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BUYER'S GUIDE TO
DISK DRIVES

FAMILY

ANNIVERSARY
ISSUE

COMPUTING

Computers & Learning: A Magical Mix

Kids Who've Made It Big



How to Work the Computer Into the Family



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Programs for ADAM,
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Timex, and TRS-80



FAMILY COMPUTING™

FEATURES

50 TELELEARNING: THE COMPUTER BRINGS THE CLASSROOM HOME
by Roger Schulman

A new "electronic university" allows you to learn in your living room.

54 21ST CENTURY EDUCATOR
by Bill Camarda

Kenneth Komoski has supervised the review of more than 5,000 school software packages. He shares his views on computers and education with FAMILY COMPUTING.

57 SAT SOFTWARE: DOES IT MAKE THE GRADE?
by Jonathan Webster

A close look at College-Board preparation packages from 10 manufacturers.

62 THE SECRETS OF TEEN SOFTWARE STARS
by Marc Berman

Successful kids tell how they made it in the software business. PLUS: TIPS ON WHERE TO SEND YOUR SOFTWARE IDEAS

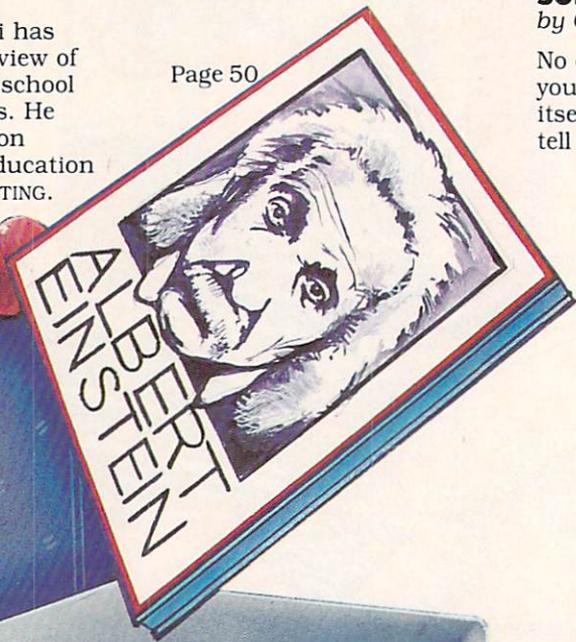
66 LIFE WITH A COMPUTER: SOLVING THE PUZZLES
by Gail Henderson

No computer will bring your family together all by itself—you have to help. We tell you how.

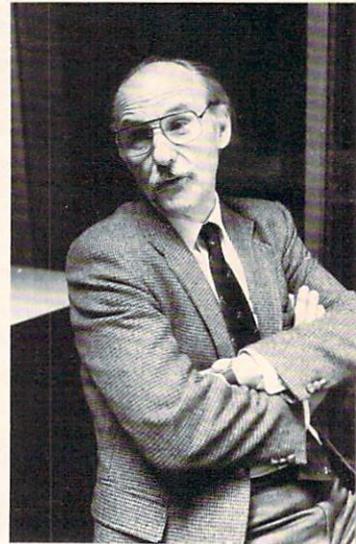
68 BUYER'S GUIDE TO DISK DRIVES

Choosing between the computer manufacturer's disk drives and third-party models.

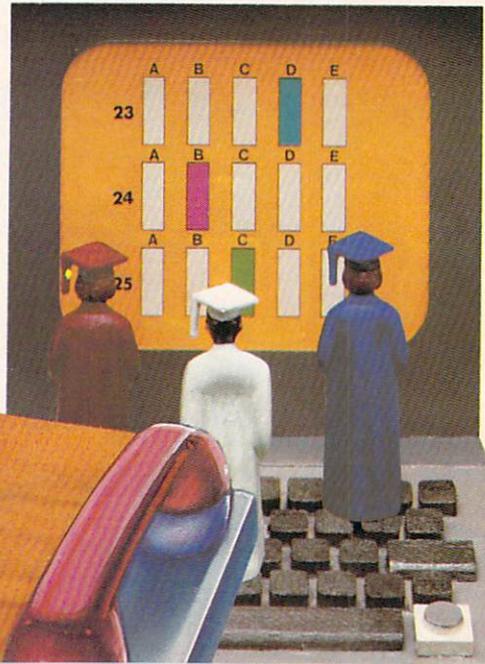
Page 50



Page 54



Page 57



PROGRAMMING

75 THE PROGRAMMER

For enthusiasts of all levels.

76 NEW BYTE-SIZE BASIC

Introducing a regular feature that will have you programming in no time.

84 BEGINNER PROGRAMS
by Joey Latimer

Remember phone numbers with words generated by *Dial-A-Word*; and watch leaves drop in *Falling Again* on your ADAM, Apple, Atari, Commodore, IBM, TI, Timex, or TRS-80 computers.

104 PROGRAMMING P.S.

Sorry, we goofed. Inside, we provide a few corrections and some enhancements for programs from previous issues.

108 READER-WRITTEN PROGRAM

Put your baby to sleep with *Teddy's Song* on a Commodore 64.

PRODUCTS

110 WHAT'S IN STORE

Product announcements and reviews.

110 NEW HARDWARE ANNOUNCEMENTS

The latest in the field: The Mindset computer, Sears' TV/monitor, Olympia's printer/typewriter, and more.

114 SOFTWARE GUIDE

Quick takes on two dozen new and noteworthy programs.

120 SOFTWARE REVIEWS



Page 122

DEPARTMENTS

6 EDITOR'S NOTE

8 LETTERS

10 BEHIND THE SCREENS

Making computers a household word; Lowell, Massachusetts—Silicon Valley East; two-faced floppies; and more.

16 HOME-SCHOOL CONNECTION
by Anthony D. Fredericks

Putting out the welcome mat: 12 ways to get to know your school's computers. PLUS: HOW TO RUN A SUCCESSFUL COMPUTER WORKSHOP

24 HOME BUSINESS
by June Rogoznica

Tutor to go: Kris U'Ren has made it her business to ease the learning process for computer novices.

30 GAMES
by James Delson

Games that make learning fun.

34 TELECOMPUTING
by P. Gregory Springer

People are gathering together on national networks. Here's some basic information and starter phone numbers.

42 COMPUTING CLINIC
by Jeffrey Bairstow

Questions from readers are answered.

44 NEW LEARNING LOGO
by Mindy Pantiel and Becky Petersen

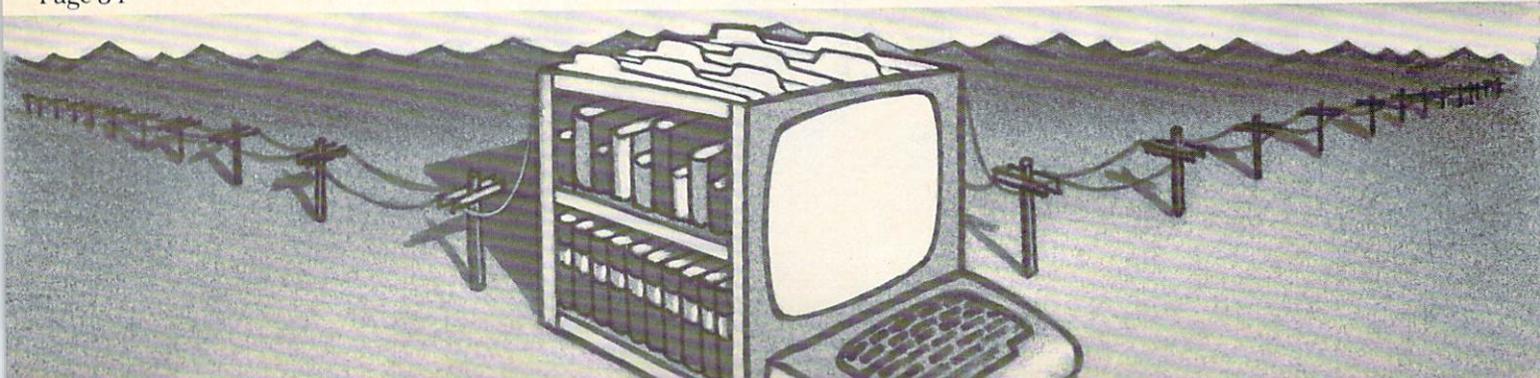
An introduction to the powerful computer language for learners of all ages. Part one of a six-part series.

