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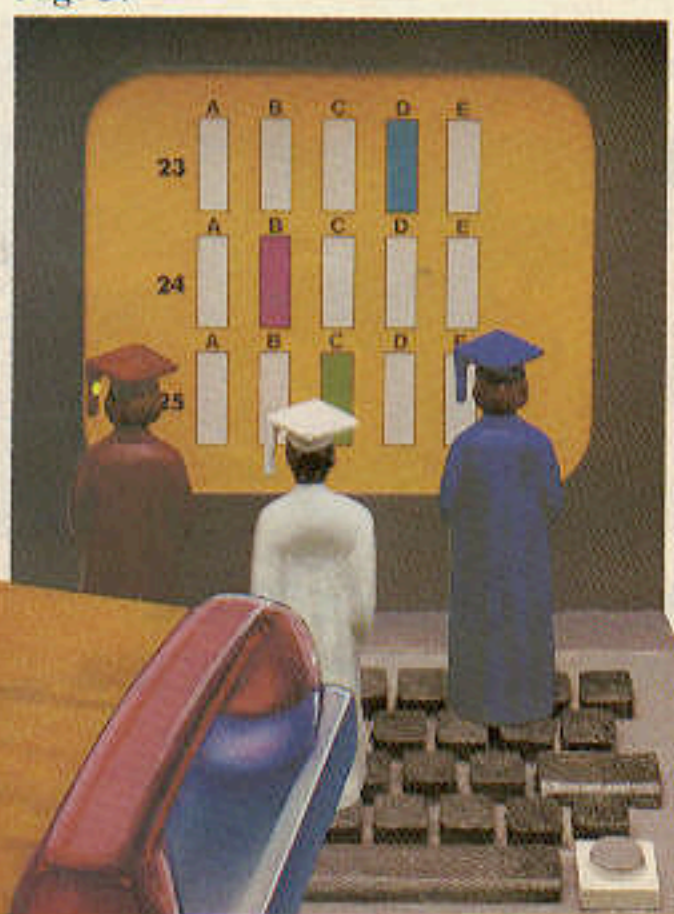

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COVER PHOTOGRAPH BY JOEL WIRTZ

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LETTERS

A MIRACLE GADGET

I just discovered that I'm an inventor. I call my miracle gadget the "Data Liner." It has eased the drudgery of typing data statements, and hopefully other FAMILY COMPUTING readers can benefit from it.

Our TI and its expansion box take up most of the room on my sewing-machine cabinet leaving little room for a magazine. Whenever I copied a program from a magazine, the magazine invariably found the worst time to slither to the floor. I now fold the magazine, leaving only the column I'm copying showing. A rubber band keeps it from unfolding and the magazine no longer slithers. An added bonus is that the rubber band can be scooted down the page—underlining difficult lines such as data statements—hence Data Liner.

LOUISE GOAD RITCHIE
Frankfort, Kentucky

TUTORING SIS

My TI-99/4A has been great for my family ever since we got it. My father has one also, but all he does is play games on it! Last weekend I went over to his house, and I just happened to bring along my collection of FAMILY COMPUTINGS. My sister told me she had never seen a PRINT statement nor ever touched a computer keyboard. Then I showed her how to type in a program and explained what some statements meant; we accomplished a lot. Her two favorite programs were the *Turkey* (November 1983 issue) and *Personal Valentine* (February issue). I want to thank you for showing my sis the world of computer programs.

JENNIFER SVOBODA, *age 13*
Villa Park, Illinois

SOME WORDS FROM HOMEWORD

I would like to take this opportunity to thank you very much for your review of *HomeWord* in the June issue. Given the range of features that were noted, I realize it is very difficult always to be 100 percent accurate. The only point I would like to correct is the N/A listing under chain printing for *HomeWord*. While a few of the word processors listed had chain printing, the INCLUDE document facility in *HomeWord* is much more powerful than simple chain printing because it returns to the original file upon completion of printing the included document.

It therefore allows the user to include standard paragraphs in the middle of documents. The INCLUDED documents may be of any length and may contain additional INCLUDES. You are allowed up to eight levels of INCLUDE, which should be sufficient for anybody's needs.

THOMAS CAIN, *president*
Target Technologies, Inc.
Norwalk, Connecticut

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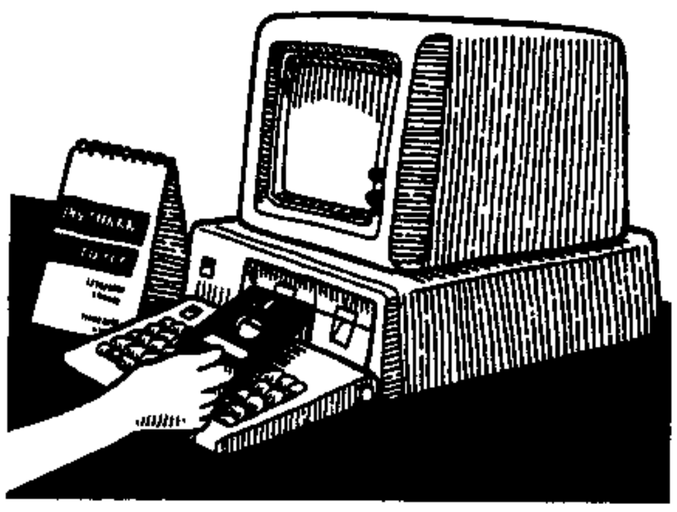

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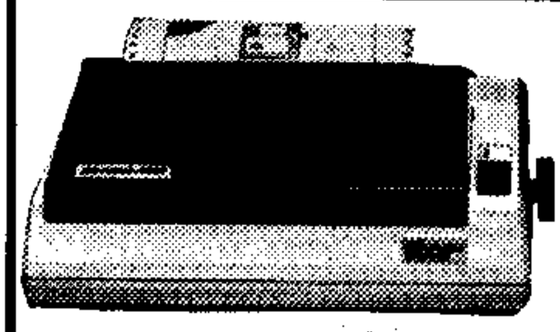

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HOME-SCHOOL CONNECTION

"guess how many bytes are in this computer," and simulated classroom activities). Keep the carnival fun and exciting—perhaps even award prizes (such as copies of student-created programs) for some of the activities.

10. Adult Education. Sometimes we adults—just like our children—prefer a learning environment where we study among our peers. One solution is to schedule an adult-education course for the community through the local high school. The course should be offered free of charge, or for a minimal fee, and should provide an introduction to the world of computing in a relaxed and informative manner.

11. Computer Council. Take advantage of the know-how you have on hand. If you set up an advisory council—made up of both teachers and parents—they can make recommendations on the purchase of hardware or software, and also act as a "clearinghouse" for passing information out to the community. This group, sharing common interests and goals, could put together newsletters, press releases, and other printed information that could be distributed throughout the school district.

12. Computers on Cable. Local cable TV stations are a great way to reach a large segment of the community. Develop a series of video tapes offering an introduction to computer-assisted instruction (CAI) as well as other uses of the computers in the schools. With kids and parents as "stars" in these shows—you'll have an almost guaranteed audience.

Introducing computers to the school community need not be an overwhelming task. It should be based on the idea that the more people know about computers and their role in the educational process the more comfortable they will feel with them; not only in their homes, but in their schools as well. Increased knowledge about computers will be necessary as we move forward—exploring new dimensions and exciting possibilities in education. Of equal importance is the fact that computers become demystified and "friendly" when people learn more about them. The "computerized" partnerships that form between home, school, and community are powerful bonds that can translate into improved academic achievement on the part of each and every youngster. And isn't that a revolution we should all join?

