNTAX ERROR message. How can I avoid this?

JAMES RHEA
Peoria, Arizona

Program lines on the Commodore 64 are limited to 80 characters, or two lines, on the display. If you have very long program lines, try taking out unnecessary spaces, such as those between commands and variables. For example, PRINTA will produce the same result as PRINT A.

If the long lines are DATA statements, you can break them into several one-line statements. This is good programming practice, by the way. Similarly, if long lines are caused by using lengthy alphanumeric strings, either shorten the strings or use variables to define the parts of the string separately. Finally, if you have several statements in a long line, you can place them in separately numbered lines. Just be sure not to alter the logic of the program; be wary, for instance, of breaking up IF . . . THEN clauses.

What is a mouse and how is it used?

STEVE TARDIF
Kensington, Connecticut

A mouse is a device for moving a cursor or other object (such as a sprite) around on the screen. Joysticks and cursor keys will also do the same thing, but in many cases are not as easy to use. A typical mouse has one or more buttons on the top of a small box that can be moved around on a flat surface. The box is connected to the computer with a cord that's like a tail, so the gadget does resemble a "mouse." "Optical" mice, such as the PC Mouse, move over a special pad, but most can be used on any desk top.

As the mouse moves, the cursor moves correspondingly on the screen. The buttons are used for specific actions, as is the "fire" button on a joystick.

The mouse's main advantage is that it can move a pointer around on the screen with great precision. On the Apple Macintosh, for example, this is very important since most of its programs have complex displays with menus or graphic icons that are selected by moving a pointer. The mouse is also good at moving the cursor diagonally, such as from the center of the screen to the top left-hand corner. With cursor keys, you cannot make diagonal movements.

Mice are available for several computers, including the IBM PC and the Apple II series. They cost between $100 and $200. The price often includes special software that's needed for the mouse to operate.

What is the difference between TI BASIC and TI Extended BASIC for the TI-99/4A computer?

JAMES WILLIAMS
Detroit, Michigan

TI Extended BASIC does indeed extend the capabilities of the TI-99/4A computer. This optional cartridge provides more than 40 additional or "expanded" commands and subprograms to the regular TI BASIC. In particular, Extended BASIC adds sprite graphics, speech capability (with the speech synthesizer), and provides the ability to load and run one program from another. It's such a powerful language that using it is like using a new computer.

The TI Extended BASIC cartridge is available from several mail-order companies, such as 99/4A National Assistance Group, Box 290812, Fort Lauderdale, FL 33329; (305) 583-0467, for under $100.

JEFFREY BAIRSTOW, *a technical journalist who lives in West Redding, Connecticut, was a founder and managing editor of* Computer Decisions *magazine. He has also taught math and computer science in England. His family, including two preschoolers, uses a variety of computers.*

Sondak, the book is an excellent introduction and reference guide. It has chapters on choosing and using software, and on the rudiments of programming in BASIC and another popular computer language, Logo.

More advanced users will enjoy Peter Norton's *Exploring the IBM PCjr Home Computer* (Microsoft, 1984, $18.25, 336 pages). Written for those who've "become comfortable" with the PC*jr*, the book offers 20 chapters of clear, interesting instruction.

RADIO SHACK COLOR COMPUTER/ TRS-80 MODELS III/4

New CoCo owners or potential buyers should look at *Your Color Computer* (Sybex, 1984, $16.95, 342 pages). Doug Mosher discusses the CoCo's capabilities and includes advanced-programming tips and lots of program listings. The book also gives advice on the purchase of commercial software.

Jerry Willis and others have published CoCo and TRS-80 Model 4 versions of their inexpensive, popular series, *Things to Do With Your . . .* (Signet/dilithium Press, 1983, $3.95, 214 pages). Beginners or potential buyers will profit most from these books, which contain descriptions of many commercially available software programs.

If you're looking for BASIC program listings, look no further than *Color Computer Applications* (John Wiley & Sons, 1983, $10.95, 160 pages). Authors John P. Grillo and J.D. Robertson give clear, concise descriptions of their 11 well-thought out, exciting programs.

TRS-80 Models III or 4 users can find listings in *32 BASIC Programs for the TRS-80 Computer* (dilithium Press, 1980, $19.95, 266 pages). This is an early edition of Tom Rugg and Phil Feldman's *32 BASIC* series *(see the Atari section)*.

TIMEX SINCLAIR

Douglas Hergert's short, engaging guide, *Your Timex Sinclair 1000 and ZX81* (Sybex, 1983, $6.95, 159 pages) will show you how to unleash your Timex's potential. The author uses a clever structure—that of a play—to organize the book. More full program listings would have been welcome, but on the whole, the book provides an adequate introduction to programming for children or adults. Some of the longer programs will not run on 1K machines.

Learning Timex Sinclair BASIC (CompuSoft, 1983, $14.95, 333 pages), written by one of the masters of the language, David Lien, covers all the essentials, including math functions and graphics. With a thorough, straightforward style, the book could serve as a self-paced text for older children (with parental guidance).

Advanced beginners will profit from David C. Foyt's *The ZX81/TS 1000 Home Computer Book* (Osborne/McGraw-Hill, 1983, $7.95, 350 pages). While not a BASIC programming guide per se, the book helps users gain a better understanding of their micros. Many short, instructive programs are listed.

TS game players will enjoy *Bogglers: 22 Smart Games Programs (2K to 16K) in Timex/ Sinclair BASIC* (Byte/McGraw-Hill, 1983, $9.95, 162 pages). The authors, Graham Charlton, and other computer experts offer program listings for 22 games and three home applications (including an address book). Some programming notes and explanations follow each listing. Also, Tim Hartnell's collection, *70 games for the Timex/Sinclair 1000 and 1500* (Addison-Wesley, 1983, $9.95, 210 pages) contains many elegant programs including 24 with moving graphics, 13 board games and simulations, and many exercises which are both educational and entertaining.

TI-99/4A

Bill Brewer and Jerry Willis present a quick intro for Texas Instruments owners in *How to Use the TI-99/4A Computer* (dilithium Press, 1984, $3.95, 139 pages). Like others in the *How To* series, it is well written and inexpensive. *(See the VIC-20 section.)*

TI users who wish to learn BASIC programming can do no better than *Get Personal with Your TI-99/4A* (dilithium Press, 1984, $9.95, 230 pages), by William A. Manning and Lon Ingalsbe. The heart of the book is its excellent minicourse in BASIC, which introduces concepts such as algorithms, string functions, and subprograms. In addition to its optional learning activities, the book has "chapter challenges" at the end of each programing chapter—problems you solve by writing programs.

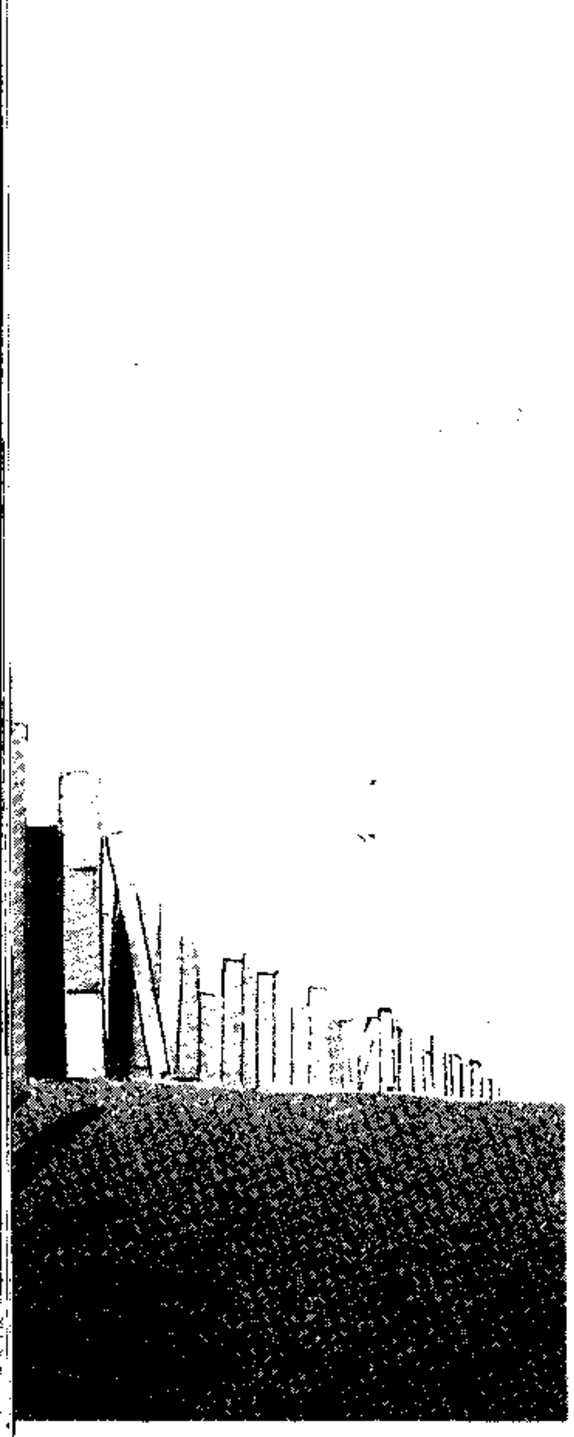
Several collections of games programs are available for TI users. You'll find 11 listings in *Fun and Games with Your TI-99/4A* (Hayden, 1984, $12.95, 104 pages), in which author Stephen M. Muncy also includes a brief 40-page tutorial on creating arcade-style games.

In *Zappers: Having Fun Programming and Playing 23 Games for the TI-99/4A* (Computer Books/Simon & Schuster, 1984, $9.95, 205 pages), Henry Mullish and Dov Kruger not only provide lengthy descriptions of each game, they also analyze the functions of various program statements, and suggest ways to modify the games.

Still more games can be found in *TI-99/4A Game Programs* (TAB, 1983, $10.95, 214 pages), by Frederick Holtz. Like the games in *Zappers*, the 32 games, written in TI standard (not Extended) BASIC teach a bit of programming along the way.

HAPPY READING

Our coverage of the fast-growing computer-book market is by no means complete. The roster of titles is huge and grows every week. The books we mention here are sure to shed new light on your family's computer. They can help you out of the swamp of confusion that may be hindering your enjoyment of the machine. And they can help you to reach new heights in understanding its vast potential. FC



THE STATS ON SPORTS SOFTWARE

TITLE/PRICE	MANUFACTURER	HARDWARE REQUIREMENTS	NUMBER OF PLAYERS	DIFFICULTY OF LEARNING	DOCUMENTATION	COMMENTS
Color Baseball $24.95	Tandy/Radio Shack 1800 One Tandy Center Fort Worth, TX 76102 (817) 338-2395	For TRS-80 Color Computer, 16K (cartridge). Joystick(s).	1 or 2	Easy, except fielding, which is difficult	Fair	Graphics a bit rough; pitching too limited; but CoCo owners don't have much choice.
Computer Baseball $39.95	Strategic Simulations 883 Stierlin Road, Bldg. A-200 Mountain View, CA 94043 (415) 964-1353	Reviewed on Apple II series, 48K (disk). Also for Commodore 64 (disk). Version planned for Atari.	1 or 2	Easy	Very good	Playing the computer is an enjoyable option; opportunity to make many decisions during the game.
Computer Football Strategy $21 (disk) $16 (cassette)	Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (800) 638-9292	Reviewed on IBM PC/PC*jr*, 64K (disk). Also for Atari Home Computers, 32K (disk or cassette); Commodore 64 (disk or cassette); TRS-80 Models I/III/4, 32K (disk or cassette).	1 or 2	Easy	Excellent	Thinking fan's game; the computer is a tough opponent. Atari version allows for choosing stats from classic pro teams.
Computer Quarterback $39.95	Strategic Simulations 883 Stierlin Road. Bldg. A-200 Mountain View, CA 94043 (415) 964-1353	For Apple II series, 48K (disk). Paddle(s).	1 or 2	Average	Very good/ excellent	Challenges would-be coaches; advanced level is a plus for expert players.
Football $15.95	Triton Products Co. P.O. Box 8123 San Francisco, CA 94128 (800) 227-6900	For TI-99/4A, 16K (cartridge).	1 (practice) or 2 (play game)	Easy	Very good	Fast, fun game for the entire family; even the novice can learn it easily; simple format, but still diverse; good buy.
Hockey $29.95	Gamma Software P.O. Box 25625 Los Angeles, CA 90025 (213) 473-7441	For Atari 400/800, 16K (disk or cassette). Joysticks.	2 to 4	Easy	Good	Easy to understand for novices; players on screen move well.
Indoor Soccer $15.95	Triton Products Co. P.O. Box 8123 San Francisco, CA 94128 (800) 227-6900	For TI-99/4A, 16K (cartridge). Joystick(s).	2	Average	Very good	Lively game; indoor version is good twist; graphics not as realistic as other soccer games.
International Soccer $24.95	Commodore Bus. Mach. 1200 Wilson Drive West Chester, PA 19380 (215) 431-9100	Commodore 64 (cartridge). Joystick(s).	1 or 2	Average	Fair	Highly entertaining; players have lifelike moves; nine skill levels make it good for family play.
I.Q. Baseball $24.95	Davka Corp. 845 N. Michigan Ave., Suite 843 Chicago, IL 60611 (800) 621-8227	Reviewed on Commodore 64 (disk). Also for Apple II series, 48K (disk).	1 or 2	Easy	Fair	A trivia game—correct answers are hits; tough questions (two levels of difficulty); great for baseball nuts.
Julius Erving and Larry Bird Go One-on-One $40	Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171	Reviewed on Apple II series, 48K (disk). Also for Commodore 64 (disk). Joystick(s) recommended.	1 or 2	Average/ difficult	Excellent	Top-notch action; players have the superstars' tendencies; takes practice; a treat for joystick jocks.
Starbowl Football $31.95	Gamestar, Inc. 1302 State St. Santa Barbara, CA 93101 (805) 963-3487	For Atari Home Computers, 24K (disk or cassette). Joystick(s).	1 or 2	Average, except passing/ receiving, which is difficult	Good	Not overly complicated, a plus among football games; one-player feature; good graphics.
Star League Baseball $31.95 (Atari) $29.95 (Commodore)	Gamestar, Inc. 1302 State St. Santa Barbara, CA 93101 (805) 963-3487	Reviewed on Atari Home Computers, 32K (disk or cassette). Also for Apple II series, 64K (disk); Commodore 64 (disk or cassette). Joystick(s).	1 or 2	Average, except batting, which is difficult	Good	Best of baseball-simulation games; excellent view of field; ballpark sounds; easy to get involved.
Statis-Pro Baseball $35	Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (800) 638-9292	Reviewed on Apple II/II plus/IIe, 48K (disk). Also for TRS-80 Models I/III/4, 48K (disk).	1 or 2	Average	Excellent	Puts you in dugout as manager of any major-league team; a strategy game for stats freaks.
Super Action Baseball $75 (can only buy w/Super Action Controllers)	Coleco Industries 10 Park St. Amsterdam, NY 12010 (518) 842-0010	For ADAM (cartridge). Super Action Controllers.	1 (practice) or 2 (play game)	Average, except fielding, which is difficult	Good	Highly detailed graphics are interesting; but, overall, not as realistic as other games; batting-practice option is fun.
Super Action Football $34	Coleco Industries 10 Park St. Amsterdam, NY 12010 (518) 842-0010	For ADAM (cartridge). Super Action Controllers.	1 (offense practice) or 2 (play game)	Difficult	Good/very good	Takes lots of practice; special joysticks full of options; good graphics; extensive playbook.
The World's Greatest Baseball Game $39.95	Epyx 1043 Kiel Court Sunnyvale, CA 94089 (408) 745-0700	For Commodore 64 (disk). Joysticks for simulation; no joysticks for strategy.	1 or 2	Simulation is difficult/ average; strategy is average	Poor	Can play statistics or simulation game; the latter mode is confusing, seems unrealistic.
Touchdown Football $34.95	Imagic 981 University Ave. Los Gatos, CA 95030 (408) 399-2200	For IBM PC*jr* (enhanced), 128K (disk). Joystick(s).	1 or 2	Easy	Demo copy only at press time	Easy-to-learn; sharp color graphics; many different formations, fun to play.

Football strategists have two hearty offerings to chew on. *Computer Football Strategy* features minimal graphics but is a whopping challenge. You'll need a steady grip on which plays to call when. (One tip about playing the computer—it likes to pass, often!) Play-probability charts are supplied (on all versions except the Atari) so you can bone up on which offensive formations work against defensive alignments and vice versa. In all, depending upon field position, you can choose from 23 plays on offense; there are a standard 10 different defenses you can call.

The game moves rapidly, which is the beauty of using the computer. In addition, *Computer Football Strategy* supplies quarter-time, half-time, and final stats.