133 CLASSIFIED

134 ADVERTISERS' INDEX

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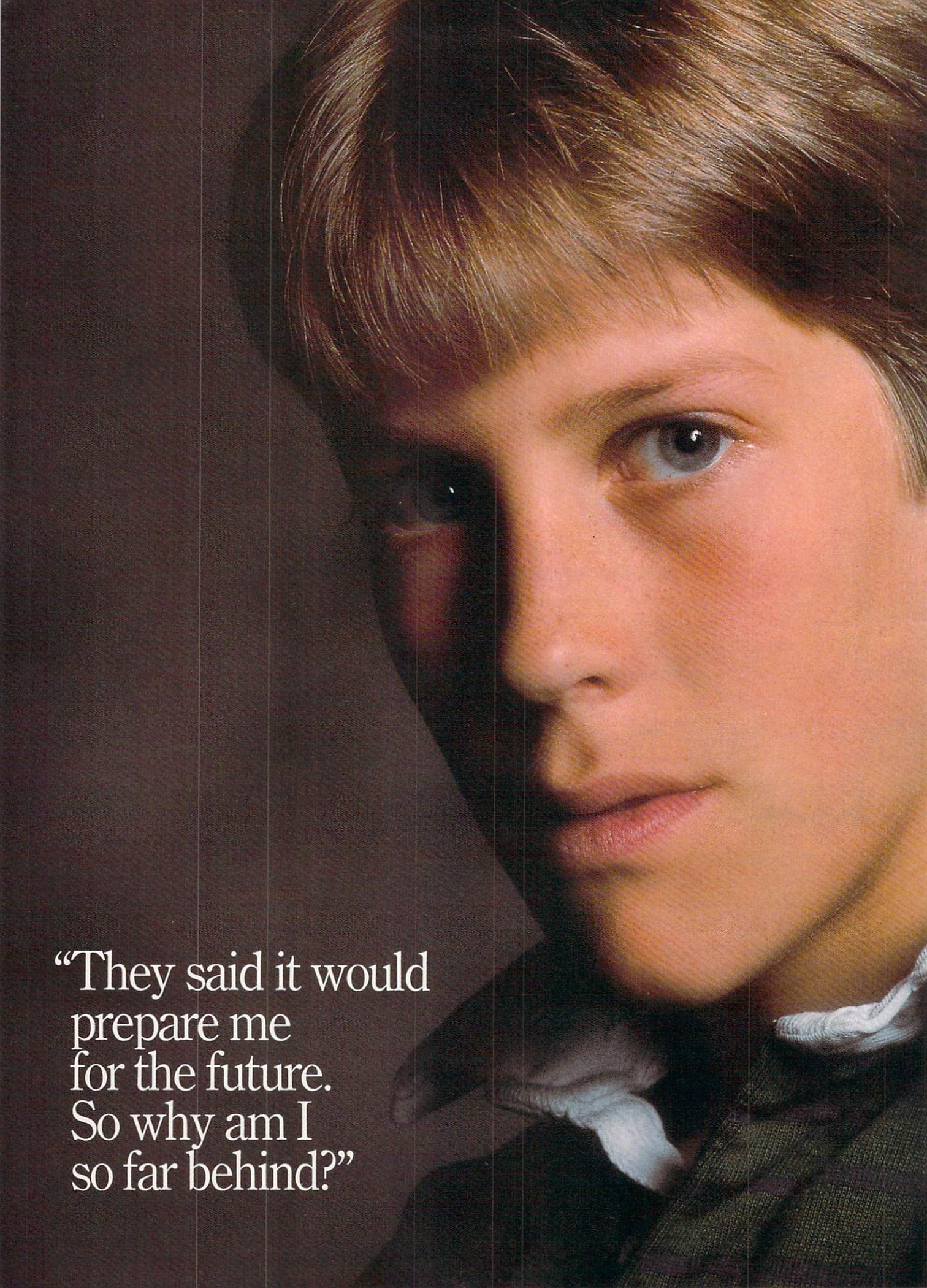


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1984/1 diskette with documentation/ISBN 0-89303-586-6/\$49.95

TAKING OFF WITH BASIC FOR THE COMMODORE 64

By Nancy Ralph Watson

This comprehensive, self-paced guide to BASIC programming was specifically designed for youngsters. Created for fun, the "Rocket Take-off" program teaches the necessary elements of BASIC as readers experience countdown, sound effects, and color. Two books in one include 17 supplemental chapters that expand the BASIC concepts introduced in the first chapters. It lists the most frequently used statements and commands with quick reference page numbers and a musical code chart.

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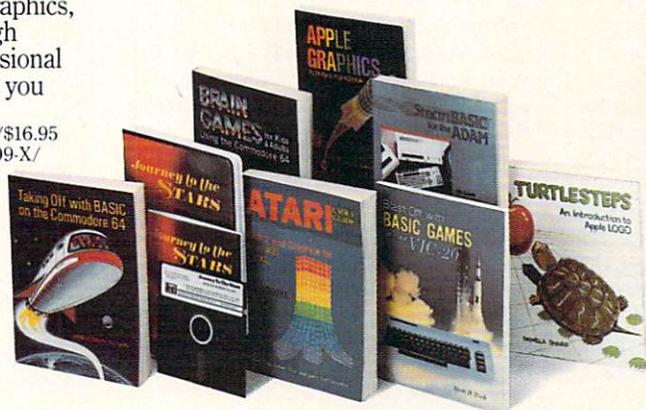
TURTLESTEPS: AN INTRODUCTION TO APPLE LOGO AND TERRAPIN LOGO

By Pamela Sharp

Turtlesteps is a gentle introduction to LOGO with numerous sample programs and activities. Graphic LOGO concepts are presented in 20 "turtlesteps" and 5 "doublesteps." LOGO, math, science and the arts are integrated for the child in fun. The cover extends to become a handy reference guide to mount near the computer for simplicity's sake. A glossary, an index and appendix complete this volume written by an art educator researching children and computers at Stanford.

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LEARNING LOGO

FROM THE BEGINNING

First of
Six Articles

An Introduction to the Powerful Computer Language for Learners of all Ages

BY MINDY PANTIEL
AND BECKY PETERSEN

The first day of school has come and gone. Your youngster has just barged in the door, flopped an empty lunch box down on the kitchen table, and handed you a list of school supplies to purchase before tomorrow. She's not quite the same kid you sent off this morning . . . her new shoes are now scuffed and her new dress looks rumpled. But there's a smile on her face.

"So how was school today?" you ask. A flood of responses comes forth. "Guess what? The school got computers over the summer and I'm going to learn to do computers this year. I can't wait. My teacher says we're going to learn Logo and all kinds of neat things like computer programming."

"You're going to learn Logo . . . what's that?"

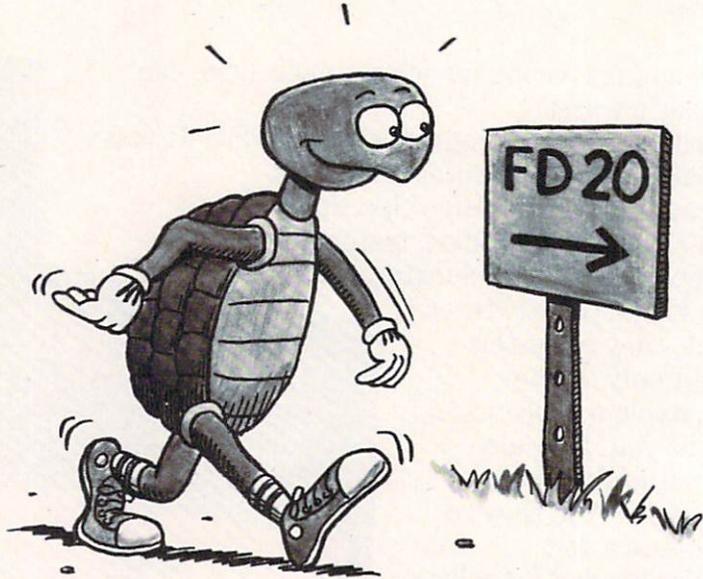
"Well, I don't know, but it's going to be fun. And we get to use the computers three times a week and I can't wait until it's my turn."

LOGO?

Logo is the computer programming language that's finding its way into more and more elementary schools across the country. Many educators believe it's especially well-suited for helping children explore and discover new ideas. With Logo, the child is in charge of the computer, actually teaching it how to do what he or she wants. Many teachers believe this sense of control is a powerful incentive for learning.

This is the first of six articles designed to introduce Logo to computing beginners of all ages. We think Logo is not only valuable in the

MINDY PANTIEL and BECKY PETERSEN of *Niwot, Colorado*, authors of the new book *Kids, Teachers, and Computers* (Prentice-Hall), are both experienced Logo instructors. They wrote "Learning Logo is a Family Affair" in the February FAMILY COMPUTING.



schools, but in the home as well. It's an ideal language for families to learn together.

Logo's roots go back to the 1960s and the Massachusetts Institute of Technology, where teams of researchers, led by Dr. Seymour Papert, worked on large "mainframe" computers to develop a computer language for children. The result was Logo. Now there are several different variations of Logo that have been adapted for use on microcomputers. (See the accompanying article, "Going Logo," for a brief run-down of available Logo packages; a more detailed comparison appeared in the February FAMILY COMPUTING.)

While Logo was developed for children, it's much more than child's play. This powerful language is capable of solving complex, real-world problems; it even shares some features with sophisticated artificial intelligence languages. While that's beyond the scope of these six beginner's articles, we will at least take note of some of Logo's more advanced capabilities.

TIME FOR TURTLE GRAPHICS

Central to Logo is its so-called "turtle graphics." Using a simple vocabulary of Logo commands, users direct a triangle-shaped "turtle" on the computer screen to make such moves as FORWARD, BACK, RIGHT, or LEFT. The turtle's "footprints" can be used to create designs that are limited only by the user's instructions and imagination.

Here are some more reasons why Logo and turtle graphics are so exciting.

Logo graphics provide immediate visual results. The turtle responds to your commands immediately, so you can see if it's doing what you had in mind. This is a real plus for novices. In addition, the combination of graphic designs, color, and animation tends to captivate children without intimidating adults.