COMPUTING CLINIC

BUSINESS SOFTWARE FOR THE TI-99/4A • TYPEWRITERS THAT DOUBLE AS PRINTERS • SOUND THROUGH A STEREO • COMMUNICATIONS SOFTWARE FOR THE COMMODORE 64

BY JEFFREY BAIRSTOW

I have a TI-99/4A and am having difficulty finding business software to use in a retail flower shop. I would appreciate your help in contacting someone knowledgeable about accounts receivable, income tax, and other business programs.

MALCOLM GOUDEAU
Ames, Texas

Although the TI-99/4A is a surprisingly powerful computer for the price, the system was not designed with business applications in mind. Consequently, most of the software for the TI-99/4A is for home entertainment and educational applications. I would not recommend attempting to write business software in TI BASIC. That's very difficult for a novice user.

However, Yu/Can Business Software has several business packages for the TI-99/4A designed for use by lawyers, dentists, doctors, and other small enterprises. Yu/Can's *Commercial Billing Plus* package (disk) includes accounts receivable and payable, general ledger, inventory control, invoicing, mailing list, and order entry. It is available by mail from Microdistributors International Inc., 34 Maple Ave., Armonk, NY 10504; (914) 273-6480, and costs $232. There is also Pike Creek's *TI-COUNT*, which is a series of six business packages. It is available for $499 from Triton Products Co., P.O. Box 8123, San Francisco, CA 94128; (800) 227-6900.

You will need an expanded TI-99/4A to run business software. For example, the Yu/Can package requires the TI peripheral expansion system with additional memory, RS-232 card, printer, disk drive, and drive controller card. *TI-COUNT* requires all this, plus the Extended BASIC cartridge, which is also available from Triton.

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.*

I have an Apple IIe with a disk drive. I occasionally need to use an 80-column printout. My wife could use a new "memory" typewriter in her legal office. What typewriter should I purchase for her office, with both memory and legal quality print, that I could bring home for word processing?

JAMES S. LONG
Bedford, Kentucky

There are many typewriters on the market that can be used with microcomputers. I would suggest you consider such models as the Olympia Electronic Compact 2, the Smith-Corona Ultrasonic Messenger II, or one of Brother's models. All these typewriters have interchangeable daisy wheels for a variety of letter-quality print styles, and have a one-line memory correction feature.

These typewriters are either portable or at least transportable. Be sure that you purchase a typewriter with an interface (either parallel or serial) to match the one on your computer. You will also need a special cable to connect your Apple IIe to the typewriter. Total price for one of these typewriters should be around $500.

I am using a monitor that does not have sound capabilities with my Commodore 64. What is the cheapest and easiest way to obtain sound for my system?

J.F. STADALSKY
Campobello, South Carolina

The 5-pin DIN cable used to link your computer to the audio/video jacks of your monitor should have two, three, or four output connectors. One, probably white or red, carries the video signal and plugs directly into your monitor. (Sometimes the video signal is carried by two connectors.) Another, probably a black connector, can be plugged into the auxiliary input of a stereo amplifier or receiver to produce the sound generated by the Commodore 64 (or other computers). If the cable won't reach to your stereo, you may need a standard extender cord. If a stereo receiver is not available, you can buy a small, battery-operated amplifier for about $10. In either case, you may also need an adapter to plug your monitor cable into the jack of the amplifier.

Radio Shack stores should be able to supply all the above items.

I have a Commodore 64 with a 1650 Automodem, but I cannot download programs with the software supplied with the modem. Is there a program I can purchase that will allow me to download programs?

SCOTT R. KNAUF
East Meadow, New York

There are a number of terminal programs for the Commodore 64 that are in the public domain and can be obtained through local users'groups. If you do not belong to a users' group, I suggest you contact Tony Ott, 10378 Coburg Lands, St. Louis, MO 63137. If you send him $7 plus a formatted disk and a stamped, self-addressed disk mailer, Ott will copy a full-featured, public domain terminal program onto your disk.

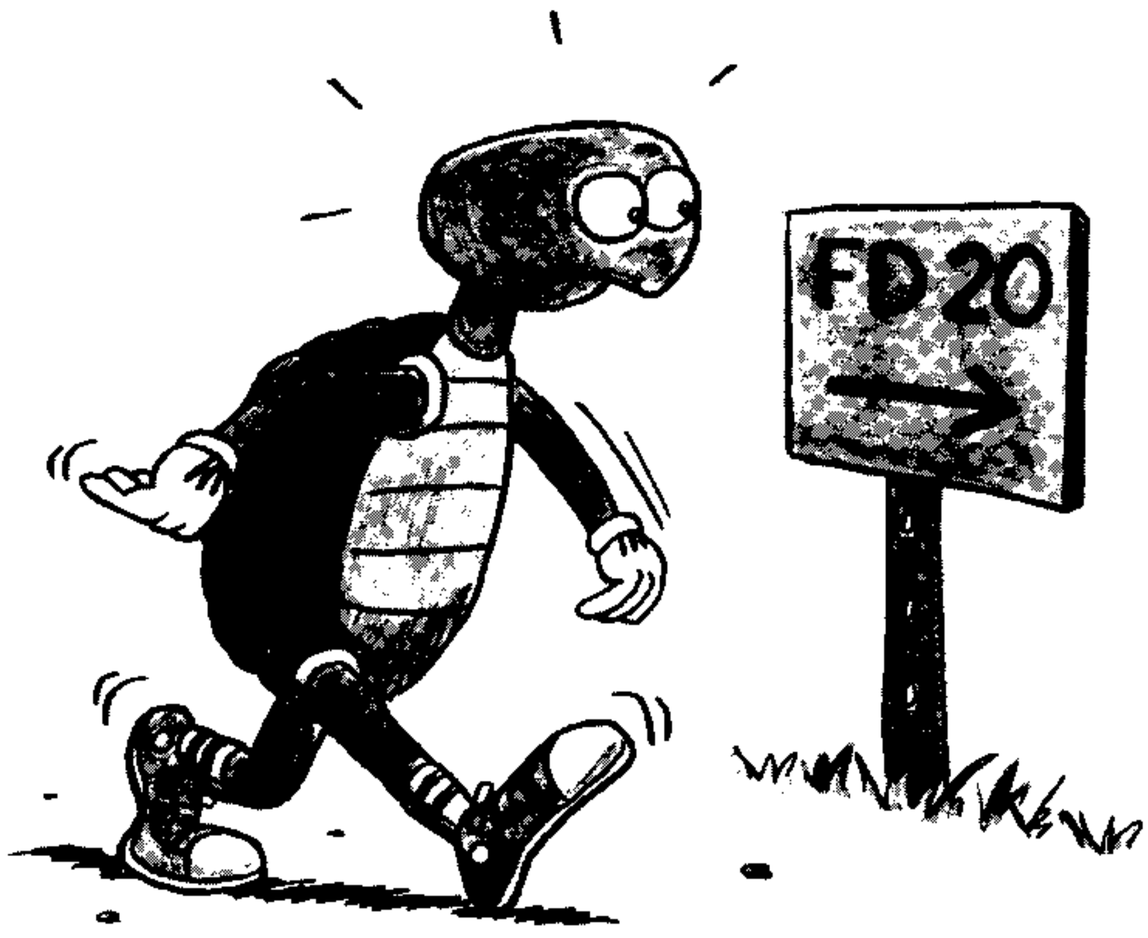
Another program we can recommend is the Commodore 64 version of CompuServe's *Vidtex*, *EasyComm 64* ($40). It's designed to be used with the 1650 Automodem (and compatibles) and allows the user to upload and download files, save them, autodial, etc. It, too, is a full-featured program. FC

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 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 rundown 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

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.

