Telecommunications: How To Get Started

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The Leading Magazine Of Home, Educational, And Recreational Computing

How To Add Peripherals And Choose The Right TV For Your Computer

***Climber*: A Fast-paced Game For VIC-20, TI-99/4A, And Commodore 64**

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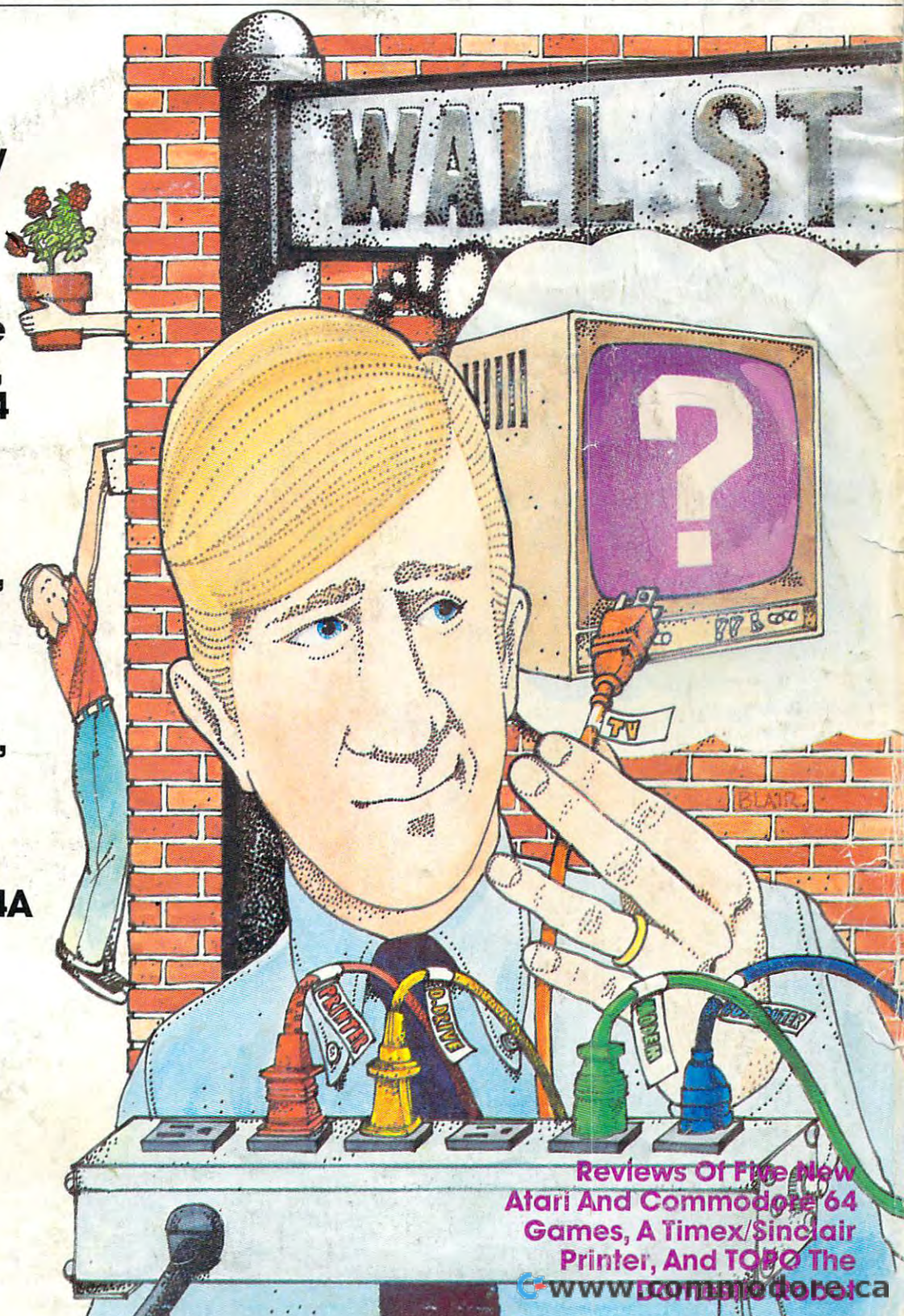

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EDITOR'S NOTES

A recent article in *Business Week* touched on the topic of decelerating sales in the home computer market. Not that sales are declining, mind you; they're just not accelerating with the velocity that many had predicted. One of the recurring questions raised was the value of home computers aside from their use as game machines. If you process words, then obviously a word processing package is of use to you. Perhaps you need a data management program or even a home accounting package. Beyond these uses, what can you do? Or are these uses intrinsically enough?

Our opinion is that there's a bit of a crisis of expectations involved, and perhaps an inch or two of gap between the reality of a basic system and the advertisements describing a fully configured system. It is, in fact, quite frustrating to discover that a home computer may cost you $99, but the memory expansion, disk drives, and so on to go with it – which turn it into a far more practical system – may cost you an additional $1,000. And that's before you buy that word processor or data manager software.

In most consumer market items there's far more parity of pricing, given that one rarely expects to pay more for a lens than a camera; more for a record than a player. In the home computer market, especially the low end, this pricing parity expectation is even more greatly exaggerated. There's not very much you can add to your computer that doesn't cost more than the computer did.

We suggest that this simple mismatch may have a great deal to do with perceptions of machines such as the Timex/Sinclair which has recently been falling off in sales. And these aren't sales that are necessarily being lost to other market leaders. The industry is simply not expanding at the rate many expected.

Perhaps bundling (selling a combination of home computer, peripherals, and software) will provide an answer. We'll be closely watching the success of Adam, and an expected bundled Commodore 64 package, to see what the market decides.

Random Bits: Where is *Baby Blue*? As all the industry speculates on the arrival of the IBM Home Computer (frequently called Peanut), other industry stocks are being buffeted by the rumors and speculation about this long-pending announcement. One important point to remember is that there are literally thousands of computers being sold each day, and the market is truly growing.

Commodore 1541 disk drives are in short supply, and a rumor exists for every possible reason. While some have suggested that a recall has quietly taken place, it appears to us that the shortage that Commodore predicted several months ago is actually upon us. This shortage has been complicated by an apparent high rate of problems with the drives, causing excessive downtime and consumer complaints.

Robert Lock

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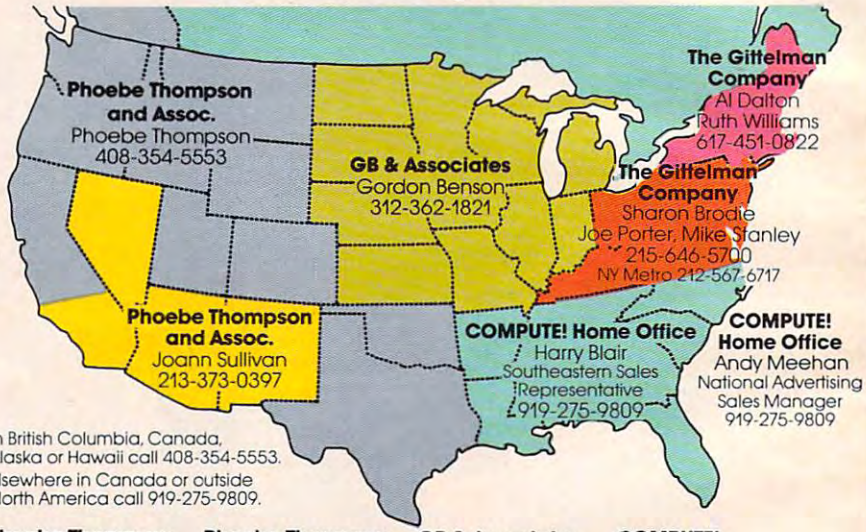

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READERS' FEEDBACK

The Editors and Readers of COMPUTE!

Tone Generator For The VIC

I own a VIC-20 and I am very pleased with it. However, I would like to know if it's possible to add a tone generator so that when I hit a key on the keyboard a tone is heard to indicate that an entry was made. I've seen this on other computers and find it most useful.

Kevin M. Regenhard

The positive stroke keyboard tone generator you mention is not built into the VIC-20. However, it is possible to program this useful function into your VIC.

Type in, SAVE, and then RUN the following short BASIC loader which will POKE in a machine language program. The program is written to run in the cassette buffer, so it shouldn't interfere with your BASIC programming memory. Once the program is POKEd into memory, SYS828 to start, and press RUN/STOP – RESTORE to stop.

```
60000 FOR A=828 TO 861: READ B: POKE A,B:
      NEXT: END
60010 DATA169,15,141,14,144,120,169,78,14
      1,20,3,169,3,141,21,3,88,96
60015 DATA165,197,201,128,240
60020 DATA7,101,197,105,128,141,12,144,76
      ,191,234
```

The Atari Mystery Connection

I took apart the Atari 400 and noticed on the back of the main board chip that there is a connection not in use. What is this connection for and why is it not in use?

Ki Jeong Yun

This connection, also found on the Atari 800, is used by Atari to test the machines on the assembly line. Due to its inaccessibility, it has never had any other use, although it could possibly be used for expansion.

Double-spaced Listings On Commodore Printers

I have a Commodore 64 and a Commodore 1525E printer. There are many occasions while I'm debugging a new program when a double-spaced paper listing would provide a lot more room to make corrections and additions.

Is there a way to force the LIST command to double-space on the printer without modifying the program being listed? Perhaps Jim Butterfield could suggest a short machine language routine.

Stephen D. Eitelman

Yes, it is possible to command the printer to double-space during the LIST command. In fact, all Commodore printers and many other printers have this ability. You will also, of course, see double-spaced listings on your screen. With any Commodore printer, you can enter and run one of these short BASIC programs, which will POKE a machine language program into the cassette buffer to create double-spacing.

```
5 AD = PEEK(55)+PEEK(56)*256-20
10 I=AD
15 POKE 55,AD AND 255 : POKE 56,AD/256
20 READ A:IF A=256 THEN END
25 IF A=-1THENA=(AD+11)AND255
26 IF A=-2THENA=(AD+11)/256
30 POKE I,A:I=I+1:GOTO 20
35 PRINT"{CLR}RUN WITH : {RED}SYS"AD
40 CLR
828 DATA 169,-1,141,38,3
834 DATA 169,-2,141,39,3
840 DATA 96,201,13,208,5
846 DATA 32,122,242,169,13
852 DATA 76,122,242,256
```

```
5 PRINT"{CLR}RUN WITH SYS 679"
10 I=679
20 READ A:IF A=256 THEN END
30 POKE I,A:I=I+1:GOTO 20
679 DATA 169,178,141,38,3,169,2
687 DATA 141,39,3,96,201,13,208
695 DATA 5,32,202,241,169,13,76
703 DATA 202,241,256
```

TI Free Memory Techniques

I would like to clarify and expand upon the ideas expressed by Howard Patlik in "More on TI Memory" (Readers' Feedback, August 1983). This two-line program for determining free memory on the TI-99/4A was offered:

```
1 A=A+8
2 GOSUB 1
```

If you RUN this program alone and PRINT the variable A, you will find the amount of available memory less the 37 bytes required by the program itself. (A equals 14536, so A plus 37 equals 14573 bytes of memory for programming.) When the program RUNs, the GOSUB in line 2 will ex-

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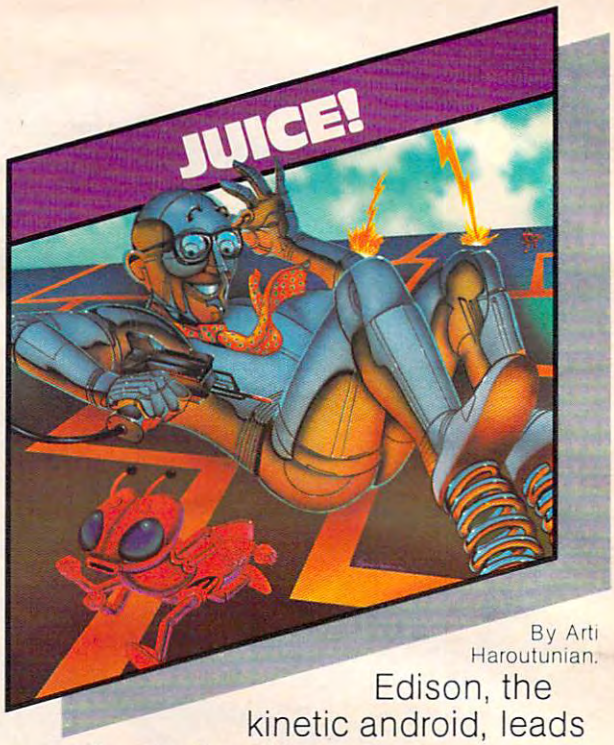

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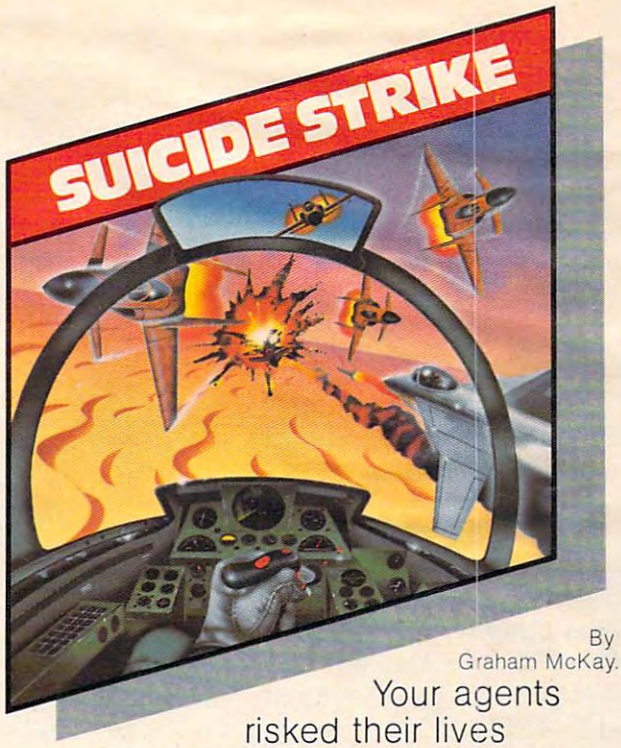

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ecute 1817 times before a MEMORY FULL error is issued in line 1. Each time this GOSUB executes, 8 bytes of memory are consumed and thus 1817 times 8 is 14536. As many as 7 bytes may still be unused.

Of course, if this two-line routine is entered with a program already in memory (providing the variable A is not used within this program), you will find the amount of free memory less 37 bytes when you RUN and PRINT A.

There are some more considerations. String variables and graphic characters defined above CHR$(127) will require additional memory that this two-line routine will not pick up. The TI-99/4 has 256 more free bytes than the TI-99/4A, but if graphic characters above 127 are used, then both will use the same amount of memory.

Screen and BASIC overhead is 1792 bytes. And if all or only the graphics character 159 is used, then overhead is 2048 bytes (1792 + 8*(159-127)). The 16K TI-99/4A is, of course, actually 16,384 bytes. So, 16,384 minus 1792 is 14,592 bytes free. (There is a slight discrepancy from the two-line method of up to 19 bytes.)

Here is another way to find memory size using CALL PEEK. For TI BASIC, you need the Mini Memory or the Editor/Assembler cartridges. Type in CALL PEEK(-31974,A,B). Again the variables A and B should not be in the program. Then PRINT A*256 + B-1776. With no program present, this will give a size of 14577 bytes free.

To check this with TI Extended BASIC (Version 110), type PRINT A*256 + B-2455. The TI's response is 13886. Now type SIZE. The TI responds with 13886 BYTES FREE.

Another user of memory in TI BASIC is Terminal Emulator II. It takes about 512 bytes. It is also well-known that the disk controller uses console memory. Even after ENTERing CALL FILES(1) and the NEW command, it still uses 1052 bytes. Here's how to free up this memory. Type CALL LOAD(-31888,63,255) and NEW.

Again, in TI BASIC the Mini Memory or Editor/Assembler cartridge is needed, but in TI Extended BASIC, the 32K Expansion is needed. To restore disk drive(s) and disk controller, use the command BYE or FCTN QUIT.