Computer Quarterback is the ultimate game for true football fanatics in your family. It features detailed graphics and two levels of play: "Semi-Pro" and "Professional." The Semi-Pro option allows for 18 offense formations and 14 defensive alignments; the Pro version has a hefty 36 and 24, respectively. You can play alone at the Semi-Pro level, which is a good way to learn the nuances of the game, before finding human opponents.

The statistical component of this game is impressive. It offers some surprises, but plays out realistically. Consequently, games can take about an hour if you're playing regulation 15-minute quarters.

One added attraction of *Computer Quarterback* is its "Pro Draft." Before playing at any level or option, you can conduct a team selection process where each player is allotted $3 million to pick a team. You can spend your loot on a good quarterback and sure-handed pass receivers, setting up a high-scoring team for yourself, or you can spend more on defensive players so your team gives up fewer points. In connection with this feature, the manufacturer offers separate disks with data for NFL players and teams.

Another intriguing plus in this game is, if you have the proper printer, you can record every play. With this alternative, you get hard copy at game's end which shows how you won or lost: It's something you can study before playing the same opponent again (just like a pro or college coach would review game films).

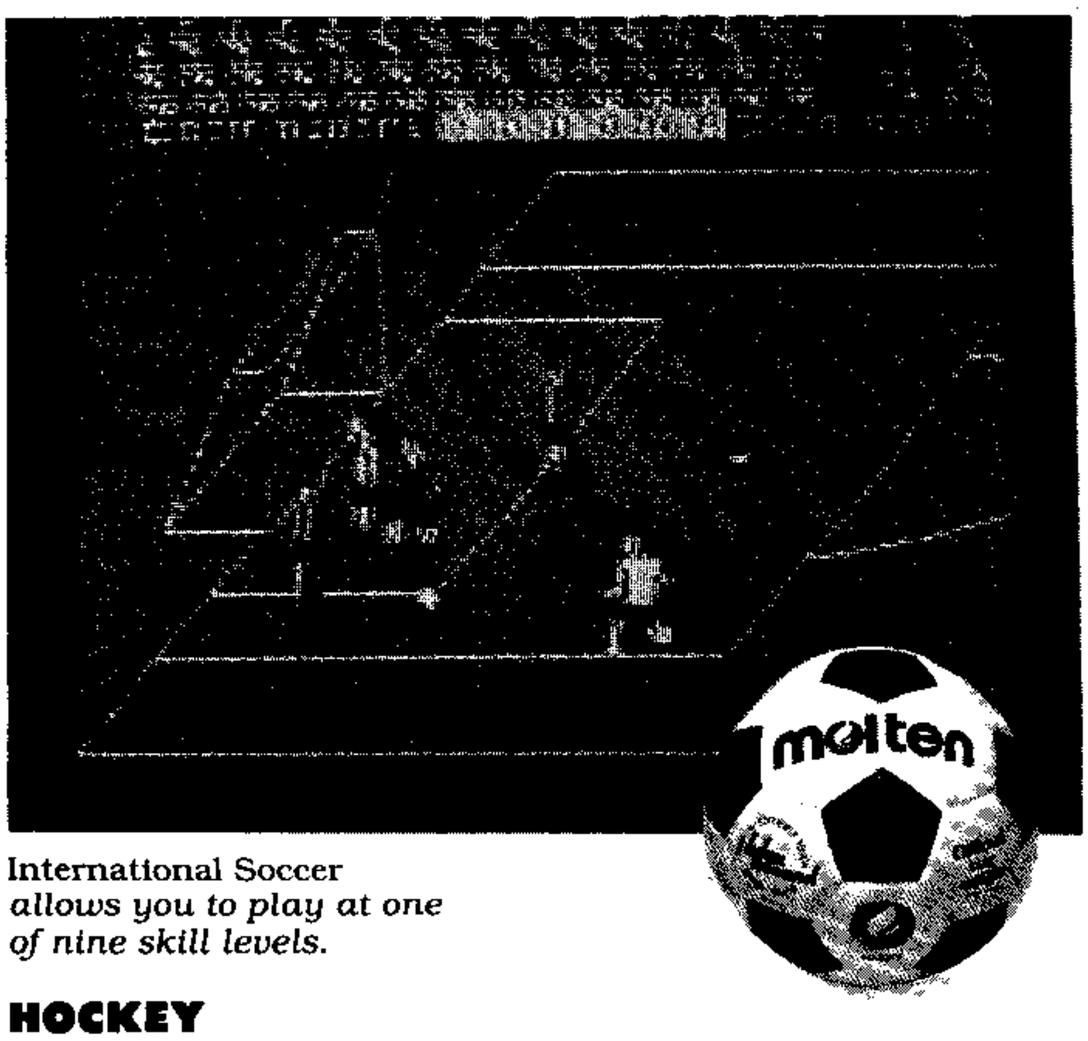
Computer Quarterback comes with advice on how to set up a league of any NFL teams, which isn't a bad idea. Except that this game can get habit-forming.

BASKETBALL

Appropriately enough, *Julius Erving and Larry Bird Go One-on-One* is the only basketball product we've reviewed, for it *is* in a class by itself. This game has successfully combined the excitement of simulation play and the realism of strategy/statistics games. You have the choice of being either Dr. J or Bird, with a human opponent or the computer taking the other role. What happens after you choose sides is—if the Los Angeles Laker will pardon the expression—purely magic. Or at least hints at artificial intelligence.

Each basketball superstar's on-court tendencies (the players helped with the design) have been programmed into the game. If you're the Doctor, you'll have all the fancy moves inside and be a step quicker. As Bird, you'll be more physical, rebound better, and play relentless defense. What's more, *One-on-One* shows you how tired the players are getting and who has the hot shooting hand.

As you practice—at one of the four skill levels—you'll soon be swishing jumpers and spinning in the air like these stars. Why, you may even hit a point-blank slam dunk which shatters the backboard, bringing out a maintenance man to sweep up. This software package nets my vote for Sports Game of the Year.



International Soccer *allows you to play at one of nine skill levels.*

HOCKEY

When it comes to the best sports games for the whole family to play together, don't overlook fast-paced hockey. For example, *Hockey* allows for up to four players. The main objective: score more often than your opponent (a defense-oriented approach usually backfires).

Hockey is a sleeper. At first glance, with stick-figure players on a smallish rink covering only about two-thirds of the screen, it doesn't look like much. But the game's players move around the ice well, particularly when they're not carrying the puck. Shooting or moving in any direction is easily done and you won't lack for goal-scoring with this product. A lively puck, which bounces off the boards with power, makes things interesting. However, a smart player will slow down the action a bit.

There are two problems with *Hockey*: 1) the goalie only moves vertically and 2) "offsides" can't be called, meaning a player can "camp out" at the opponent's net.

SOCCER

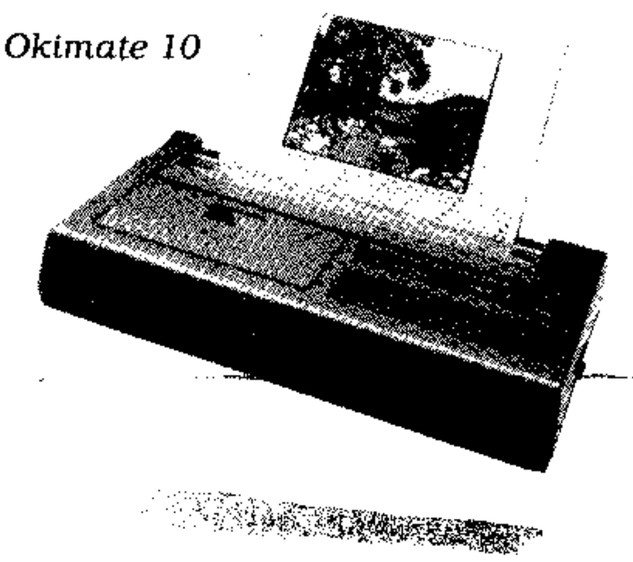
As more boys and girls play the sport, soccer is fast becoming the family game. And, similar in ways to the computer boom, parents are often learning about soccer *after* their kids get involved. Although neither of these pieces of software allows for more than two players, each moves quickly enough to provide a fast turnover among participants.

International Soccer could be more realistic, but it *is* lively. The players are large (seven to a side) and it's easy to see their moves, such as throwing the ball in-bounds, "heading" it downfield, or slowing down when dribbling. Players carrying the ball are slowed purposely, to encourage downfield passing. The most entertaining feature of *International Soccer* is the perky goaltender, who jumps, dives, and sprawls to make the big save.

Another plus with *International Soccer* is its nine skill levels, the highest being a World Class mode that'll have you playing like Pelé.

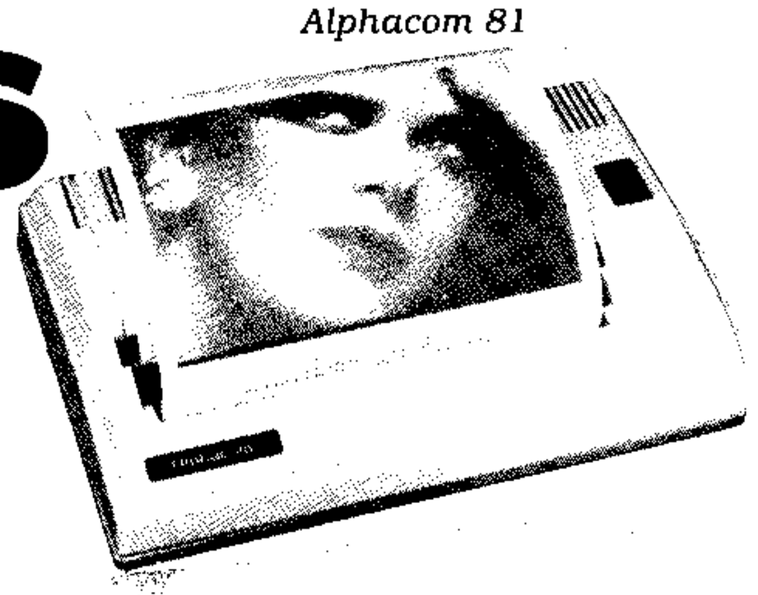
Indoor Soccer brings a new twist to a traditional game. Just like the American indoor version of soccer played in ice-hockey rinks, this game's ball bounces off the boards with alert players keeping up with the action. The graphics could be better (players run backward instead of turning around to chase a loose ball). But *Indoor Soccer*, with five players on each team, does keep your interest. Perhaps it's that suspense Neil Simon was talking about—you just never know how it's going to end up.

Okimate 10



BUYER'S GUIDE TO PRINTERS UNDER $600

Alphacom 81



BY BILL HOWEY

Since word processing is one of the most popular uses for computers, printers are among the most sought-after computer peripherals. After all, a manuscript or letter doesn't do anyone much good when it's stuck inside a computer.

While printers are not cheap, prices have dropped considerably in the past year. You can find basic but reliable printers for less than $300. And in the $300 to $600 range, there's a whole slew of fast, sturdy, and versatile printers. You can even find so-called "letter-quality" printers in this price range; a year ago, that was virtually impossible. Finally, in many cases, printers have become easier to shop for, as some manufacturers supply special cables for specific computers.

Here are the three main types of printers, and their strengths and weaknesses.

THREE TYPES OF PRINTERS

Thermal. Thermal printers work by "burning" visible dots onto special heat-sensitive paper. They are extremely reliable, inexpensive, and compact. They are relatively fast, and very quiet. However, the paper is expensive, not suitable for most applications, sometimes hard to find, and the print quality is only mediocre. Now that dot-matrix printers are dropping in price, there's less demand for thermals.

A newer version is the thermal-transfer printer, which actually uses a completely different technology, and is bringing color printers down to an affordable price. The Okimate 10 and the forthcoming Apple Scribe (both color printers), two examples of thermal-transfer printers, work by heating up ribbon and transferring ink to paper. Standard paper may be used. However, the ribbon is good for only one go-through.

Dot-matrix. Dot-matrix printers, like thermals, use the dot process to form characters, but do so by striking a typewriter-style ribbon against regular paper, either single-sheet or fanfold. Fanfold paper has holes along each side which fit into a pin- or tractor-feed mechanism on the printer. Dot-matrix printers are the fastest around, and many can also print out graphics. If you need to do a lot of printing, either of manuscripts or program listings, dot-matrix printers are the best buy. Many users don't think dot-matrix output is good enough for formal use, but if the printer has a "double-strike," or "emphasized," mode, it's pretty close to letter-quality.

Letter-quality. Often known as daisywheel printers, letter-quality printers are ideal for correspondence. They offer the most handsome text output available, trading off this look against speed and price. Individual "dies" for each character are mounted on a small, removable plastic or metal unit, called a daisywheel, thimble, or ball. Because the print elements are removable, it's easy to exchange one set of characters for another.

Daisywheel printers can feed single sheets of paper (dot-matrix printers often can't), so that formal letterhead or special paper can be used. However, unless you buy a sheet-feeder, which is expensive, you'll have to feed the printer one sheet at a time. In most cases, a pin- or tractor-feed mechanism is standard or can be added later, to allow use of the perforated, fanfold paper. Also, daisywheel printers usually have wider carriages than dot-matrix printers, often allowing 132-column (or character) printouts. For printing out spreadsheets and other specialized formats, this expanded carriage is a real bonus.

Daisywheel printers, however, are very slow. In the under-$600 range, you won't find any faster than 25 characters per second (cps), and most are much slower. At this speed, a 20-page, double-spaced report will take half an hour to print—for the frequent user with lots of copy, an annoying waste of time. So, a daisywheel printer may not be your best bet, unless you need a printer for formal business correspondence.

POINTS TO CONSIDER WHEN SHOPPING

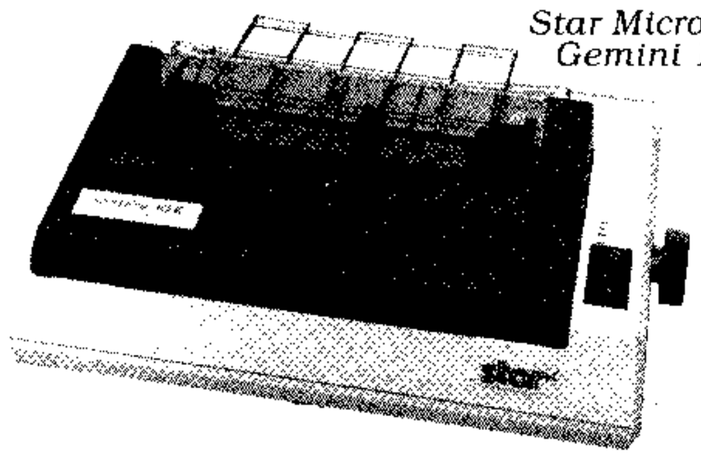
Paper. What kind of paper do you want to use? If it doesn't matter, then a thermal or dot-matrix printer is fine. (But don't forget that thermal paper is expensive.) If you want special letterhead paper, then a daisywheel is virtually a necessity. If you want to use fanfold, perforated paper on a daisywheel—for large print jobs—then you'll need a pin- or tractor-feed mechanism. Finally, on any printer, have the salesperson show you how to put the paper into the machine and try it yourself. Is it awkward? Some tractor-feed mechanisms resemble a Chinese ring puzzle! Does the cover swivel (preferable) or must it be removed from the printer (awkward)?

Ribbon/Printheads. The ribbons (on dot-matrix and daisywheel printers) will need to be replaced. Ribbon replacement can be expensive (see ribbon costs on chart). And, if you want to try new character sets on your daisywheel printer, you'll need new daisywheels. So, you want to know that your particular printer uses a standard daisywheel. Qume and Diablo are the standards—ribbons and daisywheels of this type are easy to find.

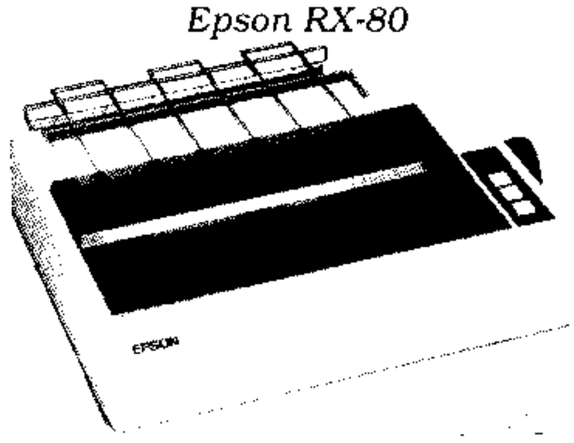
Cables. You buy a printer, bring it home and . . . Wait! How do you connect it? You need a cable, and there's only one that will work. Make sure you solve that little mystery before you buy. Some manufacturers (such as Alphacom, Axiom, and Star Micronics) now make special cables for specific computers. If such cables don't exist, then a standard Centronics or RS-232C serial cable should work—if your computer has either of those interfaces. In some cases, you'll need to buy an interface card (or circuit board) to give your computer a printer connection. But, there's something funny about standards in the computer industry—don't trust a connector until you see it work with your own eyes.