Logo's "modular" structure means that a child can develop one part of a Logo program while her brother or sister develops another and her mother develops a third. Because each task is broken into small

LEARNING LOGO

chunks, which then can be used as the building blocks for larger programs. Logo can show children how to think a problem through, step-by-step. This helps children develop problem-solving skills. It's one of the biggest reasons more and more schools are using Logo.

Despite its apparent simplicity, Logo uses some remarkably complex mathematical ideas. Concepts related to geometry and trigonometry often become second nature to Logo programmers who may not even realize they're learning higher level math.

FIRST: LOGO SOFTWARE

Ready to tackle computer pro-

gramming with turtle graphics? Not so fast. First, you need to purchase a Logo software package. There are Logo packages available for most computers used in the home. Your family can't program in Logo without one.

All microcomputer versions of Logo offer a screen "turtle" that can be moved around to draw pictures, but the commands, procedures, and capabilities vary. These articles will be based on versions of Logo developed at MIT by Papert and his Logo laboratory. Where MIT Logo varies from other kinds, we'll try to alert you to the differences. In order to get the most out of your Logo software and these articles, keep your

users' manual nearby.

As your family learns, share your discoveries with one another. Include not only the end result, but also how it was done. Writing down the sequence of commands on paper often helps. That way, the image can be redrawn on the screen later on. (Later in the series, we will show you how to save your designs on a disk so they can be called back easily.)

LOGO LESSON NO. 1

In our first lesson, we'll meet the turtle on our computer screen; then we'll learn seven easy commands and put them to work creating graphic designs. If you don't yet have a Logo software package, don't stop read-

GOING LOGO: 17 PACKAGES TO CHOOSE FROM

| COMPUTER | NAME/PRICE | ADDRESS | BACKUP POLICY |
|--|---|---|--|
| ADAM | SmartLOGO; \$100 (data pack) | Coleco Industries, Inc. 999 Quaker Lane S., West Hartford, CT 06110 | Replacement free w/in 90 days of purchase |
| Apple II plus/IIe (64K) | Apple Logo; \$100 | Apple Computer, Inc. 20525 Mariani Ave., Cupertino, CA 95014 | Backup included |
| Apple IIe/IIc (128K) | Apple Logo II; \$100 | Apple Computer, Inc. 20525 Mariani Ave., Cupertino, CA 95014 | User makes backup |
| Apple II plus/IIe (64K) | Krell Logo; \$89.95 | Krell Software Corp. 1320 Stony Brook Road, Stony Brook, NY 11790 | Backup included |
| Apple II/II plus/IIe (64K) | Sprite Logo; \$299 (disk and circuit board) | Logo Computer Systems 220 Fifth Ave., New York, NY 10001 | User makes backup disk |
| Apple II plus/IIe (64K) | Terrapin Logo; \$99.95 | Terrapin, Inc. 222 Third St., Cambridge, MA 02142 | No backup provided |
| Apple II plus/IIe (48K) | Cyber Logo (turtle graphics program); \$79.95 | Cybertronics International 999 Mount Kemble Ave., Morristown, NJ 07960 | For backup copy, send \$15 and proof of purchase |
| Atari Home Computers (16K) | Atari Logo; \$100 (cartridge) | Atari, Inc. 1399 Moffett Park Drive, Sunnyvale, CA 94086 | No backup provided |
| Commodore 64 | Commodore Logo; \$69.95 | Commodore Business Machines 1200 Wilson Drive, West Chester, PA 19380 | For replacement, send \$5 and damaged disk to Commodore w/in 90 days of purchase |
| IBM PC/enhanced PCjr (128K) | IBM Logo; \$175 | IBM, Inc. Personal Computer Division P.O. Box 1328, Boca Raton, FL 33432 | User makes backup |
| IBM PC (192K), version planned for PC/enhanced PCjr (128K) | Dr. Logo; \$149.95 | Digital Research, Inc. 160 Central Ave., Pacific Grove, CA 93950 | Backup included |
| IBM PC/PCjr (64K) | PC Logo; 149.95 | Gold Hill Computer and Harvard Associates 260 Beacon St., Somerville, MA 02143 | Backup included; user makes copy |
| IBM PC/enhanced PCjr (128K) | Turtle Power (turtle graphics program); \$50 | IBM, Inc. Personal Computer Division P.O. Box 1328, Boca Raton, Florida 33432 | Replacement free w/in 90 days of purchase |
| IBM PC (128K) | Waterloo Logo; \$125 | Waterloo Microsystems 171 Columbia St. W., Waterloo, Ontario N2L 575 | User makes backup |
| IBM PC/PCjr (64K) | Ladybug Logo; \$10 (public- domain turtle-graphics program) | Young Peoples' Logo Association 1208 Hillsdale Drive, Richardson, TX 75081 | User makes backup |
| Radio Shack Color Computer (16K, 64K versions) | Color Logo; \$99 (64K); \$49.95 (16K cartridge) | Radio Shack/Tandy Corp. Available through Radio Shack stores. | User makes backup of disk |
| TI-99/4A (48K) | TI Logo II; \$99.95 | Triton Products Co. P.O. Box 8123, San Francisco, CA 94128 | No backup provided |

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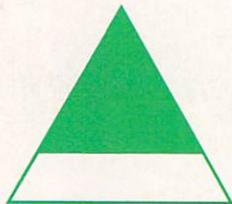
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LEARNING LOGO

ing. You can learn, even if you can't practice.

Once the Logo language disk or cartridge is loaded into the computer's memory (see your users' manual for specific directions), you will see a short welcome message on the screen. At this point, type in the command **DRAW** (on some systems, **SHOWTURTLE** or **ST**). That puts you in the **DRAW** mode. A very simple shape appears in the center of the screen. Meet the "turtle":



It's waiting for directions from you—Logo commands. As you give the turtle Logo commands, it can start drawing on the screen. Each new set of commands will direct it to do something.

Here are six instructions you can give it.

● To tell the turtle to move forward in the direction it is heading, use the command **FD** (or **FORWARD**—you can type it in either way). The turtle will leave a line of "turtle tracks" as it goes. You must add a number to tell the turtle how far you want it to go. For example, **FD 20** moves the turtle forward 20 turtle steps. Generally, eight turtle steps equal one inch on the screen. Give it a try.

● The opposite command to **FD** is **BK** (or **BACK**). For example, **BK 50** moves the turtle backwards 50 turtle steps, leaving tracks behind as it goes.

● The command **RT** (or **RIGHT**) tells the turtle to turn to its right. **RT** lets you change the direction the turtle is headed in. This command must be combined with a number of degrees to indicate how sharply you want the turtle to turn. For example, **RT 90** would turn the turtle 90 degrees to the right. Most adults know that 90 degrees is a right angle; not all children have encountered this concept. It's not necessary for them to identify right angles in order to use them, however. Through trial and error, they'll quickly learn how much **RT 45**, **RT 60**, or **RT 360** turns the turtle.

● The opposite of **RT** is **LT** (or **LEFT**). Using it along with a number of degrees tells the turtle how much you want it to turn to the left.

THE FAMILY CHALLENGE

Here's a challenge that will provide practice with the Logo commands you've just learned—**DRAW** or **ST**, **FD**, **BK**, **RT**, **LT**, **CS**, and **HOME**.

First, have all family members try to make a square. Adults and teenagers should be able to handle this rather quickly, but watch as your younger children wrestle with the problem. (You may need to remind them that a square has four equal sides.) It will take some experimenting on their part, but eventually they will discover that a combination of **FORWARD** and **RIGHT 90** commands will create a square.

With a little help, even your youngest family members—prereaders, too—can master the commands **FD**, **BK**, **RT**, and **LT**. One helpful strategy for these little ones is to have them "play turtle" by walking out a square first. This helps them relate their own body movements to the movements the screen turtle must make in order to create the same shape. Or have them use a big stuffed animal to make a square shape on the floor. It's especially fun if you have a real stuffed turtle.

Once everyone's discovered a way to make a square, see how many alternative ways they can find to make that same square. Remember there are **FORWARD**, **BACK**, **RIGHT**, and **LEFT** commands to use. Here's this month's ultimate challenge: Can you put together a series of squares to make more complex shapes like windows and ladders?

● **CS** (or **CLEAR SCREEN**) erases all lines that have been drawn on the screen, providing a clean workspace on which to start over. The turtle remains where you left it before you cleared the screen.

● **HOME**. This command sends the turtle back to the center of the screen, which is considered to be its home.

● That's all for this month. Now, practice. See how many creative graphic designs you and your family members can come up with. Refer to the accompanying article, "The Family Challenge," for another way to practice these commands.

Next month we'll take a look at a variety of make-it-yourself tools you can use to help your family learn Logo. We'll also introduce you to Logo commands that will give you more control over your turtle. **FC**

HOW TO TYPE IN PROGRAMS

START BY TYPING IN PUBLISHED PROGRAMS.
YOU'LL SOON BE ON THE WAY TO
CREATING YOUR OWN.

BY JOHN JAINSCHIGG



Learning to program doesn't have to be a chore—if you go about it with imagination, it can be downright entertaining. This month we explain what you need to know to type a program into your computer and get it to work. In future months, "Byte-Size BASIC" will teach you programming the easy way: with short, fun programs to type in and enjoy—and learn from!