Paul E. Schippnick

Atari Upgrade Update

We have recently heard from several factory authorized Atari service center representatives who tell us that there is an inexpensive (under $30) upgrade for the 10K ROM operating system. The original operating system of the 400/800 had a number of minor errors (bugs), and the Revision B operating system corrected these problems. This is the first time to our knowledge that Atari has offered this upgrade. To check which operating system you have, enter: PRINT PEEK(58383). If you get a 56, you may want to visit your nearest service center and get the upgrade (a value of 0 returned means you already have Revision B).

Another Perfect Commodore INPUT

In the last several issues I have seen a number of "Perfect INPUTS" to avoid Commodore's return to READY from input. All of these methods work. In my opinion, however, since you can continue from READY by entering CONT on a clear line, their disadvantages outweigh their advantages.

I have another way of avoiding this problem. It uses the standard INPUT statement and CBM's active screen. When an input statement is executed, CBM BASIC prints a ? at the current cursor position, then moves the cursor to the right one additional space. All of the positions to the right of the cursor are automatically allocated for inputting data (up to 80 characters). By printing some default value into this area before executing the input statement, not only do you avoid the return to READY, but you also allow for inputting default values by just hitting RETURN.

For example:

```
10 VA = 10 : REM SET DEFAULT VALUE TO 0
20 PRINT "WHAT IS THE NEW VALUE": PRINT
   " "; VA;"{UP}"
30 INPUT VA
40 PRINT "THE CURRENT VALUE IS"; VA
50 INPUT "IS THE VALUE CORRECT (Y/N)
   {3 SPACES}Y{3 LEFT}"; A$
60 PRINT "WHAT IS THE VALUE"; TAB(20);"D
   EFAULT VALUE"
70 PRINT TAB(18);"{UP}";
80 INPUT DV$
```

This appears on the screen as:

```
WHAT IS THE NEW VALUE
? 10
THE CURRENT VALUE IS 10
IS THE VALUE CORRECT [Y/N] ? Y
WHAT IS THE VALUE ? DEFAULT VALUE
```

The flashing cursor is positioned over the 1, Y, and D respectively.

By hitting only the RETURN key (3 times), you INPUT 10 to VA, Y to A$, and DEFAULT VALUE to DV$. If you want some other value, you need only type it in before hitting RETURN.

By taking a little time in choosing default values when writing a program, you can save a lot of time when running it and entering data.

Dennis D. Duke

Atari Listings

How can hard copy be printed from RAM memory which has been loaded from a user-made BASIC program on a cassette? I realize that this is not too difficult a problem, but I have not found a solution

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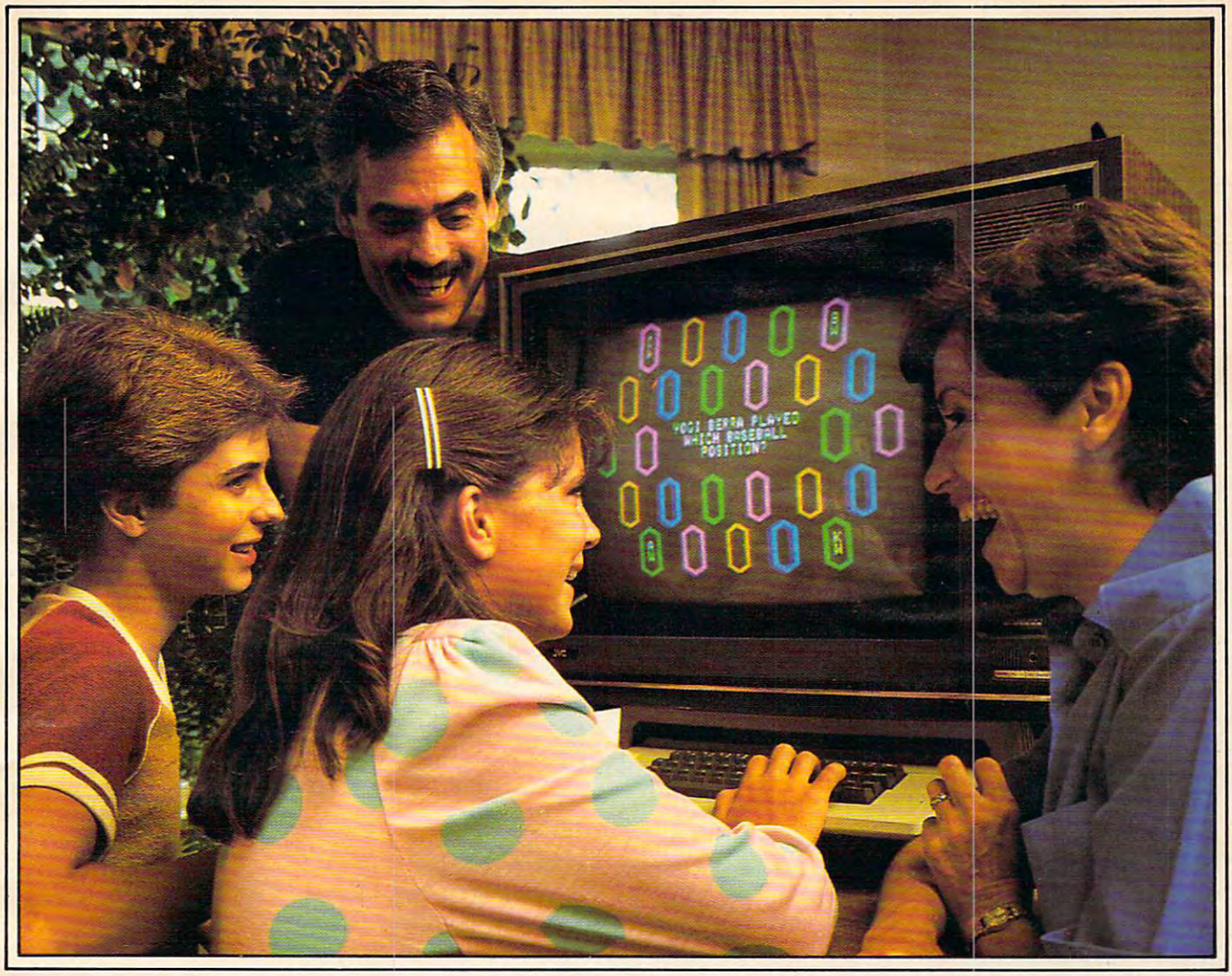

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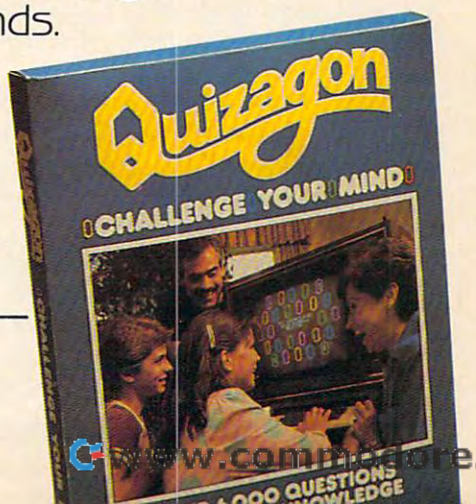

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in either your Atari books or in the issues I have of COMPUTE!.

David Cimochowski

*If we understand your question, you want to print out a listing of a BASIC program in memory. Use the command LIST "P:" for this purpose. You can also use the following program to copy any data file (*not *programs) to your printer.*

```
100 OPEN #1,4,0,"C:":REM Use OPEN #1
    ,4,0,"D:name" for disk
110 OPEN #2,8,0,"P:":REM Output to p
    rinter
120 TRAP 140:REM Go to 140 when end
    of file error occurs
130 GET #1,A:PUT #2,A:GOTO 130
140 PRINT #2:CLOSE #1:CLOSE #2
150 END
```

Mode Shifting And Automatic Tape RUN For Commodore

I seem to remember reading of a POKE that allows the use of upper- and lowercase with the use of the shift key, but can't find it in the *Programmer's Reference Guide*, the *VIC-20 User's Manual*, or *COMPUTE!'s First Book of VIC*. Could you tell me what this POKE is? Also, how do I make my taped programs run after being LOADed without my intervention?

Tim S. Hallen

There are a number of ways that you can place the VIC-20 or the Commodore 64 into the upper/lowercase or "text" mode. Using a POKE, the locations are 36869 on the VIC, and 53272 on the 64. These locations are on the VIC (Video Interface Chip) chip of each machine, and tell the computer where to get its character set. On the VIC, the normal value is 240, and on the 64 it's 21. To place the VIC into the text mode, POKE 36869,242 and for the 64, POKE 53272,23. To return to uppercase/full graphics (normal) mode, POKE 36869,240 on the VIC, and POKE 53272,21 on the 64.

There are other methods which switch between text and normal modes. One of these is to hold down the COMMODORE and SHIFT keys. To switch to text mode, press and continue to hold the COMMODORE key while pressing the SHIFT key. To return to normal, simply toggle the keys again. Another method, and probably the safest and most efficient, is via the PRINT command. To switch to text mode, type PRINT CHR$(14) then press RETURN. To return to normal mode, type PRINT CHR$(142). These PRINT statements can also be used within a program if you wish.

There are a number of ways to make the computer automatically run your programs after LOADing. The easiest is via the keys on the keyboard. After positioning your tape cassette to the beginning of the program you wish to LOAD and RUN, press and continue to hold the SHIFT key, then press the RUN/STOP key. This will LOAD your program into memory, then run it without your having to type and enter RUN.

*Another method is to "string load" your cassette programs. String LOADing programs is LOADing and RUNning one program which in turn LOADs and RUNs the next program on the cassette tape. To accomplish this, LOAD and RUN your first program normally, and use the last statement of this program to call in the second program with a LOAD command. For instance, the last line of the program would read: 60000 LOAD "*filename*". When the program encounters this statement, it will automatically LOAD and RUN the next program on the cassette tape. This can also be a very useful programming technique for saving memory if, for example, you have a program that has a long list of instructions for the user to read before running the program. You can use the first program in the "string" to display the instructions and then load in the second program when the user is finished reading.*

Use Any Tape Recorder With Atari?

I am a new owner of an Atari 800. I eventually plan to purchase a disk drive, but as a temporary storage device, I would like to use my Panasonic cassette recorder, rather than purchase an Atari 410 or 1010 program recorder. Is this possible? If so, how do I go about wiring connections without causing any damage to the computer?

Mark Inman

The serial plug used to connect Atari peripherals has connections for audio out and audio in. You can attach a standard recorder to audio out and record CSAVEs, but there is no way to get the computer to read the audio-in line (which is used to play the audio track through the TV speaker). The Atari 410 recorder has a special analog to digital circuit used to translate tape tones into digital information that the computer can *read.*

Text On The Apple High-Resolution Screen

My family has just purchased an Apple II+ computer. I can program graphics on the high-resolution screen, but things just aren't the same without text somewhere besides the text window at the bottom of the screen. Is it possible to put text on the high-resolution graphics screen?

Mark Hayek

You can put shapes that look like text on the Apple's high-resolution graphics screen by using the program "HRCG" (high-resolution character generator) that comes on the DOS Tool Kit disk. This program can be accessed from a BASIC program and will load shape tables representing different character sets into memory just below DOS.

Normally, these shape tables will produce the standard ASCII characters on the high-resolution screen. However, there are other character sets on the Tool Kit

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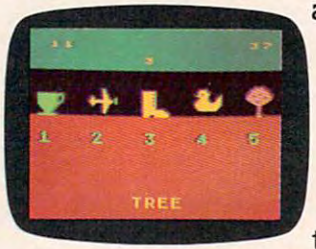

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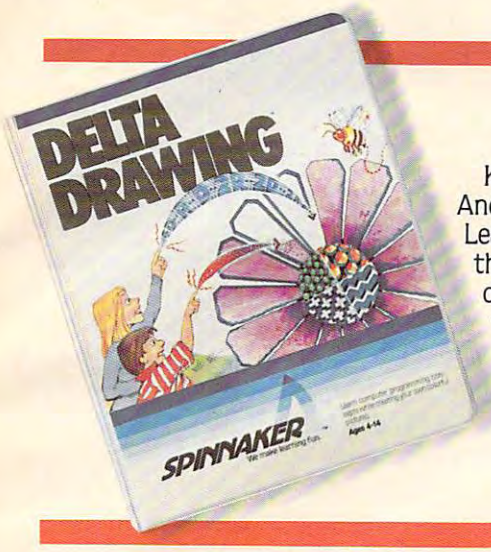

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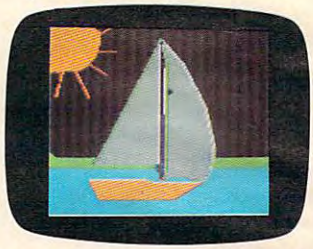

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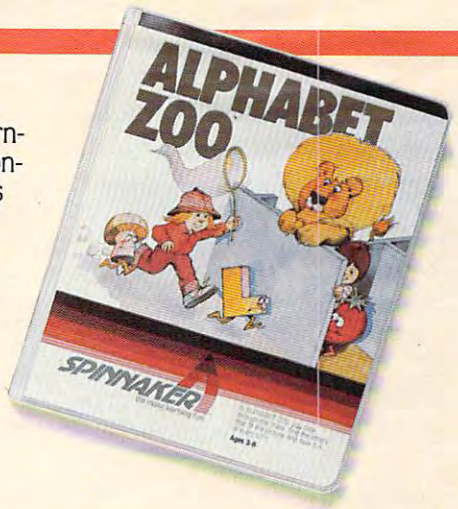

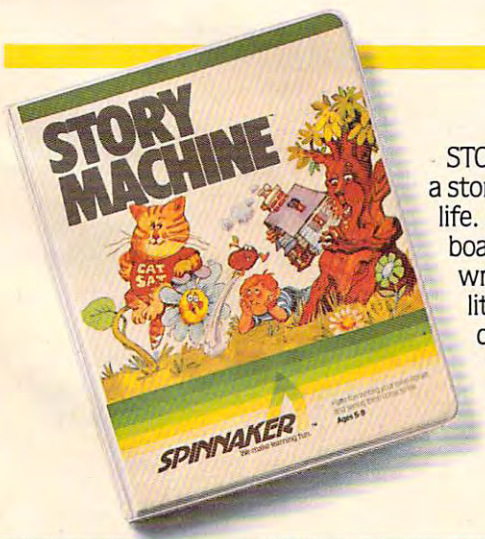

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disk which can be substituted for the ASCII set. If you like, you can even define your own character set using the program "Animatrix," also on this disk. This method was employed in the Apple version of the game "Goblin," which appeared in the July 1983 issue of COMPUTE!. Consult the booklet which accompanies the Tool Kit disk for details on these techniques.

Programming The Commodore Joystick

I own a Commodore VIC-20. I have learned how to program games, but I have not learned how to program the games to respond to a joystick.

I have looked in the *VIC-20 Programmer's Reference Guide*, but I did not understand the information. I would like to know how to program games to respond to a joystick. Would you please explain this to me?

Mitchell Kerman

In both the VIC-20 and the Commodore 64, the joystick is programmed by PEEKing two bytes.

The VIC is designed to handle only one joystick, and it takes two bytes to control that joystick. In the VIC, location 37137 is PEEKed to read the joystick for the up, down, left, and fire button movements. Location 37152 is PEEKed to detect movements to the right.

The 64 is designed to handle two joysticks, and unlike the VIC, each joystick is controlled with one byte. To detect the position of a joystick plugged into port A, PEEK 56320, and for port B, PEEK 56321 is used.

To see just how easy it is to detect movement on the joystick, plug in your joystick, type in one of the following short programs, and then RUN. The programs simply PEEK the joystick control bytes, and then PRINT that reading to the screen.