Compatibility. You want to make sure a certain printer works with your computer. If you can connect it, you've

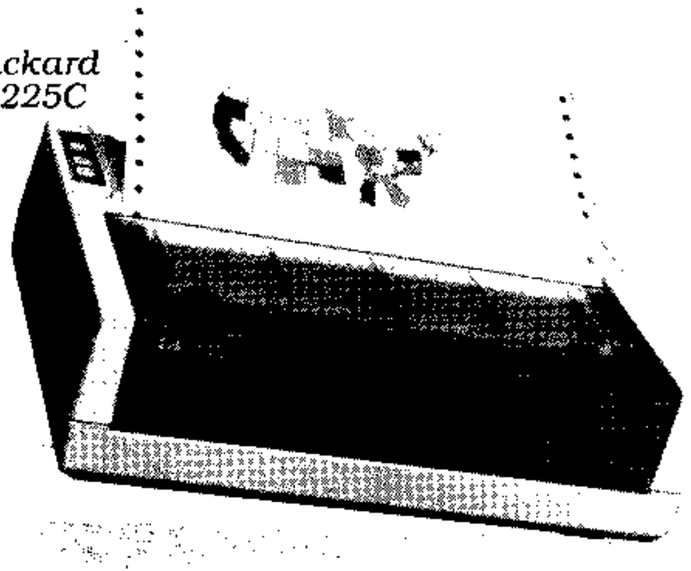
BILL HOWEY *is the system operator for EpSource, Epson's national bulletin board. He wrote the "Buyer's Guide to Modems" in the March* FAMILY COMPUTING.



Star Micronics Gemini 10X



Epson RX-80



Hewlett-Packard 2225C

generally got a match. But, more important, you want to make sure it will work with your favorite piece of software. Most word-processing programs, for instance, are designed to work with two or three printers—beyond those, you may be on your own. Features such as underlining, boldface, subscript (H_20), and superscript (x^{10}) might work well with one printer and not at all with another.

And, don't assume that just any printer will print out your computer's graphics characters. Most printers have a self-test function, so that you can see all the characters featured by that particular model. Also, remember that a special interface is sometimes needed to print out the graphics. Conversely, don't assume that your computer or software will be able to take advantage of all the features of a certain printer.

Speed. Daisywheels are the slowest printers, dot-matrix are the fastest, and thermals are in-between. Speed is measured in characters per second. To churn out long reports, you'll want something in the 100 cps range, though 60 cps should do close to two double-spaced pages a minute. Anything under 25 cps is considered slow—but if the printer meets your other needs, it's bearable.

Noise. Except for thermals, computer printers are not especially quiet. Printer noise levels are measured in decibels (db). While acceptable noise levels will vary with personal taste and the situation, figure that anything in the 50–65 db range is fairly average. Above that, hold on to your earmuffs!

And now, some quick reviews of some of the top performers in the under-$600 category.

PRINTERS REVIEWED

Abati LQ-20. This low-cost, letter-quality printer ($479) is a pleasant surprise. It produces good letter-quality output, and its print wheels and ribbons are standard Qume products, so they should be easy to replace. Two sets of DIP switches (a row of tiny switches used to control different printer functions) allow configuration to most any computer. A smoked plastic cover that swivels to allow access to the ribbon and print head helps to reduce printer noise to a very respectable 58 db. However, speed is not a strong point of the Abati. At 18 cps, it's not intended to be used for extensive "production" work.

Early shipments of the printer included a confusing owner's manual, but an improved, expanded manual should be available soon. And, if you have any troubles, Abati answers its service phone! The LQ-20 is a quality, no-frills printer that should produce clean copy for years.

Alphacom 42 and 81, Alphacom Alphapro. Alphacom's two thermal printers are inexpensive, reliable, and have special interfaces ($45–$60) for Atari, Commodore, IBM, and Texas Instruments computers. The Alphacom 42 ($119) prints two 40-column lines a second, and can print uppercase and lowercase letters. The 81 ($169) prints 80-column lines at 100 cps. In addition, the 81 is capable of printing fairly sophisticated graphics, and can be connected to the Apple Macintosh. Neither includes interfaces. Both printers use a friction-feed mechanism to hold thermal roll-paper.

Now, Alphacom is trying to bring its expertise for high-performance, low-cost printers to a letter-quality printer, the Alphapro ($399). This daisywheel printer, which uses standard Diablo- and Qume-compatiable print wheels and

ADDRESSES OF PRINTER MANUFACTURERS

Alphacom, Inc.
2323 S. Bascom Ave.
Campbell, CA 95008
(408) 559-8000

Apple Computer, Inc.
(see your local dealer)

Atari, Inc.
1312 Crossman Road
Sunnyvale, CA 61657
(408) 745-2820

Axiom Corp.
1014 Griswold Ave.
San Fernando, CA 91340
(818) 365-9521

Brother Industry, Inc.
5698 Bandini Blvd.
Bell, CA 90201
(714) 859-9700

Cardco Inc.
300 S. Topeka
Wichita, KS 67202
(316) 267-6525

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
(215) 431-9100

Epson America, Inc.
3415 Kashiwa St.
Torrance, CA 90505
(800) 421-5426

Ergo Systems
1360 Willow Road
Menlo Park, CA 94025
(415) 322-3746

Hewlett-Packard
1000 N.E. Circle Blvd.
Corvallis, OR 97330
(800) 367-4772

Inforunner
Airport Business Center
431 N. Oak St.
Inglewood, CA 90302
(213) 453-6688

C. Itoh Electronics Inc.
5301 Beethoven St.
Los Angeles, CA 90066
(800) 348-1984

Juki Industries of America
299 Market St.
Saddle Brook, NJ 07662
(201) 368-3666

Kaypro Corp.
533 Stevens Ave.
Solana Beach, CA 92075
(619) 481-4300

Mannesman Tally
8301 S. 180th St.
Kent, WA 98032
(206) 251-5524

Micro D
17406 Mount Cliffwood Circle
Fountain Valley, CA 92708
(800) 854-6801

NEC Home Electronics
Personal Computer Division
Elk Grove Village, IL 60007
(312) 228-5900

Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
(609) 235-2600

Olympia USA
Route 22, Box 22
Somerville, NJ 08876-0022
(201) 722-7000

Panasonic Co.
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7292

Silver-Reed America, Inc.
19600 S. Vermont Ave.
Torrance, CA 90502
(213) 516-7008

Smith-Corona
65 Locust Ave.
New Canaan, CT 06840
(203) 972-1471

Star Micronics
200 Park Ave., Pan Am Bldg.
New York, NY 10016
(214) 456-0052

Tandy Corp./Radio Shack
1800 One Tandy Center
Fort Worth, TX 76102
(817) 390-3944

Transtar
Box C-96975
Bellevue, WA 98009
(206) 454-9250

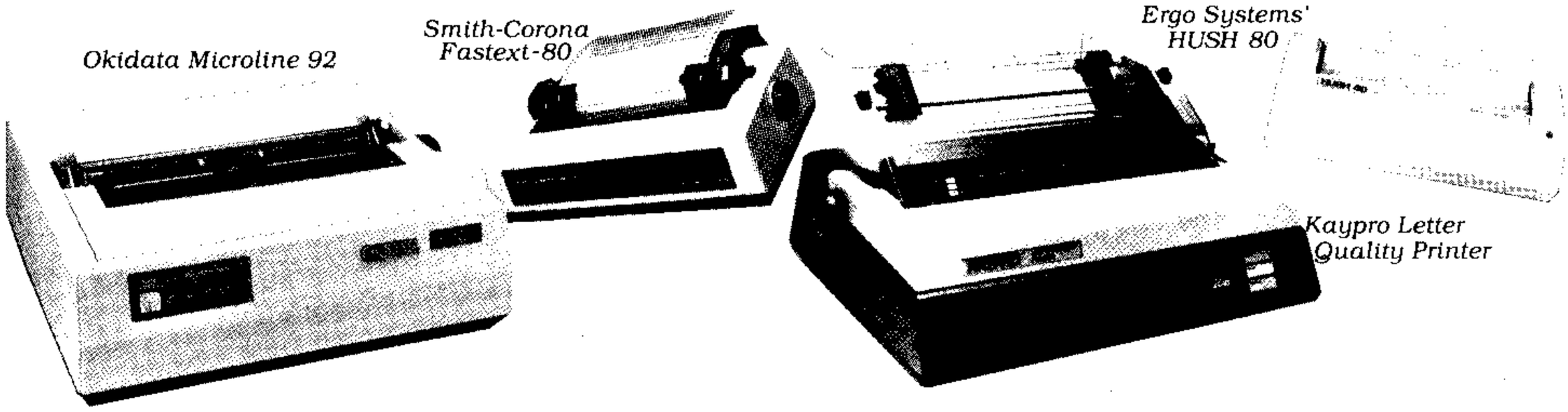
UNDER-$600 PRINTERS

PRINTER MODEL	MFR./ DIST.	INTERFACE	PRINT METHOD	SPEED (CPS)	SOUND (Db)	PAPER WIDTH (in.)	PRICE PRINTER/ RIBBON	FEATURES
Abati LQ-20	Micro D	P/S	Daisywheel	18	58	13	479/10	Special character wheels available
Alphacom 42	Alphacom, Inc.	P/S	Thermal	80	NA	4.33	119/N A	Atari, Commodore, and Apple compatible
Alphacom 81	Alphacom, Inc.	P/S	Thermal	80	NA	8.75	169/N A	Friction feed; interface for Macintosh (optional)
Alphapro	Alphacom, Inc.	P/S	Daisywheel	18	NA	13	399/5	Intelligent Cable Interface; Diablo-compatible
Atari 1025	Atari, Inc.	S	Dot-matrix	40	66	13	399/6.50	Cable included; direct serial connection
Atari 1027	Atari, Inc.	S	Rotary head	12/20	68	13	349/7.95	Cable included; direct serial connection
Brother HR-15	Brother Industry*	P/S	Dot-matrix	13	65	13.5	559/ 2.35–3.40	5K buffer
Cardco LQ-2	Cardco Inc.	P	Daisywheel	12	62	8.7	349/7.95	Optional battery pack; interface for PC*jr*, Commodore
Commodore 1526	Commodore Bus. Mach.	S**	Dot-matrix	30	66	8.5	300/8.95	Interface for Commodore
Delta-10	Star Micronics	P/S	Dot-matrix	160	74	10	549/2.45	Special character sets; 8K buffer
DMP-120	Tandy Corp./Radio Shack	P	Dot-matrix	120	70	9.5	499/17	Pin/friction feed; text and graphics
Electronic Compact NP	Olympia USA	P/S (opt.)	Dot-matrix	100–165	65	10	499/6.95	Tractor feed; bidirectional; very fast
Epson FX-80	Epson America, Inc.	P/S (opt.)	Dot-matrix	160	68	10	599/9–14	Pin/friction feed; many styles
Epson RX-80	Epson America, Inc.	P/S (opt.)	Dot-matrix	100	64	10	399/9–14	Pin/friction feed; graphics
EXP 400	Silver-Reed America, Inc.	P	Daisywheel	12	65	12	399/ 3.65–7.25	Boldface; sub/superscripts
EXP 500	Silver-Reed America, Inc.	P/S	Daisywheel	16	65	13	549/ 3.65–7.25	Diablo-compatible
Fastext-80	Smith-Corona	P/S (opt.)	Daisywheel	80	63	11	259/9.50	Friction feed; bidirectional
Gemini 10X	Star Micronics	P/S (opt.)	Dot-matrix	120	74	10	399/2.50	Pin/friction feed
Gemini 15X	Star Micronics	P/S (opt.)	Dot-matrix	120	74	15	549/2.50	Pin/friction feed; 8K buffer
GP-100TI	Axiom Corp.	S	Dot-matrix	50	82	9.5	309/10	Tractor feed; direct-connect cable for TI-99/4A; graphics
GP-550	Axiom Corp.	P/S	Dot-matrix	86/43	60	8.5	319/14.95	Near letter-quality mode
GP-700AT	Axiom Corp.	S	Dot-matrix	50	82	9.5	599/20	Direct connect cable Atari; graphics
HP 2225C	Hewlett-Packard	P	Ink-jet	150	50	12	495/7.95	International character set
HUSH 80P	Ergo Systems	P	Thermal	80	56	8.5	159/NA	Includes interface, cable, and roll-paper; portable
HUSH 80S	Ergo Systems	S	Thermal	80	56	8.5	159/NA	Includes interface, cable, and roll-paper; portable
Imagewriter	Apple Computer, Inc.	S	Dot-matrix	120/80	NA	10	595/10.50	Pin/friction feed; graphics and text
Juki 6100	Juki Industries	P/S (opt.)	Daisywheel	17	62	13	599/5.95	Proportional spacing; add-on buffer available
Kaypro Letter Quality Printer	Kaypro Corp.	P	Daisywheel	18	62	13	599/ 1.58–3.75	Optional pin feed
KX-P1090	Panasonic Co.	P/S (opt.)	Dot-matrix	80	72	10	399/6.70	Pin/friction feed; graphics
Microline 92	Okidata	P/S (opt.)	Dot-matrix	160	67	9.5	599/3.15	Pin/friction feed; optional acoustical cover; international character set
NEC PC-8021	NEC Home Electronics	P	Thermal	40	54	4.5	249/NA	Friction feed
NEC PC-8027	NEC Home Electronics	P	Dot-matrix	120	NA	10	499/6.79	Pin/friction feed; portable
Okimate 10	Okidata	S**	Thermal	60	50	8	239/6	40 colors; software included
Prowriter 8510-AP	C. Itoh Electronics Inc.	P	Dot-matrix	120	65	10	495/6.79	Additional character sets; pin/ friction feed
Riteman Plus	Inforunner	P	Dot-matrix	120	64	9.75	399/8.50	One of several models
Spirit 80	Mannesman Tally	P/S (opt.)	Dot-matrix	80	64	10	399/8.80	Pin feed; text and graphics
Transtar 120	Transtar	P/S	Daisywheel	14	65	12	550/ 6.95–8.95	Autoload

KEY TO CHART P = Parallel S = Serial *Also sold as Comriter CR-11 and Dynax DX-15. **Special Commodore or Atari interface
CPS = Characters Per Second Db = Decibels NA = Not Available or Not Applicable

ribbon cartidges, prints 18 cps. An Intelligent Cable Interface ($49) adapts the Alphapro to computers with RS-232C serial or Centronics-parallel ports; there's also an interface for the Macintosh. The Alphapro offers boldface, double strike (emphasized), superscripts, and subscripts. We have yet to try it out, but it sounds promising.

Brother HR-15, Comriter CR-11, Dynax DX-15. The Brother HR-15 ($599), also sold under the Comriter and Dynax labels, has a lot of pluses and one minus. The latter is a turtlelike print speed of 13 cps. Beyond this, the Brother/Comriter/Dynax is a great buy, because many of its features are so well executed. A tractor-feed mechanism ($139.95), an inexpensive ($259.95) cut-sheet feeder (for single-sheet paper), a choice of four types of ribbons ($50–$70 for 12), and 26 cassette-style daisywheels should be enough incentive to send most printerless com-



puter owners to the nearest store for a closer look—if you want letter-quality output.

Cables do not come with the printer, but are standard and available at many stores. In addition, an attachable typewriter keyboard is available ($200), so you can use the printer to type up an envelope without loading in a word-processing program, formatting, etc. Overall, the unit is handsome, civilized, and a pleasure to use.

Epson RX-80 and FX-80. You can't go wrong with an Epson printer—at least not that we know of. They are extremely well-built, and will do most anything you ask of them. Expanded, compressed, and italic print styles are standard, as are subscripts and superscripts. The FX-80 ($599) and RX-80 ($399) are both durable, fast, and versatile; the FX-80 is somewhat faster and produces slightly crisper letters than its sibling. Both can print graphics characters and international character sets. Again, the FX-80 has slightly better definition. If you're wary of making a purchase mistake and want to buy a proven performer, Epson must be near the top of everyone's list. The documentation is more than adequate, though getting the DIP switches properly adjusted for your particular needs takes a little experimentation.