BASIC is a very simple and straightforward programming language. It's easy to learn because its small vocabulary consists mostly of Englishlike expressions. It's well suited to beginning programmers because it works in an interactive way that makes it easy to experiment with and to correct mistakes.

Still, a complicated-looking BASIC program can look intimidating—although typing it into your computer and making it work can be easy and enjoyable. By understanding a little about how BASIC works and knowing the ground rules for correcting typing errors, you'll avoid the pitfalls beginners fear most. Here's a step-by-step guide:

JOHN JAINSCHIGG is FAMILY COMPUTING's technical editor.

1. Find a program that will run on your computer. Not all BASICs are the same. The BASIC language that comes with your microcomputer is designed to work only with that brand of system and is different from others. Don't jump in head first! Unless you understand the differences between various versions of BASIC, be sure to choose only programs written to run on your machine.

Many micros come with beginners' versions of BASIC built in, although they sometimes also have other dialects available for more advanced programming. (See Chart No. 1.) If you don't have TI Extended BASIC, for example, you'll only be able to run programs written in the version that comes built into all TIs.

Finally, make sure you have any additional equipment that's required for a particular program: extra memory, joysticks, disk drive, printer, etc. Read the introductory notes and headline above the program carefully for this information. If there's no mention of what language or peripherals are required, chances are that the program will run on any computer of that brand.

2. Get the machine ready. The next step is to

make sure BASIC is ready to go. Check that everything is connected correctly (and plugged in!). Then turn on your TV or monitor, your other peripherals, and finally, your computer. Check Chart No. 1 for details on how to start up the version of BASIC you want, or have, on your machine. You should see an introductory message on the screen and a "prompt" (the word READY or OK, or some special symbol like > or |, that tells you the computer is waiting for you to type something in).

3. Make yourself comfortable. Now you're in BASIC, but you're not quite ready to start typing yet. Before you begin typing in a long program, it's wise to spend a few moments getting comfortable in front of the keyboard. Make sure that your chair provides proper support for good typing posture. Check that your TV or monitor is tuned for maximum clarity, and place it at a comfortable viewing angle and where it is free of glare. Take a look at the printed page you intend to type from. Is there enough light to read the program listing easily?

Do you want to prop the page against something or let it lie flat? Remember, a little time spent getting comfortable can save you backaches and eyestrain later on! (For more information on ergonomics, see "How People and Machines Can Work in Harmony," in the November and December 1983 issues of FAMILY COMPUTING.)

4. Explore the keyboard. Your computer keyboard is set up to resemble a typewriter's, but there are several differences, many of which are specific to one brand of computer or another.

Part of the computer keyboard's function is typewriter-like: When you press a key, the corresponding letter, number, punctuation mark, or special symbol appears on the screen. Most computers also have keys for special functions: to produce graphics characters, to invert characters (switching to light-on-dark or dark-on-light), to clear the screen, etc. Computer keyboards manage to be very versatile by adding extra keys and by giving additional functions to normal keys.

CHART 1 HOW TO GET YOUR COMPUTER INTO BASIC

| COMPUTER | VERSION OF BASIC | FORM | HOW TO ACTIVATE |
|---------------------------------------|-----------------------------|---|---|
| ADAM | SmartBASIC | Loaded from digital data pack | Turn on system; insert SmartBASIC digital data pack in left drive; press button marked RESET COMPUTER. BASIC will load automatically. |
| Apple II series | Applesoft BASIC* | Built in (ROM) | Cassette systems: Turn on computer. Disk systems: Place DOS-formatted disk bearing HELLO file in Drive 1. Turn on computer. |
| Atari Home Computers | Atari BASIC | 400 & 800 cartridge; 600XL, 800XL built in (ROM) | 400 & 800, prepare by inserting BASIC cartridge in center or left-hand cartridge slot, respectively. Then, for all models, proceed as follows: Cassette systems: turn on computer. Disk systems: turn on disk drive(s). Place Master or other disk with DOS in Drive 1. Turn on computer. |
| Commodore 64 | C 64 BASIC | Built in (ROM) | Turn on computer. |
| IBM PC | Cassette BASIC | Built in (ROM) | Turn on computer. |
| | Disk BASIC | Loaded from disk | Place DOS disk in Drive A; turn on computer; wait until self-check completed; at A> prompt, type BASIC, and press RETURN. |
| IBM PCjr | Advanced BASIC | Loaded from disk | As above, but enter BASICA at A> prompt. |
| | Cassette BASIC | Built in (ROM) | Turn on computer. |
| Texas Instruments 99/4A | Cartridge BASIC | Cartridge | Cassette systems: Place cartridge in either cartridge port; turn on computer. Disk systems: Place cartridge in either cartridge port; place DOS disk in drive; continue as above for IBM PC Disk BASIC. |
| | TI BASIC | Built in (ROM) | Turn on computer; press any key for menu; select TI BASIC at prompt. |
| Timex Sinclair 1000 & 1500 | TI Extended BASIC | Cartridge | As above, but select TI EXTENDED BASIC at prompt. |
| | Sinclair BASIC | Built in (ROM) | Turn on computer. |
| TRS-80 Color Computer | Color BASIC | Built in (ROM) in entry-level machine | Turn on computer. |
| | Extended Color BASIC | Built in (ROM); chip replaces Color BASIC | Turn on computer. |
| | Disk Extended Color BASIC | Built into disk-interface cartridge; Extended Color BASIC must be installed in computer | Turn on disk drive; turn on computer. |
| TRS-80 Models III & 4 | Radio Shack Model III BASIC | Built in (ROM) | Cassette systems: turn on computer. Disk systems: turn on computer. Hold down BREAK key and press RESET. Press ENTER at the CASS? prompt. |
| | Disk BASIC | Loaded from disk | Turn on computer. Place Model III DOS disk in Drive 0. Press RESET. Answer the DATE and TIME prompts. When the DOS prompt appears, type BASIC and press ENTER. Answer each of the prompts: MEMORY SIZE? and HOW MANY FILES? by pressing ENTER. |
| | BASIC 01.00.00 (Model 4) | Loaded from disk | BASIC 01.00.00 (Model 4 disk systems only): As above for loading Disk BASIC, but use a Model 4 DOS disk. |
| VIC-20 | CBM BASIC | Built in (ROM) | Turn on computer. |

*Integer BASIC was supplied with the original Apple IIs and can be loaded from disk into II pluses that have a language card and all IIs and IIcs. Cassette BASIC can be used on disk systems by pressing RESET (on IIs and IIcs you have to hold down the CONTROL key at the same time) after turning on the computer.

Take some time to try out the more unusual-looking keys on your keyboard. Your manual will explain any keys you can't figure out yourself. And feel free to press any key or combination of keys; nothing you type can hurt your computer!

(If you own a Timex Sinclair computer, you know that you can use just one key to type a whole command at once. The Timex manuals contain full instructions for using this highly efficient keyboard.)

As you type, you'll notice that the cursor (that special marker the computer display uses to show your typing position) moves to the right, leaving letters in its wake. But when your cursor reaches the right-hand margin, you'll see something unusual. Unlike a typewriter's carriage, which merely rings a bell and eventually refuses to advance, the computer's cursor proceeds to the beginning of the next screen line and continues on its way. The computer doesn't recognize its own margins the way a typewriter does.

To start a new line, you must press your RETURN key. (See Chart No. 2 to find the corresponding key for your machine.) This also tells the computer that you've reached the end of a command or of a program line—regardless of how many actual lines it filled on the computer's screen—and that you want it to do something. If you've been typing gibberish, the response you'll most likely get will be SYNTAX ERROR or a similar message. Don't worry; that just means the computer didn't understand your command.

5. Clear the computer's memory. Before you start typing in an actual program, you'll want to get rid of any random typing you've done while experimenting. Type NEW and press your RETURN key. This tells the computer to forget everything you've typed in previously and start with a clean slate.

6. Type in your program, line by line. Now let's do some real programming. Starting with your cursor at the left margin (if it's not already there, press RETURN to get it there), type in your program, pressing RETURN at the end of each numbered line. Or try this little program, which will work on any personal computer and in any BASIC:

```
10 PRINT "WELCOME. I AM HERE TO SERVE YOU IN ANY WAY I CAN."
```

If the letters appear in lowercase, refer to Chart No. 2 under the heading "This Is Your SHIFT LOCK Key" and set your computer for all capital letters; then retype the line. Some BASICs don't understand lowercase letters except in special situations. As a general rule, unless you need to use lowercase letters for some specific purpose, do all your work in BASIC in uppercase only.

If you make a mistake before pressing RETURN, you can use the BACKSPACE key (check Chart No. 2 for the right key on your machine) to move the cursor back to the point of the error, type over the mistake, and type in the rest of the line once more. (On Apple computers the letters don't disappear from the screen as you BACKSPACE over them. You have to correct the error and retype the rest of the line anyway.) If any characters left over from the mistake remain on the right side of the cursor after you've reached the end of the line, use the space bar to move the cursor over them and wipe them out. Then move the cursor back to the end of your line—using your BACKSPACE key—before pressing RETURN.

You may not notice a mistake until after you've pressed RETURN—or your computer may beep at you and complain that there's something wrong with the line you just entered. In that case, just retype the entire line and press RETURN.