For the VIC-20:

```
10 PRINT PEEK(37137),PEEK(37152): GOTO 10
```

For the Commodore 64:

```
10 PRINT PEEK(56320),PEEK(56321): GOTO 10
```

As you run the programs and play with the joystick, you'll see the values printed to the screen change as the values in the joystick ports change. You can program the joystick into your games by PEEKing these locations, and using IF...THEN statements in your program to process the information.

A quick word about programming techniques here. Because the joystick control bytes are often shared (that is, they do other things besides read the joysticks), it is more efficient to PEEK only the affected bits *in the joystick control bytes. This will filter out other information not connected to the joystick. This is done by ANDing your PEEKs. For more information on which bit is used for each joystick application, consult the* Programmer's Refeference Guide *for your specific computer.*

Saving Machine Language Programs

I'd like to protect programs I write on my VIC-20, and I know that using machine language accomplishes this. But how do you save machine language on tape?

Dave Karlson

The easiest, quickest, and most efficient way to save a machine language program is from within a machine language monitor. There are many monitor/assembler packages available for your VIC-20, among them "TINYMON1," published in COMPUTE!'s First Book Of VIC, *and the VICMON Machine Language Monitor Cartridge available at your local Commodore dealer. The following technique will also work successfully on the Commodore 64.*

*Once a monitor is loaded and running, the usual format for saving to cassette tape is: S "*name*", XXXX, YYYY, 01 where S = save,* name *= name of program, XXXX = starting address of the machine language program to be saved, YYYY = ending address of the program, and 01 is the device number (tape). Saving to disk would use the same format, except that the device number would be 08 (disk). However, it should be noted that some monitor/assemblers use a different format. See the accompanying documentation.*

There is another way to save machine language programs, but it involves some redefining of the VIC's operating system. You can save a machine language program in the same manner that you would a BASIC program. To accomplish this, you have to redefine, or POKE three sets of pointers. First, you have to determine the beginning and the ending addresses of the machine language program. Once this is known, POKE 43 and 44 (start of BASIC pointer) to point to the beginning of the program, POKE 45 and 46 (start of BASIC variables, or end of BASIC pointer) to point about 10 bytes past the end of the program, and POKE 55 and 56 (highest address used by BASIC) to point about 30 bytes past the end of the program. Next type CLR. Now you are ready to save to tape or disk in the normal manner, i.e., "SAVE filename, *1" (for tape) or "SAVE* filename, *8" (disk).*

To LOAD the programs back into memory, use the standard format for LOADing machine language programs: LOAD filename, device number, *1. For example, LOAD "filename", 8, 1.*

COMPUTE! welcomes questions, comments, or solutions to issues raised in this column. Write to: Readers' Feedback, COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403. COMPUTE! reserves the right to edit or abridge published letters. ©

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Questions Beginners Ask

Tom R. Halfhill, Features Editor

Are you thinking about buying a computer for the first time, but don't know anything about computers? Or maybe you just purchased a computer and are still a bit baffled. Each month, COMPUTE! will tackle the questions most often asked by beginners.

Q I have recently purchased a computer with a cassette recorder. In a recent issue of COMPUTE!, an author stated, "Remember that the safest way to make sure that your program is not lost forever is to save it at least every half an hour that you work on it." Does this mean that, when typing in the extra long programs, you should stop half an hour into the program and save it, then continue typing from that point on?

A To be safe, yes. You might want to stop and save the program even more often, or less often – depending upon how much of your work you are willing to reconstruct in the event of a disaster.

Remember that programs loaded from disk or tape, or typed on the keyboard, are kept by the computer in Random Access Memory (RAM). RAM holds this information only while the computer's power is on. If you are typing in a long program and a thunderstorm suddenly knocks out the electricity, or if someone kicks loose the power cord, all your work will be lost. You would have to start over again from the beginning.

That's why most people "safety save" the program they are typing or writing. Admittedly, if you are working with a cassette recorder instead of a disk drive, this can be inconvenient because of the waiting involved. A very long program might take ten minutes to save. If you save your work every half-hour, you could spend one-third of your time waiting for the recorder.

A good compromise might be to save to tape once every hour. Decide for yourself: If there are no storms brewing, if the power cords are safely hidden from passing feet and pets, and if no one else is around to accidentally turn off your computer, you can probably get away with saving your work less often than someone who must put up with such hazards.

Q I own an Atari 800 (48K) with a 410 Program Recorder and my brother owns an Atari 400 (16K) and a 410 also. Is there any way to interface the two computers in order to play a program through both at the same time?

A It is possible to hook up two (or more) computers to share a program – even two computers which are normally incompatible – but there are several complications involved.

First, you would have to buy or make a cable to hook the two computers together. One way would be to use the parallel or serial ports on a pair of 850 Interface Modules, or the built-in serial bus on each computer (although the latter method would interfere with access to peripherals, such as your cassette recorders). I know of no cables for this purpose, and making one would be a task for a knowledgeable technician.

Perhaps using a pair of modems would be the easiest way to hook up the computers. Each computer would require its own modem and telephone. You would call up your brother's computer and link them together over the phone lines. Of course, this would also require the proper terminal software – a program to allow each computer to act as a remote terminal, communicating with the other. Whatever you typed on your computer would appear on your brother's screen, and vice versa. In effect, you would be "sharing" a program on both computers – the terminal program.

But to do anything more would require a special program to take the place of the terminal software. You don't mention in your letter what type of program you want to share on both computers. There are only a few programs designed for this. If you want to play an interactive game – with you and your brother making moves and countermoves from your own computers – you'd need a game program specially designed for this. The only one I've heard of is *Commbat* by Adventure International. This is an interactive tank battle game with simple graphics that can be played over the phone lines between even normally incompatible computers, such as a Radio Shack TRS-80 and an Atari.

Be aware, however, that such games are limited by the speed of data transmission over the phone lines. It is very difficult to program fast action and flashy graphics. For more information, see "Telegames: Computer Games By Phone," in last month's COMPUTE!, and "Telecommunications: How To Get Started," elsewhere in this issue. ©

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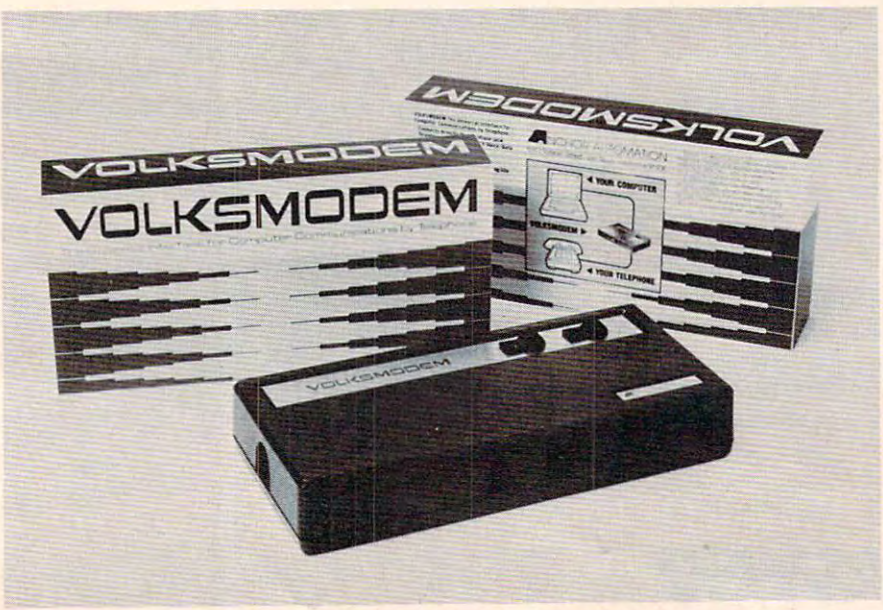
TELECOMMUNICATIONS: How To Get Started

Kathy Yakal, Editorial Assistant

More and more people are using their personal computers to communicate with bulletin board systems, information services, mainframe computers, and other personal computers. How do you get started in telecommunications? What kind of software do you need? Here's an overview.

Telecommunications has been big news lately. People are breaking into university systems and bank account files. They're even doing what some people said couldn't be done after *WarGames* came out: making some sort of contact with computers that monitor and control this country's defense system.



Anchor Automation's Volksmodem *can interface with most personal computers via a separate cable. It is a* direct-connect *modem.*

Translating Foreign Signals

In telecommunications, the information being sent from one computer to another travels over the telephone lines. Though this is the most efficient method available now, there is a problem: telephones and computers are based on different technologies. Phone systems are designed to filter out the very clicks and pops that computers use to communicate.

This is why you need a modem (MOdulator/DEModulator). This device modulates the computer's digital signals into analog signals, so the phone lines can carry them, and then demodulates them back into digital,

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Now from Timex...a powerful new computer.

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And so it goes on into the night.

And everytime you hit a new high score, it's displayed after the game, just like at the arcade.

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so the computer on the other end can receive them. The modem serves as a translator.

There are two types of modems commonly used with personal computers. *Acoustic modems* have a set of soft rubber cups into which you insert the phone's handset. One cup contains a speaker, which generates audio tones, the other a microphone, which receives tones from the other modem.

Once you have the correct hardware and software for telecommunications, there is a great deal of information that you can access.

Direct-connect modems plug directly into the telephone through a modular phone jack. Some, like the VICmodem, are cartridges that are plugged directly into a port on the computer. Others are stand-alone units about the size and shape of an eight-track cartridge tape which can be placed directly beneath the phone and plugged in. Some of these have a feature which allows you to switch from phone functions to modem functions. This spares you from having to keep connecting and disconnecting the modem when you want to use the phone to make a call.

Acoustic modems are generally less expensive but direct-connect modems generally offer a better connection, since the sound frequencies necessary for telecommunications are generated directly on the phone lines. Extraneous room noises can interfere when you're using an acoustic modem if the phone handset is not sealed very tightly in the cups.

Some computers come with a built-in modem. The Radio Shack TRS-80 Model 100 Portable Computer is an example. The modem functions and terminal software are contained inside the computer; all you need is a cable to start telecomputing.

Dumb Peripherals

If you turn your personal computer into a terminal when using a modem, how can it accomplish something as complicated as transmitting data to another terminal around the block or around the world? Your computer must be able to send and interpret bits in the pattern you want, or you'll just be sending and receiving nonsense. This is why you need special software for telecommunications.

Some terminal software comes on cassette, some on disk, and some in cartridge form. There are several terminal programs in this issue.

Matching Up

Also, a modem must be properly aligned with another modem before information transmission is possible. Both modems must be matched in several ways.

Baud rate is the number of bits being sent every second. This can vary from 110, which is what the old teletypes use, up to 9600. The faster the rate, the lower your phone bills. But sending information as fast as 9600 bits per second really tests the capabilities of the telephone system. In order to establish communications, you need to know the baud rate at which the system you are calling is operating so that you can set your terminal software to the same rate.

Another factor is *duplexing*. Full-duplex means being able to send and receive data at the same time. Half-duplex allows for only one-way communication. If this is not matched correctly to the system with which you are communicating, you may see double characters on your screen or none at all.

Some terminal software allows you to *upload* and *download* programs. Say you have a friend in another part of the country who just programmed

The Racal-Vadic VA3413 *is an* acoustic *modem. The telephone handset is pushed into the soft rubber cups on the side.*

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Consumer Information Service, P. O. Box 20212
5000 Arlington Centre Blvd., Columbus, OH 43220

800-848-8199

In Ohio call 614-457-0802.

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Modem Manufacturers And Distributors

Listed below are the manufacturers and distributors of the modems included in our buyer's guide, as well as those of the major information and news services.

Anchor Automation
6913 Valjean Street
Van Nuys, CA 91406

Cermetek Microelectronics, Inc.
1308 Borregas Avenue
P.O. Box 3565
Sunnyvale, CA 94089

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Emtrol Systems, Inc.
123 Locust Street
Lancaster, PA 17602

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Boulevard
Norcross, GA 30092

Microbits Peripheral Products, Inc.
225 West 3rd Street
Albany, OR 97321

The Microperipheral Corporation
2565 152nd Avenue N.E.
Redmond, WA 98052

Novation, Inc.
20409 Prairie Street
Chatsworth, CA 91311

Prentice Corporation
266 Caspian Drive
P.O. Box 3544
Sunnyvale, CA 94088

Racal-Vadic
1525 McCarthy Boulevard
Milpitas, CA 95035

TNW Corporation
3444 Hancock Street
San Diego, CA 92110

Universal Data Systems
5000 Bradford Drive
Huntsville, AL 35805

a great game and wants to share it with you, but doesn't have a printer. If you both have the same kind of computer, and an appropriate terminal program, that program can be uploaded (sent) to you. What you will be downloading is ASCII code (numbers which represent all possible screen characters). Each character is received one at a time. Not all terminal software has this capability; make sure that yours does if you want to be able to upload and download to and from bulletin board systems, information services, or other personal computers.

The World Of Telecomputing

Once you have the correct hardware and software for telecommunications, there is a great deal of information that you can access:

News and information services. CompuServe and The Source are two examples. Once you have purchased a subscription, you can call, type in your secret ID number or password, and have all kinds of information delivered to you immediately – news, sports, stock market reports. You can set up your own *electronic mailbox* so that messages can be left for you. CompuServe even has its own version of CB radio: You can get on-line with other people using the system and have a conversation.

Bulletin board systems. Offering some of the features of the major information services, there are hundreds of bulletin board systems set up in North America. Some of them are free, some require a membership fee. Most of them are designed to bring together people with common interests: owners of specific types of computers who want to share programs and help solve

News And Information Services

Here are addresses and phone numbers for some of the major news and information services. New York Zoetrope publishes *The Directory of On-Line Databases;* you can get one by sending $29.95 plus $1.50 for shipping and handling to New York Zoetrope, 80 East 11th Street, New York, NY 10003.

CompuServe
5000 Arlington Centre Boulevard
P.O. Box 20212
Columbus, OH 43220
Customer Service: (800) 848-8990
or (614) 457-8650

Dow Jones Information Services
P.O. Box 300
Princeton, NJ 08540
Customer Service: (800) 257-5114
or (609) 452-1511

The Source
1616 Anderson Road
McLean, VA 22102
Customer Service: (800) 336-3366
or (703) 734-7500

Telenet
(GTE Communications)
8229 Boone Boulevard
Vienna, VA 22180
Customer Service: (800) 572-0408 (in Virginia)
(800) 336-0437 (outside of Virginia)
(703) 442-2200 (outside of U.S.)

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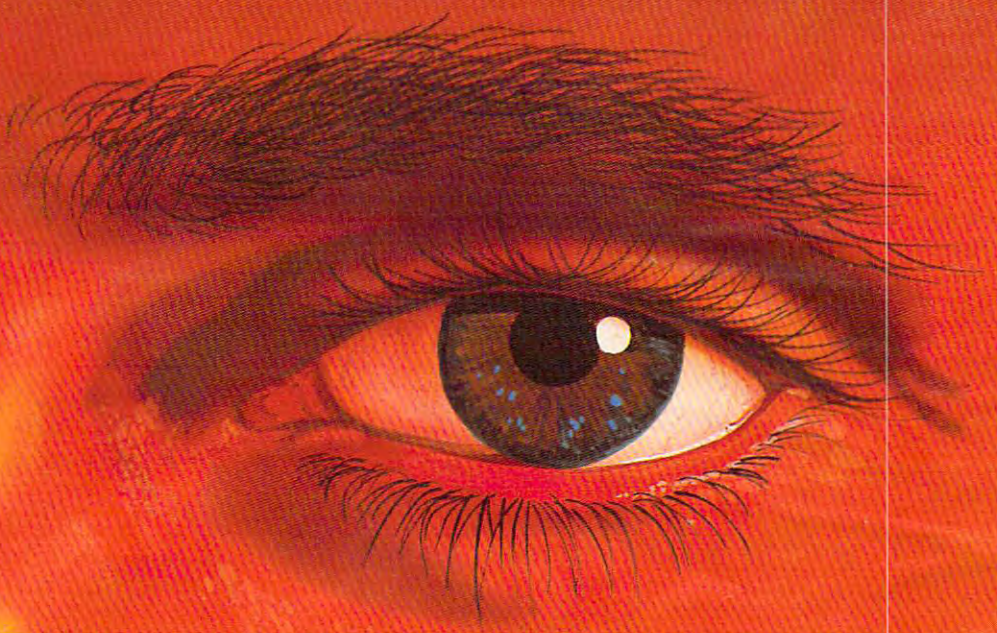

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8. **Sexual confidence**

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@ 39.95 ea. Plus ☐Interface Device at $89.95 ea. Add $3 shipping & handling. Michigan residents add 4% sales tax. TOTAL PRICE $_____. Enclosed is check or money order. Computer Type: ☐VIC-20 ☐Comm. 64 ☐Atari 400, 800. Specify ☐Cart. ☐Disk ☐Tape. I will use with cable, transmitting on Ch. ☐2 ☐3 ☐4 ☐Other. Send ☐Dealer info. ☐FREE brochure. ☐Enclosed is $3 for System Manual only.