Juki Model 6100. The Juki is an attractive and solid daisywheel printer that is compatible with existing accessories. Replacement IBM cartridge ribbons can be found in most stationery stores. The 100-character daisywheel is available in a number of print fonts and styles. A 2K buffer is standard, and can be expanded in 2K increments ($28 each from Juki) to 8K. (A buffer, a storage space inside the printer, allows a computer to send several pages of a document to the printer and free itself up for other tasks.) Though the output is clean and crisp (and includes graphics), the Juki is relatively slow, at 17 cps.

The 6100 uses a 13-inch platen, which will allow use of oversize paper and multipart forms. A tractor-feed is available ($149), allowing use of perforated fanfold paper. Front-panel controls program the printer for 10, 12, or 15 characters per inch, along with proportional spacing. Word-processing users will be glad to know that subscript, superscript, underscore, boldface, and shadow printing are standard features. The manual is superb. Complete setup instructions for some popular computers and word-processing programs are provided.

Mannesman Tally Spirit 80. The Spirit 80 is one of the lower-priced ($399), full-featured, dot-matrix printers around. Its film ribbon accounts for the clean, crisp, and fully formed characters. It prints at 80 cps—about two-and-a-half pages per minute. Both serial and parallel versions are available; both accept standard cables that should be available at most major dealers.

The Spirit's smoked plastic cover lifts off to allow access to the ribbon and print head. This design feature, however, is a slight nuisance. Hinged covers don't add that much to the cost of a printer, and make threading paper, changing ribbons, and cleaning the print head easier.

The Mannesman manual is unusually short (it is a 50-page, half-size book), but contains all the information necessary to hook up the printer to just about any computer. One pleasant surprise is the clear explanation given for setting the DIP switches.

Okidata Microline 92. This dot-matrix printer ($599) does not represent the latest in printer technology, and it's not the darling of the computer-show circuit—but it happens to be an excellent value.

The Microline 92 is small, so it's ideal for the home or crowded office desk. Two built-in character sets make it versatile; and its top speed of 160 cps makes it incredibly efficient. Furthermore, the print output is sharp.

Loading new paper is a breeze. You may select between pin-feed rollers and standard friction feed. Finding new ribbons will never be a problem. The standard spool ribbon can be found in most computer stores.

Two drawbacks: at 67db, it's a little noisy; and setup is a little difficult because the DIP switches are accessed by removing the upper casing. This lack of user consideration is somewhat surprising for a machine that offers so many other convenient features.

Okimate 10. Once regarded as inferior in quality to daisywheel and dot-matrix printers, thermal printers have blossomed with new technology. An example is the new Okimate 10 ($239), a quiet thermal-transfer printer that is capable of full-color printing in more than 40 shades. A printer of this capability at this price is an unbelievable accomplishment! The Okimate 10 can be used with Atari and Commodore computers, and print out any graphics the computers can produce. Two programs—a learn-to-print and a color-screen kit—are included.

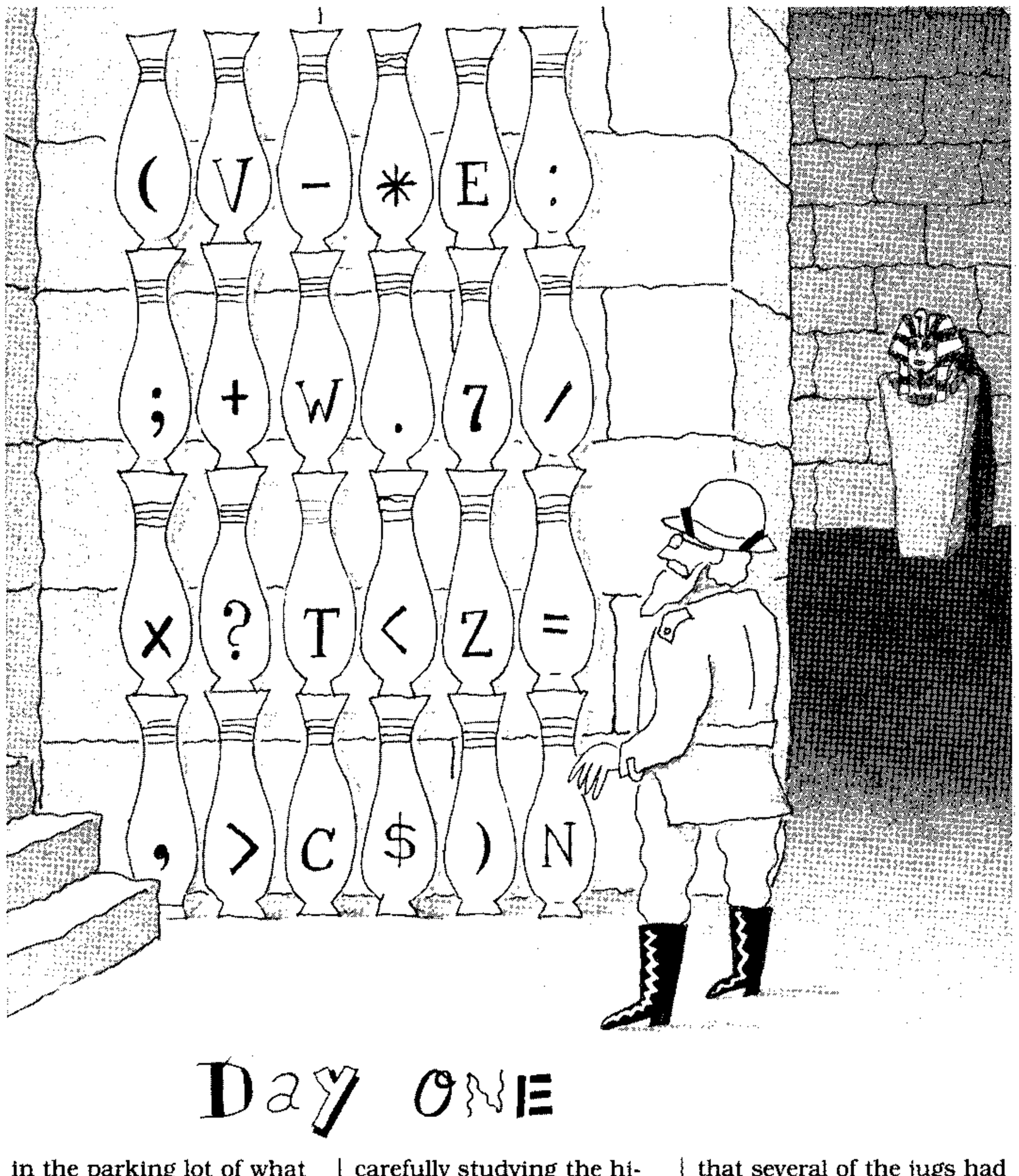
Users get about 10 pages of color printing, and about 75 pages of text from one ribbon (about $6). High-gloss paper is recommended, but not necessary, for color printing. The printer produces graphics at 18 cps, and text at 60 cps. The text is very clear.

Star Micronics Gemini 10X. Star Micronics has a wide range of printers for less than $600, and all are solid performers. The STX-80 ($199) is a fast (60 cps), quiet thermal printer with a standard Centronics-parallel interface. The two Geminis, the 10X ($399) and 15X ($549), are dot-matrix printers. Both offer friction and tractor feed as standard items, but can also use single-sheet paper. They print at 120 cps, and can print italic, condensed, enlarged, emphasized, double-strike, and international characters. The output is extremely sharp in any style. Both come with a Centronics-parallel interface, and offer an RS-232C serial interface as an option. The only difference between the two printers is that the 15X features a 15.5-inch carriage, making it ideal for spreadsheet printouts.

Finally, the Delta 10 ($549) keeps all these laudable features and adds another—speed. It prints at 160 cps, so is ideal for large-volume printing. Star Micronics also has more printers at the high end of the price scale. FC

MUMMY MANEUVERS Jug-gling Your Way Out Of An Egyptian Pyramid

BY PETER FAVARO



Day One

As Professor Understone stood at the entrance to the ancient Egyptian pyramid, his heart fluttered. His lifelong dream was about to come true. For years, Professor Understone had been scoffed and harrumphed at by his pompous, stuffy colleagues in the archaeology department of the university where he taught. Now, he would finally collect the evidence that would reveal one of the greatest historical inaccuracies of all time—that the wealth and power of ancient Egypt's boy king Tutankhamen was insignificant compared to that of Tut's second cousin twice removed, Muchincommon ("Much" for short).

Much's father (Tut's uncle) owned Egypt's largest pyramid construction company. He died leaving Much the richest and most powerful boy in Egypt. Much never got the attention nor the press that Tut received, because of his stinginess and surly disposition. Much was so stingy that the slogan of his pyramid construction company read: "You *Can* Take It With You—As Long As It's Well-Sealed!" The rivalry between Tut and Much was so great that Professor Understone even unearthed hieroglyphics about the feuding relatives in the parking lot of what is now an Egyptian fast-food restaurant: McTut's.

Seconds after Professor Understone entered the pyramid, a thundering crash shook the walls and sealed the only door back to the outside world. Armed with only a canteen of water, five peanut butter-and-jelly sandwiches, a few matches, and a disposable lighter, Professor Understone began to explore the pyramid. As he was carefully studying the hieroglyphics on 24 ancient Egyptian water jugs, his lighter flickered and died.

Professor Understone's heart sank. A day passed. He was just about to give up all hope of escape when a strange thing happened. The pyramid door opened a crack, throwing a ray of sunlight on the 24 water jugs. Goose pimples rose on the professor's neck when he realized that several of the jugs had *shifted position*! New jugs had appeared in place of those that had moved. Suddenly, as quickly as it had opened, the door slammed shut.

The same thing happened during Professor Understone's third and fourth days in the pyramid. Each day the same jugs changed position, and the door opening grew wider. Professor Understone waited with baited breath for the

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fifth day, when, if everything went according to sequence, the door would open wide enough for him to escape. But nothing happened.

Down to his last peanut butter-and-jelly sandwich, Professor Understone racked his brain for all he could recall about Muchincommon. The ancient Egyptian loved puzzles, and clearly had a stake—selfish as it may be—in releasing the Professor and securing his name in history. But Much was as mean and stingy in his afterlife as he had been in his heyday. He was going to make the Professor work for his release. Somehow, the Professor had to discover the pattern in which the jugs were moving, and move them to their fifth and final position himself, thereby triggering the opening of the door.

HOW TO PLAY

Make sure your computer is set for all uppercase letters before you type in or RUN this program. The illustration (page 64) shows the arrangement of the jugs when the Professor first entered the pyramid. When you run *Mummy Maneuvers*, you will see the new arrangement on Day Two. (The jugs will be represented on the screen by their hieroglyphics.) To see the jug arrangements for days three, four, and five, press the space bar.

Note that the arrangement on day five is exactly the same as that of day four. It is up to you to place the jugs in their final position and thereby permit the opening of the door. Use your "I" (up), "J" (left), "K" (right), and "M" (down) keys to position your cursor over a jug. Then input the appropriate jug hieroglyphic. Repeat this procedure until you are satisfied that all the jugs have been placed in the correct position.

Now type "D" to try the door. If your arrangement is correct, the door will open and the program will end. If your arrangement is incorrect, you can get a helpful hint by typing the "H" key. Pressing the space bar returns you to the fifth day so you can continue with your experimenting. If you need to go back and study the jug arrangements on the previous days, use your space bar. (This will not affect your jug arrangement.) There is no limit to the number of times you can try the door, but hurry; Professor Understone is down to his last sandwich!

Base Version (IBM PC)/*Mummy Maneuvers*

```
10 DIM DAY$(2,6),S$(24):WL=80:WH=12:XP=32:YP=4:WIDTH W
L:KEY OFF:LOCATE ,,0
20 CLS:TRU=-1:DT=100:TZ=0:TX=1:T1$=CHR$(178)
30 M=(WL-20)/2+TZ:W3=INT(WL/3):DP=2:BL$=""
60 FOR I=1 TO 6:READ DAY$(1,I),T$:C=ASC(LEFT$(T$,1))-6
4
70 FOR Z=2 TO LEN(T$):N=ASC(MID$(T$,Z,1))-C
80 IF N+C<64 THEN N=N+TRU*28*(N<36):GOTO 100
90 N=N+TRU*26*(N<65)
100 DAY$(2,I)=DAY$(2,I)+CHR$(N):NEXT Z:NEXT I
110 FOR I=1 TO 20:L$=L$+"-":NEXT I
120 FOR I=1 TO W3+1:DR$=DR$+T1$:BL$=BL$+" ":NEXT I
130 BL$=LEFT$(BL$,W3-1):W3=W3+TZ
140 FOR I=1 TO 24:S$(I)=MID$(DAY$(2,4),I,1):NEXT I
150 CLS:IF DP<>5 THEN FOR DL=1 TO DT:NEXT DL:GOTO 180
160 DAY$(2,DP)="":FOR I=1 TO 24
170 DAY$(2,DP)=DAY$(2,DP)+S$(I):NEXT I
180 Q$="DAY "+DAY$(1,DP):GOSUB 1000:PRINT
190 FOR X=0 TO 3:PRINT TAB(M);L$:PRINT TAB(M);
200 FOR Y=1 TO 6:PRINT "  ";MID$(DAY$(2,DP),X*6+Y,1);
210 NEXT Y:PRINT:NEXT X:PRINT TAB(M);L$
220 PRINT:R$="PRESS":IF DP<>5 THEN 240
230 R$="USE <I>, <J>, <K>, AND <M> TO MOVE CURSOR, <D>
 TO TRY DOOR, OR"
240 R$=R$+" <SPACE BAR> TO MOVE FROM DAY TO DAY."
250 GOSUB 2000:IF DP=5 THEN PC=1:GOSUB 3000
260 GOSUB 5000:K$=INKEY$:IF K$<CHR$(32) OR K$>"Z" THEN
 260
270 IF K$<>CHR$(32) THEN 290
280 DP=DP+1-TRU*4*(DP=5):GOTO 150
290 IF DP<>5 THEN 260
300 IF K$="D" THEN 370
310 RD=TRU*((K$="M")-(K$="I")):CD=TRU*((K$="K")-(K$="J
"))
320 IF RD+CD=0 THEN 360
330 PC=PC+CD+RD*6
340 PC=PC+24*TRU*((PC<1)-(PC>24))
350 GOTO 260
360 S$(PC)=K$:GOSUB 5000:GOTO 260
370 CLS:FL=0:T$="":FOR I=1 TO 24
380 FL=FL+(S$(I)=MID$(DAY$(2,1),I,1)):NEXT I
390 FOR I=1 TO WH+1:PRINT TAB(W3);DR$:NEXT I
400 PRINT TAB(W3/2);DR$;DR$:PRINT:IF ABS(FL)=24 THEN 5
10
410 SOUND 50,1:SOUND 37,2
420 R$="WRONG ARRANGEMENT; DOOR DOESN'T BUDGE!"
430 R$=R$+" PRESS <H> FOR A HINT OR <SPACE BAR> TO CON
TINUE.":GOSUB 2000
440 K$=INKEY$:IF K$=CHR$(32) THEN 150
450 IF K$<>"H" THEN 440
460 CLS:PRINT:R$="TRY LOOKING AT A "+DAY$(2,6)+" ..."
470 GOSUB 2000:PRINT:PRINT:PRINT
480 R$="PLEASE PRESS <SPACE BAR> TO CONTINUE.":GOSUB 2
000
490 K$=INKEY$:IF K$<>CHR$(32) THEN 490
500 GOTO 150
510 R$="RUMBLE RUMBLE ...":GOSUB 2000
520 FOR A=40 TO 500 STEP 30:SOUND A,.1,15:NEXT A
530 X=1:Y=WH+5:GOSUB 4000
540 R$="SUCCESS! THE DOOR SLOWLY RISES. YOU'RE FREE!"
550 GOSUB 2000:X=W3+2-TX:FOR Y=WH+2 TO 2 STEP -1
560 GOSUB 4000:PRINT BL$;
570 FOR A=.5 TO 0 STEP -.1:SOUND 50,A,15:FOR B=1 TO 10
:SOUND 40,.01,15:NEXT B:NEXT A
580 NEXT Y:Y=WH+7:X=1:GOSUB 4000:END
1000 PRINT TAB((WL-LEN(Q$))/2+TZ);Q$;
1010 IF LEN(Q$)<WL THEN PRINT
1020 RETURN
2000 IF LEN(R$)<=WL THEN Q$=R$:GOSUB 1000:RETURN
2010 J=WL+1:K=1:FOR I=WL+1 TO 1 STEP -1
2020 IF MID$(R$,I,1)=" " THEN K=0:J=I:I=1
2030 NEXT I:Q$=LEFT$(R$,J-1):GOSUB 1000
2040 R$=RIGHT$(R$,LEN(R$)-J+K):GOTO 2000
3000 Y=INT((PC-1)/6):X=(PC-6*Y-1)*3+XP
3010 Y=Y*2+YP:GOSUB 4000:RETURN
4000 LOCATE Y,X:RETURN
5000 IF DP<>5 THEN RETURN
5010 GOSUB 3000:PRINT " ";CHR$(29);
5020 FOR DL=1 TO 25:NEXT DL:PRINT S$(PC);:RETURN
6000 DATA ONE,"V>R'$A45%S(1)T9P6V7&8Y:?J"
6010 DATA TWO,"T<P%>Y2?UWS/'R7N4T5$6Z&=H"
6020 DATA THREE,"W?S(%B56&TV2*U:Q7W8'9Z;$)"
6030 DATA FOUR,"K3G85P)*LHJ&9I6E+K,N-Q/4Y"
6040 DATA FIVE,NONE,SIX,FIUSVGYY
```