CHART 2

SOME

| COMPUTER | THIS IS YOUR RETURN KEY: | THIS IS YOUR DELETE KEY: |
|----------------------------|--------------------------|--|
| ADAM | RETURN | ← |
| Apple II series | RETURN | ← |
| Atari Home Computers | RETURN | DEL/BACK S |
| Commodore 64 | RETURN | INST/DEL |
| IBM PC | ← | DEL |
| IBM PCjr | ENTER | DEL |
| Texas Instruments 99/4A | ENTER | ← Press FCTN and "S" keys simultaneously |
| Timex Sinclair 1000 & 1500 | ENTER | SHIFT-DELETE Press SHIFT and numeral 0 simultaneously |
| TRS-80 Color Computer | ENTER | ← |
| TRS-80 Model III | ENTER | ← |
| TRS-80 Model 4 | | |
| VIC-20 | RETURN | INST/DEL |

N/A Not Applicable

What you've just entered is a BASIC program line. The number 10 at the front of the line tells the computer that this line may be part of a larger program, so it shouldn't do anything right now but store the line away in its memory. If you enter more lines beginning with different numbers, the numbers will tell the computer the order in which you want it to perform your instructions.

7. Check your typing. Computers are very particular; every space and punctuation mark should be exactly as it appears in the printed listing. To make sure that you've entered the program correctly, type LIST and press RETURN. LIST tells the computer to show you all of your program. But with longer programs, this may result in the listing disappearing off the top of the screen before you can read it. In such a case, you can ask the computer to show you only certain lines, or you can make the computer pause or slow down (see "How to List a Range of Lines" and "How to Make a Listing Pause" in Chart No. 2).

Check each program line carefully. If you find an error, retype the entire numbered line and press RETURN; the computer will automatically replace your original version of that line with the new one.

8. Save the program. Some program errors can cause your computer to "lock up" so completely that the only escape is to reset the computer, losing everything you've typed in so far. To guard against this—or to preserve your program for later use—you might want to make a permanent record of your program on tape or disk. See Chart No. 2 for instructions on how to save a program and load it back in.

SPECIAL KEYS AND COMMANDS

Enter the commands below, substituting your own file names or parameters, and press RETURN or ENTER.

| THIS IS YOUR SHIFT LOCK KEY: | HOW TO MAKE A LISTING PAUSE | HOW TO STOP A RUNNING PROGRAM | HOW TO LOAD TO/SAVE FROM CASSETTE | HOW TO LOAD TO/SAVE FROM DISK | HOW TO LIST A RANGE OF LINES (e.g., 10 to 100) |
|--|--|---|--|---|--|
| LOCK | CONTROL-S (To pause/resume) | CONTROL-C | LOAD FILENAME SAVE FILENAME | N/A | LIST 10-100 |
| CAPS LOCK | CONTROL-S (To pause/resume) | CONTROL-C (All models) CONTROL-RESET (Ile, Iic) RESET (II plus) | CLOAD FILENAME CSAVE FILENAME | LOAD FILENAME SAVE FILENAME | LIST 10-100 OR LIST 10,100 |
| SHIFT-CAPS LOWR | CTRL-1 (To pause/resume) | BREAK | CLOAD OR LOAD "C:FILENAME" CSAVE OR SAVE "C:FILENAME" | LOAD "D:FILENAME" SAVE "D:FILENAME" | LIST 10,100 |
| COMMODORE KEY | CTRL (Press to slow listing; release to resume) | RUN STOP or RUN STOP-RESTORE | LOAD "FILENAME" SAVE "FILENAME" | LOAD "FILENAME".8 SAVE "FILENAME".8 | LIST 10-100 |
| CAPS LOCK | CTRL-NUM LOCK (To pause) CTRL-SCROLL LOCK (To resume) | CTRL-SCROLL LOCK | CLOAD "FILENAME" CSAVE "FILENAME" | LOAD "FILENAME" SAVE "FILENAME" | LIST 10-100 |
| CAPS LOCK | FN-PAUSE (To pause; any key to resume) | FN-BREAK | CLOAD "FILENAME" CSAVE "FILENAME" | LOAD "FILENAME" SAVE "FILENAME" | LIST 10-100 |
| ALPHA LOCK | N/A | FCN-CLEAR ("4" key) | OLD CSI SAVE CSI | OLD DSK1.FILENAME SAVE DSK1.FILENAME | LIST 10-100 |
| (Uppercase only) | Listing pauses automatically when screen is full | SPACE | LOAD "FILENAME" SAVE "FILENAME" | N/A | LIST 10 (Line 10 becomes line displayed at top of screen) |
| SHIFT-0 (Lowercase appears as inverse) | SHIFT-@ (To pause; press any key to resume) | BREAK | CLOAD "FILENAME" CSAVE "FILENAME" | LOAD "FILENAME" SAVE "FILENAME" | LIST 10-100 |
| SHIFT-0 | SHIFT-@ (To pause; any key to resume) | BREAK | CLOAD "FILENAME" CSAVE "FILENAME" | LOAD "FILENAME" SAVE "FILENAME" | LIST 10-100 |
| CAPS | | | | | |
| COMMODORE KEY | CTRL (Press to slow listing; release to resume) | RUN STOP or RUN STOP-RESTORE | LOAD "FILENAME" SAVE "FILENAME" | LOAD "FILENAME".8 SAVE "FILENAME".8 | LIST 10-100 |

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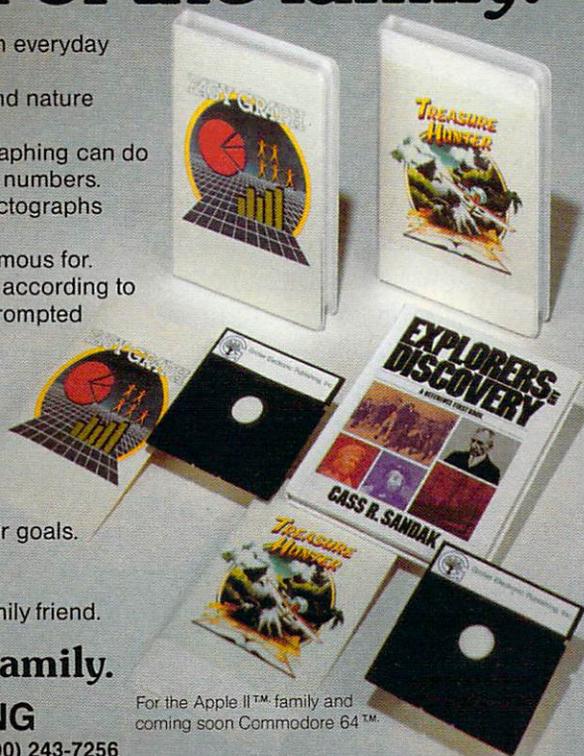
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9. Run the program. When you're satisfied that your program is correct, type RUN and press RETURN. If you're lucky, it'll do exactly what it's supposed to do! (Our little program above should print WELCOME, I AM HERE TO SERVE YOU IN ANY WAY I CAN. on your screen.)

10. "Debug" the program. If the program worked, congratulations! But generally speaking, any substantial program you type in won't work on the first go around. If your program contains "bugs" (errors), one of three things may happen.

PROBLEM: The program may run but not do what it's supposed to do. Graphics may be misshapen, for example, or the program may print nonsense on the screen.

SOLUTION: LIST the program and double-check each line carefully. If you find an error, the easiest thing to do at this stage is to type the whole of the line that contains the error into the computer again and press RETURN.

(Most computers offer much more efficient means of correcting typographical mistakes than retyping an entire line. Advanced editing functions are generally system specific, though, and mastery of them can be delayed until you are more familiar with the keyboard. Consult your manuals for further information.)

PROBLEM: The program may stop and print an error message on the screen like SYNTAX ERROR IN 10 OR BAD VALUE IN 550. (At this point Radio Shack computers may automatically go into a special editing mode: They'll display the line number at the left margin. Unless you've learned the special TRS-80 editing commands, press RETURN.)

SOLUTION: Type LIST followed by the specified line number and press RETURN. Check the line very carefully and enter it again if necessary. If it looks correct—and the error message was something other than SYNTAX ERROR—

then the error is elsewhere in the program; you must double-check every line, unless you understand programming well enough to interpret the error message. (Example: if you get an OUT OF DATA IN LINE 360, the error may not be in LINE 360 but rather in a DATA statement.) If you have a printer, printing out a copy of the program can very often help you find errors (see your computer's manual).

PROBLEM: The program runs and runs and won't stop.
SOLUTION: See "How to Stop a Running Program" in Chart No. 2. Once you've stopped the program, double-check each line and correct as necessary.