Dealer inquiries, orders call 517-332-7717.

NOTE TO BUYERS: Owners of VIC 20® and Commodore 64® Computers can view Expando-Vision ™ with TV signals from a TV antenna (Ch. 3 or 4 only), cable TV (transmissions on Ch. 3 or 4), or from any video cassette or video disk player. Atari 400 or 800 owners can use Expando-Vision with TV antenna (Ch. 2 or 3 only), Cable (transmissions on Ch. 2 or 3) or any video cassette or disk player. Systems compatible with other home computers are under development and will be introduced soon.

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Straight To The Mind's Eye

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hardware or software problems, people involved in ham radio, film buffs – even people who want to find a date.

Personal business. It may be possible soon to attend to most of your personal needs with your personal computer. Periphonics, an Exxon affiliate, has developed an interface that permits a bank to link up with almost any personal computer for individual bank transactions. Shopping by mail is possible through the Burbank-based "Fantasy Plaza." Expect to see more services like this springing up.

Computer programs over the radio. It is possible to download computer programs from your radio. The Microperipheral Corporation has even developed a modem designed for reception of computer data from commercial radio stations. Though this is not a widespread use right now, radio stations and cable operations around the country may soon be following the lead of stations like KMPS in Seattle, which has been downloading computer programs by radio since March.

A Buyer's Guide To Modems

The following chart lists features of several modems compatible with personal computers. We have tried to include as many as possible; any omissions do not represent an editorial judgment on their quality. If you need more information about a specific modem, consult the list of manufacturers and distributors.

Here is a brief explanation of the categories on the chart:

- *Compatibility.* This is probably the most important consideration in choosing a modem. Since modems are serial devices, most are RS-232 compatible; some, however, are specific to certain machines. Even if your computer has an RS-232 port, make sure you have the necessary interface cable.
- *Communication Standard.* The Bell 103 is the most common communication standard found on modems available for personal computers. It allows information to be sent at the rate of 300 baud; some can go as fast as 600 baud. The Bell 202 and 212A facilitate data transmission at a faster rate.
- *Coupling Method.* A modem can link your home computer to the phone lines in one of two ways. A direct-connect modem plugs directly into the phone through a modular phone jack. Acoustic modems require a standard desk phone handset, so that the handset can be pushed directly into the modem's soft rubber cups.
- *Baud Rate.* Or, more technically correct, bits per second. A speed of 300 baud is pretty standard on most of the modems you will encounter.
- *Duplexing.* Half-duplex and full-duplex indicate whether information can be sent and received at the same time. When telecomputing, failure to match your modem's duplexing abilities with those of the modem at the other end may result in character duplication or "echo."
- *Auto-Answer.* This feature is necessary if you want to be able to automatically answer calls from other telecomputing stations (for example, if you want to set up a bulletin board system for others to call).
- *Auto-Originate.* Lets your modem dial phone numbers to call other telecommunications facilities.
- *Self-Test.* Some modems have the capability to test themselves to see if everything is hooked up correctly and working.
- *Carrier Detection Indicator.* How can you tell if you have connected with the party at the other end? Most modems have a way of indicating this to you, either by a light or LED on the modem itself, or by a signal that appears on the screen.
- *Power Supply.* Your modem must operate from some kind of power source. Usually this is through a wall socket or internal battery; sometimes the modem draws its power directly from the host computer.
- *Cables/Connectors Included?* Connecting your modem to your computer may require the purchase of additional cables or connectors like an RS-232 cable (if you do not already own one), or some other kind of system-specific connector. Some, like the VICmodem, plug directly into the computer.
- *Terminal Software Included?* Some modem packages include terminal software. If the one you buy does not, you will need to either purchase a program or type one in from a magazine or book.
- *Price.* The modems listed on this chart include suggested retail prices at the time of this writing.

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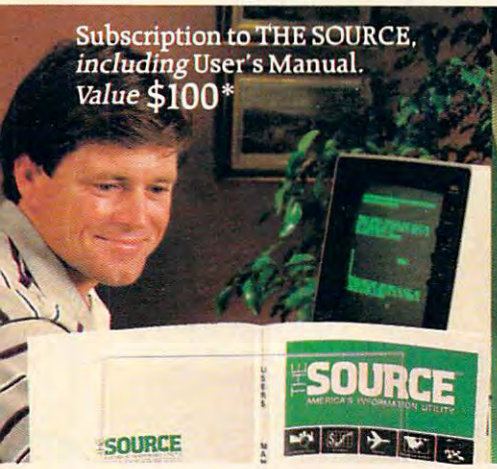
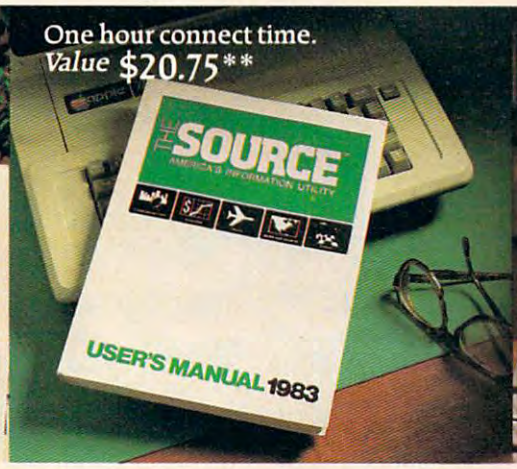
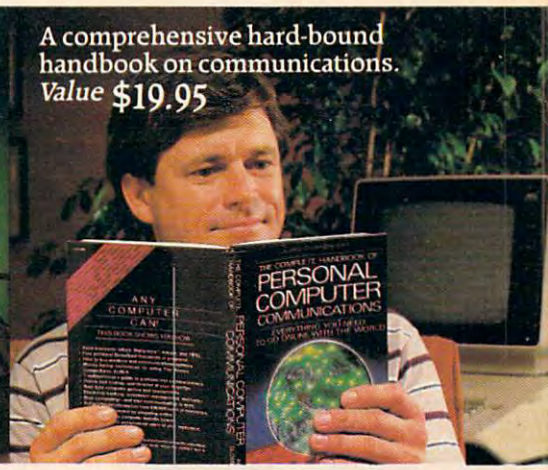


Subscription to THE SOURCE, *including* User's Manual. *Value* $100*



One hour connect time. *Value* $20.75**



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It frees up your time. This offer also entitles you to $20.75 worth of connect time–at no charge. Use it as you please! Check the latest news and sports. Look up your flight schedule. View your stock portfolio. You name it. The time is yours! Sixty minutes worth, or more, depending on the day and hour.

Giving you lots of connections. THE SOURCE has assembled the most comprehensive programs available on any system. For fun and practical applications. From games to commodity news. Electronic mail to teleconferencing. Discount shopping to abstracts of articles from business magazines. And everything you need to know is right there in your comprehensive, illustrated User's Manual. It's included with your free membership to THE SOURCE during this special, limited time offer from Hayes.

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1. When you purchase your Micromodem IIe with Smartcom I, *save* your sales receipt and Hayes registration card (packed inside the box).
2. Pick up the phone and call THE SOURCE, on their toll-free number:

1-800-336-3366.

Tell THE SOURCE representative that you are participating in the special Hayes promotion, give the serial number of your Micromodem IIe (on the modem), and your credit card number (VISA, Master Card, or American Express).† You will get your password to THE SOURCE, right on the spot!

3. Within a week you will receive an agreement from THE SOURCE, along with your New Member Kit. Sign the agreement, and return it within 10 days to THE SOURCE, along with your sales receipt for Micromodem IIe/Smartcom I, and Hayes registration card. Remember, send no money. Your membership is free!
4. That's all it takes! Look for your User's Manual and free communications book within two weeks of receipt of the agreement, sales receipt and registration card.

†THE SOURCE requires a major credit card for billing of hourly connect time to individual members. Corporate members may apply for direct billing.

*Suggested retail price. **60 minutes or more connect time, depending on the day and hour.

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MODEM	Volksmodem	Mark VI	Mark VII	Mark X	Mark XII	AutoVIC 1650	VICmodem	Info-Mate ZIZA	TRS-80 Lynx
Manufacturer/ Distributor	Anchor Automation	Anchor Automation	Anchor Automation	Anchor Automation	Anchor Automation	Commodore Business Machines	Commodore Business Machines	Cermetek Micro-Electronics, Inc.	Emtrol Systems, Inc.
Compatibility	most personal computers	IBM-PC	RS-232	Hayes-compatible	Hayes-compatible	Commodore 64	VIC-20 and Commodore 64	RS-232	TRS-80 I, III
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 212A	Bell 103	Bell 103	Bell 212A	Bell 103
Coupling Method	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	300	300	300	300-1200	0-300	0-300	300/1200	300
Duplexing	full/half	full/half	full/half	full/half	full/half	full/half	full	full	full/half
Auto-Answer	no	yes	yes	yes	yes	yes	no	yes	yes
Auto-Originate	yes	yes	yes	yes	yes	yes	no	yes	yes
Self-Test	yes	no	no	no	no	no	no	yes	no
Carrier Detection Indicator	varies	tone	light	light	varies	LED	LED	light	LED
Power Supply	9-volt battery	host computer	AC	12-volt adapter	12-volt adapter	host computer	host computer	AC	AC
Necessary Cables/ Connectors Included?	no	plugs into computer	yes	yes	yes	plugs into computer	plugs into computer	yes	yes
Terminal Software Included?	no	yes	no	no	no	no	yes	no	yes
Warranty	lifetime	2 years	2 years	2 years	2 years	90 days	90 days	1 year	1 year
Price	$79.95 ($12.95 for cable)	$239	$159.95	$179.95	$399	$179.95	$109.95	$595.00	$299.95

MODEM	Apple Lynx	Hayes Micro-modem 100	Micromodem II	Stack Smartmodem 300	Smartmodem 1200	Smartmodem 1200B	MPP-1000C	Micro-connection 01	Micro-connection R1
Manufacturer/ Distributor	Emtrol Systems, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Microbits	The Micro-peripheral Corp.	The Micro-peripheral Corp.
Compatibility	Apple I, II, II+	S-100 bus	Apple	RS-232	RS-232	IBM-PC	Atari (no 850 needed)	Osborne	RS-232
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103 & 212A	Bell 212A	Bell 103	Bell 103	Bell 103
Coupling Method	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	45-300	110 or 300	0-300	0-300 & 1200	0-300 & 1200	300	300	300
Duplexing	full/half	full	full	full/half	full/half	full/half	full/half	full/half	full/half
Auto-Answer	yes	yes	yes	yes	yes	yes	yes	no	no
Auto-Originate	yes	yes	yes	yes	yes	yes	yes	no	no
Self-Test	no	no	no	yes	yes	yes	no	no	no
Carrier Detection Indicator	LED	none	LED on board	LED	LED	on screen	tone	LED	LED
Power Supply	AC	host computer	host computer	AC	AC	AC	AC	AC	AC
Necessary Cables/ Connectors Included?	yes	yes	yes	no	no	no	yes	yes	yes
Terminal Software Included?	yes	no	yes	no	no	yes	yes	no	no
Warranty	1 year	2 years	2 years	2 years	2 years	2 years	1 year	90 days	90 days
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MODEM	Micro-connection TI	PConnection Modem Card	Micro-connection A1A	Micro-connection A2A	Micro-connection TC1	Micro-connection A1	Micro-connection R1A	Micro-connection T1A	Micro-connection A2
Manufacturer/ Distributor	The Micro-Distributor Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.	The Micro-peripheral Corp.
Compatibility	TRS-80 Model I	IBM-PC	Atari (with 850)	Atari (no 850)	TRS-80 Color	Atari (with 850)	RS-232	TRS-80 II, III, 16	Atari
Communication Standard	Bell 103	Bell 103/113	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103
Coupling Method	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	300	300	300	300	300	300	300	300	300
Duplexing	full/half	full/half	full/half	full/half	full/half	full/half	full/half	full/half	full/half
Auto-Answer	no	yes	yes	no	no	no	yes	yes	no
Auto-Originate	no	yes	yes	yes	no	no	yes	yes	no
Self-Test	no	no	no	no	no	no	no	no	no
Carrier Detection Indicator	LED	on screen	LED	LED	LED	LED	LED	LED	LED
Power Supply	AC	host computer	AC	AC	AC	AC	AC	AC	AC
Necessary Cables/ Connectors Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	yes	yes	yes	yes	no	yes	no	yes	yes
Warranty	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days	90 days
Price	$209	$170	$239	$279	$199.50	$199	$199	$259	$249

MODEM	Micro-connection Auto-Print	Cat	D-Cat	Auto-Cat	212 Auto-Cat	Apple-Cat II	212 Apple-Cat II	J-Cat	103 Smart-Cat
Manufacturer/ Distributor	The Micro-peripheral Corp.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.	Novation, Inc.
Compatibility	RS-232	RS-232	RS-232	RS-232	RS-232	Apple II, II+, IIe	Apple II, II+, IIe	RS-232	RS-232
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103 & 212A	Bell 103 & 202	Bell 103 & 212A	Bell 103	Bell 103
Coupling Method	direct-connect	acoustic	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct connect
Baud Rate	300	0-300	0-300	0-300	0-300 & 1200	0-300 & 1200	0-300 & 1200	0-300	0-300 & 110
Duplexing	full/half	full/half	full/half	full/half	full/half	full/half	full/half	full	full
Auto-Answer	yes	no	no	yes	yes	yes	yes	yes	yes
Auto-Originate	yes	no	no	yes	yes	yes	yes	yes	yes
Self-Test	no	yes	yes	yes	yes	yes	yes	yes	yes
Carrier Detection Indicator	LED	LED	LED	LED	LED	light	light	LED	LED
Power Supply	host computer	AC	AC	AC	AC	host computer	host computer	AC	AC
Necessary Cables/ Connectors Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	yes	no	no	no	no	yes	yes	no	no
Warranty	90 days	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Price	$149.95	$189	$199	$249	$695	$389	$725	$149	$249

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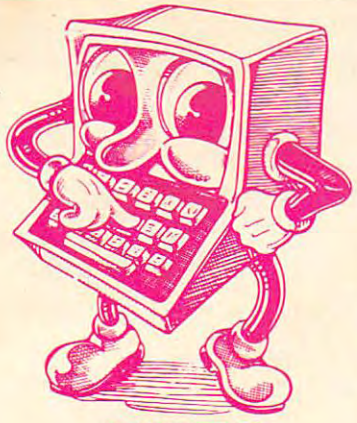