Atari/*Mummy Maneuvers*

```
10 DIM DAY$(30),DAY1$(130),R$(5),R1$(25),L$(20),Q$(200
),DR$(40),BL$(14)
20 PRINT CHR$(125):DP=2:OPEN #1,4,0,"K:":POKE 752,1
30 DAY$=" ":DAY$(30)=DAY$:DAY$(2)=DAY$:L$="-":L$(20)=L
$:L$(2)=L$
40 DR$=CHR$(160):DR$(40)=DR$:DR$(2)=DR$:BL$=" ":BL$(14
)=BL$:BL$(2)=BL$
50 FOR I=1 TO 6:READ R$,R1$:DAY$(I*5-4,I*5)=R$:C=ASC(R
1$(1,1))-64
60 FOR Z=2 TO LEN(R1$):N=ASC(R1$(Z,Z))-C
70 IF N+C<64 THEN N=N+28*(N<36):GOTO 90
80 N=N+26*(N<65)
90 DAY1$(LEN(DAY1$)+1)=CHR$(N):NEXT Z:NEXT I
```

```
100 DAY1$(121)=DAY1$(100,LEN(DAY1$))
110 DAY1$(97,120)=DAY1$(73,96)
120 PRINT CHR$(125)
130 POSITION 16,0:PRINT "DAY ";DAY$(DP*5-4,DP*5)
140 POKE 82,10:PRINT :PRINT :FOR X=0 TO 3:PRINT L$
150 FOR Y=1 TO 6:PT=DP*24+X*6+Y-24:PRINT "  ";DAY1$(PT
,PT);
160 NEXT Y:PRINT :NEXT X:PRINT L$:POKE 82,0
170 Q$="PRESS":IF DP<>5 THEN 190
180 Q$="USE <I>, <J>, <K>, AND <M> TO MOVE CURSOR, <D>
 TO TRY DOOR, OR"
190 Q$(LEN(Q$)+1)=" <SPACE BAR> TO MOVE FROM DAY TO DA
Y."
200 PRINT :GOSUB 2000:IF DP=5 THEN POKE 752,0:POSITION
 11,4:PRINT CHR$(31);:X=12:Y=4:PC=97
210 GET #1,K:IF K=32 THEN DP=DP+1-4*(DP=5):POKE 752,1:
GOTO 120
220 IF DP<>5 OR K<33 OR K>90 THEN 210
230 IF K=68 THEN 290
240 RD=(K=77)-(K=73):CD=(K=75)-(K=74)
250 IF RD+CD=0 THEN DAY1$(PC,PC)=CHR$(K):PRINT CHR$(K)
;CHR$(30);:GOTO 210
260 PC=PC+CD+RD*6:PC=PC+24*((PC<97)-(PC>120))
270 N=PC-97:Y=INT(N/6):X=3*(N-6*Y)+12:Y=2*Y+4
280 POSITION X,Y:PRINT CHR$(31);CHR$(30);:GOTO 210
290 PRINT CHR$(125):POKE 752,1:FOR X=1 TO 15
300 POKE 85,12:PRINT DR$(1,16):NEXT X:POKE 85,0:PRINT
DR$
310 IF DAY1$(1,24)=DAY1$(97,120) THEN 410
320 PRINT CHR$(253);
330 Q$="WRONG ARRANGEMENT; DOOR DOESN'T BUDGE! PRESS <
H> FOR A HINT OR <SPACE BAR> TO CONTINUE.":GOSUB 2000
340 GET #1,K:IF K=32 THEN 120
350 IF K<>72 THEN 340
360 PRINT CHR$(125):Q$="TRY LOOKING AT A "
370 Q$(LEN(Q$)+1)=DAY1$(121,127):Q$(LEN(Q$)+1)=".":GOS
UB 2000
380 POSITION 0,10:Q$="PLEASE PRESS <SPACE BAR> TO CONT
INUE.":GOSUB 2000
390 GET #1,K:IF K<>32 THEN 390
400 GOTO 120
410 Q$="RUMBLE RUMBLE ...":GOSUB 2000
420 FOR VL=0 TO 15:FOR VC=0 TO 3:SOUND VC,250,8,VL:NEX
T VC
430 FOR D=1 TO 100:NEXT D:NEXT VL
440 Q$="SUCCESS! THE DOOR SLOWLY RISES. YOU'RE FREE!":
POSITION 0,18:GOSUB 2000
450 FOR I=16 TO 2 STEP -1:POSITION 13,I
460 PRINT BL$:FOR D=1 TO 100:NEXT D:NEXT I
470 FOR VC=0 TO 3:SOUND VC,0,0,0:NEXT VC
480 POKE 82,2:POSITION 0,21:POKE 752,0:END
2000 IF LEN(Q$)<=40 THEN POKE 85,(40-LEN(Q$))/2:PRINT
Q$:RETURN
2010 J=41:K=0:FOR I=40 TO 1 STEP -1
2020 IF Q$(I,I)=" " THEN K=1:J=I:I=1
2030 NEXT I:POKE 85,(40-J)/2:PRINT Q$(1,J-1)
2040 Q$=Q$(J+K,LEN(Q$)):GOTO 2000
6000 DATA ONE,V>R'$A45%S(1)T9P6V7&8Y:?J
6010 DATA TWO,T<P%>Y2?UWS/'R7N4T5$6Z&=H
6020 DATA THREE,W?S(%B56&TV2*U:Q7W8'9Z;$)
6030 DATA FOUR,V>R'$A45WSU1(T%P6V7Y8B:?J
6040 DATA FIVE,NONE,SIX,FIUSVGYY
```

TI-99/4A/*Mummy Maneuvers*

```
10 DIM DAY$(2,6),S$(24)
20 CALL CLEAR
29 REM --MAKE SURE <ALPHA LOCK> KEY IS DOWN--
30 CALL CHAR(130,"FFFFFFFFFFFFFFFF")
40 DP=2
50 FOR I=1 TO 6
60 READ DAY$(1,I),T$
70 C=ASC(SEG$(T$,1,1))-64
80 FOR Z=2 TO LEN(T$)
90 N=ASC(SEG$(T$,Z,1))-C
100 IF N+C>=64 THEN 130
110 N=N-28*(N<36)
120 GOTO 140
130 N=N-26*(N<65)
140 DAY$(2,I)=DAY$(2,I)&CHR$(N)
150 NEXT Z
160 NEXT I
170 FOR I=1 TO 24
180 S$(I)=SEG$(DAY$(2,4),I,1)
190 NEXT I
200 CALL CLEAR
210 IF DP=5 THEN 250
220 FOR DL=1 TO 200
230 NEXT DL
240 GOTO 290
250 DAY$(2,DP)=""
260 FOR I=1 TO 24
270 DAY$(2,DP)=DAY$(2,DP)&S$(I)
280 NEXT I
290 Q$="DAY "&DAY$(1,DP)
300 R=2
310 GOSUB 2000
320 FOR X=0 TO 3
330 R=5+X*2
340 CALL HCHAR(R-1,6,45,20)
350 FOR Y=1 TO 6
360 CALL HCHAR(R,5+3*Y,ASC(SEG$(DAY$(2,DP),X*6+Y,1)))
370 NEXT Y
380 NEXT X
390 CALL HCHAR(12,6,45,20)
400 R=16
410 R$="PRESS"
420 IF DP<>5 THEN 440
430 R$="USE <I>, <J>, <K>, AND <M> TO MOVE CURSOR, <D>
 TO TRY DOOR, OR"
440 R$=R$&" <SPACE BAR> TO MOVE FROM DAY TO DAY."
450 GOSUB 3000
460 IF DP<>5 THEN 490
470 PC=1
480 GOSUB 4000
490 CALL KEY(0,K,S)
500 IF DP<>5 THEN 520
510 GOSUB 5000
520 IF (K<32)+(K>90)THEN 490
530 IF K<>32 THEN 560
540 DP=DP+1+4*(DP=5)
550 GOTO 200
560 IF DP<>5 THEN 490
570 IF K=68 THEN 660
580 RD=(K=73)-(K=77)
590 CD=(K=74)-(K=75)
600 IF RD+CD=0 THEN 640
610 PC=PC+CD+RD*6
620 PC=PC-24*((PC<1)-(PC>24))
630 GOTO 480
640 S$(PC)=CHR$(K)
650 GOTO 480
660 CALL CLEAR
670 FL=0
680 FOR I=1 TO 24
690 FL=FL+(S$(I)=SEG$(DAY$(2,1),I,1))
700 NEXT I
710 FOR I=3 TO 16
720 CALL HCHAR(I,11,130,12)
730 NEXT I
740 CALL HCHAR(17,6,130,22)
750 IF FL=-24 THEN 930
760 CALL SOUND(100,-7,0)
770 R$="WRONG ARRANGEMENT; DOOR DOESN'T BUDGE!"
780 R$=R$&" PRESS <H> FOR  A HINT OR <SPACE BAR> TO CO
NTINUE."
790 GOSUB 3000
800 CALL KEY(0,K,S)
810 IF K=32 THEN 200
820 IF K<>72 THEN 800
830 CALL CLEAR
840 R=5
850 R$="TRY LOOKING AT A "&DAY$(2,6)&" ..."
```

```
860 GOSUB 3000
870 R=R+2
880 R$="PLEASE PRESS <SPACE BAR> TO CONTINUE."
890 GOSUB 3000
900 CALL KEY(0,K,S)
910 IF K<>32 THEN 900
920 GOTO 200
930 R$="RUMBLE RUMBLE ..."
940 R=21
950 GOSUB 3000
960 R$="SUCCESS! THE DOOR SLOWLY RISES. YOU'RE FREE!"
970 GOSUB 3000
980 X=12
990 FOR Y=17 TO 4 STEP -1
1000 FOR DL=1 TO 80
1010 NEXT DL
1020 CALL HCHAR(Y,X,32,10)
1030 CALL SOUND(300,-7,0)
1040 NEXT Y
1050 FOR DL=1 TO 1000
1060 NEXT DL
1070 END
2000 W=INT((32-LEN(Q$))/2)
2010 FOR I=1 TO LEN(Q$)
2020 CALL HCHAR(R,W+I,ASC(SEG$(Q$,I,1)))
2030 NEXT I
2040 IF LEN(Q$)>32 THEN 2060
2050 R=R+1
2060 RETURN
3000 IF LEN(R$)>32 THEN 3040
3010 Q$=R$
3020 GOSUB 2000
3030 RETURN
3040 J=33
3050 K=1
3060 FOR I=33 TO 1 STEP -1
3070 IF SEG$(R$,I,1)<>" " THEN 3110
3080 K=0
3090 J=I
3100 I=1
3110 NEXT I
3120 Q$=SEG$(R$,1,J-1)
3130 GOSUB 2000
3140 R$=SEG$(R$,J-K+1,LEN(R$)-J+1)
3150 GOTO 3000
4000 Y=INT((PC-1)/6)
4010 X=(PC-6*Y-1)*3+8
4020 Y=Y*2+5
4030 GOSUB 5000
4040 RETURN
5000 CALL HCHAR(Y,X,30)
5010 CALL HCHAR(Y,X,ASC(S$(PC)))
5020 RETURN
6000 DATA ONE,"V>R'$A45%S(1)T9P6V7&8Y:?J"
6010 DATA TWO,"T<P%>Y2?UWS/'R7N4T5$6Z&=H"
6020 DATA THREE,"W?S(%B56&TV2*U:Q7W8'9Z;$)"
6030 DATA FOUR,"K3G85P)*LHJ&9I6E+K,N-Q/4Y"
6040 DATA FIVE,NONE,SIX,FIUSVGYY
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/*Mummy Maneuvers*

```
10 PRINT TAB 5;"USE <ENTER> INSTEAD OF";TAB 3;"<SPACE
BAR> TO MOVE FROM";TAB 10;"DAY TO DAY."
20 PAUSE 180
30 FAST
40 DIM E$(6,5)
50 DIM D$(6,25)
60 DIM S$(24,1)
70 LET X$=""
80 LET L$=""
90 LET A$=""
100 LET C$=""
110 LET Z$="ONE,YD5JK(BMI6OWL7C3G9HNF:AE;,TWO,VA2GH$8F
WY5TI49OD6EKC:LB-,THREE,ZE6KL)CNJ79XM8D4HAIOG?BFP,FOUR
,K.<56P;8L=-IA+4)2*3N1Q/OY,FIVE,NONE,SIX,D6SQTEWW"
120 LET DP=2
130 LET DI=4
140 LET DJ=1
150 FOR I=1 TO 6
160 GOSUB 5000
170 LET E$(I)=X$
180 GOSUB 5000
190 LET T$=X$
200 FOR Z=2 TO LEN T$
210 LET N=CODE T$(Z)-CODE T$(1)+37
220 LET N=N+51*(N<13)
230 LET D$(I,Z-1)=CHR$ N
240 NEXT Z
250 NEXT I
260 FOR I=1 TO 20
270 LET L$=L$+CHR$ 131
280 NEXT I
290 FOR I=1 TO 11
300 LET A$=A$+CHR$ 128
310 LET C$=C$+" "
320 NEXT I
330 LET C$=C$( TO 9)
340 FOR I=1 TO 24
350 LET S$(I)=D$(4,I)
360 NEXT I
370 SLOW
380 CLS
390 IF DP<>5 THEN GOTO 430
400 FOR I=1 TO 24
410 LET D$(DP,I)=S$(I)
420 NEXT I
430 LET Q$="DAY "+E$(DP)
440 GOSUB 2000
450 PRINT
460 FOR X=0 TO 3
470 PRINT TAB 6;L$
480 PRINT TAB 6;
490 FOR Y=1 TO 6
500 PRINT "  ";D$(DP,X*6+Y);
510 NEXT Y
520 PRINT
530 NEXT X
540 PRINT TAB 6;L$
550 PRINT
560 LET R$="PRESS"
570 IF DP<>5 THEN GOTO 590
580 LET R$="USE <I>, <J>, <K>, AND <M> TO MOVE CURSOR,
 <D> TO TRY DOOR, OR"
590 LET R$=R$+" <ENTER> TO MOVE FROM DAY TO DAY."
600 GOSUB 3000
610 IF DP=5 THEN LET PC=1
620 GOSUB 6000
630 LET K$=INKEY$
640 IF K$="" THEN GOTO 620
650 IF K$<>CHR$ 118 THEN GOTO 680
660 LET DP=DP+1-4*(DP=5)
670 GOTO 380
680 IF DP<>5 THEN GOTO 630
690 IF K$="D" THEN GOTO 780
700 LET RD=(K$="M")-(K$="I")
710 LET CD=(K$="K")-(K$="J")
720 IF RD+CD=0 THEN GOTO 760
730 LET PC=PC+CD+RD*6
740 LET PC=PC+24*((PC<1)-(PC>24))
750 GOTO 620
760 LET S$(PC)=K$
770 GOTO 620
780 CLS
790 LET FL=0
800 LET T$=""
810 FOR I=1 TO 24
820 LET FL=FL+(S$(I)=D$(1,I))
830 NEXT I
840 FOR I=1 TO 13
850 PRINT TAB 10;A$
860 NEXT I
```

IBM PCjr/*Mummy Maneuvers*

Use the base version, except change line 10 to read as follows:

```
10 DIM DAY$(2,6),S$(24):WL=40:WH=12:XP=12:YP=4:WIDTH W
L:KEY OFF:LOCATE ,,0
```

TRS-80 Color Computer/*Mummy Maneuvers*

Use the base version, except change lines 10, 20, 180, 410, 520, 570, 4000, and 5010 to read as follows:

```
10 CLEAR 500:DIM DAY$(2,6),S$(24):WL=32:WH=7:XP=9:YP=3
20 CLS:TRU=-1:DT=400:TZ=0:TX=0:T1$=CHR$(128)
180 Q$="DAY "+DAY$(1,DP):GOSUB 1000
410 SOUND 20,1:SOUND 19,1
520 SOUND 70,2:SOUND 50,2
570 SOUND 1,1:SOUND 2,1:FOR DL=1 TO 100:NEXT DL
4000 PRINT@(Y-1)*WL+X-1,"";:RETURN
5010 GOSUB 3000:PRINT " ";CHR$(8);
```

TRS-80 Model III/*Mummy Maneuvers*

Use the base version, with the following alterations. Delete lines 410 and 520. Also, change lines 10, 20, 570, 4000, and 5010 to read as follows:

```
10 CLEAR 500:DIM DAY$(2,6),S$(24):WL=64:WH=6:XP=25:YP=
4
20 CLS:TRU=-1:DT=400:TZ=0:TX=0:T1$=CHR$(191)
570 FOR DL=1 TO 200:NEXT DL
4000 PRINT@(Y-1)*WL+X-1,"";:RETURN
5010 GOSUB 3000:PRINT " ";:GOSUB 3000
```

TRS-80 Model 4/*Mummy Maneuvers*

Use the Model III modification instructions, except change lines 10, 20, and 4000 to read as follows:

```
10 DIM DAY$(2,6),S$(24):WL=80:WH=6:XP=33:YP=4:PRINT CH
R$(15)
20 CLS:TRU=-1:DT=500:TZ=0:TX=0:T1$=CHR$(191)
4000 PRINT@(Y-1,X-1);"";:RETURN
```

VIC-20/*Mummy Maneuvers*

Use the base version, with the following alterations. Add line 40:

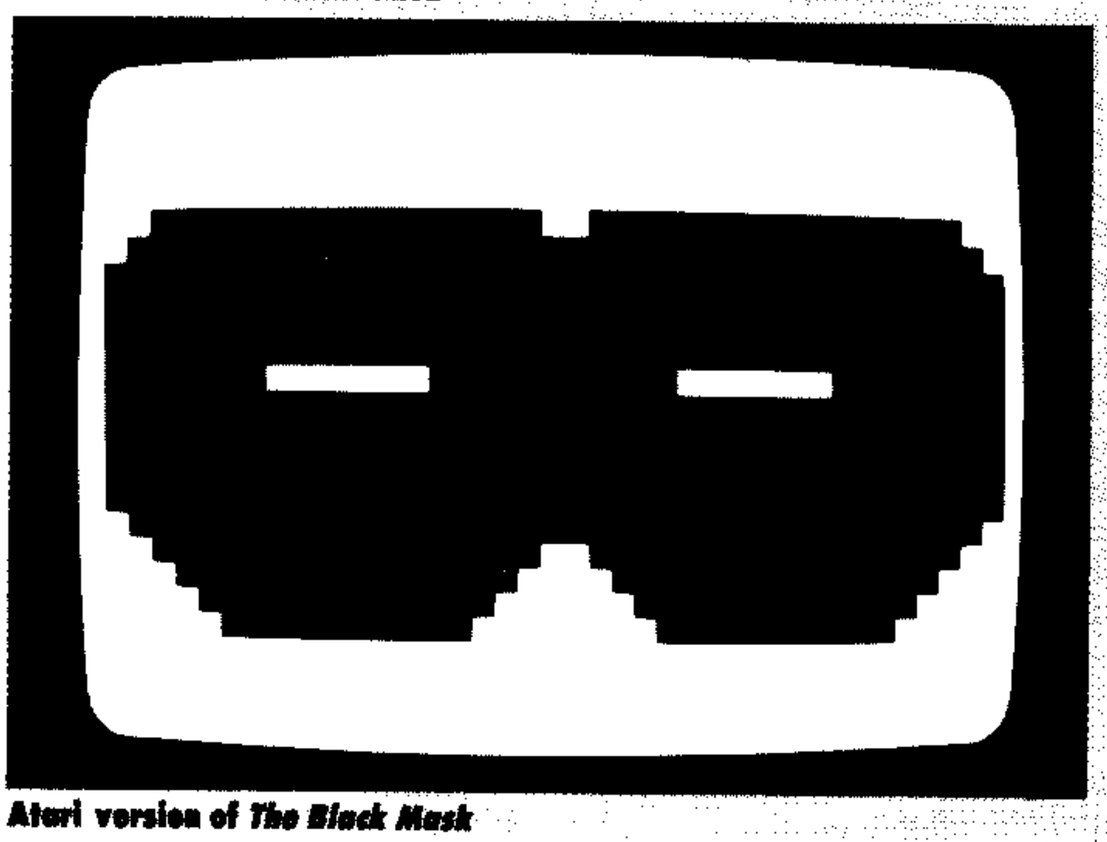
```
40 POKE 36878,15
```

Change CLS to PRINT CLS; in lines 150, 370, and 460. Finally, change lines 10, 20, 260, 410, 440, 490, 520, 550, 570, 4000, and 5010 to read as follows:

```
10 DIM DAY$(2,6),S$(24):WL=22:WH=12:XP=4:YP=3:CL$=CHR$
(147)
20 PRINT CL$:TRU=-1:DT=300:TZ=0:T1$="*"
260 GOSUB 5000:GET K$:IF K$<CHR$(32) OR K$>"Z" THEN 26
0
410 POKE 36877,128:FOR DL=1 TO 100:NEXT DL:POKE 36877,
0
440 GET K$:IF K$=CHR$(32) THEN 150
490 GET K$:IF K$<>CHR$(32) THEN 490
520 POKE 36877,255
550 GOSUB 2000:X=W3+2:FOR Y=WH+2 TO 1 STEP -1
570 POKE 36877,180:POKE 36877,200:FOR DL=1 TO 200:NEXT
 DL:POKE 36877,0
4000 POKE 214,Y-1:PRINT:PRINT TAB(X-1):RETURN
5010 GOSUB 3000:PRINT CHR$(18);" ";CHR$(146);CHR$(157)
;
```


THE BLACK MASK

BY JOEY LATIMER



Atari version of *The Black Mask*

Who is that stranger in your living room—the one wearing *The Black Mask*? Look at those beady eyes darting back and forth behind the slits in the mask. Why do they look so suspicious? Exactly *who is* hiding behind that black mask?

Why, it's your computer, that's who! Now you can dress your computer up in disguise and catch the attention of the whole neighborhood this Halloween! All you have to do is type in *The Black Mask*, RUN it, and place your computer in your front window or in your foyer on the 31st. And look closely: Sometimes the eyes cross!

ADAM/*The Black Mask*

```
9 REM --INITIALIZE VARIABLES AND CLEAR SCREEN--
10 p1 = 10
20 p2 = 28
30 v = 1
40 q = 0
50 fl = 0
60 HOME
70 GR
79 REM --PAINT BACKGROUND ORANGE--
80 COLOR = 9
90 FOR x = 0 TO 39
100 HLIN 0,39 AT x
110 NEXT x
119 REM --DRAW LEFT AND RIGHT SIDES OF MASK--
120 COLOR = 0
130 FOR x = 10 TO 29 STEP 19
140 p = 7
150 FOR y = 8 TO 24
160 HLIN x-p,x+p AT y
170 IF y < 10 THEN p = p+1
180 IF y > 18 THEN p = p-1
190 NEXT y,x
199 REM --DRAW WHITES OF EYES--
200 COLOR = 13
210 GOSUB 1000
219 REM --PRINT PUPILS--
220 COLOR = 6
230 PLOT p1,14
240 PLOT p2,14
249 REM --PAUSE (LONG IF PUPILS CENTERED OR CROSSED)--
250 IF p1 = 10 OR (p1 = 13 AND p2 = 27) THEN q = 1000
260 FOR d = 1 TO RND(1)*1500+q
270 NEXT d
280 q = 0
289 REM --ERASE PUPILS--
290 COLOR = 13
300 PLOT p1,14
```

```
30 P1=10
40 P2=28
50 V=1
60 Q=0
70 FL=0
80 PRINT CHR$(147)
89 REM --SET BACKGROUND AND BORDER COLOR TO YELLOW--
90 POKE 53280,7
100 POKE 53281,7
109 REM --DRAW LEFT AND RIGHT SIDES OF MASK--
110 FOR X=10 TO 29 STEP 19
120 P=7
130 FOR Y=4 TO 20
140 FOR Z=X-P TO X+P
150 POKE SB+Z+40*Y,160
160 POKE CB+Z+40*Y,0
170 NEXT Z
180 IF Y<6 THEN P=P+1
190 IF Y>14 THEN P=P-1
200 NEXT Y,X
209 REM --DRAW WHITES OF EYES--
210 K0=7
220 GOSUB 1000
229 REM --PRINT PUPILS--
230 POKE SB+P1+400,81
240 POKE CB+P1+400,6
250 POKE SB+P2+400,81
260 POKE CB+P2+400,6
269 REM --PAUSE (LONG IF PUPILS CENTERED OR CROSSED)--
270 IF P1=10 OR (P1=13 AND P2=27) THEN Q=1000
280 FOR D=1 TO RND(1)*1500+Q
290 NEXT D
300 Q=0
309 REM --ERASE PUPILS--
310 POKE SB+P1+400,160
320 POKE CB+P1+400,7
330 POKE SB+P2+400,160
340 POKE CB+P2+400,7
349 REM --BLINK SOMETIMES--
350 IF P1<>10 OR RND(0)<0.7 THEN 410
360 K0=6
370 GOSUB 1000
380 FOR D=1 TO 450
390 NEXT D
400 GOTO 210
409 REM --COMPUTE NEW POSITIONS (P1,P2) FOR PUPILS--
410 IF P1=7 OR P1=13 THEN V=-V
420 IF FL=1 AND P1=10 THEN FL=0:GOTO 440
430 IF RND(0)<0.2 AND P1=10 THEN FL=1:V=1
440 P1=P1+V
450 IF FL=0 THEN P2=P2+V
460 IF FL=1 THEN P2=P2-V
470 GOTO 230
999 REM --FILL EYES WITH COLOR K0--
1000 FOR Z=7 TO 13
1010 POKE CB+Z+400,K0
1020 POKE CB+Z+400+18,K0
1030 NEXT Z
1040 RETURN
```

IBM PC w/Color Graphics Adapter & IBM PC*jr*/*The Black Mask*

```
10 RANDOMIZE
20 WIDTH 40
30 KEY OFF
40 SCREEN 0,1
50 COLOR ,7,7
59 REM --INITIALIZE VARIABLES AND CLEAR SCREEN--
60 P1=11
70 P2=26
80 V=1
90 Q=0
100 FL=0
110 CLS
119 REM --DRAW LEFT AND RIGHT SIDES OF MASK--
120 COLOR 0
130 FOR X=11 TO 26 STEP 15
140 P=5
150 FOR Y=5 TO 19
160 FOR Z=X-P TO X+P
170 LOCATE Y,Z:PRINT CHR$(219)
180 NEXT Z
190 IF Y<7 THEN P=P+1
200 IF Y>15 THEN P=P-1
210 NEXT Y,X
219 REM --DRAW WHITES OF EYES--
220 COLOR 7
230 GOSUB 1000
239 REM --PRINT PUPILS--
240 COLOR 0
250 LOCATE 10,P1:PRINT "O"
260 LOCATE 10,P2:PRINT "O"
269 REM --PAUSE (LONG IF PUPILS CENTERED OR CROSSED)--
270 IF P1=11 OR (P1=15 AND P2=23) THEN Q=1000
280 FOR D=1 TO RND(1)*800+Q
290 NEXT D
300 Q=0
309 REM --ERASE PUPILS--
310 COLOR 7
320 LOCATE 10,P1:PRINT CHR$(219)
330 LOCATE 10,P2:PRINT CHR$(219)
339 REM --BLINK SOMETIMES--
340 IF P1<>11 OR RND(1)<.5 THEN 400
350 COLOR 12
360 GOSUB 1000
370 FOR D=1 TO 600
380 NEXT D
390 GOTO 220
399 REM --COMPUTE NEW POSITIONS (P1,P2) FOR PUPILS--
400 IF P1=8 OR P1=14 THEN V=-V
410 IF FL=1 AND P1=11 THEN FL=0:GOTO 430
420 IF P1=11 AND RND(1)<.2 THEN FL=1:V=1
430 P1=P1+V
440 IF FL=0 THEN P2=P2+V
450 IF FL=1 THEN P2=P2-V
460 GOTO 240
999 REM --FILL EYES WITH CURRENT COLOR--
1000 LOCATE 10,8:PRINT STRING$(7,219)
1010 LOCATE 10,23:PRINT STRING$(7,219)
1020 RETURN
```

TI-99/4A/*The Black Mask*

```
10 RANDOMIZE
19 REM --INITIALIZE VARIABLES AND CLEAR SCREEN--
20 P1=11
30 P2=22
40 V=1
50 Q=0
60 FL=0
70 CALL CLEAR
80 CALL SCREEN(12)
89 REM --NOTE: MAKE SURE ALPHA LOCK IS DOWN--
90 A$="FFFFFFFFFFFFFFFF"
100 C$="3C7EFFFFFFF7E3C"
110 CALL CHAR(128,A$)
120 CALL CHAR(136,A$)
130 CALL CHAR(144,C$)
140 CALL CHAR(152,A$)
150 CALL COLOR(13,2,2)
160 CALL COLOR(14,10,1)
170 CALL COLOR(15,5,1)
180 CALL COLOR(16,12,12)
189 REM --DRAW LEFT AND RIGHT SIDES OF MASK--
190 FOR X=11 TO 22 STEP 11
200 P=3
210 FOR Y=4 TO 19
220 FOR Z=X-P TO X+P
230 CALL HCHAR(Y,Z,128)
240 NEXT Z
```

```
250 IF Y>=6 THEN 270
260 P=P+1
270 IF Y<=15 THEN 290
280 P=P-1
290 NEXT Y
300 NEXT X
309 REM --DRAW WHITES OF EYES--
310 K0=152
320 GOSUB 1000
329 REM --PRINT PUPILS--
330 CALL HCHAR(10,P1,144)
340 CALL HCHAR(10,P2,144)
349 REM --PAUSE (LONG IF PUPILS CENTERED OR CROSSED)--
350 IF (P1<>11)*((P1<>14)+(P2<>19))THEN 370
360 Q=1000
370 FOR D=1 TO RND*500+Q
380 NEXT D
390 Q=0
399 REM --ERASE PUPILS--
400 CALL HCHAR(10,P1,152)
410 CALL HCHAR(10,P2,152)
419 REM --BLINK SOMETIMES--
420 IF (P1<>11)+(RND<0.7)THEN 480
430 K0=136
440 GOSUB 1000
450 FOR D=1 TO 300
460 NEXT D
470 GOTO 310
479 REM --COMPUTE NEW POSITIONS (P1,P2) FOR PUPILS--
480 IF (P1<>8)*(P1<>14)THEN 500
490 V=-V
500 IF (FL<>1)+(P1<>11)THEN 530
510 FL=0
520 GOTO 560
530 IF (P1<>11)+(RND>0.2)THEN 560
540 FL=1
550 V=1
560 P1=P1+V
570 IF FL=1 THEN 600
580 P2=P2+V
590 GOTO 330
600 P2=P2-V
610 GOTO 330
999 REM --FILL EYES WITH CHARACTER K0--
1000 CALL HCHAR(10,8,K0,7)
1010 CALL HCHAR(10,19,K0,7)
1020 RETURN
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/*The Black Mask*

```
10 FAST
20 RAND
30 DIM P$(2,7)
39 REM --INITIALIZE VARIABLES--
40 FOR X=1 TO 7
50 LET P$(1,X)=CHR$ 0
60 LET P$(2,X)=CHR$ 136
70 NEXT X
80 LET P1=9
90 LET P2=22
100 LET V=1
110 LET Q=0
120 LET FL=0
129 REM --DRAW LEFT AND RIGHT SIDES OF MASK--
130 FOR X=9 TO 22 STEP 13
140 LET P=4
150 FOR Y=2 TO 17
160 FOR Z=X-P TO X+P
170 PRINT AT Y,Z;CHR$ 128
180 NEXT Z
190 IF Y<4 THEN LET P=P+1
200 IF Y>12 THEN LET P=P-1
210 NEXT Y
220 NEXT X
230 SLOW
239 REM --DRAW WHITES OF EYES--
240 LET K0=1
250 GOSUB 1000
259 REM --PRINT PUPILS--
260 PRINT AT 9,P1;CHR$ 52;AT 9,P2;CHR$ 52
269 REM --PAUSE (LONG IF PUPILS CENTERED OR CROSSED)--
270 IF P1=10 OR (P1=12 AND P2=25) THEN LET Q=5
280 FOR D=1 TO RND*20+Q
290 NEXT D
300 LET Q=0
309 REM --ERASE PUPILS--
310 PRINT AT 9,P1;CHR$ 0;AT 9,P2;CHR$ 0
319 REM --BLINK SOMETIMES--
320 IF P1<>9 OR RND<0.7 THEN GOTO 380
330 LET K0=2
340 GOSUB 1000
350 FOR D=1 TO 5
360 NEXT D
370 GOTO 240
379 REM --COMPUTE NEW POSITIONS (P1,P2) FOR PUPILS--
380 IF P1=6 OR P1=12 THEN LET V=-V
390 IF FL=0 OR P1<>9 THEN GOTO 420
400 LET FL=0
410 GOTO 450
420 IF P1<>9 OR RND>0.2 THEN GOTO 450
430 LET FL=1
440 LET V=1
450 LET P1=P1+V
460 IF FL=0 THEN LET P2=P2+V
470 IF FL=1 THEN LET P2=P2-V
480 GOTO 260
999 REM --FILL EYES WITH P$(K0)--
1000 PRINT AT 9,6;P$(K0);AT 9,19;P$(K0)
1010 RETURN
```

TRS-80 Color Computer/*The Black Mask*

```
9 REM --INITIALIZE VARIABLES AND CLEAR SCREEN--
10 P1=8
20 P2=23
30 V=1
40 Q=0
50 FL=0
60 CLS(2)
69 REM --DRAW LEFT AND RIGHT SIDES OF MASK--
70 FOR X=9 TO 22 STEP 13
80 P=5
90 FOR Y=2 TO 13
100 FOR Z=X-P TO X+P
110 PRINT@Z+32*Y,CHR$(128);
120 NEXT Z
130 IF Y<3 THEN P=P+1
140 IF Y>8 THEN P=P-1
150 NEXT Y,X
159 REM --DRAW WHITES OF EYES--
160 K0=159
170 GOSUB 1000
179 REM --PRINT PUPILS--
180 PRINT@P1+224,CHR$(175);
190 PRINT@P2+224,CHR$(175);
199 REM --PAUSE (LONG IF PUPILS CENTERED OR CROSSED)--
200 IF P1=8 OR (P1=1 AND P2=19) THEN Q=1000
210 FOR D=1 TO RND(500)+Q
220 NEXT D
230 Q=0
239 REM --ERASE PUPILS--
240 PRINT@P1+224,CHR$(159);
250 PRINT@P2+224,CHR$(159);
259 REM --BLINK SOMETIMES--
260 IF P1<>8 OR RND(0)<0.7 THEN 320
270 K0=191
280 GOSUB 1000
290 FOR D=1 TO 600
300 NEXT D
310 GOTO 160
```

NAME THAT MONSTER!