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 programming 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 **PC*jr*** (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 **PC*jr*** (128K)	Dr. Logo; $149.95	Digital Research, Inc. 160 Central Ave., Pacific Grove, CA 93950	Backup included
IBM PC/PC*jr* (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 **PC*jr*** (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/PC*jr* (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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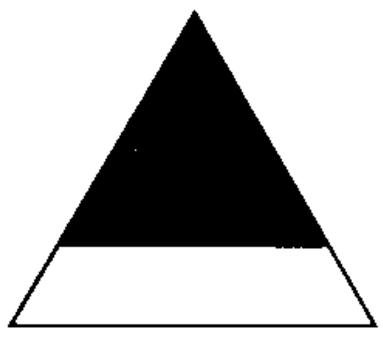
LEARNING LOGO

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.
- **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

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?

reputation for frequent breakdowns. Commodore will replace a defective drive, but you must pay $85 if the 90-day warranty has expired. And you must wait at least three weeks for shipping to Commodore and back. Beyond this, the 1541 is painfully slow—in some cases four times slower when loading programs than other drives.

Concorde. The new Concorde C-321P disk drive plugs into the expansion port on the Commodore 64, unlike the 1541, which plugs into the serial port and transfers data more slowly. The high-speed data transfer is especially helpful when using word-processing and spreadsheet programs—or any time you need to access a disk frequently.

MSD Systems. The Super Disk Drives from MSD offer some attractive features, though they are considerably more expensive than Commodore's 1541. The SD1 ($399) is a single drive that stores 174K and the SD2 ($699) is a dual drive, with each drive storing 350K. Both the SD1 and SD2 connect to the standard serial port on the Commodore 64 or VIC-20, and run most—about 95 percent—of the Commodore software.

The main advantage of these drives is that they can also connect to the Commodore expansion port with an IEEE parallel interface, allowing much faster transfer of data. For example, while a Commodore 1541 drive takes about 90 seconds to format a disk, the Super Disk Drive can do it in 17 seconds. However, the IEEE interface is not included in the purchase price, and using it reduces software compatibility considerably. More than half of the programs for the Commodore won't run with the IEEE interface, making it more a tool for programmers than for those who want to buy commercial software. Both MSD and Batteries Included, a hardware/software company from Toronto, Canada, sell IEEE interfaces for the Commodore 64 and VIC-20.

IBM

IBM. IBM sells two kinds of disk drives. For the IBM PC, it offers internal drives that store 180K ($289) or 360K ($425); for the PC*jr*, only the 360K drive ($480) is available. These drives are built into the computers and are not external. After the 90-day warranty expires, servicing depends on the type of agreement you've made with your dealer.

Rana. The Rana 2000 drive ($399) is also a double-sided drive that stores 360K, and it's made to mount inside the IBM PC housing. It's much quieter than the IBM drive, and runs both MS-DOS 1.1 and MS-DOS 2.0. The Rana 2.5 is an external disk drive that stores an incredible 2.5 megabytes on a single disk—that's 2500K. The drive comes with five disks; additional disks cost $79 for a box of five. The Rana 2.5 ($1,550) runs PC-DOS 2.0.

RADIO SHACK

Radio Shack/Tandy Corp. Radio Shack's TRS-80 Model 4 is sold in three versions: a 16K model, without disk drives ($799); a 64K model with one disk drive ($1,099); and a 64K version with two disk drives and an RS-232C serial interface ($1,299). The disk drives are installed at a Radio Shack service center. They are built into the Model 4 housing, and store 184K of data. A third disk drive (external) costs $319; a fourth costs $279.

Color Computer owners can also add one or two disk drives. The first costs $399, and the second, $279. These drives, which store 156K, require Extended BASIC. Complaints about Radio Shack drives are virtually nonexistent, a testament to their reliability.

Third-party manufacturers. As with the IBM PC, which uses internal disk drives, it's possible to buy disk drives for the TRS-80 Model 4 through mail-order houses. Disk drives from companies with established reputations, such as Tandon, Siemens, Teac, and Shugart, are available, often at prices well below Radio Shack's. The problem is that you must assemble them—put a "bare" drive into its casing, then put the casing inside the computer. If you're up for this kind of work, then you can save some money.

Here's a list of mail-order houses that offer disk drives for Radio Shack computers:

Texas Computer Systems, P.O. Box 1327, Arlington, TX 76004; (800) 433-5184; Software Support Inc., One Edgell Road, Framingham, MA 01701; (617) 872-9090; Micro Data Supplies, 22295 Euclid Ave., Euclid, OH 44117; (800) 321-3552; in Ohio, (216) 481-4993; Displayed Video, 886 Ecorse Road, Ypsilanti, MI 48197; (313) 426-5086.

TI and TIMEX

Disk drives for the TI-99/4A are not exactly easy to come by, now that the computer is no longer manufactured. But Triton Products Co., which has taken over the marketing of TI products, offers a Mini Peripheral Expansion System from Myarc, Inc., in its catalog. This $595 system, which connects directly to the TI-99/4A, includes a disk drive, 32K RAM expansion, and serial and parallel ports. Up to four disk drives may be attached to the system. For information, contact Triton Products Co., P.O. Box 8123, San Francisco, CA 94128; (800) 227-6900.

For the Timex 1000, 1500, and 2068 computers, the disk-drive vendor recommended most often is Aerco, P.O. Box 18093, Austin, TX 78760; (512) 451-5874. Its drives, with interfaces, cost approximately $500.

—LOUIS WALLACE

DIARY OF AN EX-CASSETTE USER

To disk, or not to disk? This question, I'm sure, is foremost in the minds of practically all tape users each time a long taped program is being loaded. And the question looms even larger each time a NO-LOAD occurs. I use a data-base management system in my business, and as my customer file has grown, the LOAD and SAVE times have been increased accordingly.

But, I'm rather conservative, and can rationalize very easily. "I'm up to a 25-minute LOAD, so what?" I just get to the office a few minutes early, start the old tape machine running, and go ahead with my early morning activities. No problem at all—unless there's a problem with the LOAD. Sound familiar? Even this I can live with. So it takes an hour to get on-line. I'm in no hurry anyway. Or am I?

The phone rings and now I need some information from the system and I'm still looking at black-and-white squiggly lines on the screen. I tell myself that this isn't such a big deal. I tell the customer that the computer doesn't come on-line until 9 a.m. and that I'll return the call in just a few minutes. This sounds impressive and is a good stall. All the while, I'm hoping that the second LOAD attempt will be successful. I'm also thinking about the speed with which a disk drive could provide the information.

That was the old days. To make a long story short, I ended up getting a disk drive. I am not capable of describing the pleasure and pride of owning and operating the system I now have. The 25-minute LOAD time for my data-base management system was reduced to about 20 seconds. A box of taped programs now lies in the corner of my office, banished to obscurity as each tape has been loaded into the computer in "X" minutes and SAVEd to disk in "X" seconds. The utility of my system grows each day as I incorporate programs not previously used. I've entered a whole new world.

By the way, I own a Timex Sinclair 1000, with 48K RAM. I bought a disk drive and FDZX interface from Aerco Manufacturing.

—JACK ROBERTS

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"Plus, my Gemini can do all sorts of advanced graphics, which a daisywheel can't.

"And it's much faster. No more time wasted typing. It was a pleasure to throw the whiteout away."