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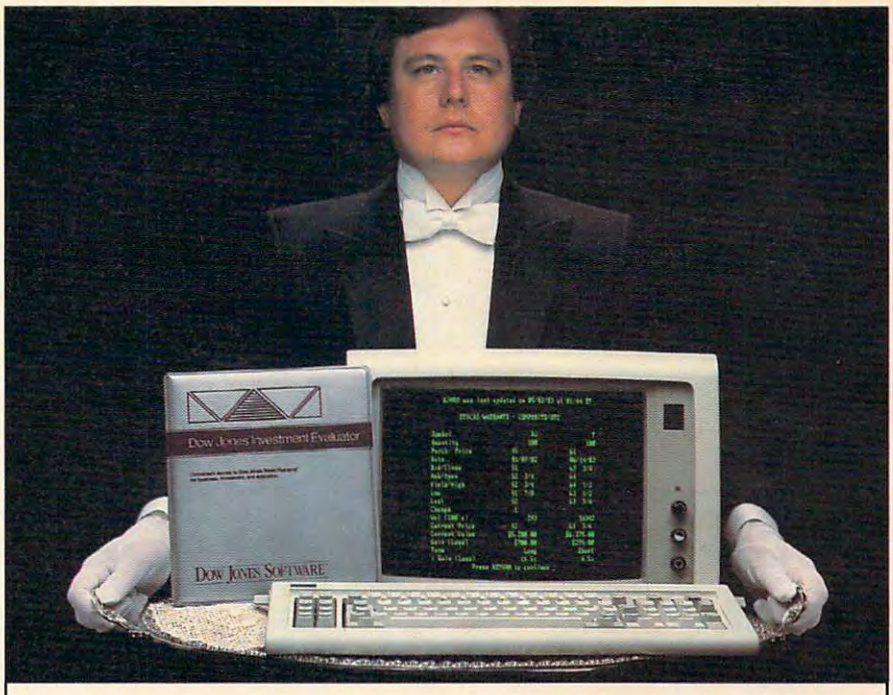

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MODEM	103-212 Smart-Cat	Star Acoustic	P-113D	P-212	VA103 Modemphone	VA315	VA317	VA355	VA1252 G/K
Manufacturer/ Distributor	Novation, Inc.	Prentice Corp.	Prentice Corp.	Prentice Corp.	Racal-Vadic	Racal-Vadic	Racal-Vadic	Racal-Vadic	Racal-Vadic
Compatibility	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232
Communication Standard	Bell 103 & 212A	Bell 103	Bell 103	Bell 103 & 212A	Bell 103/113	Bell 103/113	Bell 113B/113C	Bell 103/113	Bell 202
Coupling Method	direct-connect	acoustic	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	0-300 & 1200	0-300	0-300	0-300 & 1200	0-300	0-300	0-300	0-300	0-1200
Duplexing	full	full/half	full/half	full/half	full	full	full	full	full/half
Auto-Answer	yes	no	yes	yes	yes	yes	yes	yes	no
Auto-Originate	yes	no	no	no	yes	no	no	no	no
Self-Test	yes	yes	yes	yes	no	yes	yes	yes	no
Carrier Detection Indicator	LED	LED	LED	light	lamp	LED	LED	LED	LED
Power Supply	AC	AC	AC	AC	AC	AC	AC	AC	AC
Necessary Cables/ Connectors Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	no	yes	yes	yes	no	no	no	no	no
Warranty	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Price	$595	$199	$260 (rack mounted) $395 (stand-alone)	$495 (rack mounted) $595 (stand-alone)	$250-$380	$375	$250	$375	$525

MODEM	VA1250/55	VA3413	VA212PA	VA212LC	TNW-103	Operator 103	UDS-212LP	UDS-103JLP	UDS-103 O/A LP
Manufacturer/ Distributor	Racal-Vadic	Racal-Vadic	Racal-Vadic	Racal-Vadic	TNW Corporation	TNW Corporation	Universal Data Systems	Universal Data Systems	Universal Data Systems
Compatibility	RS-232	RS-232	RS-232	RS-232	PET/CBM IEEE-488	RS-232	RS-232	RS-232	RS-232
Communication Standard	Bell 202	Bell 103	Bell 103/212A	Bell 103/212A	Bell 103	Bell 103	Bell 212A	Bell 103	Bell 103
Coupling Method	direct-connect	acoustic	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect	direct-connect
Baud Rate	0-1200	0-300, 1200	0-300, 1200	0-300, 1200	300	0-300	1200	0-300	0-300
Duplexing	half	full	full	full	full/half	full/half	full	full	full
Auto-Answer	yes	no	yes	yes	yes	yes	no	yes	no
Auto-Originate	no	no	yes	no	yes	yes	no	no	no
Self-Test	yes	yes	yes	yes	yes	yes	no	no	no
Carrier Detection Indicator	LED	LED	LED	LED	on screen	beep	none	none	none
Power Supply	AC	internal	AC	AC	AC	AC	telephone line	telephone line	telephone line
Necessary Cables/ Connectors Included?	yes	yes	yes	yes	yes	yes	yes	yes	yes
Terminal Software Included?	no	no	no	no	yes	no	no	no	no
Warranty	1 year	1 year	1 year	1 year	1 year	2 years	1 year	1 year	1 year
Price	$425-$525	$695	$795	$550	$449	$189	$445	$195	$145

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Adding Peripherals

Building A Home Computer System

Ottis Cowper, Technical Editor

Taken together, peripherals can end up costing more than your computer, so making the right purchases is a must. What brand should you buy? What "extras" are needed? Will you need software just to operate your peripheral? This article helps define the more critical issues involved.

Computer enthusiasts often brag about their "systems," adding an aura of sophistication to their home setups. These systems usually consist of a basic microcomputer surrounded by an assortment of *peripherals*. Essentially, a peripheral is anything you plug into your computer.

Without even realizing it, you started adding peripherals and building your system as soon as you bought your computer. Your first peripheral was most likely a TV or video monitor, and the next was probably a cassette tape unit to load and store programs or a joystick to use with your favorite game. From there, the list of possible peripheral devices goes on and on: printers, disk drives, modems, memory expansion cartridges, light pens, speech synthesizers, plotters, etc.

It's up to you to decide which peripherals you need: a disk drive for serious word processing, a color monitor for really sharp video displays, a modem for telecommunications. The economics of the situation should dictate the amount of time you spend comparing the available models of the item you want.

If you have been shopping for any of these items, one thing you've realized, is that it's not at all unusual for a peripheral device to cost quite a bit more than the computer to which it is attached. It might take you a while to get adjusted to the idea of hooking a $600 printer up to your $100 computer. But the overriding issue is compatibility: Will the peripheral you want work with your computer system? It's easy to see that you should choose your peripherals carefully.

Which Brand Is Best?

The obvious way to guarantee that the peripheral devices you buy will work in your system is to buy them from the same company that made your computer. Another source is the alternate "third party" suppliers and many of them offer truly innovative designs.

Most home computer peripherals are someone else's product wearing a new name. The computer company buys the hardware in huge quantities from the original manufacturer and then puts on its own brand label. In many cases, a similar product is also available directly from the original maker.

The key to whether a product is a better buy from the original manufacturer or the reseller can lie in whether the reseller just slapped on a logo or whether the product was modified to optimize its performance in conjunction with a particular computer. This isn't usually something that is obvious. One way to check is to see if the peripheral supports any of the computer's special features. For example, Commodore computers have a set of built-in graphics characters which are directly accessible from the keyboard. Commodore sells a printer made by another company, but modified to print the special characters. Similar printers are available under other brand names, but the others either will not print the graphics characters or will print them only if you pay extra for an additional ROM chip and install the chip in your printer.

Read The Fine Print

Price should not be your sole concern when deciding what peripheral to buy. An important factor to consider is ease of interfacing. Again using printers as an example, a $300 printer that requires a $75 interface module to be used with your system is *not* a better buy than a $350 model that would plug in directly. Moreover, all interfaces are not

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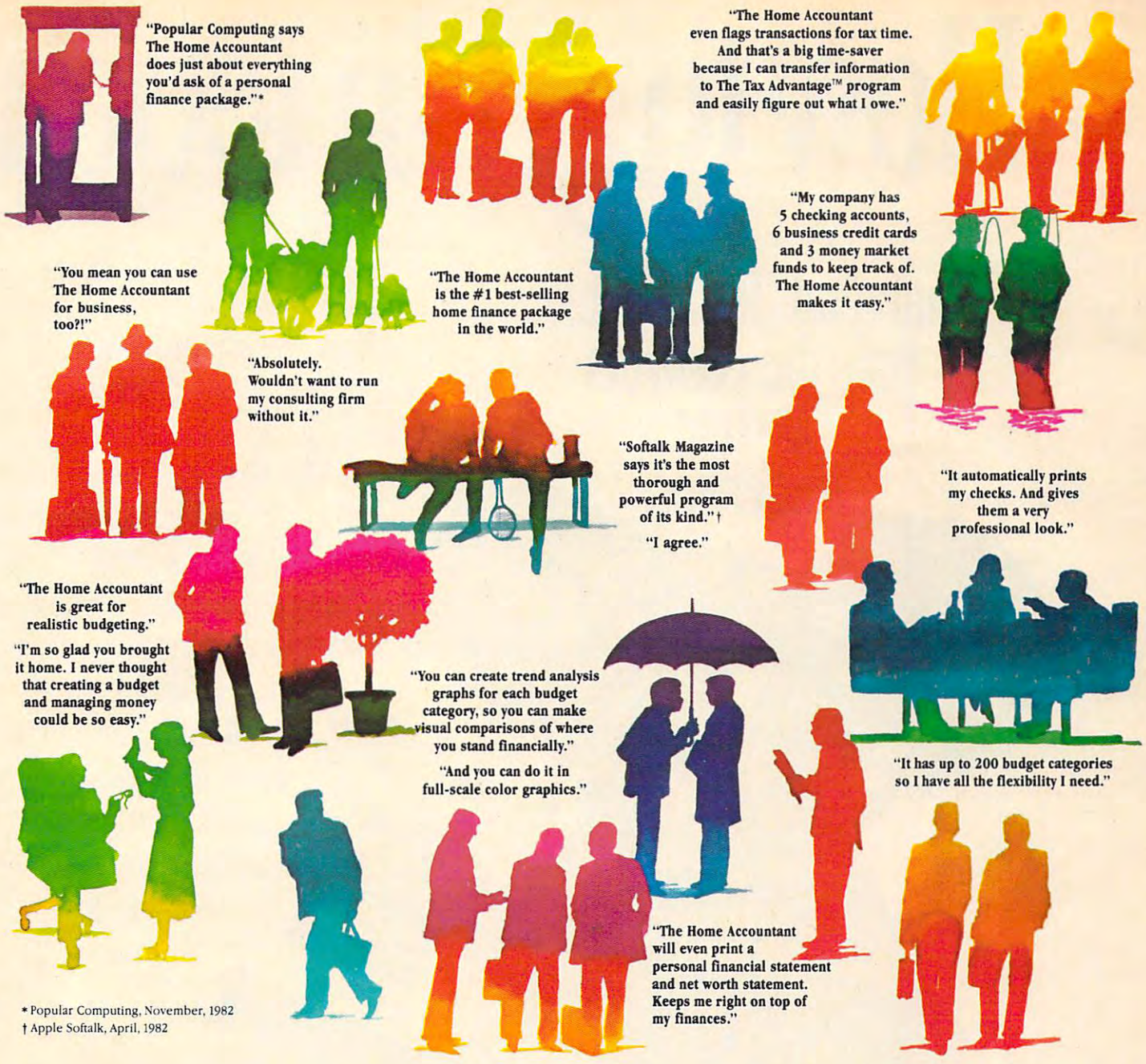

* Popular Computing, November, 1982
† Apple Softalk, April, 1982

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We recently saw an interface which could be used to connect the VIC-20 to a popular brand of dot matrix printer. We assumed at first that using the interface was simply a matter of plugging one cable from the interface into the computer and another cable into the printer. It was only when we read the fine print in the instruction manual that we discovered we had to go inside the printer and solder in a wire to provide power for the interface. Such a modification would certainly void any warranty on the printer, and should not be undertaken thoughtlessly. This is the kind of detail that you need to investigate thoroughly before you buy any peripheral that doesn't plug directly into your system.

You should also check to see if any special cables are required to connect the peripheral to your computer or to the necessary interface. Many buyers have been dismayed to arrive home with a new peripheral only to discover that a special cable is required to hook it up to their system. They can get even more dismayed when they discover that the manufacturer wants $35 for the necessary cable. Owners with some soldering experience may be able to save some money by building the cable themselves if they can find the necessary connectors, but, again, it's really not a job for beginners so you should make sure that all necessary cables are included with the peripheral.

The Software Issue

Yet another item to consider is support software. Some peripherals require no special software; others are useless without it. For example, the same light pen can be used interchangeably on an Atari, VIC, or 64. However, without software to read the light pen and convert the value for the light pen position to an equivalent screen location for your particular machine, the pen doesn't do you much good.

If you're not a sufficiently advanced programmer to write your own support software, you should be sure that programs for your computer model are included with the hardware. This is especially true for complex peripherals like speech synthesizers and plotters. If you don't get software for your computer with the device, you can face possibly spending quite a bit of time developing your own.

Lack Of Standardization

There are few standards for home computer peripherals. Much of the lack of standardization is the result of the various companies following different design philosophies. For example, the mechanical workings of all 5-1/4 inch floppy disk drives are essentially identical, but drive units for particular computers are not at all interchangeable. Using the same basic hardware, a Commodore drive stores data on the diskette in 683 256-byte sectors; a TRS-80 Color Computer drive creates 630 256-byte sectors; an Apple II drive, 560 256-byte sectors; and a Texas Instruments drive, 360 256-byte sectors. An Atari drive uses 720 sectors, but each sector is only 128 bytes long. The Commodore writes the directory on track 18 of the disk, the Apple and TRS-80 on track 17, and the TI on track 0. This not only makes the disk drives incompatible, but also means that disks written by one brand cannot be read by another. Each manufacturer has strong arguments why the particular method it chose is the best, and no one seems willing to compromise in the name of compatibility.

Interfaces

A few attempts at standardization have been made. For example, a company called Centronics was one of the first major suppliers of computer printers. Centronics used a parallel interface scheme in which data was sent to the printer one byte at a time. Companies which entered the market later used Centronics' connection so that their printers could be easily attached to computers set up for Centronics printers. So this connection scheme, with its 36-pin plug, became the de facto standard, and Centronics parallel interfaces are now available for most home computers.

A more formal standard has been established for serial data communications. The standard, called RS-232, calls for a set of wires including a transmitted data line, a received data line, and a collection of "handshaking" signal lines to regulate data transfer. Moreover, a particular type of plug called a DB25 is almost always used on RS-232 data lines, and each pin on this plug has been assigned a particular RS-232 signal. So if you have an RS-232 port on your computer, you can interface without problems to an RS-232 peripheral, right?

Unfortunately, it's not always that simple. The RS-232 standard defines a set of signal lines, but fails to specify what shall be considered a valid signal on those lines. Some RS-232 systems use +12 volts and -12 volts as the two signal levels, some use +5 volts and -5 volts, and a few others use +5 and 0 volts. For example, the VIC-20 and Commodore 64 have the ROM software built in to support RS-232 communications through the user port on the computer, but you still must plug an interface module into the user port to increase the output voltage levels before you can use most non-Commodore RS-232 devices. You should be aware of this before purchasing any RS-232 "standard" equipment.

At some point in the future, one company may come to so dominate a sufficiently large share of the home computer market that it determines the standard for everyone. Some are predicting

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Choosing The Right TV

Michael A Covington

"What kind of TV should I get to use with my computer?" This is a frequently asked question nowadays, and a good answer can be hard to get. Low-priced microcomputers are designed with the idea that you'll use the TV that you already have, to keep costs down. But perhaps you don't want to interrupt the whole family's TV viewing every time you want to work on a program, or perhaps there was no TV set in your home before you got a computer. In these cases, you must shop for a TV – and some TV sets are much more suitable for computer use than others.

Size And Color

The first question to be settled is, what size? That depends on whether you want to look at the screen from across the room, with the computer on the coffee table in front of you, or whether you want to put the TV on your desk right behind the keyboard. The coffee-table arrangement is usual for joystick game playing, and the ideal TV size is the same as for watching TV programs at the same distance. But a TV set that is to go on your desk should probably be in the 10- to 12-inch range; a 19-inch will be far too big to read comfortably, and even a 5-inch will give a crisp, small, very readable display, with letters about the same size as those produced by a pica typewriter.