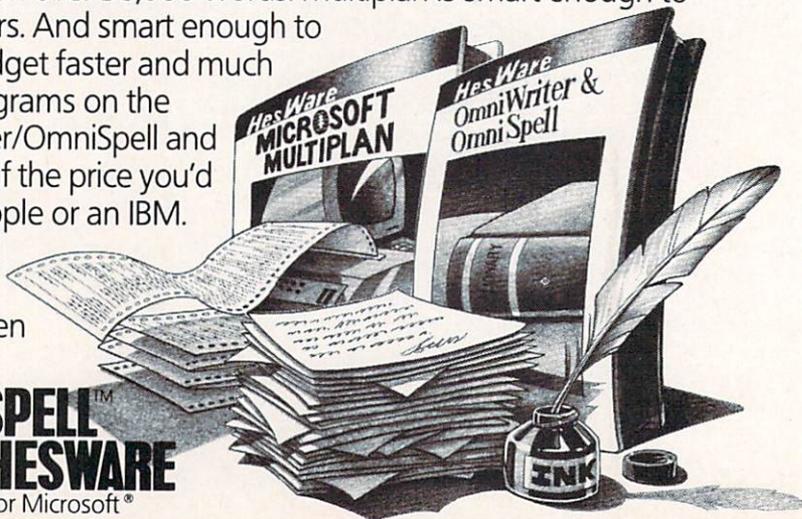
When you've found and corrected all the typing errors in your program, save the final version and try typing RUN (and pressing RETURN) again. If the program still doesn't work as it's expected to, you may have missed something. Chances are that one or two rounds of error checking will fix all but the most recalcitrant problems. As you learn more and more about the way BASIC works, you will quickly become able to anticipate likely places where errors can occur. (A tip: Start by checking DATA statements and other tricky typing; then look for missing lines and for zeros where letter "O"s should be, and vice versa.)

11. Have some fun! After you've enjoyed the program, feel free to experiment with changes. You can customize most programs to work just the way you want (slower, faster, different words on the screen, etc.). The great thing about BASIC is that it's very easy to change one line at a time, then find out immediately what happens. Playing around with programs is the best way to learn quickly. And if you find ways to improve programs we've published, let us know!

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DIAL-A-WORD

BY JOEY LATIMER

Quick: What was your last telephone number? You can't remember? What if you had to remember a word instead, such as HIC-CUPS (442-2877) or CAB-BAGE (222-2243)?

There are many words hidden in a telephone number. Since each of the digits 2 through 9 on a phone dial stands for three possible letters of the alphabet, a single, seven-digit phone number can represent up to 2,187 letter combinations!

Of course, you'd never want to take the trouble of working out all the possible combinations yourself—but, now your computer can do it for you!

Simply type in *Dial-A-Word* and RUN it. You'll be asked to enter a seven-digit telephone number (no area codes or extensions, please!). Type in the digits without any spaces or punctuation marks between them, like this: 5558888.

Press RETURN or ENTER and watch as your computer generates every possible letter combination for those numbers. Some of these letters will form



gibberish, but others (or combinations of several) will form into a word or words that you won't ever forget! And when you're ready to dial a phone number, just use the letters that accompany the digits on a telephone dial. (Note: Neither 1 nor 0 is accompanied by letters on a telephone dial; they'll remain as digits within the letter combinations.)

ADAM/Dial-A-Word

```

9 REM --INITIALIZE VARIABLES--
10 DIM a(7)
20 a$ = "ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR i = 1 TO 7
40 a(i) = 0
50 NEXT i
60 np = 0
70 fl = 0
79 REM --GET TELEPHONE NUMBER--
80 HOME
90 PRINT TAB(10);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
120 PRINT "(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <RETURN>."
140 PRINT
150 INPUT "NUMBER? ";n$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(n$) <> 7 THEN 80
170 FOR i = 1 TO 7
180 IF MID$(n$,i,1) < "0" OR MID$(n$,i,1) > "9" THEN fl = 1

```

```

190 NEXT i
200 IF fl <> 0 THEN 70
210 HOME
219 REM --PRINT CURRENT COMBINATION OF LETTERS--
220 FOR i = 1 TO 7
230 IF MID$(n$,i,1) < "2" THEN PRINT MID$(n$,i,1);:GOT 0 250
240 PRINT MID$(a$,VAL(MID$(n$,i,1))*3-5+a(i),1);
250 NEXT i
260 PRINT SPC(3);
270 np = np+1
280 IF np/3 <> INT(np/3) THEN 300
290 PRINT
300 IF np < 63 THEN 380
309 REM --IF SCREEN FULL, PRINT MESSAGE--
310 PRINT
320 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
330 GET k$
340 IF k$ = "q" THEN END
350 IF k$ <> "c" THEN 330
360 np = 0
370 HOME
379 REM --PRODUCE NEXT COMBINATION--
380 p = 1
390 a(p) = a(p)+1
400 IF a(p) < 3 AND MID$(n$,p,1) > "1" THEN 220
410 a(p) = 0
420 p = p+1
430 IF p < 8 THEN 390
440 PRINT
450 PRINT "DONE!"
460 END

```

Apple/Dial-A-Word

```

10 DIM A(7)
20 A$ = "ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I = 1 TO 7
40 A(I) = 0
50 NEXT I
60 NP = 0
70 FL = 0
79 REM --GET TELEPHONE NUMBER--
80 HOME
90 PRINT TAB(15);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
120 PRINT "(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <RETURN>."
140 PRINT
150 INPUT "NUMBER? ";N$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(N$) <> 7 THEN 80
170 FOR I = 1 TO 7
180 IF MID$(N$,I,1) < "0" OR MID$(N$,I,1) > "9" THEN FL = 1
190 NEXT I
200 IF FL <> 0 THEN 70
210 HOME
219 REM --PRINT CURRENT COMBINATION OF LETTERS--
220 FOR I = 1 TO 7
230 IF MID$(N$,I,1) < "2" THEN PRINT MID$(N$,I,1);:GOT 0 250
240 PRINT MID$(A$,VAL(MID$(N$,I,1)) * 3 - 5 + A(I),1);
250 NEXT I
260 PRINT " ";
270 NP = NP + 1
280 IF NP < 110 THEN 360
289 REM --IF SCREEN FULL, PRINT MESSAGE--
290 PRINT
300 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
309 REM --WAIT FOR KEY TO BE PRESSED--
310 GET K$
320 IF K$ = "q" THEN END
330 IF K$ <> "c" THEN 310
340 NP = 0

```

ILLUSTRATIONS BY JOSH COSEFIELD

FALLING AGAIN

BY JOEY LATIMER



Fall has arrived and the trees that provided comforting shade during the hot summer months are now shedding their leaves. Overnight, the weather has taken a turn for the colder, and up and down the block the scraping of rakes can be heard.

While your neighbors are

hard at work, you can sit back in your easy chair and enjoy the change of seasons without lifting a rake! Type *Falling Again* into your computer, RUN it, and watch our fall tree change color and slowly shed its leaves, one by one, until all its branches are bare.

ADAM/Falling Again

```

10 DIM r(15),c(15),b(15)
20 HOME
30 GR
39 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
40 FOR x = 1 TO 10
50 READ ko,r1,r2,c1,c2
60 COLOR = ko
70 FOR y = r1 TO r2
80 HLIN c1,c2 AT y
90 NEXT y,x
99 REM --DRAW BRANCHES OF TREE--
100 FOR x = 1 TO 46
110 READ br,bc
120 PLOT br,bc
130 NEXT x
139 REM --DRAW LEAVES--
140 COLOR = 4
150 FOR x = 1 TO 15
160 READ r(x),c(x),b(x)
170 PLOT r(x),c(x)
180 NEXT x
189 REM --MAKE THE LEAVES FALL--
190 COLOR = 13
200 FOR x = 1 TO 15
210 PLOT r(x),c(x)
220 FOR t = 1 TO RND(1)*1100+1
230 NEXT t
240 COLOR = 2
250 PLOT r(x),c(x)
260 FOR y = c(x)+1 TO b(x)-1
270 hk = SCRNR(r(x),y)
280 COLOR = 13
290 PLOT r(x),y
300 FOR t = 1 TO 10+RND(1)*200
310 NEXT t
320 COLOR = hk
330 PLOT r(x),y
340 NEXT y
350 COLOR = 13
360 PLOT r(x),b(x)
370 NEXT x

```

```

379 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
380 FOR t = 1 TO 2500
390 NEXT t
400 VTAB 22
410 PRINT "PRESS <R> FOR AN INSTANT REPLAY";
420 PRINT "OR <Q> TO QUIT.";
429 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
430 GET k$
440 IF k$ = "q" OR k$ = "Q" THEN TEXT:END
450 IF k$ = "R" OR k$ = "r" THEN RESTORE:GOTO 20
460 GOTO 430
1000 DATA 2,0,28,0,39,4,29,39,0,39,13,4,4,38,39
1010 DATA 13,3,3,37,39,13,2,2,36,39,13,0,1,35,39
1020 DATA 3,38,38,9,13,3,37,37,10,12,3,14,37,10,11
1030 DATA 3,12,13,10,10
1040 DATA 9,17,8,16,7,17,12,15,13,15,14,15,15,16,13
2000 DATA 14,13,13,14,12,15,11,16,11,9,13,8,12,7
2010 DATA 13,6,14,9,11,9,10,8,9,7,8,6,9,5,10,3,10
2020 DATA 5,12,4,11,6,7,5,6,11,11,12,11,13,10,14,9
2030 DATA 15,8,16,8,17,7,12,9,11,8,10,7,9,6,9,8,12
3000 DATA 7,11,6,13,6,12,5,11,4,12,3,13,3,14,7,35,4
3010 DATA 13,37,15,17,38,13,4,39,2,11,36,8,5,38,16
3020 DATA 12,36,5,7,35,6,15,37,17,8,35,7,18,39,12
3030 DATA 12,36,10,5,39,8,10,36,9,14,37