Steven Clarke—San Francisco, California

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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.
	Advanced BASIC	Loaded from disk	As above, but enter BASICA at A > prompt.
IBM PC*jr*	Cassette BASIC	Built in (ROM)	Turn on computer.
	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.
Texas Instruments 99/4A	TI BASIC	Built in (ROM)	Turn on computer; press any key for menu; select TI BASIC at prompt.
	TI Extended BASIC	Cartridge	As above, but select TI EXTENDED BASIC at prompt.
Timex Sinclair 1000 & 1500	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 IIes and IIcs. Cassette BASIC can be used on disk systems by pressing RESET (on IIes 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 PC*jr*	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 (IIe, 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	FCTN-CLEAR ("4" key)	OLD CS1 SAVE CS1	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 CAPS	SHIFT-@ (To pause; any key to resume)	BREAK	CLOAD "*FILENAME*" CSAVE "*FILENAME*"	LOAD "*FILENAME*" SAVE "*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

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$,i,1) > "9" THEN f
l = 1
190 NEXT i
200 IF fl <> 0 THEN 70
210 HOME
219 REM --PRINT CURRENT COMBINATION OF LETTERS--
220 FOR i = 1 TO 7
230 IF MID$(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$,I,1) > "9" THEN F
L = 1
190 NEXT I
200 IF FL <> 0 THEN 70
210 HOME
219 REM --PRINT CURRENT COMBINATION OF LETTERS--
220 FOR I = 1 TO 7
230 IF MID$(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
```

```
230 PRINT MID$(A$,VAL(MID$(N$,I,1))*3-5+A(I),1);
240 NEXT I
250 PRINT " ";
260 NP=NP+1
270 IF NP<110 THEN 350
279 REM --IF SCREEN FULL, PRINT MESSAGE--
280 PRINT
290 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
299 REM --WAIT FOR KEY TO BE PRESSED--
300 K$=INKEY$
310 IF K$="Q" THEN END
320 IF K$<>"C" THEN 300
330 NP=0
340 CLS
349 REM --PRODUCE NEXT COMBINATION--
350 P=1
360 A(P)=A(P)+1
370 IF A(P)<3 AND MID$(N$,P,1)>"1" THEN 210
380 A(P)=0
390 P=P+1
400 IF P<8 THEN 360
410 PRINT
420 PRINT "DONE!"
430 END
```

TI-99/4A/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 CALL CLEAR
90 PRINT TAB(10);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT"
120 PRINT "PHONE NUMBER":"(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <ENTER>."
140 PRINT
150 INPUT "NUMBER? ":N$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(N$)<>7 THEN 80
170 FOR I=1 TO 7
180 IF (SEG$(N$,I,1)>="0")*(SEG$(N$,I,1)<="9") THEN 20
0
190 FL=1
200 NEXT I
210 IF FL<>0 THEN 70
220 CALL CLEAR
229 REM --PRINT CURRENT COMBINATION OF LETTERS--
230 FOR I=1 TO 7
240 IF SEG$(N$,I,1)>="2" THEN 270
250 PRINT SEG$(N$,I,1);
260 GOTO 280
270 PRINT SEG$(A$,VAL(SEG$(N$,I,1))*3-5+A(I),1);
280 NEXT I
290 PRINT "  ";
300 NP=NP+1
310 IF NP/3<>INT(NP/3) THEN 330
320 PRINT
330 IF NP<63 THEN 410
339 REM --IF SCREEN FULL, PRINT MESSAGE--
340 PRINT
350 PRINT "PRESS <C> TO CONTINUE,":"<Q> TO QUIT.";
359 REM --WAIT FOR KEY TO BE PRESSED--
360 CALL KEY(3,K,S)
370 IF K=81 THEN 480
380 IF K<>67 THEN 360
390 NP=0
400 CALL CLEAR
409 REM --PRODUCE NEXT COMBINATION--
410 P=1
420 A(P)=A(P)+1
430 IF (A(P)<3)*(SEG$(N$,P,1)>"1") THEN 230
440 A(P)=0
450 P=P+1
460 IF P<8 THEN 420
470 PRINT
480 END
```

Timex Sinclair 1000 & 1500/*Dial-A-Word*

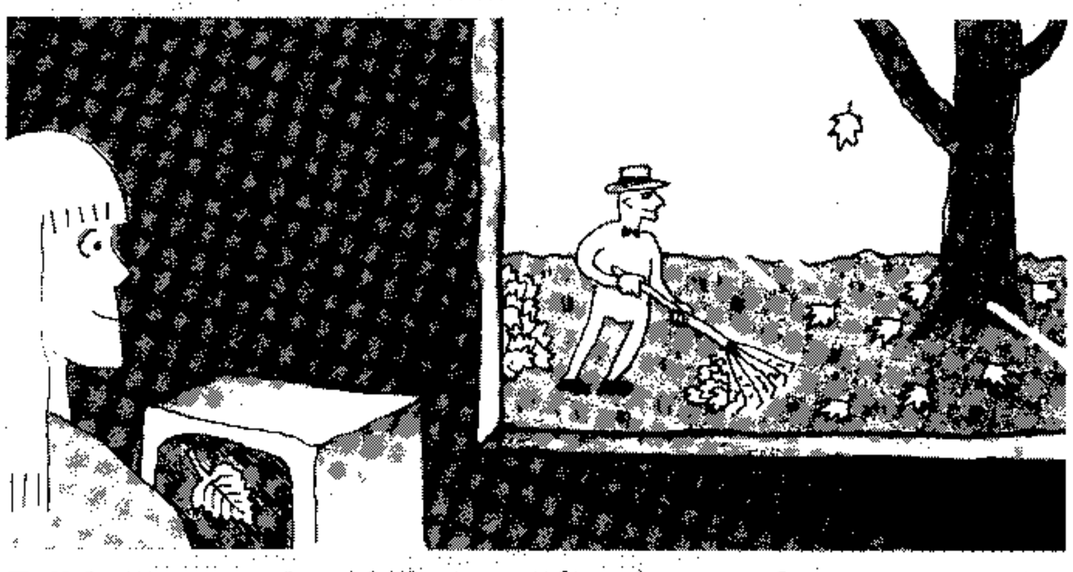
```
10 DIM A(7)
20 LET A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 LET NP=0
40 FOR I=1 TO 7
50 LET A(I)=0
60 NEXT I
70 SLOW
80 LET FL=0
89 REM --GET TELEPHONE NUMBER--
90 CLS
100 PRINT TAB 10;"DIAL-A-WORD"
110 PRINT
120 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE","NUMBER (I
N THIS FORM: 5558888);"
130 PRINT "THEN PRESS <ENTER>."
140 PRINT
150 PRINT "NUMBER? ";
160 INPUT N$
170 PRINT N$
179 REM --CHECK FOR ERRORS IN INPUT--
180 IF LEN N$<>7 THEN GOTO 90
190 FOR I=1 TO 7
200 IF N$(I)<"0" OR N$(I)>"9" THEN LET FL=1
210 NEXT I
220 IF FL<>0 THEN GOTO 80
230 CLS
239 REM --PRINT CURRENT COMBINATION OF LETTERS--
240 FOR I=1 TO 7
250 IF N$(I)>="2" THEN GOTO 280
260 PRINT N$(I);
270 GOTO 290
280 PRINT A$(VAL (N$(I))*3-5+A(I));
290 NEXT I
300 PRINT " ";
310 LET NP=NP+1
320 IF NP<76 THEN GOTO 410
329 REM --IF SCREEN FULL, PRINT MESSAGE--
330 PRINT
340 PRINT
350 PRINT "PRESS <C> TO CONTINUE,","<Q> TO QUIT."
359 REM --WAIT FOR KEY TO BE PRESSED--
360 PAUSE 4E4
370 IF INKEY$="Q" THEN STOP
380 IF INKEY$<>"C" THEN GOTO 360
390 LET NP=0
400 CLS
409 REM --PRODUCE NEXT COMBINATION--
410 LET P=1
420 LET A(P)=A(P)+1
430 IF A(P)<3 AND N$(P)>"1" THEN GOTO 240
440 LET A(P)=0
450 LET P=P+1
460 IF P<8 THEN GOTO 420
470 PRINT
480 PRINT "DONE."
490 STOP
```