Color or black-and-white? That depends mainly on how much money you want to spend and whether you want a color picture. For computerizing your finances or learning BASIC, you probably don't need a color display; for playing *Pac-Man*, you probably do. Very small (under-10-inch) color TV sets often show a lack of fine detail because the color phosphor dots can't be made small enough in proportion to the size of the screen; no such problem occurs with black and white.

A computer that generates a color display can of course be used with a black-and-white TV; you get a black-and-white version of the display, with different colors rendered as different shades of gray. A few computers, such as the Timex/Sinclair 1000, do not generate color.

The main thing you want out of the TV set's performance is sharpness. In the dealer's showroom, watch TV programs and commercials that place lots of lettering on the screen. Manipulate the fine tuning until the lettering is as sharp as possible, then look at the final results. An overall smeared appearance is a bad sign; the better you can get the lettering to look, the better the TV set will perform with a computer.

Convenient Controls

You also need convenient access to certain controls – volume, brightness, contrast, and, for color sets, tint and color saturation. All of these controls need readjusting when you switch between computer usage and ordinary TV viewing; they should be conveniently accessible on the front panel, not hidden away in back.

Preferably, the TV set should also have some other controls for occasional touching up: width and horizontal linearity adjustments can keep you from losing part of the display at the edges, and focus and video peaking adjustments can give you a sharper picture. These latter adjustments need touching up only rarely, so it's fine if they're on the back panel or inside. Not all TV sets have them; check a circuit diagram to be certain.

If you come across a TV with direct video and sound inputs for a video player, so much the better. You can connect your computer to them – contact the manufacturer to find out how – and get a sharper picture because the signal does not have to go through a modulator or the TV set's tuner. In fact, if you aren't interested in watching TV programs, perhaps you should buy a *monitor* – a device like a TV set without a tuner or channel selector, only a direct video input.

If your computer uses sound, make sure that the monitor has sound capability. The ones intended for use with video recorders generally do, while monitors designed for use with computers often do not. Also, there are two types of color computer monitors. Get one with a composite video input, rather than RGB direct drive, unless you are sure that the latter is what your computer requires.

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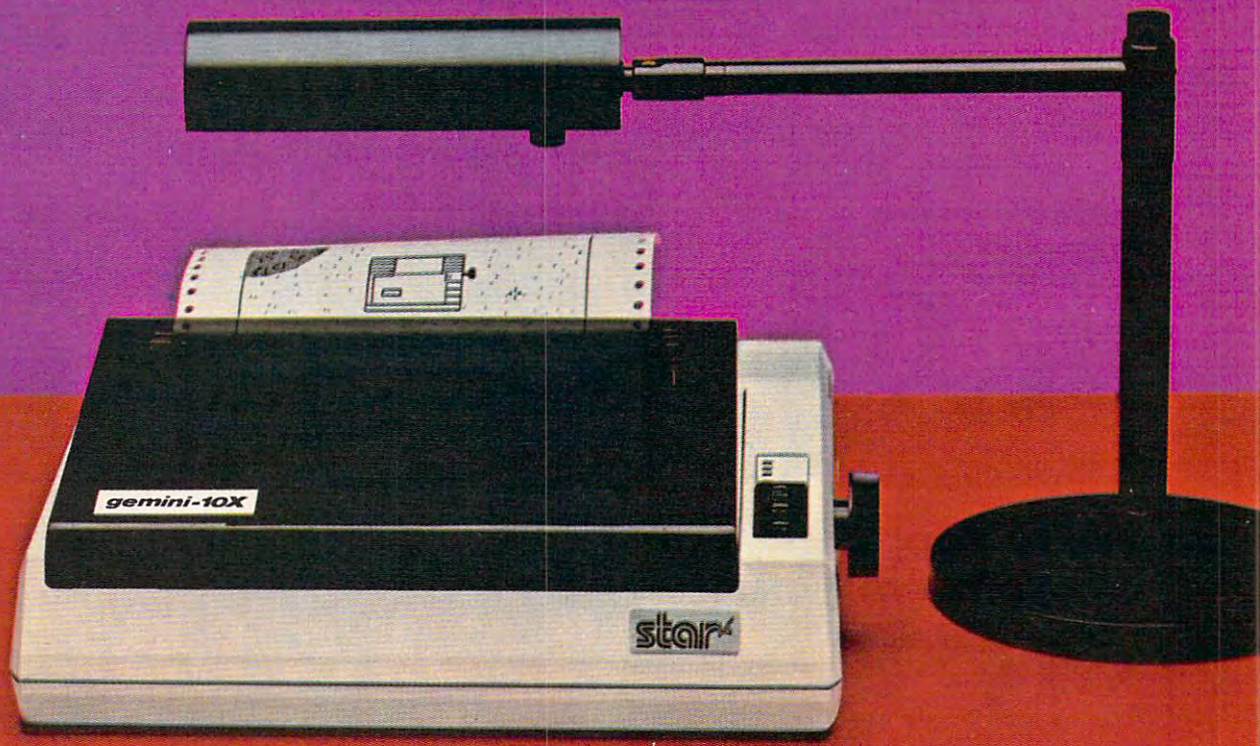

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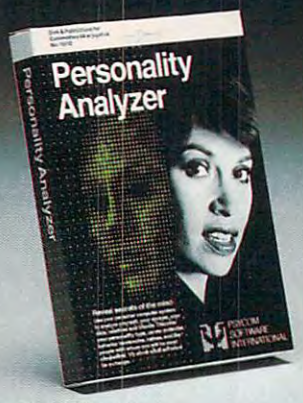

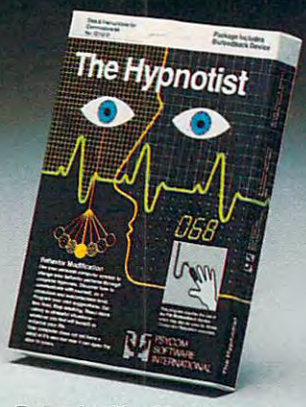

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that IBM's new home computer, due to be released soon, will become the archetype. The Japanese are reportedly attempting to develop a set of standards to reduce incompatibility problems in their new generation of home computers in the hope that they will come to be the standard. For now, the name of the game is caveat emptor, let the buyer beware. For any given computer there is much more incompatible than compatible equipment available. ©

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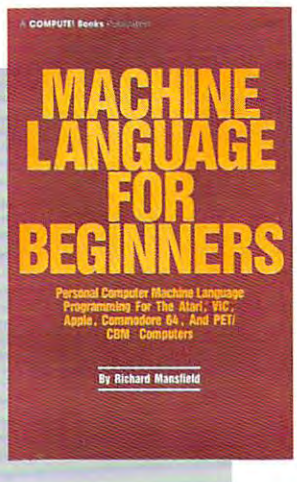

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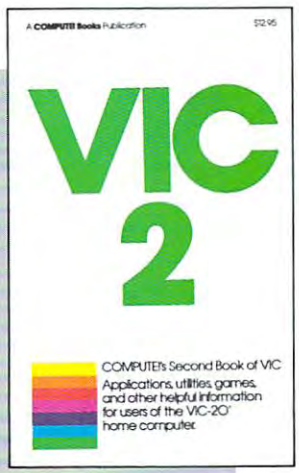

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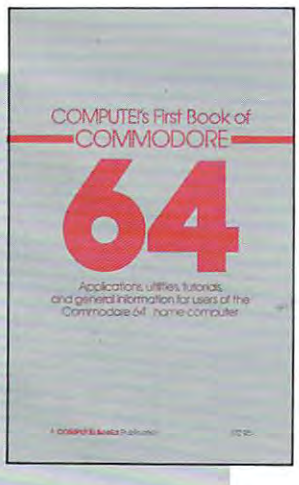

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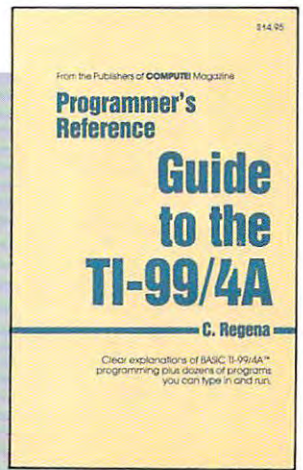

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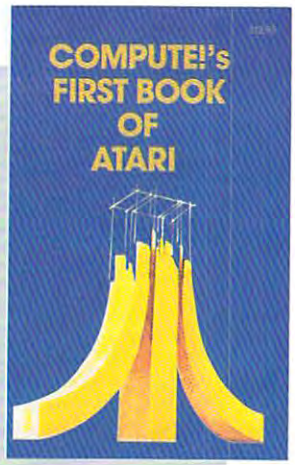

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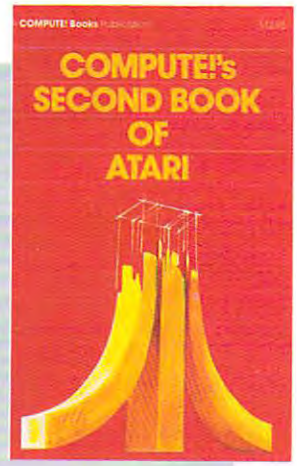

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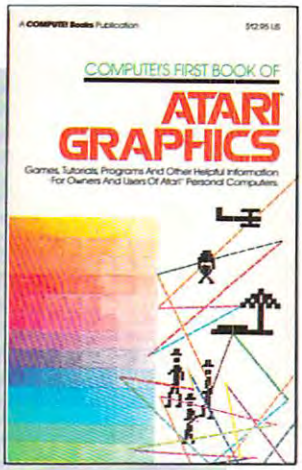

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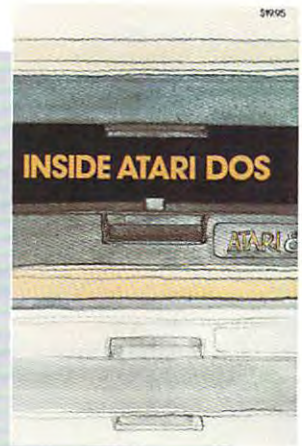

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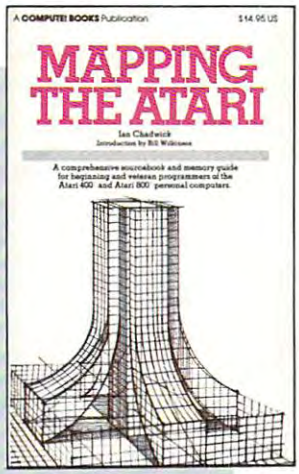

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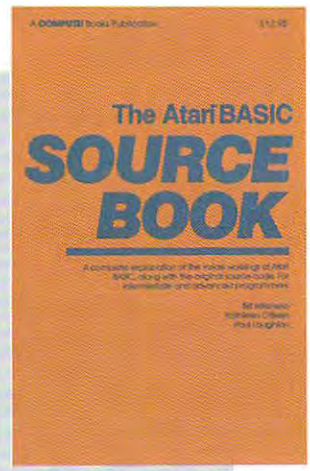

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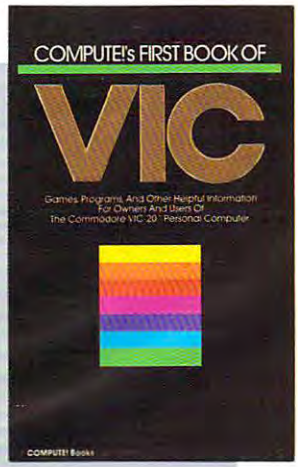

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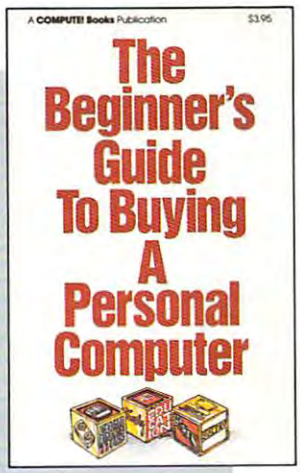

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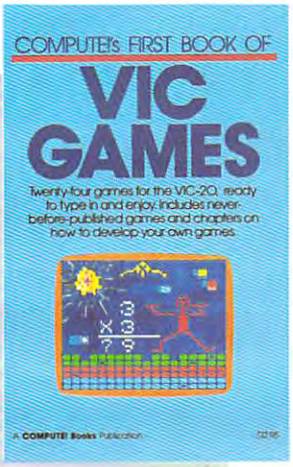

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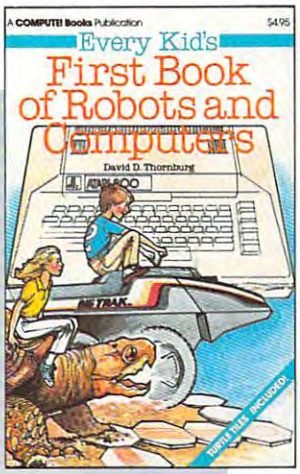

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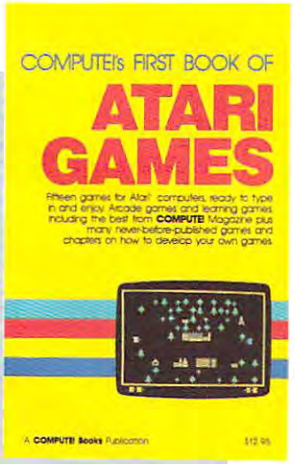

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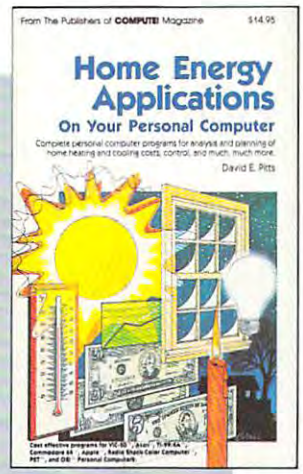

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Guest Commentary

The High Cost Of Personal Telecommunications

Robert Braver

As telecommunication becomes an increasingly important aspect of home computing, the telephone rates and hookup fees are of interest to both the consumer and the telephone companies. Robert Braver, President of the Oklahoma Modem Users Group, raises some important issues in this guest commentary. We contacted Southwestern Bell of Oklahoma, and the remarks of their spokesperson are included.

Sometime in mid-May, 1983, I called my local Bell business office to request that a trace be placed on my bulletin board system's phone line. Someone had been calling up my system and tying it up for an hour at a time by sitting at the prompt which asks for a user ID number.

When requesting a trace, you must describe the type of calls you have been receiving. I thought that since these calls were not voice messages, there would more than likely be confusion when I tried to explain things to the business office representative. I expected to need about half an hour to explain exactly what a modem and bulletin board system is. After all, I had to do that when I first had the phone line installed a year ago.

There Must Be Some Mistake

To my surprise, she seemed to know all about modems. In fact, she informed me that since I used a modem on my phone line, I would have to pay a higher monthly phone rate.

Of course, I thought she must be mistaken. Perhaps she was referring to the "Data Perfect" lines, which are used for high-speed (2400 baud) transmissions. I didn't need a special line for my relatively slow 300 baud modem. Even 1200 baud modems do fine on ordinary phone lines.

After about two weeks of arguing with Bell business office representatives, insisting that there must be some mistake, I received a copy of a tariff sheet from the Oklahoma Corporation Commission. Bell was right. Their tariffs do call for the charging of a higher rate for connecting a computer using a modem to the phone lines.

This section of Southwestern Bell's Oklahoma tariffs, called Information Terminal Service tariffs, was written in the mid-sixties. Obviously, this was long before there were home computers. When the tariffs were written, generally the only modem users were large corporations transmitting data 24 hours a day. Therefore, the rates for having a computer or similar device connected to the phone lines with a modem were somewhat higher.

Because there were no home computers when the tariffs were written, Bell had no reason to distinguish between commercial and residential modem use. And now, almost 20 years later, Southwestern Bell is using those tariffs to charge personal computer users *five times* their normal phone rate if they wish to use modems with their personal computers.

An Organized Response

Since this tariff would seriously inhibit home modem use in Oklahoma, I immediately organized the Oklahoma Modem Users Group, or OMUG, to challenge Southwestern Bell and its unfair tariff.