BY JOEY LATIMER

Before you reward your local witches and vampires with a treat on Halloween, give them a trick to solve! *Name That Monster!* is a word-scramble game that features five jumbled monster names and five hints. Players are graded on their total number of correct guesses. (Make sure to set your computer to all uppercase letters before RUNning the program.)

So when the wind starts howling on the 31st and the moon disappears behind a black cloud, move your computer near your front door, type in *Name That Monster!*, and you'll be ready when the first werewolf calls!

(Note: It is easy to make substitutions or additions to our monster names by altering the information in the DATA lines, starting with line 1000. If you're substituting your own five monster names, be sure to keep the same line numbers and the word DATA. Follow this with an unscrambled monster name, a comma, a scrambled version of the same name, another comma, and a hint.

If you're adding extra monster names, follow the same procedure, only add new line numbers. Then change NW=5 in line 10 to reflect the new total of monster names. For example, if you've added three monster names to the program, it should read NW=8. TI-99/4A owners will also have to change the number 5 wherever it appears in line 20 to reflect this total. The above instructions won't work with the Timex version.)

Base Version (TRS-80 Color Computer)/*Name That Monster!*

```
9 REM --NW = NUMBER OF WORDS--
10 CLEAR 500:NW=5
20 DIM W$(NW),S$(NW),H$(NW)
29 REM --READ IN WORDS AND HINTS--
30 FOR X=1 TO NW
40 READ W$(X),S$(X),H$(X)
50 NEXT X
60 S=0
69 REM --PRINT TITLE AND INSTRUCTIONS--
70 CLS
80 PRINT TAB(7);"NAME THAT MONSTER!"
90 PRINT
100 PRINT "GUESS THE SCRAMBLED MONSTERS"
110 PRINT "AND GET A HALLOWEEN TREAT!"
120 PRINT "PRESS <RETURN> AFTER TYPING IN"
130 PRINT "YOUR GUESS."
140 PRINT
149 REM --DO MAIN LOOP ONCE FOR EACH WORD--
150 FOR X=1 TO NW
159 REM --DISPLAY SCRAMBLED WORD--
160 PRINT "MONSTER NUMBER";X;"IS ";S$(X);"."
170 PRINT
179 REM --GIVE A HINT--
180 PRINT "HINT:"
190 PRINT H$(X);"."
200 PRINT
209 REM --GET PLAYER'S GUESS--
210 INPUT "WHAT IS YOUR GUESS";G$
220 IF G$=W$(X) THEN 280
229 REM --RESPOND TO WRONG ANSWER--
230 PRINT
240 PRINT "WRONG! IT WAS ";W$(X);"."
250 PRINT "PRESS ANY KEY TO CONTINUE.";
260 K$=INKEY$
270 IF K$="" THEN 260 ELSE 330
279 REM --INCREASE SCORE & RESPOND TO CORRECT ANSWER--
280 S=S+1
290 CLS
300 FOR T=1 TO 120
310 PRINT "YOU GOT IT! ";
320 NEXT T
330 CLS
340 NEXT X
349 REM --PRINT SCORE AND GOOD-BYE MESSAGE--
350 PRINT "YOUR SCORE WAS";S;"OUT OF";NW;"--".
360 IF S=NW THEN PRINT "A 100% PERFECT SCORE!":GOTO 40
0
370 IF S>NW*.4 THEN PRINT "YOU REALLY KNOW YOUR MONSTE
RS!":GOTO 400
380 PRINT "YOU'D BETTER STUDY YOUR"
390 PRINT "MONSTERS."
400 PRINT
410 PRINT "THE TRICKS ARE OVER;"
420 PRINT "NOW YOU GET A TREAT!"
430 PRINT
440 PRINT "SEE YOU AGAIN NEXT YEAR!"
450 PRINT
460 PRINT "PRESS ANY KEY TO BEGIN AGAIN.";
469 REM --AFTER KEY IS PRESSED, BEGIN AGAIN--
470 K$=INKEY$
480 IF K$="" THEN 470 ELSE 60
1000 DATA WITCH,THWIC,USUALLY SEEN WITH A BROOM
1010 DATA VAMPIRE,RIPVAME,DON'T LET ONE KISS YOUR NECK
1020 DATA TROLL,LORLT,OFTEN LIVES UNDER A BRIDGE
1030 DATA GHOST,STOGH,DON'T CHASE ONE THROUGH A WALL
1040 DATA WEREWOLF,FLOWWEER,BARKING MAN IN NEED OF SHA
VE
```

ADAM/*Name That Monster!*

```
9 REM --SET NUMBER OF WORDS--
10 nw = 5
20 DIM w$(nw),s$(nw),h$(nw)
29 REM --READ IN WORDS AND HINTS--
30 FOR x = 1 TO nw
40 READ w$(x),s$(x),h$(x)
50 NEXT x
60 s = 0
69 REM --PRINT TITLE AND INSTRUCTIONS--
70 HOME
80 PRINT TAB(6);"NAME THAT MONSTER!"
90 PRINT
100 PRINT "Guess the scrambled monsters"
110 PRINT "and get a Halloween treat!"
120 PRINT
130 PRINT "Press <RETURN> after typing in"
140 PRINT "your guess."
150 PRINT
159 REM --DO MAIN LOOP ONCE FOR EACH WORD--
160 FOR x = 1 TO nw
169 REM --DISPLAY SCRAMBLED WORD--
170 PRINT "Monster number ";x;" is ";s$(x);"."
180 PRINT
189 REM --GIVE A HINT--
190 PRINT "Hint:"
200 PRINT h$(x);"."
210 PRINT
219 REM --GET PLAYER'S GUESS--
```

```
220 INPUT "What is your guess?";g$
230 IF g$ = w$(x) THEN 300.
239 REM --RESPOND TO WRONG ANSWER--
240 PRINT
250 PRINT "Wrong! It was ";w$(x);"."
260 PRINT
270 PRINT "Press any key to continue."
280 GET k$
290 GOTO 350
299 REM --INCREASE SCORE & RESPOND TO CORRECT ANSWER--
300 s = s+1
310 HOME
320 FOR t = 1 TO 80
330 PRINT "YOU GOT IT! ";
340 NEXT t
350 HOME
360 NEXT x
369 REM --PRINT SCORE AND GOOD-BYE MESSAGE--
370 PRINT "Your score was"
380 PRINT s;" out of ";nw;" --"
390 PRINT
400 IF s = nw THEN PRINT "a 100% perfect score!":GOTO
430
410 IF s > nw*.4 THEN PRINT "You really know your mons
ters!":GOTO 430
420 PRINT "Better study your monsters."
430 PRINT
440 PRINT "The tricks are over;"
450 PRINT "now you get a treat!"
460 PRINT
470 PRINT "See you again next year!"
480 PRINT
490 PRINT "Press any key to begin again."
499 REM --AFTER KEY IS PRESSED, BEGIN AGAIN--
500 GET k$
510 GOTO 60
1000 DATA WITCH,THWIC,USUALLY SEEN WITH A BROOM
1010 DATA VAMPIRE,RIPVAME,DON'T LET ONE KISS YOUR NECK
1020 DATA TROLL,LORLT,OFTEN LIVES UNDER A BRIDGE
1030 DATA GHOST,STOGH,DON'T CHASE ONE THROUGH A WALL
1040 DATA WEREWOLF,FLOWWEER,BARKING MAN IN NEED OF SHA
VE
```

Atari/*Name That Monster!*

```
9 REM --SET NUMBER OF WORDS--
10 NW=5
20 DIM S$(NW*20),W$(NW*20),H$(NW*50),P(NW,4),SC$(20),R
1$(20),R2$(20),R3$(50),G$(20)
30 OPEN #1,4,0,"K:"
39 REM --SET LEFT SCREEN MARGIN--
40 POKE 82,0
49 REM --READ IN WORDS AND HINTS--
50 FOR X=1 TO NW
60 READ R1$,R2$,R3$
70 P(X,1)=LEN(W$)+1
80 P(X,2)=P(X,1)+LEN(R1$)-1
90 W$(P(X,1))=R1$
100 S$(P(X,1))=R2$
110 P(X,3)=LEN(H$)+1
120 P(X,4)=P(X,3)+LEN(R3$)-1
130 H$(P(X,3))=R3$
140 NEXT X
150 S=0
159 REM --PRINT TITLE AND INSTRUCTIONS--
160 PRINT CHR$(125)
170 POSITION 11,0
180 PRINT "NAME THAT MONSTER!"
190 PRINT
200 PRINT "GUESS THE SCRAMBLED MONSTERS"
210 PRINT "AND GET A HALLOWEEN TREAT!"
220 PRINT
230 PRINT "PRESS <RETURN> AFTER TYPING IN"
240 PRINT "YOUR GUESS."
250 PRINT
260 PRINT
269 REM --DO MAIN LOOP ONCE FOR EACH WORD--
270 FOR X=1 TO NW
279 REM --DISPLAY SCRAMBLED WORD--
280 PRINT "MONSTER NUMBER ";X;" IS ";S$(P(X,1),P(X,2))
;"."
290 PRINT
299 REM --GIVE A HINT--
300 PRINT "HINT: ";H$(P(X,3),P(X,4));"."
310 PRINT
319 REM --GET PLAYER'S GUESS--
320 PRINT "WHAT IS YOUR GUESS";
330 INPUT G$
340 IF G$=W$(P(X,1),P(X,2)) THEN 410
349 REM --RESPOND TO WRONG ANSWER--
350 PRINT
360 PRINT "WRONG! IT WAS ";W$(P(X,1),P(X,2));"."
370 PRINT
380 PRINT "PRESS ANY KEY TO CONTINUE.";
390 GET #1,K
400 GOTO 460
409 REM --INCREASE SCORE & RESPOND TO CORRECT ANSWER--
410 S=S+1
420 PRINT CHR$(125);
430 FOR T=1 TO 75
440 PRINT "YOU GOT IT! ";
450 NEXT T
460 PRINT CHR$(125);
470 NEXT X
479 REM --PRINT SCORE AND GOOD-BYE MESSAGE--
480 PRINT "YOUR SCORE WAS ";S;" OUT OF ";NW;" --"
490 IF S=NW THEN PRINT "A 100% PERFECT SCORE!":GOTO 52
0
500 IF S>NW*0.4 THEN PRINT "YOU REALLY KNOW YOUR MONST
ERS!":GOTO 520
510 PRINT "YOU'D BETTER STUDY YOUR MONSTERS."
520 PRINT
530 PRINT "THE TRICKS ARE OVER;"
540 PRINT "NOW YOU GET A TREAT!"
550 PRINT
560 PRINT "SEE YOU NEXT YEAR!"
570 PRINT
580 PRINT "PRESS ANY KEY TO BEGIN AGAIN."
589 REM --AFTER KEY IS PRESSED, BEGIN AGAIN--
590 GET #1,K
600 GOTO 150
1000 DATA WITCH,THWIC,USUALLY SEEN WITH A BROOM
1010 DATA VAMPIRE,RIPVAME,DON'T LET ONE KISS YOUR NECK
1020 DATA TROLL,LORLT,OFTEN LIVES UNDER A BRIDGE
1030 DATA GHOST,STOGH,DON'T CHASE ONE THROUGH A WALL
1040 DATA WEREWOLF,FLOWWEER,BARKING MAN IN NEED OF SHA
VE
```

TI-99/4A/*Name That Monster!*

```
9 REM --SET NUMBER OF WORDS--
10 NW=5
20 DIM W$(5),S$(5),H$(5)
29 REM --READ IN WORDS AND HINTS--
30 FOR X=1 TO NW
40 READ W$(X),S$(X),H$(X)
50 NEXT X
60 S=0
69 REM --PRINT TITLE AND INSTRUCTIONS--
70 CALL CLEAR
80 PRINT TAB(6);"NAME THAT MONSTER!"
90 PRINT
100 PRINT "GUESS THE SCRAMBLED MONSTERS"
110 PRINT "AND GET A HALLOWEEN TREAT!"
120 PRINT
130 PRINT "PRESS <ENTER> AFTER TYPING"
140 PRINT "IN YOUR GUESS."
150 PRINT
159 REM --DO MAIN LOOP ONCE FOR EACH WORD--
160 FOR X=1 TO NW
169 REM --DISPLAY SCRAMBLED WORD--
170 PRINT "MONSTER NUMBER";X,"IS ";S$(X);"."
180 PRINT
189 REM --GIVE A HINT--
```

```
190 PRINT "HINT: "
200 PRINT H$(X);"."
210 PRINT
219 REM --GET PLAYER'S GUESS--
220 INPUT "WHAT IS YOUR GUESS?":G$
230 IF G$=W$(X)THEN 300
239 REM --RESPOND TO WRONG ANSWER--
240 PRINT
250 PRINT "WRONG! IT WAS ";W$(X);"."
260 PRINT
270 PRINT "PRESS ANY KEY TO CONTINUE."
280 CALL KEY(0,K,R)
290 IF R=0 THEN 280 ELSE 350
299 REM --INCREASE SCORE & RESPOND TO CORRECT ANSWER--
300 S=S+1
310 CALL CLEAR
320 FOR T=1 TO 48
330 PRINT "YOU GOT IT! ";
340 NEXT T
350 CALL CLEAR
360 NEXT X
369 REM --PRINT SCORE AND GOOD-BYE MESSAGE--
370 PRINT "YOUR SCORE WAS";S;
380 PRINT "OUT OF";NW;"--"
390 PRINT
400 IF S<NW THEN 430
410 PRINT "A 100% PERFECT SCORE!"
420 GOTO 470
430 IF S<NW*0.4 THEN 460
440 PRINT "YOU SURE KNOW YOUR MONSTERS!"
450 GOTO 470
460 PRINT "BETTER STUDY YOUR MONSTERS."
470 PRINT
480 PRINT "THE TRICKS ARE OVER;"
490 PRINT "NOW YOU GET A TREAT!"
500 PRINT
510 PRINT "SEE YOU AGAIN NEXT YEAR!"
520 PRINT
530 PRINT "PRESS ANY KEY TO BEGIN","AGAIN."
539 REM --AFTER KEY IS PRESSED, BEGIN AGAIN--
540 CALL KEY(0,K,R)
550 IF R=0 THEN 540 ELSE 60
1000 DATA WITCH,THWIC,USUALLY SEEN WITH A BROOM
1010 DATA VAMPIRE,RIPVAME,DON'T LET ONE KISS YOU
1020 DATA TROLL,LORLT,OFTEN LIVES UNDER A BRIDGE
1030 DATA GHOST,STOGH,DON'T CHASE ONE INTO A WALL
1040 DATA WEREWOLF,FLOWWEER,BARKING MAN NEEDING A SHAV
E
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/*Name That Monster!*