TRS-80 Color Computer/*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
```

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 = SCRN(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 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) * 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 = SCRN(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$
```

```
430 POKE 214,12
440 PRINT
449 REM --PRINT CLOSING MESSAGE--
450 PRINT TAB(15);CHR$(5);"PRESS <R> FOR AN INSTANT"
460 PRINT TAB(17);"REPLAY OR <Q> TO QUIT."
469 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
470 GET K$
480 IF K$="Q" THEN PRINT CHR$(147);:END
490 IF K$="R" THEN RESTORE:GOTO 60
500 GOTO 470
1000 DATA 5,20,24,0,39,7,0,1,35,39,7,2,2,36,39
1010 DATA 7,3,3,37,39,7,4,4,38,39,9,22,22,10,12
1020 DATA 9,23,23,9,13,9,8,21,10,11
2000 DATA 10,7,10,6,10,5,10,4,9,7,8,8,12,7,13,8
2010 DATA 13,6,11,5,9,5,8,5,7,4,6,5,5,6,12,4,14,5
2020 DATA 15,6,8,3,6,3,5,2,4,3,11,3,13,3,14,3,15
2030 DATA 2,16,3,17,4,16,1,14,1,10,2,11,1,8,2,7,1
3000 DATA 13,0,22,11,6,24,16,7,21,17,2,24,12,2
3010 DATA 21,3,4,23,6,1,24,7,6,23,8,9,21,9,1,22
3020 DATA 15,4,23,18,5,20,4,7,21,14,9,20,9,4,20
```

IBM PC w/Color Graphics Adapter & IBM PC*jr*/ *Falling Again*

```
10 DIM R(15),C(15),B(15)
20 KEY OFF
30 WIDTH 40
40 SCREEN 0,1
50 LOCATE ,,0
60 COLOR ,2
70 CLS
79 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
80 FOR X=1 TO 10
90 READ K0,R1,R2,C1,C2
100 COLOR K0
110 FOR Y=R1 TO R2
120 LOCATE Y,C1
130 PRINT STRING$(C2-C1,219);
140 NEXT Y,X
149 REM --DRAW BRANCHES OF TREE--
150 FOR X=1 TO 34
160 READ BR,BC
170 LOCATE BR,BC
180 PRINT CHR$(219)
190 NEXT X
199 REM --DRAW LEAVES--
200 COLOR 2
210 FOR I=1 TO 15
220 READ R(I),C(I),B(I)
230 LOCATE C(I),R(I)
240 PRINT CHR$(219)
250 NEXT I
259 REM --MAKE THE LEAVES FALL--
260 COLOR 14
270 FOR X=1 TO 15
280 LOCATE C(X),R(X)
290 PRINT CHR$(219)
300 FOR T=1 TO RND*1000+1
310 NEXT T
320 COLOR 1
330 LOCATE C(X),R(X)
340 PRINT CHR$(219)
350 FOR Y=C(X)+1 TO B(X)-1
360 HK=SCREEN(Y,R(X),1) MOD 16
370 COLOR 14
380 LOCATE Y,R(X)
390 PRINT CHR$(219)
400 FOR T=1 TO RND*70+20
410 NEXT T
420 COLOR HK
430 LOCATE Y,R(X)
440 PRINT CHR$(219)
450 NEXT Y
460 COLOR 14
470 LOCATE B(X),R(X)
480 PRINT CHR$(219)
490 NEXT X
499 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
500 FOR D=1 TO 3000
510 NEXT D
520 COLOR 0,1
530 LOCATE 14,16
540 PRINT "PRESS <R> FOR AN INSTANT"
550 LOCATE 15,16
560 PRINT "REPLAY OR <Q> TO QUIT."
569 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
570 K$=INKEY$
580 IF K$="Q" THEN COLOR 7,0:CLS:END
590 IF K$="R" THEN RESTORE:GOTO 60 ELSE 570
1000 DATA 1,1,16,1,41,2,17,23,1,41,14,4,4,39,41
1010 DATA 14,3,3,38,41,14,2,2,37,41,14,1,1,36,41
1020 DATA 6,22,22,9,15,6,21,21,11,14,6,8,20,12,13
1030 DATA 6,9,20,13,14
2000 DATA 9,11,8,11,7,11,6,11,9,10,10,9,9,13,10,14,8
2010 DATA 14,7,12,7,10,7,9,6,8,7,7,8,6,6,13,7,15,8
2020 DATA 16,5,9,5,7,6,4,5,5,5,12,5,14,5,15,4,16
2030 DATA 5,17,6,18,3,17,3,15,4,11,3,12,4,9,3,8
2040 DATA 14,3,21,11,7,22,17,9,19,15,11,22,12,2,23
3000 DATA 6,5,20,7,3,22,7,9,19,9,11,19,9,2,22
3010 DATA 17,4,21,18,6,22,5,7,23,14,7,23,10,4,20
```

TI-99/4A/*Falling Again*

```
10 DIM R(15),C(15),B(15)
20 A$="FFFFFFFFFFFFFFFF"
30 CALL CHAR(120,A$)
40 CALL CHAR(128,A$)
50 CALL CHAR(136,A$)
60 CALL CHAR(144,A$)
70 CALL CHAR(152,A$)
80 CALL COLOR(12,11,11)
90 CALL COLOR(13,4,4)
100 CALL COLOR(14,7,7)
110 CALL COLOR(15,13,13)
120 CALL COLOR(16,6,6)
130 CALL CLEAR
140 CALL SCREEN(6)
149 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
150 FOR X=1 TO 9
160 READ K0,R1,R2,C1,C2
170 FOR Y=R2 TO R1 STEP -1
180 FOR Z=C2 TO C1 STEP -1
190 CALL HCHAR(Y,Z,K0)
200 NEXT Z
210 NEXT Y
220 NEXT X
229 REM --DRAW BRANCHES OF TREE--
230 FOR X=1 TO 28
240 READ BR,BC
250 CALL HCHAR(BR,BC,136)
260 NEXT X
269 REM --MAKE THE LEAVES FALL--
270 FOR X=1 TO 15
280 READ R(X),C(X),B(X)
290 CALL HCHAR(R(X),C(X),144)
300 NEXT X
310 FOR X=1 TO 15
320 CALL HCHAR(R(X),C(X),120)
330 FOR T=1 TO RND*400+1
340 NEXT T
350 CALL HCHAR(R(X),C(X),152)
360 FOR Y=R(X)+1 TO B(X)-1
370 CALL GCHAR(Y,C(X),HK)
380 CALL HCHAR(Y,C(X),120)
390 FOR T=1 TO RND*30+10
400 NEXT T
410 CALL HCHAR(Y,C(X),HK)
420 NEXT Y
430 CALL HCHAR(B(X),C(X),120)
440 NEXT X
449 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
450 FOR T=1 TO 1500
460 NEXT T
470 R0=15
```

```
480 FOR X=1 TO 3
490 READ I$
500 FOR WC=1 TO LEN(I$)
510 CALL HCHAR(R0,WC+13,ASC(SEG$(I$,WC,1)))
520 NEXT WC
530 R0=R0+1
540 NEXT X
549 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
550 CALL KEY(3,K,P)
560 IF K<>81 THEN 590
570 CALL CLEAR
580 END
590 IF K<>82 THEN 550
600 RESTORE
610 GOTO 130
1000 DATA 128,19,24,1,32,120,1,2,27,32,120,3,3,28,32
1010 DATA 120,4,4,29,32,120,5,5,30,32,120,6,6,31,32
1020 DATA 136,22,22,6,10,136,21,21,7,9,136,10,20,7,8
2000 DATA 9,7,8,6,9,5,10,4,7,7,6,6,9,9,10,10,11,11
2010 DATA 8,10,7,11,8,12,7,9,6,12,5,11,6,8,5,7,8,4
2020 DATA 7,3,6,4,5,3,4,10,3,11,3,9,4,8,3,7,4,6,3,5
3000 DATA 11,4,19,12,12,21,8,8,23,8,3,21,7,10,21,2
3010 DATA 7,24,5,5,22,4,2,22,5,13,22,3,9,24,9,11,19
3020 DATA 5,13,20,5,9,20,2,4,23,2,12,23
4000 DATA PRESS <R> FOR AN,INSTANT REPLAY
4010 DATA OR <Q> TO QUIT.
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/*Falling Again*