OMUG's main goal is to organize the modem users of Oklahoma and to undertake whatever legal proceedings are deemed necessary to force Bell to exempt home modem users from the Provisions of Information Terminal Service tariffs.

As of this writing, legal proceedings are still in the future. OMUG has recently been raising funds and attempting to gain the support of home computer and modem manufacturers. OMUG has also been publicizing the situation to make sure that all modem users nationwide as well as

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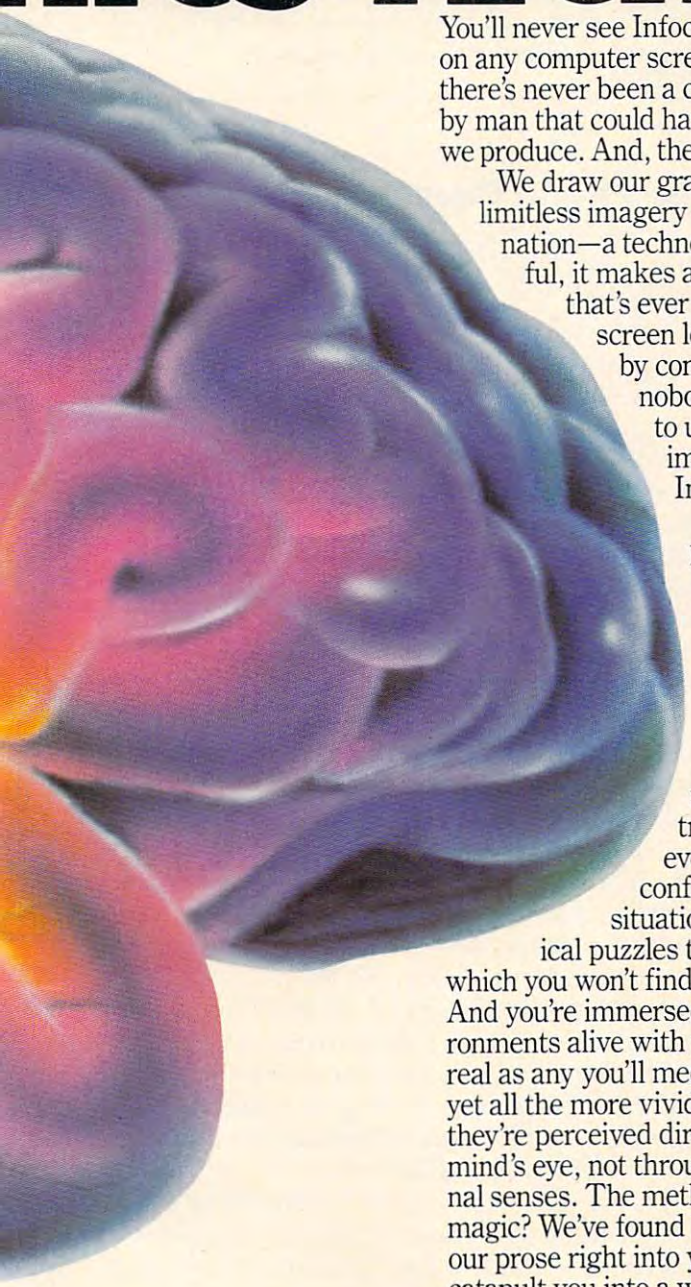

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the general public know about this problem.

Not Limited To Oklahoma

This situation, it turns out, may not be unique to Oklahoma. There are similar outdated tariffs in other states. And many experts in the industry seem to think that if Southwestern Bell is justified in charging higher rates to modem users in Oklahoma, it is just a matter of time before other states adopt similar tariffs or start enforcing their present tariffs (also written in the sixties).

According to the tariff, anyone connecting "customer-provided data transmitting and receiving equipment that processes data and/or performs calculations" including computers, associated buffering devices, and/or concentrating devices with store and forward capabilities would all be subject to the higher rate. Although dumb terminals do not fall under the tariff, computers emulating dumb terminals do. And anyway, most terminal software packages have memory buffers, auto-logon capabilities, and other features. Furthermore, most so-called dumb terminals on the market today have memory buffers and microprocessors, which cause them to also fall under the tariff.

Information Terminal Service is considered a business service. Therefore, as of July 11, 1983 (when Bell raised my rate), if I have a problem with the modem line, I don't call the residential division, but the business division of the Bell business office. As a "business," I am entitled to a free yellow pages listing in the telephone directory. But since I do not run a business, and having the ad might hamper chances of obtaining a court order to restore my old rate, I declined the free listing.

But even without the yellow pages listing, I was told by the manager of the Bell business office that once a line is classified as a business, it cannot be restored to residential status. I would have to have the line disconnected, and pay $80 to have a new number installed.

Is The Phone Company Justified?

Bell seems to think that its tariff is perfectly justified. Southwestern Bell's Rate and Separations Division Manager Charles Sutter spoke to a group of 40 home computer owners here in Oklahoma City in response to the outrage over the tariff. He was asked how Bell could justify charging a personal computer owner who uses CompuServe once a week the same rate as a large corporation transmitting data 24 hours a day. Sutter replied, "Well, I don't know how much you use your modem."

There is no physical justification for an additional charge for modems. Modems operating at speeds of up to 1200 baud do not require special lines. The four frequencies that 300 baud modems use are among the frequencies in human speech, and easily fall between the 300-3000 Hz bandwidth of an ordinary telephone line.

And for most modem users, on-line time doesn't increase phone usage any more than having a teenager does.

But Bell persists in charging the higher rate. Although representatives claim that Bell is not actively pursuing computerists with modems, anyone who follows the law and registers his modem with the phone company will be immediately notified of the extra charge.

The Phone Company Replies

In response to the issues raised here concerning the extra charges imposed on modem users, Walt Beiter, an official of Southwestern Bell of Oklahoma, told us: "With the spread of computer terminals in the home, we recognize that the situation has changed. We're going to redesign our rates." The old rate schedule "didn't specify home, business, whatever. But we do realize that the conditions have changed. We've filed an application and expect to have hearings on this issue this fall."

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On top of the additional monthly rates, Southwestern Bell also retroactively charged me the difference between a business and residential phone installation because they "should have charged [me] for a business installation in the first place. [They] made a mistake."

It is my opinion that if they charge me this rate, they must also charge everyone else who falls under the tariff. If they do start actively enforcing the tariff, which they have the capability to do, there wouldn't be much modem use in Oklahoma. And modem sales in the state would almost cease entirely.

If Oklahoma is just a test, and no one takes any concrete, effective action, there is a good possibility that this is just the beginning of unreasonable charges for personal telecommunication. ©

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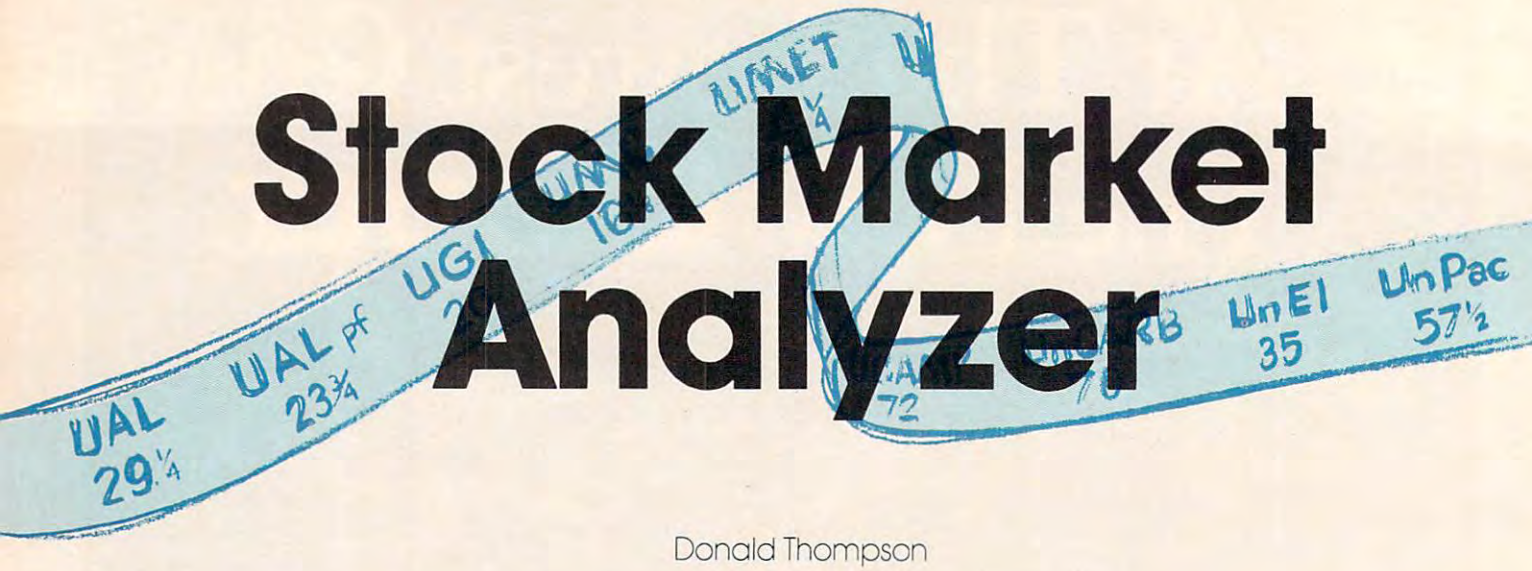
Stock Market Analyzer



Donald Thompson

Do you invest in stocks or bonds? If you like to play the stock market, this program, originally written for the Commodore 64 or 8K-expanded VIC, can help you monitor your investments more carefully – even helping you decide when to sell or buy. An Atari version is included. Of course no stock investment plan is foolproof. You might want to try this program out by playing the market on paper before putting down any real money to see if it fits your investment psychology.

Managing your stock investments can be a full-time job. "Stock Market Analyzer" provides the means to watch the progress of various stocks and record purchases and sales. The program includes a graph of the stock's price fluctuations and a guide to whether you should buy or sell a stock at any particular time. You can also see a list of transactions for each year for your tax records.

The theory behind this program is that as stocks fluctuate, the best way to invest is to put only half as much as you otherwise would in a given stock. If the stock goes up, you make money. If the stock goes down, it becomes an even better buy, so you can then invest some of the money that you have in reserve.

Using The Options

Using Stock Market Analyzer is fairly easy. After typing in the program, SAVE it to tape or disk and then type RUN. A listing of stock abbreviations will appear at the top of the screen, and you'll see seven options:

1 Search one stock
2 List stocks for any one month
3 Update DATA statements for new month
4 Buy or sell advice
5 Store data for transactions
6 Graph progress of any of your stocks
7 List transactions by year for tax purposes

Sample stock entries are included in the program. It is a good idea to run the program with the examples before entering the data for your own portfolio. Doing this will give you a better idea of how the program works. You can then enter your own stock symbols, number of shares, and initial cost in place of the sample entries.

You must update each stock price once a month or after each transaction. Before you update a stock price, make sure that you have included the necessary background data for the stock (lines 500-549). The information required for these lines is stock symbol, number of shares you have purchased (0 if you wish only to monitor the stock price), and net cost for the stock (again, 0 for monitoring only). Also set Y (in line 549) equal to the number of stocks being considered. Once you have entered this data, save the program and run it whenever you wish to update monthly stock prices or transactions.

To update monthly stock prices, run the program and use option three to produce DATA statements. Press Y in response to the INPUT DATA prompt, and press RETURN over the data lines which appear on the screen. To update stock transactions, use option five to produce DATA statements. Again, press RETURN over the printed data lines. The DATA statements from these two options are in two forms. DATA statements based on monthly updates store the date for month and year. The DATA statements based on stock transactions store the date including year,

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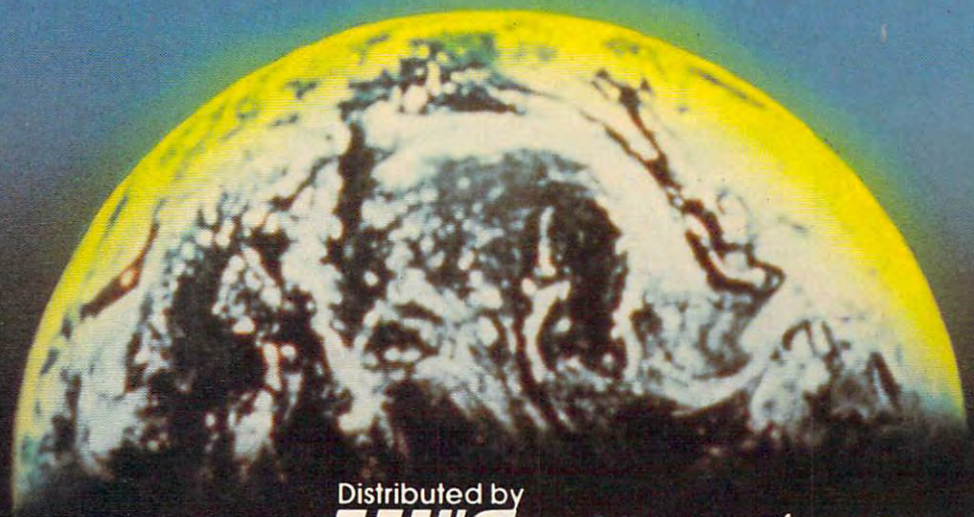

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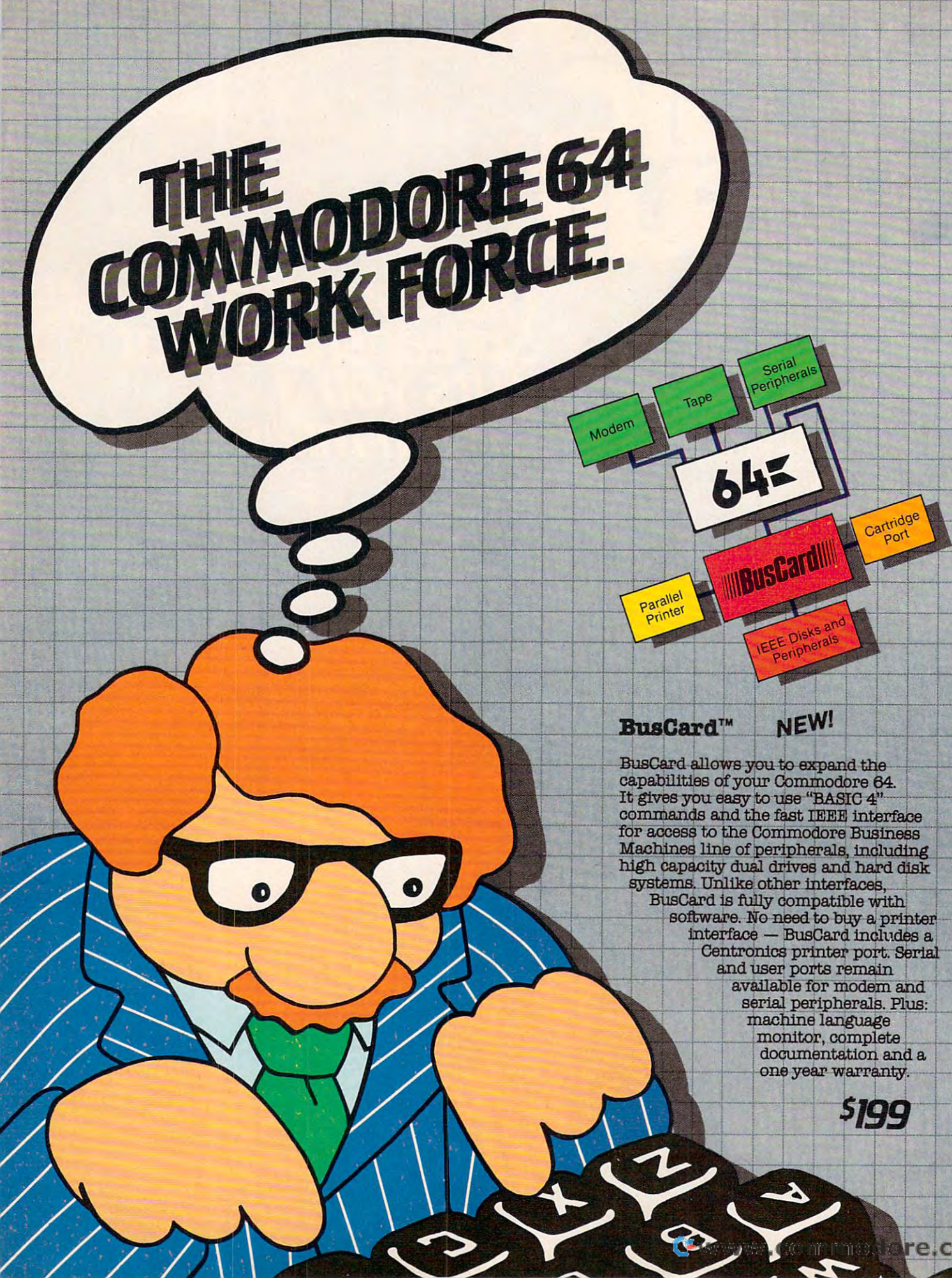