```

Apple/Falling Again

```

10 DIM R(15),C(15),B(15)
20 HOME
30 GR
39 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
40 FOR X = 1 TO 10
50 READ K0,R1,R2,C1,C2
60 COLOR= K0
70 FOR Y = R1 TO R2
80 HLIN C1,C2 AT Y
90 NEXT Y,X
99 REM --DRAW BRANCHES OF TREE--
100 FOR X = 1 TO 46
110 READ BR,BC
120 PLOT BR,BC
130 NEXT X
139 REM --DRAW LEAVES--
140 COLOR= 4
150 FOR X = 1 TO 15
160 READ R(X),C(X),B(X)
170 PLOT R(X),C(X)
180 NEXT X
189 REM --MAKE THE LEAVES FALL--
190 COLOR= 13
200 FOR X = 1 TO 15
210 PLOT R(X),C(X)
220 FOR T = 1 TO RND(1) * 800 + 1
230 NEXT T
240 COLOR= 6
250 PLOT R(X),C(X)
260 FOR Y = C(X) + 1 TO B(X) - 1
270 HK = SCRNR(R(X),Y)
280 COLOR= 13
290 PLOT R(X),Y
300 FOR T = 1 TO 10 + RND(1) * 70
310 NEXT T
320 COLOR= HK
330 PLOT R(X),Y
340 NEXT Y
350 COLOR= 13
360 PLOT R(X),B(X)
370 NEXT X
379 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
380 FOR T = 1 TO 2000
390 NEXT T
400 VTAB 22
410 PRINT "PRESS <R> FOR AN INSTANT REPLAY"
420 PRINT "OR <Q> TO QUIT.";
429 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
430 GET K$

```

PROGRAMMING P.S.

```
119 REM -- START INPUT LOOP --
120 FOR X=1 TO 3
130 READ T$,V$
140 IF X>1 THEN CLS
150 PRINT "WHAT ";T$;" DOES YOUR FATHER"
160 PRINT V$;"?"
170 PRINT
180 PRINT "(10 LETTERS OR FEWER, PLEASE.)"
190 PRINT
200 PRINT "HE ";V$(1 TO 4);"S ";V$(6 TO );
210 INPUT F$
220 IF LEN F$>10 THEN GO TO 170
230 LET C$(X)=F$
240 LET C$(X,11 TO 12)=STR$ LEN F$
249 REM -- RATE DAD --
250 CLS
260 PRINT "ON A SCALE OF 1 TO 10,"
270 PRINT "HOW GOOD IS YOUR DAD AT"
280 PRINT V$(6 TO );" ";C$(X,1 TO VAL C$(X,11 TO 12));
"?"
290 INPUT S(X)
300 IF S(X)<1 OR S(X)>10 THEN GO TO 250
310 NEXT X
319 REM -- END OF INPUT LOOP --
320 CLS
330 PRINT "PRESS <ENTER>, THEN GET YOUR","DAD."
340 LET R$=INKEY$
350 IF R$<>CHR$ 13 THEN GO TO 340
360 CLS
370 PRINT "HI DAD!"
380 PRINT "PRESS <ENTER> TO SEE"
390 PRINT "HOW GOOD YOU ARE AT ..."
400 LET R$=INKEY$
410 IF R$<>CHR$ 13 THEN GO TO 400
419 REM -- PRINT LABELS --
420 CLS
430 RESTORE
440 LET C$(4)="A FATHER 8"
450 LET S(4)=20
460 FOR X=1 TO 13 STEP 4
470 LET Q=INT(X/4)+1
480 READ T$,V$
490 PRINT AT X,0;V$(6 TO )
500 PRINT C$(Q, TO VAL C$(Q,11 TO 12))
510 NEXT X
519 REM -- DRAW GRAPHICS --
520 FOR X=1 TO 13 STEP 4
530 READ COLR
540 INK COLR
550 FOR C=11 TO 11+S(INT (X/4)+1)
560 FOR R=X TO X+1
570 PRINT AT R,C;CHR$ 143;
580 NEXT R
590 NEXT C
600 NEXT X
610 INK 0
620 PRINT AT 17,7;"HAPPY FATHER'S DAY!"
630 PRINT AT 19,25-LEN N$;"LOVE, ";N$
640 LET R$=INKEY$
650 IF R$="" THEN GO TO 640
660 STOP
1000 DATA "SPORT","LIKE PLAYING"
1010 DATA "CHORE","HATE DOING"
1020 DATA "GAME","LIKE PLAYING"
1030 DATA "NULL","NULL BEING"
1040 DATA 4,3,6,2
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/Phone Cost Monitor (May, page 70)

You must add two lines and change a third in order to make this program work correctly. Add lines 60 and 65:

```
60 LET TM=0
65 LET SP=0
```

Then change AA to AT in line 770:

```
770 IF SEC>0 AND FL=0 AND MIN>=BG THEN LET CO=CO+AT
```

... AND ENHANCEMENTS

Once you've typed in and enjoyed one or more of our programs, we hope you'll try experimenting with them (remember, nothing you type in can harm your computer!). It's a great way to learn more about programming, and in the process, you might produce a version that you like even more.

Many of our readers have sent us success stories. One reader added sound to make a game more enjoyable. Another suggested slowing down a game so her 83-year-old mother could play it. We'll publish the best of these changes in this column.

We also encourage you to try translating our programs for other computers—especially the reader-written programs, which appear each month for only one computer. If you're willing, we'll publish your name and address here so that other owners of your brand of computer can write you (with a stamped, self-addressed envelope, of course) for copies of your translation.

ADAM/Disk Label Maker (June, page 74)

Cleveland Larry Taylor writes, "I ran the *Disk Label Maker* and by adding the following lines was able to make it print two labels, side by side, in order to get twice as many labels on a page. Also, I can instruct the ADAM to print as many copies as I designate." Larry changed lines 330-380 to read

```
330 FOR k=1 TO c
340 PRINT "*****"
350 PRINT "*" ; SPC(33) ; "*" ; SPC(3) ; "*" ; SPC(33) ; "*"
360 PRINT "*" ; SPC((33-LEN(i$))/2) ; i$ ; SPC(17-LEN(i$)/2) ; "*" ; SPC(3) ; "*" ; SPC((33-LEN(i$))/2) ; i$ ; SPC(17-LEN(i$)/2) ; "*"
370 PRINT "*" ; SPC(33) ; "*" ; SPC(3) ; "*" ; SPC(33) ; "*"
380 PRINT "*****"
*****
```

and added the following new lines:

```
242 PRINT "How many copies would you like?"
328 INPUT c
383 PRINT:PRINT
385 NEXT k
```

"Thank you for including programs for the ADAM computer," he adds. "I'm sure there are many ADAM owners who share my appreciation." And thank you, Larry, for sharing your idea. Until ADAM software is more widely available, it's especially important for ADAM owners to share their knowledge.

If your labels aren't spaced the same as the ones Larry was using, you may have to add a few extra asterisks or spaces, but you can still use Larry's basic format.

TI-99/4A w/TI BASIC/Liberty Bell (July, page 58)

"My 4-year-old son and I greatly enjoyed the *Liberty Bell* program," writes Gail L. Rich of Indianapolis, Indiana. They discovered that they could get a more bell-like tone on their TI by adding the following four lines:

```
281 FOR V=0 TO 28 STEP 4
282 CALL SOUND(-100,340,V)
283 NEXT V
284 CALL SOUND(-100,340,28)
```

"Your magazine is unique!" Gail adds. "The programs in your center section are short enough for the busiest parent to type in, yet rewarding for young children to run. Providing versions for all of the popular home computer brands is a great service to your readers. Thank you!"

WHAT'S IN STORE NEW HARDWARE

The GP-700 is a four-color dot-matrix printer that includes both pin-and friction-feed mechanisms, allowing the use of either fanfold or single-sheet paper. It prints either 80 or 106 cpl (characters per line) at a maximum of 50 cps (characters per second). This printer uses a four-color cassette ribbon with automatic color mixing, which allows a variety of color combinations.

For high-speed draft and letter-quality printing, Axiom offers the GP-550. Also a dot-matrix printer, the GP-550 has 18 built-in character sets; 12 of these are "near letter-quality." The GP-550 also has both pin- or friction-feed mechanisms. In draft mode it prints at 86 cps; in near letter-quality mode it prints at 43 cps. The GP-550 prints an 80-, 96-, or 136-character line.

The GP-100 has an adjustable tractor feed. It prints 80 cpl at 30 cps. Like the other models, it is a dot-matrix printer capable of printing graphics.

Olympia Printer/Typewriter

MANUFACTURER: Olympia USA Inc., Box 22, Somerville, NJ 08876-0022; (201) 722-7000
PRICE: \$599

Olympia USA, the typewriter manufacturer, has developed a new electronic typewriter that doubles as a computer printer. The Electronic Compact 2 has a Centronics-parallel



interface built in, allowing you to connect it with a cable to the parallel port on your computer.

The Compact 2 prints at 14 characters per second, and has three pitch selections (10, 12, and 15

characters per inch). Its 46-key keyboard includes an ON-LINE key to activate printer operation.

An interface extension module that provides both a parallel and an RS-232C serial interface is an option. The extension also includes a 2K printer buffer capable of storing a page of text or data from the computer.

MISCELLANEOUS

ADAM Peripherals and Accessories

MANUFACTURER: Coleco Industries, 999 Quaker Lane S., West Hartford, CT 06110; (203) 725-6000
ESTIMATED RETAIL PRICE: \$175 (Digital Data Drive); \$175 (Memory Expander); \$400 (Floppy Disk Drive); \$300 (Modem); \$30 (Accessory Kit).

For ADAM computer owners, Coleco has introduced a series of expansion units, peripherals, and accessories.

A second digital data drive, which can be installed by the user, will be made available. With the new drive and the drive that comes with the ADAM, users can access and store up to 512K of information, or load programs on one drive and store them on another.

Another expansion unit is a plug-in memory expander that increases the memory from 80K to 144K.

New peripherals include a floppy disk drive and a modem. The 5¼-inch disk drive accepts single-sided, double-density floppy disks, and can store up to 160K of data. The disk drive works with the ADAM's built-in word-processing program and the digital data drives. All software made for ADAM can be transferred from digital tape to floppy disk drives, which are likely to be faster and more reliable than the digital data drives.

The ADAMLink Modem, which allows users to send and receive data, is a 300-baud, full-duplex, direct-connect modem.

The ADAM Accessory Kit is a package containing replacement daisy wheels for the printer (three wheels, each with a different type font), a carbon ribbon cartridge, a blank digital data pack, and a tape head-cleaner with applicator.

Cardco Interface (for Commodore)

MANUFACTURER: Cardco, Inc., 313 Mathewson Ave., Wichita, KS 67214; (316) 267-6525
PRICE: \$89



Card?/+ G, a parallel-printer interface for the VIC-20 and Commodore 64, connects to most standard parallel printers. According to Cardco, neither the computer nor the printers require hardware modifications.

When the Card?/+ G interface is connected to a dot-matrix printer, the Commodore 64's full character set may be printed out, including graphics characters, reversed graphics, and reversed alphanumeric characters.

To connect any printer other than a Commodore printer to the VIC-20 or C 64, some type of interface is required.

Key Tronic Keyboard (IBM PCjr)

MANUFACTURER: Key Tronic, Department E6, P.O. Box 14687, Spokane, WA 99214; (800) 262-6006
PRICE: \$255

Key Tronic, the same company that also manufactures and sells a typewriter-style keyboard for the IBM PC, now sells a keyboard for the PCjr. It plugs into the system unit's keyboard outlet, and offers three things that the PCjr keyboard doesn't: typewriter-style keys instead of rubber, Chiclet-style keys; alphanumeric markings on the keys instead of on the keyboard housing; and a numeric keypad. The Key Tronic keyboard also has 10 function keys. It comes in the same color as the PCjr and matches perfectly with the system components.

However, you can't buy the Key Tronic keyboard instead of the PCjr keyboard; it is an option that is sold independently of IBM. 

GAMES REVIEWS BY JAMES DELSON

| Title Manufacturer Price | Brief description | Hardware/ Equipment required | Backup policy | Ratings | | | | | |
|---|---|--|--|---------|---|----|-----|----|---|
| | | | | O | D | PS | GQ | EU | V |
| CARRIER FORCE Strategic Simulations, Inc. 883 Stierlin Road Bldg. A-200 Mountain View, CA 94043 (415) 964-1353 \$59.95 © 1983 | Fight W.W. II's battles of the Coral Sea, Midway, Santa Cruz, etc., using every ship and plane that actually took part. Too complex for most, but good for war-gamers interested in air and naval tactics. | Reviewed on Apple II with Applesoft ROM Card/II plus/IIe, 48K (d.). Also for Atari Home Computers, 48K (d.). Version planned for C 64. | 14-day money-back guarantee; 30-day warranty; disk replaced free if user-damaged; \$10 fee thereafter or for backup. | ★ | ★ | ★ | ★ | D | ★ |
| CLOSE ASSAULT Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 \$35 (d.); \$30 (cass.) ©1983 | Program keeps track of unit strength and movement on mapboard field. Adds element of chance to German and Russian encounters in W.W. II war game. † | Reviewed on Atari Home Computers, 48K (d.), XL series requires translator disk. Also for Apple II series, 48K (d. and cass.); TRS-80 Models I/III/4, 48K (d. and cass.). | Lifetime warranty; no policy for user-damaged. | ★ | ★ | ★ | N/A | A | ★ |
| DUNZHIN Screenplay P.O. Box 3558 Chapel Hill, NC 27514 (800) 334-5470 \$29.95 © 1982 | Map your way through a maze in search of a precious object. Gain experience and strength in slightly outdated fantasy role-playing game best for younger players (10+) new to the genre. † | Reviewed on Apple II plus/IIe, 48K (d.). Also for Atari Home Computers, 48K (d. and cass.); C 64 (d. and cass.); IBMPC, 128K (d.). | 14-day warranty; \$5 fee if user-damaged; \$3 for backup. | ★ | ★ | ★ | ★ | E | ★ |
| EXODUS: ULTIMA III Origins Systems 1545 Osgood St., Suite 7 North Andover, MA 01845 (617) 681-0609 \$59.95 © 1983 | Muster a band of adventurers and set forth, mapping a rich world comprised of many cities and ages in search of the evil ruler, Exodus. One of the grandest adventures seen yet. † | Reviewed on Apple II series, 48K (d.). Also for Atari 400/800, 48K (d.); C 64 (d.); IBM PC/PCjr, 48K (d.). | 90-day warranty; \$5 fee thereafter or if user-damaged. | ★ | ★ | ★ | ★ | D | ★ |
| GUMBALL Broderbund Software 17 Paul Drive San Rafael, CA 94903 (415) 479-1170 \$29.95 © 1983 | Sort gumballs into the right bins as they come off a crazy assembly line. Do well and you'll move up in the company. Colorful, fun, easy-to-play arcade game for ages 7+. | Reviewed on Apple II series, 48K (d.). Also for Atari Home Computers, 48K (d.). Joysticks and/or paddles. | Lifetime warranty; \$5 fee if user-damaged. | ★ | ★ | ★ | ★ | E | ★ |
| JAMES BOND 007 Parker Brothers 50 Dunham Road Beverly, MA 01915 (617) 927-7600 \$40 © 1983 | As James Bond, you pilot your flying submarine car across dangerous terrain, avoiding destruction while eliminating foes in 4 miniscenarios. Fun short-term play for ages 8+. | Reviewed on C 64 (cart.). Also for Atari Home Computers, 16K (cart.); Coleco ADAM (cart.). Joystick. | 180-day warranty; \$8 fee thereafter. No backups. | ★ | ★ | ★ | ★ | D | ★ |
| RINGSIDE SEAT Strategic Simulations 883 Stierlin Road Bldg. A-200 Mountain View, CA 94043 (415) 964-1353 \$39.95 © 1983 | Fascinating simulation of pro boxing lets players "manage" skills of famous or fictitious fighters. Statistically challenging, but limited in action, and lacking color. For ages 10+. | Reviewed on C 64 (d.). Also for Apple II series/III w/emulator, 48K (d.). | 14-day money-back guarantee; 30-day warranty; \$10 fee thereafter or for backup. | ★ | ★ | ★ | ★ | A | ★ |
| THE SEVEN CITIES OF GOLD Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 \$40 © 1984 | Sail for the Americas seeking riches, converts, and royal recognition. Map uncharted territory as it was in the 1400s or explore a fantasy earth created by computer in fascinating adventure game. One of 84's best. † | Atari Home Computers, 48K (d.). Version planned for C 64. Joystick. | 90-day warranty; \$7.50 fee thereafter. | ★ | ★ | ★ | ★ | D | ★ |
| TOURNAMENT GOLF Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 \$30 © 1983 | Golf simulation allows players to hit from all angles, making this program like a big game of billiards with hazards. Slightly awkward play system. Suitable for ages 8+. | Reviewed on Apple II series, 48K (d.). Also for C 64 (d.). Joystick or paddles. | Lifetime warranty; \$10 fee if user-damaged. | ★ | ★ | ★ | ★ | E | ★ |
| WIZARDRY: LEGACY OF LYLIGAMYN Sir-tech Software, Inc. 6 Main St. Ogdenburg, NY 13669 (315) 393-6633 \$39.95 © 1983 | Track down a mystical orb, taking on snakes and evil things while mapping your way through a maze. Start out using your wits and lesser spells in installment No. 3 of famous role-playing series. † | Apple II series, 48K (d.). | 30-day warranty; \$5 fee thereafter or if user-damaged. User makes backup. | ★ | ★ | ★ | ★ | A | ★ |

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

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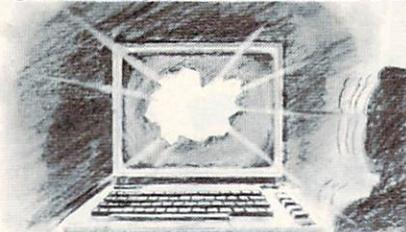
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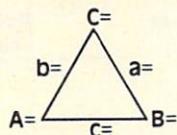
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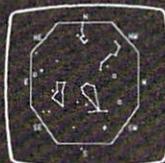
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