```
10 DIM R(11,3)
20 DIM T(5)
30 LET SCRN=PEEK 16396+256*PEEK 16397
40 FAST
49 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
50 LET D$="16,21,0,31,134,7,19,6,7,128,0,1,26,31,136,2
,2,27,31,136,3,3,28,31,136,"
60 LET P1=1
70 LET P2=1
80 FOR X=1 TO 5
90 FOR Y=1 TO 5
100 GOSUB 1000
110 LET T(Y)=VAL N$
120 NEXT Y
130 FOR Z=T(1) TO T(2)
140 FOR R=T(3) TO T(4)
150 PRINT AT Z,R;CHR$ T(5)
160 NEXT R
170 NEXT Z
180 NEXT X
189 REM --DRAW BRANCHES OF TREE--
190 LET D$="1,4,1,9,2,1,2,5,2,6,2,8,2,11,2,12,3,2,3,4,
3,9,3,11,4,3,4,6,4,10,4,12,5,4,5,7,5,9,6,3,6,5,6,6,6,8
,6,10,"
200 LET P1=1
210 LET P2=1
220 FOR X=1 TO 24
230 GOSUB 1000
240 LET A=VAL N$
250 GOSUB 1000
260 PRINT AT A,VAL N$;CHR$ 128
270 NEXT X
280 SLOW
289 REM --DRAW LEAVES--
290 LET D$="0,8,20,1,6,20,1,10,17,1,12,21,2,4,19,2,9,1
9,4,2,18,4,5,18,4,7,21,6,11,19,7,3,16,"
300 LET P1=1
310 LET P2=1
320 FOR X=1 TO 11
330 FOR Y=1 TO 3
340 GOSUB 1000
350 LET R(X,Y)=VAL N$
360 NEXT Y
370 PRINT AT R(X,1),R(X,2);CHR$ 136
380 NEXT X
389 REM --MAKE THE LEAVES FALL--
390 FOR X=1 TO 11
400 PRINT AT R(X,1),R(X,2);" "
410 FOR Y=R(X,1)+1 TO R(X,3)-1
420 LET PK=PEEK (SCRN+R(X,2)+Y*33+1)
430 PRINT AT Y,R(X,2);CHR$ 136
440 PRINT AT Y,R(X,2);CHR$ PK
450 NEXT Y
460 PRINT AT R(X,3),R(X,2);CHR$ 136
470 NEXT X
479 REM --PAUSE, THEN PRINT CLOSING MESSAGE--
480 PAUSE 120
490 PRINT AT 18,14;"PRESS <R> FOR AN"
500 PRINT AT 19,14;"INSTANT REPLAY"
510 PRINT AT 20,14;"OR <Q> TO QUIT."
520 LET K$=INKEY$
530 IF K$="Q" THEN GOTO 570
540 IF K$<>"R" THEN GOTO 520
550 CLS
560 GOTO 40
570 CLS
580 STOP
999 REM --SIMULATE READ/DATA STATEMENTS--
1000 IF D$(P1)="," THEN GOTO 1030
1010 LET P1=P1+1
1020 GOTO 1000
1030 LET N$=D$(P2 TO P1-1)
1040 LET P1=P1+1
1050 LET P2=P1
1060 RETURN
```

TRS-80 Color Computer/*Falling Again*

```
10 DIM R(13),C(13),B(13)
20 CLS(0)
29 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
30 FOR X=1 TO 8
40 READ K0,R1,R2,C1,C2
50 FOR Y=R2 TO R1 STEP -1
60 FOR Z=C2 TO C1 STEP -1
70 PRINT@Z+32*Y,CHR$(143+K0);
80 NEXT Z,Y,X
89 REM --DRAW BRANCHES OF TREE--
90 FOR X=1 TO 21
100 READ BC,BR
110 PRINT@BC+32*BR,CHR$(128);
120 NEXT X
129 REM --DRAW LEAVES--
130 FOR X=1 TO 13
140 READ C(X),R(X),B(X)
150 PRINT@C(X)+32*R(X),CHR$(143);
160 NEXT X
169 REM --MAKE THE LEAVES FALL--
170 FOR X=1 TO 13
180 PRINT@C(X)+32*R(X),CHR$(143+16);
190 FOR T=1 TO RND(800)
200 NEXT T
210 PRINT@C(X)+32*R(X),CHR$(143+32);
220 FOR Y=R(X)+1 TO B(X)-1
230 HK=PEEK(1024+C(X)+32*Y)
240 PRINT@C(X)+32*Y,CHR$(143+16);
250 FOR T=1 TO 10+RND(100)
260 NEXT T
270 PRINT@C(X)+32*Y,CHR$(HK);
280 NEXT Y
290 PRINT@C(X)+32*B(X),CHR$(143+16);
300 NEXT X
309 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
310 FOR T=1 TO 2000
320 NEXT T
330 PRINT@431,"PRESS <R> TO SEE";
340 PRINT@463,"AN INSTANT REPLAY";
350 PRINT@495,"OR <Q> TO QUIT.";
359 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
360 K$=INKEY$
370 IF K$="Q" THEN CLS:END
380 IF K$="R" THEN RESTORE:GOTO 20 ELSE 360
1000 DATA 0,11,15,0,31,32,0,10,0,31,16,0,1,28,31
1010 DATA 16,2,2,29,31,16,3,3,30,31,-15,13,13,6,10
```

BEGINNER PROGRAMS

VIC-20/Falling Again