```
9 REM --SET NUMBER OF WORDS--
10 LET NW=5
20 FAST
30 DIM W(NW)
40 DIM S$(NW,8)
50 DIM W$(NW,8)
60 DIM H$(NW,32)
70 LET P1=6
80 LET P2=1
89 REM --WORD AND HINT DATA--
90 LET D$="THWIC,WITCH,USUALLY SEEN WITH A BROOM,RIPVA
ME,VAMPIRE,DO NOT LET ONE KISS YOUR NECK,LORLT,TROLL,O
FTEN LIVES UNDER A BRIDGE,STOGH,GHOST,DO NOT CHASE ONE
 THROUGH A WALL,FLOWWEER,WEREWOLF,BARKING MAN IN NEED
OF SHAVE,"
99 REM --"READ" IN WORDS AND HINTS--
100 FOR X=1 TO NW
110 GOSUB 1000
120 LET S$(X)=V$
130 GOSUB 1000
140 LET W(X)=LEN V$
150 LET W$(X)=V$
160 GOSUB 1000
170 LET H$(X)=V$
180 NEXT X
190 SLOW
200 LET S=0
209 REM --PRINT TITLE AND INSTRUCTIONS--
210 PRINT TAB 6;"NAME THAT MONSTER."
220 PRINT
230 PRINT "GUESS THE SCRAMBLED MONSTERS"
240 PRINT "AND GET A HALLOWEEN TREAT."
250 PRINT
260 PRINT "PRESS <ENTER> AFTER TYPING IN"
270 PRINT "YOUR GUESS."
280 PRINT
289 REM --DO MAIN LOOP ONCE FOR EACH WORD--
290 FOR X=1 TO NW
299 REM --DISPLAY SCRAMBLED WORD--
300 PRINT "MONSTER NUMBER ";X;" IS ";S$(X, TO W(X));".
"
310 PRINT
319 REM --GIVE A HINT--
320 PRINT "HINT:"
330 PRINT H$(X);"."
340 PRINT
349 REM --GET GUESS FROM PLAYER--
350 PRINT "WHAT IS YOUR GUESS?"
360 INPUT G$
370 IF W$(X, TO W(X))=G$ THEN GOTO 460
379 REM --RESPOND TO WRONG ANSWER--
380 PRINT
390 PRINT "WRONG. IT WAS ";W$(X, TO W(X));"."
400 PRINT
410 PRINT
420 PRINT "PRESS ANY KEY TO CONTINUE."
430 LET K$=INKEY$
440 IF K$="" THEN GOTO 430
450 GOTO 510
459 REM --INCREASE SCORE/RESPOND TO CORRECT ANSWER--
460 LET S=S+1
470 CLS
480 FOR T=1 TO 49
490 PRINT "YOU GOT IT   ";
500 NEXT T
510 CLS
520 NEXT X
529 REM --PRINT SCORE AND GOOD-BYE MESSAGE--
530 PRINT "YOUR SCORE WAS ";S;" OUT OF ";NW;" --"
540 IF S<NW THEN GOTO 570
550 PRINT "A 100 PERCENT PERFECT SCORE."
560 GOTO 590
570 IF S>NW*0.4 THEN PRINT "YOU REALLY KNOW YOUR MONST
ERS."
580 IF S<=NW*0.4 THEN PRINT "YOU BETTER STUDY YOUR MON
STERS."
590 PRINT
600 PRINT
610 PRINT "THE TRICKS ARE OVER;"
620 PRINT "NOW YOU GET A TREAT."
630 PRINT
640 PRINT "SEE YOU AGAIN NEXT YEAR."
650 PRINT
660 PRINT "PRESS ANY KEY TO BEGIN AGAIN."
669 REM --AFTER KEY IS PRESSED, BEGIN AGAIN.--
670 LET K$=INKEY$
680 IF K$="" THEN GOTO 670
690 CLS
700 GOTO 200
999 REM --SIMULATED READ STATEMENT--
1000 IF D$(P1)="," THEN GOTO 1030
1010 LET P1=P1+1
1020 GOTO 1000
1030 LET V$=D$(P2 TO P1-1)
1040 LET P2=P1+1
1050 LET P1=P2+1
1060 RETURN
```

VIC-20/*Name That Monster!*

```
9 REM --SET NUMBER OF WORDS--
10 NW=5
```

```
20 DIM W$(NW),S$(NW),H$(NW)
29 REM --READ IN WORDS AND HINTS--
30 FOR X=1 TO NW
40 READ W$(X),S$(X),H$(X)
50 NEXT X
60 S=0
69 REM --PRINT TITLE AND INSTRUCTIONS--
70 PRINT CHR$(147);TAB(2);"NAME THAT MONSTER!"
80 PRINT
90 PRINT "GUESS THE SCRAMBLED"
100 PRINT "WORDS AND GET A"
110 PRINT "HALLOWEEN TREAT!"
120 PRINT
130 PRINT "PRESS <RETURN> AFTER"
140 PRINT "TYPING IN YOUR GUESS."
150 PRINT
159 REM --DO MAIN LOOP ONCE FOR EACH WORD--
160 FOR X=1 TO NW
169 REM --DISPLAY SCRAMBLED WORD--
170 PRINT "MONSTER NUMBER";X
180 PRINT "IS ";S$(X);"."
190 PRINT
199 REM --GIVE A HINT--
200 PRINT "HINT:"
210 PRINT H$(X);"."
220 PRINT
229 REM --GET PLAYER'S GUESS--
230 PRINT "WHAT IS YOUR"
240 INPUT "GUESS";G$
250 IF G$=W$(X) THEN 350
259 REM --RESPOND TO WRONG ANSWER--
260 PRINT
270 PRINT "WRONG! IT WAS"
280 PRINT W$(X);"."
290 PRINT
300 PRINT "PRESS ANY KEY TO"
310 PRINT "CONTINUE.";
320 GET K$
330 IF K$="" THEN 320
340 GOTO 400
349 REM --INCREASE SCORE & RESPOND TO CORRECT ANSWER--
350 S=S+1
360 PRINT CHR$(147);
370 FOR T=1 TO 90
380 PRINT "YOU GOT IT! ";
390 NEXT T
400 PRINT CHR$(147);
410 NEXT X
419 REM --PRINT SCORE AND GOOD-BYE MESSAGE--
420 PRINT "YOUR SCORE WAS";S
430 PRINT "OUT OF";NW;"--"
440 PRINT
450 IF S=NW THEN PRINT "A 100% PERFECT SCORE!":GOTO 49
0
460 IF S>NW*0.45 THEN PRINT "YOU REALLY KNOW YOUR":PRI
NT "MONSTERS!":GOTO 490
470 PRINT "YOU'D BETTER STUDY"
480 PRINT "YOUR MONSTERS."
490 PRINT
500 PRINT "THE TRICKS ARE OVER;"
510 PRINT "NOW YOU GET A TREAT!"
520 PRINT
530 PRINT "SEE YOU AGAIN NEXT"
540 PRINT "YEAR!"
550 PRINT
560 PRINT "PRESS ANY KEY TO"
570 PRINT "BEGIN AGAIN."
579 REM --AFTER KEY IS PRESSED, BEGIN AGAIN--
580 GET K$
590 IF K$="" THEN 580
600 GOTO 60
1000 DATA WITCH,THWIC,USUALLY HAS A BROOM
1010 DATA VAMPIRE,RIPVAME,AVOID KISSING HIM
1020 DATA TROLL,LORLT,LIVES UNDER A BRIDGE
1030 DATA GHOST,STOGH,FLOATS THROUGH WALLS
1040 DATA WEREWOLF,FLOWWEER,HE BARKS AT THE MOON
```

MODIFICATIONS FOR OTHER COMPUTERS

Apple/*Name That Monster!*

Use the ADAM version, changing all characters to uppercase. Change line 340 to read:

```
340 FOR T = 1 TO 120
```

Commodore 64/*Name That Monster!*

Use the VIC-20 version, except change line 370 to read:

```
370 FOR T=1 TO 120
```

IBM PC & PC*jr*/*Name That Monster!*

Use the base version, except change lines 10, 80, and 300 to read:

```
10 WIDTH 40:NW=5
80 PRINT TAB(12);"NAME THAT MONSTER!"
300 FOR T=1 TO 120
```

TRS-80 Model III/*Name That Monster!*

Use the base version, except change lines 80 and 300 to read:

```
80 PRINT TAB(23);"NAME THAT MONSTER!"
300 FOR T=1 TO 140
```

PROGRAMMING P.S.

Corrections to previous months' programs

ADAM/*Top Secret* (*April, pages 83, 88*)

By changing lines 100 and 720 to read as shown below, you can improve the way the program looks on the screen. The change to line 540 will avoid frustration for some people who don't follow the program's instructions.

```
100 PRINT "What is your code name";
540 IF a$ <> CHR$(13) THEN 530
720 VTAB 5
```

Commodore 64/*Brain Terrain* (*August, pages 89, 90*)

Line 120 is longer than the maximum length the Commodore will accept for a program line. To solve this problem, divide it into two lines:

```
120 PRINT
125 R$="PRESS A ZONE KEY (A, B, C, E, F, M, P, S, T, O
R V) TO ACCESS MEMORY"
```

TI-99/4A/*Brain Terrain* (*August, pages 86, 88*)

Line 230 is incorrect as published. It should read as follows:

```
230 R$="PRESS A ZONE KEY (A, B, C, E, F, M, P, S, T, O
R V) TO ACCESS MEMORY"
```

in time. Quite a game, though like its predecessor, its graphics still don't do justice to its play system. And there's still an infuriatingly long loading time. These drawbacks pale in comparison to the numerous special touches—the sense of humor (you can't steal some paintings because they're "too surrealistic"), ingenious use of sound effects, including blood-curdling screams and computer-generated German voices, and the same sort of edge-of-your-seat excitement found in the first game. Success takes practice, but playtesters ages 10 and up didn't object to 6-hour sessions.

Congolomerates Collide

HARDWARE REQUIREMENTS: Apple II/II plus/IIe, 48K (disk).
MANUFACTURER: RockRoy, Inc.
PRICE: $39.95

One of my playtesters, a high-school senior whose computer game interests generally run to Infocom text adventures, introduced me to this one. He and his friends came over to play *Conglomerates Collide* between regular playtesting sessions, and I couldn't resist watching over their shoulders. Within 10 minutes I understood enough to play along.

This is the most accessible financial game we've tested to date, an easy-to-understand, fast-moving simulation of big-time corporate finance. You start out with one company. Purchase and manipulate other firms, get loans from the bank, buy and sell stocks, try to forecast market trends—all to accumulate more wealth than the other human or computer players by the game's end (when all remaining companies have been bought up).

Conglomerates avoids the lengthy rule books, long turns, and complex play systems of games such as *Cartels and Cutthroats* or *Oil Barons*. As a result, this is the first game we've seen that doesn't require all but an MBA to play. The trick is in its simplification of the corporate scramble into an easy-to-follow series of set moves, an approach which allows financial analysts to enjoy it, and newcomers 10 and up to play and learn.

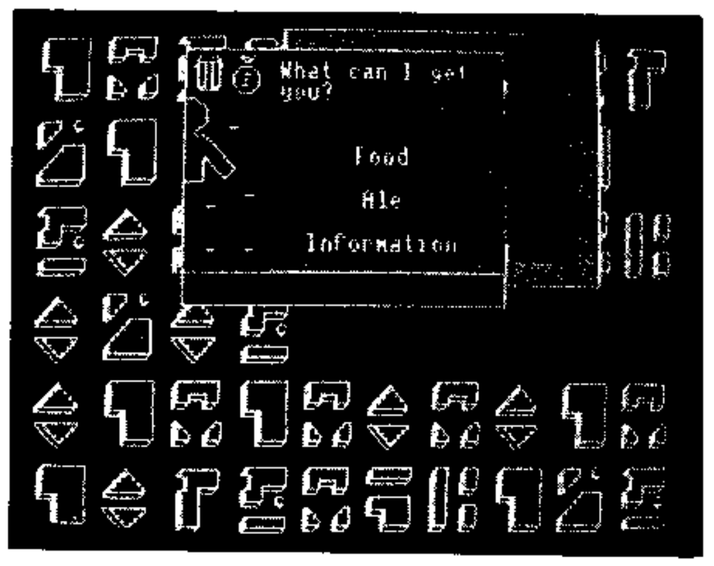
Like other financial games, *Conglomerates*' excitement lies in players' manipulation of huge sums of money. You're dealing with the green stuff, not spaceships or six-shooters. It's an intellectual exercise, but manageable because it takes only a couple of hours to play. For the most part, graphics are restricted to lists of companies and their varying price/earnings ratios, and general, variable economic factors, like the prime rate. While it doesn't offer the excitement and graphics of other computer games, it's one of the most appealing financial games around.

SunDog: Frozen Legacy

HARDWARE REQUIREMENTS: Apple II series, 64K (disk). Joystick.
MANUFACTURER: FTL Games
PRICE: $39.95

SunDog: Frozen Legacy is a compelling and absolutely enchanting program, a new kind of role-playing adventure which combines text, animated graphics, and arcade skills in one of the most absorbing games on the market today.

You're a future hero invaluable to a human colony that's being founded on a distant planet. Having inherited an armed cargo vessel from an uncle who died under mysterious circumstances, you must complete the work he started, delivering goods, and colonists who are frozen in suspended animation, to the outpost.



Success in this tough, one-player adventure requires a combination of analytical skills and patience. You'll have to navigate around several solar systems, trade skillfully in a variety of alien markets, exercise good judgement on the quality and value of interstellar trade goods, and charm unscrupulous alien purveyors of "hot" merchandise and information. Stay out of trouble when possible, but be prepared to shoot skillfully in situations in which there's no choice. All this on top of the fact that you have no prior starship-flying experience.

All in all it's a long interstellar route, but one I guarantee will keep

THE PRIMER/THE WORDS

The Words is a glossary of commonly used computer terms. Some are well-known English words, such as *read* and *write*, that have been incorporated into computer language and given different meanings. (Note: All italicized words in the definitions are defined in full elsewhere in the glossary.) Other terms that refer to a computer's inner workings are not often used in common speech, but are important because they are used in manufacturers' specifications and ads. Don't be awed by them. Remember the delight with which Americans took to the new NASA language over 20 years ago, when John Glenn first orbited the globe.

Access
To retrieve *data* from a storage place in the computer system. Access time is the amount of time it takes to obtain the *data*. Also refers to the action of connecting a terminal to a remote computer, as in: "I use my computer to access CompuServe."

Address
A specific location in the computer's *memory* where a piece of information is stored. Each address is identified by a number.

Bank-switching
The ability of a computer's *microprocessor* to address two *memory* banks, though not at the same time. For example, some 64K *RAM* computers can use bank-switching to *access* 128K *RAM*, but only 64K at a time. Bank-switching allows you to run more powerful *software*, and gives you a larger "work space" in *memory*.

BASIC
Beginner's All-purpose Symbolic Instruction Code. A popular, easy-to-learn *programming language* widely used with microcomputers.

Baud
Bits per second. A unit of measurement that describes the rate at which *data* are transmitted from one device to another, such as computer to printer, or computer to computer.

Bit
The smallest unit of information a computer uses. A bit is either the digit "0" or "1." An "8-bit" processor manipulates *data* in clusters of 8 bits.

Board
Printed circuit board. A flat, thin, rectangular component of a computer that includes one or more layers of printed circuitry to which *chips* and other electronic parts are attached. As an add-on to an existing computer, sometimes called a card.

Boot
Derived from "bootstrap." To start or restart a computer system by *reading* instructions from a storage device into the computer's *memory*.

Buffer
A temporary storage area to hold *data* during a transfer from one part of a computer system to another. The buffer may be in the computer, in the *peripheral* device, or it may be a separate, stand-alone unit.

Bug
An error in the logic of a computer *program* that prevents it from running properly. Bugs can cause a program to "freeze up," that is, to repeat the same operation endlessly. Finding and correcting the error is called debugging.

Bulletin board
An area, reached by dialing a remote computer system via *modem*, where you can leave or read messages electronically. Bulletin boards are usually set up on computers in people's homes, or at information services such as The Source or CompuServe.

Byte
One byte contains eight *bits*, enough to stand for one character of English, or one number. Thus, it generally takes more than one byte to make up a word. "Cat," for instance, requires three bytes.

CAI
Computer-Assisted Instruction. A term ap-

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