```
10 DIM R(15),C(15),B(15)
20 SB=7680
30 CB=38400
39 REM --SET SCREEN AND BORDER COLOR--
40 POKE 36879,25
50 PRINT CHR$(147);
59 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
60 FOR K=1 TO 9
70 READ K0,R1,R2,C1,C2
80 FOR Y=R2 TO R1 STEP -1
90 FOR Z=C2 TO C1 STEP -1
100 POKE CB+Z+22*Y,K0
110 POKE SB+Z+22*Y,160
120 NEXT Z,Y,K
129 REM --DRAW IN BRANCHES OF TREE--
130 FOR X=1 TO 23
140 READ BC,BR
150 POKE CB+BC+22*BR,9
160 POKE SB+BC+22*BR,160
170 NEXT X
179 REM --DRAW LEAVES--
180 FOR X=1 TO 15
190 READ C(X),R(X),B(X)
200 POKE CB+C(X)+22*R(X),5
210 POKE SB+C(X)+22*R(X),160
220 NEXT X
229 REM --MAKE THE LEAVES FALL--
230 FOR X=1 TO 15
240 POKE CB+C(X)+22*R(X),7
250 FOR T=1 TO RND(0)*800+1
260 NEXT T
270 POKE CB+C(X)+22*R(X),6
280 FOR Y=R(X)+1 TO B(X)-1
290 HK=PEEK(CB+C(X)+22*Y)
300 HS=PEEK(SB+C(X)+22*Y)
310 POKE CB+C(X)+22*Y,7
320 POKE SB+C(X)+22*Y,160
330 FOR T=1 TO 10+RND(0)*70
340 NEXT T
350 POKE CB+C(X)+22*Y,HK
360 POKE SB+C(X)+22*Y,HS
370 NEXT Y
380 POKE CB+C(X)+22*B(X),7
390 NEXT X
399 REM --PAUSE--
400 FOR T=1 TO 2000
410 NEXT T
419 REM --SET PRINT POSITION--
420 POKE 214,10
430 PRINT
439 REM --PRINT CLOSING MESSAGE--
440 PRINT TAB(8);"PRESS <R> FOR"
450 PRINT TAB(10);"AN INSTANT"
460 PRINT TAB(8);"REPLAY OR <Q>"
470 PRINT TAB(11);"TO QUIT."
479 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
480 GET K$
490 IF K$="Q" THEN PRINT CHR$(147);:END
500 IF K$="R" THEN RESTORE:GOTO 50
510 GOTO 480
1000 DATA 5,17,22,0,21,6,0,16,0,21,7,0,1,17,21,7,2
1010 DATA 2,18,21,7,3,3,19,21,7,4,4,20,21,0,20,20
1020 DATA 4,8,0,19,19,5,7,0,6,18,5,6
2000 DATA 5,5,4,5,3,6,2,7,7,5,8,4,9,5,10,6,11,5,6
2010 DATA 4,3,4,2,3,1,4,1,2,7,3,5,3,4,2,3,1,6,2,7
2020 DATA 1,9,1,10,2,9,3
3000 DATA 0,1,17,1,5,19,2,0,22,2,8,18,3,2,20,4,4,19
3010 DATA 5,1,22,6,3,21,7,6,18,8,0,21,8,2,19,9,4,20
3020 DATA 10,0,21,11,2,22,11,7,18,12,5,19
```

SOLUTION TO LAST MONTH'S PUZZLE:

Mr. Harry Winkler was abducted by the Outer People while watching the 1969 moon walk on television. (His flower association refers to the orange drink, Tang, which the astronauts drank on the journey.) Mr. Winkler's last recent memory is of a toothpaste commercial.

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PROGRAMMING P.S.

Corrections to previous months' programs—and enhancements suggested by our readers

CORRECTIONS . . .

Experienced programmers know how difficult it is to produce a program that is 100 percent free of "bugs"—and how many published programs contain errors. Our goal each month is to give you only perfect programs. However, programs we publish must go through many phases of development in a very short time, so errors could creep in at any stage, despite our constant testing. We are upset when this happens, because our hard work has gone to waste and because of all the trouble this causes you. We apologize.

We're constantly improving the process of developing programs. Meanwhile, we also retest programs after they have appeared in print. Here are errors we've found.

ADAM/Renegade Robot *(August, page 74)*

This program may go into an infinite loop if the player doesn't follow the instructions on the screen. You can prevent this by changing line 660 to read

```
660 IF K$ <> CHR$(13) THEN 650
```

IBM PC w/Color Graphics Adapter & IBM PCjr/Ice Cream Cone *(August, page 70)*

If you're not using an RGB monitor, black-and-white TV, or monochrome monitor, you can turn your black-and-white ice cream cone into a color one by changing line 30 to read

```
30 SCREEN 0,1
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/Library Golf *(July, pages 58, 60)*

Thanks to Gary D. Jeter of Denham Springs, Louisiana, for discovering typographical errors in lines 50 and 340. Here are the correct versions of those lines:

```
50 LET D$="5,5,5,5,5,5,5,4,3,2,2,2,2,2,2,2,2,2,2,2,2,2
,3,4,5,5,5,5,5,3,"
340 LET P2=1
```

To make the program repeat correctly every time, also add line 75:

```
75 CLS
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/Father's Day Card *(June, page 63)*

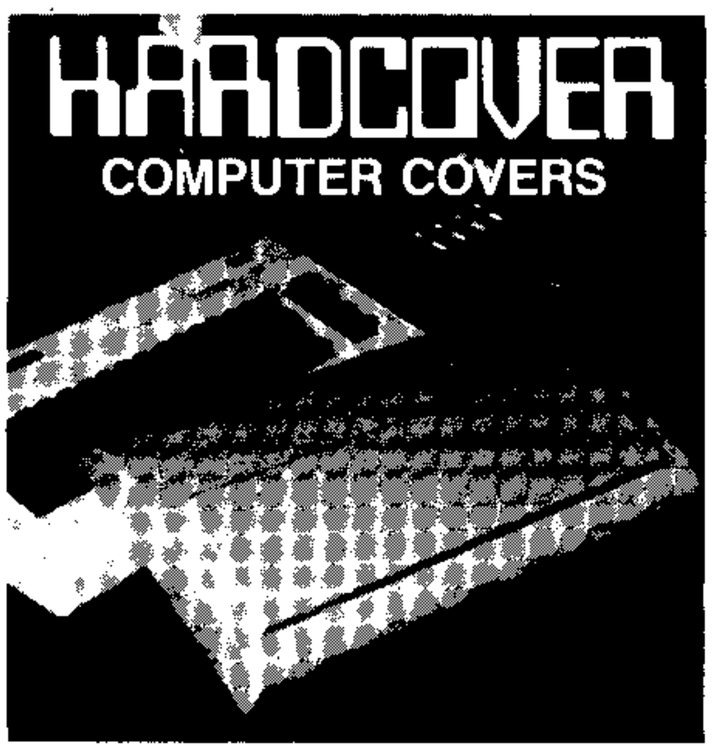
The word GOTO must be added to line 630:

```
630 IF K$="" THEN GOTO 630
```

Timex Sinclair 2068/Father's Day Card *(June, page 90)*

Incorrect lines were inadvertently inserted at the end of this program. For clarity's sake (and for the benefit of Timex owners who didn't see the June issue), we're reprinting the entire version here:

```
10 DIM S(4)
20 DIM C$(4,12)
30 CLS
40 PRINT "FATHER'S DAY CARD"
50 PRINT
60 PRINT "PLEASE PRESS <ENTER> AFTER EACH REPLY."
70 PRINT
80 PRINT "WHAT IS YOUR FIRST NAME?"
90 INPUT N$
100 PRINT
110 PRINT "TELL ME, "N$;" ..."
```

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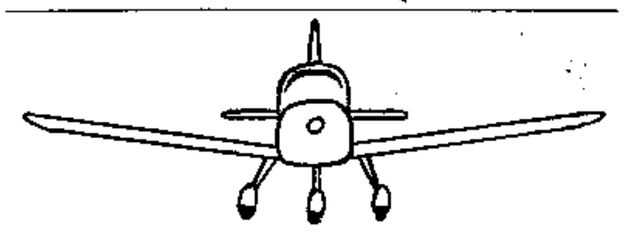

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```
119 REM -- START INPUT LOOP --
120 FOR X=1 TO 3
130 READ T$,V$
140 IF X>1 THEN CLS
150 PRINT "WHAT ";T$;" DOES YOUR FATHER"
160 PRINT V$;"?"
170 PRINT
180 PRINT "(10 LETTERS OR FEWER, PLEASE.)"
190 PRINT
200 PRINT "HE ";V$(1 TO 4);"S ";V$(6 TO );
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)*
Clevelander 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!"

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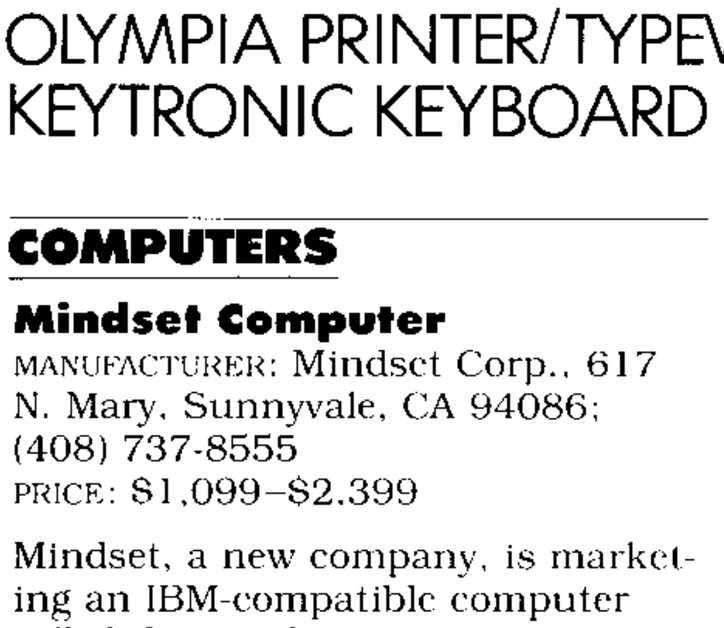
MANUFACTURER: Mindset Corp., 617 N. Mary, Sunnyvale, CA 94086; (408) 737-8555
PRICE: $1,099–$2,399

Mindset, a new company, is marketing an IBM-compatible computer called the Mindset. It runs most programs written for the IBM PC, including *Lotus 1-2-3*, *WordStar*, and *Multiplan*. What sets this new computer apart from other IBM-compatibles is its superior graphics capabilities.



The Mindset connects to a television, video monitor, or RGB monitor. It can display 16 colors at once, at a resolution of 320 × 200 (the number of dots measured horizontally and vertically). In high-resolution mode, the machine can display two colors on a 640-pixel by 400-pixel screen. Both these displays are extremely clear and sharp. Also, the Mindset can create animated graphics. The GW BASIC that is included with the system has special animation commands, such as START and STOP.

The base system ($1,099) includes 64K RAM, a typewriter-style keyboard, and two ROM cartridge slots. The system is based on the 80186 16-bit microprocessor, which allows the Mindset to run programs faster than the IBM PC.

One or two disk drives (with two drives, storage is 720K) can be added, and the computer's RAM can be expanded to 256K. The fully configured Expansion II unit (two disks and 256K RAM) costs $2,399. Parallel and serial ports are not included, but can be added. Also available is the Mindset Mouse, which can be used as a drawing tool with any of the several advanced-graphics software packages that are available.

MONITORS

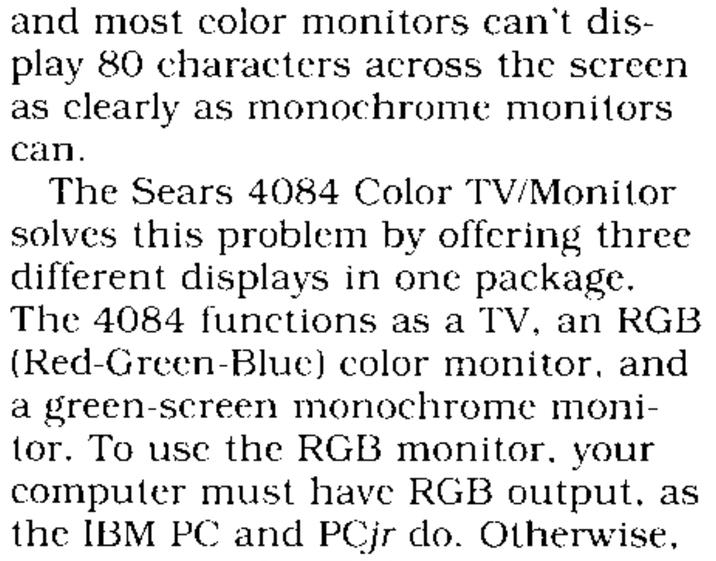
Sears TV/Monitor

MANUFACTURER: Sears, Roebuck & Co., Dept. 703-BSC 4015, Sears Tower, Chicago, IL 60684; (312) 875-8306
PRICE: $350

Computer users who want to play games in full color and then switch to word processing with an 80-character display, often find themselves switching between a TV and a monochrome monitor. That's because TVs and most color monitors can't display 80 characters across the screen as clearly as monochrome monitors can.

The Sears 4084 Color TV/Monitor solves this problem by offering three different displays in one package. The 4084 functions as a TV, an RGB (Red-Green-Blue) color monitor, and a green-screen monochrome monitor. To use the RGB monitor, your computer must have RGB output, as the IBM PC and PC*jr* do. Otherwise, you can use the TV for color.

While in the RGB mode, at the touch of a switch you can improve the clarity of on-screen material by compressing it to 70 percent of its original height. Both the monochrome monitor and the RGB monitor can also display 25 lines of text at 80 characters each.



As a portable television, the unit has electronic channel selection, is capable of receiving 12 stations, and has the usual color, tint, and vertical hold controls found on a TV.

All connections are on the back of the unit to keep wires out of sight and out of the way. Videocassette recorders, videodisk players, and other accessories can also be connected.

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Three different models are offered: the GP-700 for $599–$659, GP-550 for $319–$369, and GP-100 for $299-$309. (The GP-700 is not made in a Commodore version and the GP-700 and GP-100 are not made for the IBM PC.) →

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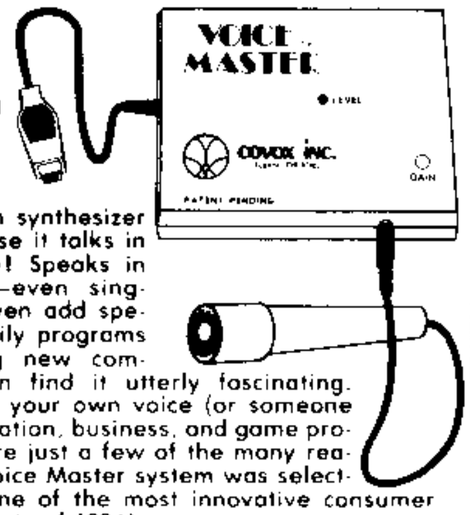

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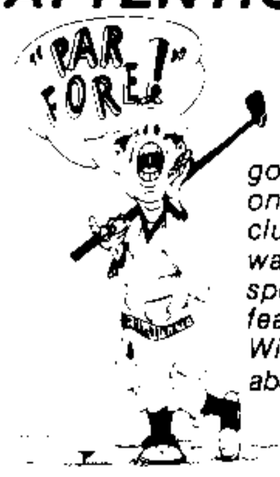

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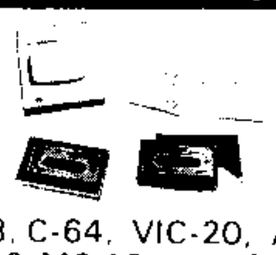

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