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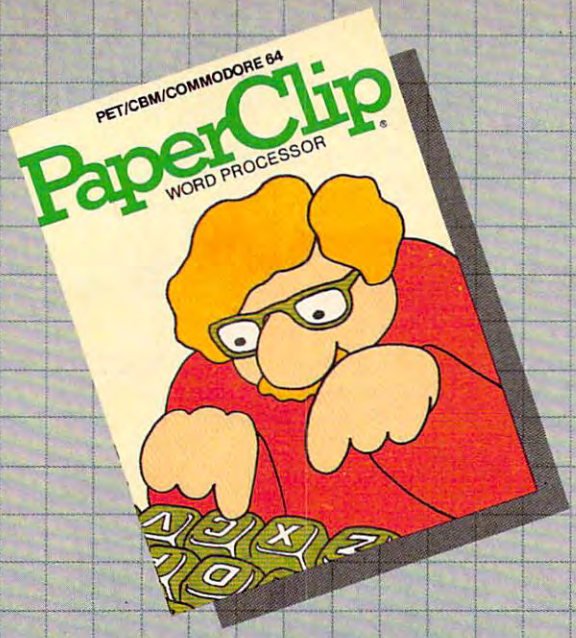

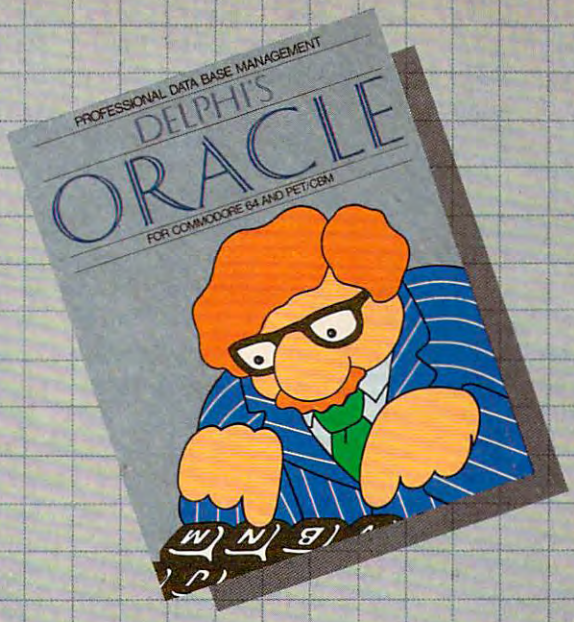

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month, and day. This difference allows the program to distinguish between monthly updates and transactions. If you want to clear out the oldest DATA, then, in immediate mode, type GOTO 20040. Each time the routine beginning at this line is executed, the first three DATA statements containing the earliest stock data will be deleted.

Keep in mind that the program is designed to monitor the cost factor involved in buying and selling stocks, as well as the actual purchase price of a stock. Under normal circumstances, transactions under $300 are not practical since such transactions include high brokerage fees.

Buy and sell advice is activated when the stock moves outside a range of values, which is determined in the subroutine beginning in line 850.

There is, of course, no perfect method to guide investors in trading in the stock market. Stock Market Analyzer is simply an aid to help you keep track of your investments and to offer an alternative way of making choices.

Program 1:
Stock Market Analyzer – VIC (8K)/64 Version

```
10 PRINT"{CLR}STOCK MARKET ANALYZER"
12 FORX=1TO500:NEXT
25 DIMS$(50),FF(50),P(50),SA(50),R$(50),T
   P(50)
30 PRINT"{CLR}":T=0:GOSUB500
32 PRINT"{CLR}THESE ARE THE STOCKS I HAVE
    IN MEMORY"
35 FORX=1TOYSTEP2
40 PRINTS$(X);TAB(5)S$(X+1):NEXTX
45 Q=0
50 C=0:T=0
60 F= 1022
95 PRINT"CHOICES AVAILABLE HIT":PRINT
96 PRINT"SEARCH STOCK{8 SPACES}1"
97 PRINT"STOCKS AT A DATE{4 SPACES}2"
98 PRINT"MONTHLY STK PRICES{2 SPACES}3"
99 PRINT"BUY OR SELL ADVICE{2 SPACES}4"
100 PRINT"STORE BUYS/SALES{4 SPACES}5"
101 PRINT"GRAPH A STOCK{7 SPACES}6"
102 PRINT"TRADES IN ANY{2 SPACES}YEAR 7"
105 GETQ:IFQ=0THEN105
106 ONQGOTO110,200,300,400,700,920,650
107 GOTO30
110 INPUT"WHICH STOCK";A$
111 RESTORE
112 GOSUB900
120 FORX=1TO1000
130 READAA$,BB$,CC$,DD,EE,FF,GG
140 IFA$=AA$THENGOSUB800
150 IFAA$="XXXX"THENX=1000:NEXTX:GOTO160
155 NEXTX:GOTO160
160 PRINT:PRINT"{5 SPACES}HIT ANY KEY "
170 GETB$:IFB$=""THEN170
180 GOTO30
200 PRINT
205 RESTORE
210 PRINT"STOCKS-DATE YRMM":INPUTD$
215 IFLEN(D$)<>4THEN210
216 D=VAL(D$):GOSUB900
220 FORX=1TO1000
221 READAA$,BB,CC$,DD,EE,FF,GG
222 IFBB=DTHENBB$=STR$(BB):GOSUB800
226 IFAA$="XXXX"THENX=1000:NEXTX:GOTO240
228 NEXTX
240 PRINTTAB(5)"TOTAL IS";T:PRINT"
    {5 SPACES}HIT ANY KEY"
241 GETB$:IFB$=""THEN241
242 GOTO30
300 PRINT"{CLR}{2 DOWN}TO CALCULATE TODAY
    'S{2 SPACES}VALUES AND CREATE DATA ST
    ATEMENTS I NEED"
306 GOSUB500
307 PRINT"TODAYS DATE(YRMM)":INPUTG
308 PRINT"YOU HAVE";Y;"STOCKS-"
309 PRINT"FROM STOCK# TO STOCK#":INPUTT,U
310 FORX= TTOU
312 PRINT"PRICE OF{4 SPACES}";S$(X)
315 INPUTP(X)
320 NEXTX:PRINT"{CLR}{4 DOWN}"
325 FORX=TTOU
330 GR$="":GR$=STR$(F)+"DATA "+S$(X)+","+
    STR$(G)+",H,0,0,"+STR$(FF(X))+","
335 PRINT GR$+STR$(P(X))
338 F=F+1
339 PRINT
340 NEXTX
345 PRINT"60 F=";F:PRINT"RUN
350 PRINT"HIT Y TO INPUT DATA"
351 GETT$:IFT$=""THEN351
355 IFT$="Y"THENPRINT"{HOME}":END
356 GOTO300
400 PRINT"{CLR}{3 DOWN}THE PATTERN FOR RE
    COMMENDING SALES IS BASED ON INCREASI
    NG AND ";
401 PRINT"DECREASING PRICES"

405 PRINT"TODAYS PRICES ARE"
410 FORX=1TOY
411 PRINT"{DOWN}{2 RIGHT}"
412 PRINTS$(X);:PRINT"{2 SPACES}TODAYS PR
    ICE=":INPUTP(X)
415 NEXTX
420 FORX=1TOY
425 GOSUB850
440 PRINTS$(X);"{2 SPACES}";R$(X);"
    {2 SPACES}";MR
445 IFR$(X)="H"THEN PRINT"NO TRADE RECOMM
    ENDED"
450 NEXTX
480 PRINT"DONE{DOWN} HIT ANY KEY"
485 GETZ$:IFZ$=""THEN485
499 GOTO30
500 S$(1)="AGOL":FF(1)=600:SA(1)=3375
501 S$(2)="TRVMF":FF(2)=200:SA(2)=726.6
503 S$(3)="EAL":FF(3)=0:SA(3)=0
504 S$(4)="SEAG":FF(4)=100:SA(4)=9280
505 S$(5)="CASH":FF(5)=1:SA(5)=55
506 S$(6)="FLYT":FF(6)=100:SA(6)=3020
507 S$(7)="SMKV":FF(7)=1000:SA(7)=5220
549 Y=7
550 RETURN
601 PRINT"{HOME}{17 DOWN}";
610 FORS=1TOX:PRINT"{RIGHT}";:NEXTS
615 IFHI=0THENGOTO640
620 FORT=1TOINT(15/HI)*TP(X):PRINT"{UP}";
    :NEXTT
625 IFS>20THENPRINT"{UP}";GOTO20040
630 PRINT"*";
635 PRINT"{HOME}"
640 RETURN
650 RESTORE
```


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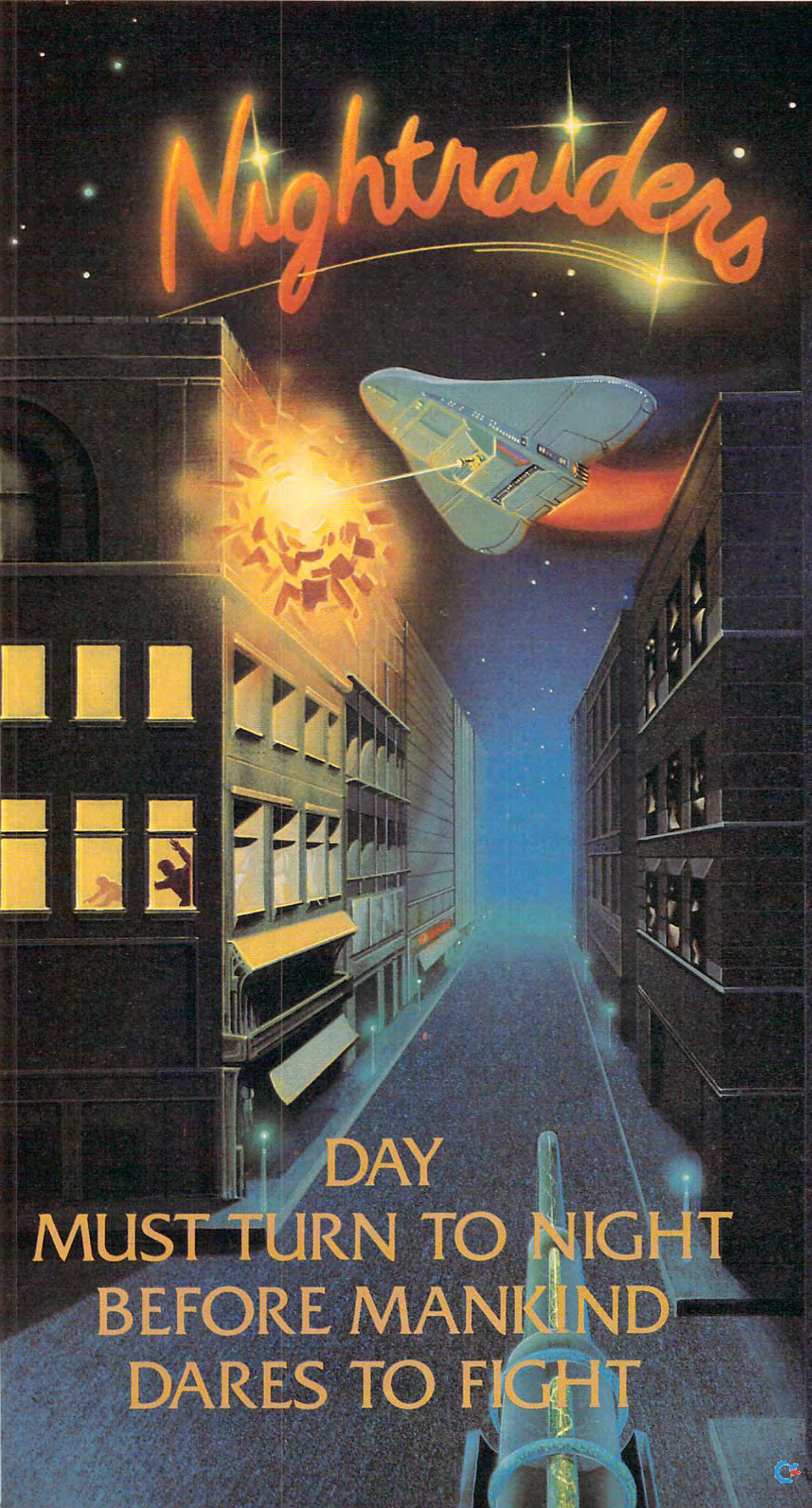

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```
652 PRINT"YEAR OF PORTFOLIO-YR";INPUT;D
654 IFD=0THEN210
656 GOSUB900
658 FORX=1TO1000
660 READAA$,BB,CC$,DD,EE,FF,GG
662 IFD=INT(BB/10000)THENGOSUB800
664 IFAA$="XXXX"THENGOTO680
668 NEXTX
670 GOTO780
675 C=0:GETD$:IFD$=""THEN675
676 GOTO668
680 PRINTTAB(5)"{4 SPACES}HIT ANY KEY "
681 GETB$:IFB$=""THEN681
685 GOTO30
700 PRINT"{CLR}{3 DOWN}STORING NEW TRANSA
    CTIONS"
710 PRINT"THERE ARE SEVERAL LINE STATEMEN
    TS THAT MUST BE CHANGED"
725 PRINT"TODAYS DATE-YYMMDD":INPUT DA
728 PRINT"WHICH STOCK":INPUTSO$
730 PRINT"BUY(B){2 SPACES}OR SELL(S)":INP
    UT{2 SPACES}S$
735 PRINT"HOW MANY SHARES":INPUT SH
737 PRINT"WHAT PRICE":INPUT P
741 FORX=1TOY:IFSO$=S$(X)THENTE=X:X=Y:NEX
    TX:GOTO745
742 NEXTX
745 INPUT"NET COST OR PROCEEDS";NP
747 IF S$="B"THEN NW=SA(TE)+NP:NF=FF(TE)+
    SH:GOTO 750
748 NW=SA(TE)-NP:NF=FF(TE)-SH
750 PRINT"FF(X) BETWEEN 500-600 IS";NF
752 PRINT"SA(X) SHOULD BE";NW
755 PRINT"IT SHOULD BE ABOUT";TE-1;"DOWN"
756 GR$="":GR$=STR$(F)+"DATA "+SO$+","+ST
    R$(DA)+","+S$+","+STR$(SH)
757 GR$=GR$+","+STR$(NP)+","+STR$(NF)+","
    +STR$(P)
760 PRINTGR$
768 PRINT"60 F=";F+1
770 PRINT"RUN
775 PRINT"HIT ANY KEY BUT N TO ENTER DATA
    "
780 GETY$:IFY$=""THEN780
782 IFY$="N"THEN700
783 END
800 REM ROUNDING
801 DD$=STR$(DD):FF$=STR$(FF):IFLEN(DD$)=
    1THENDD$=DD$+"{2 SPACES}"
802 L=EE:GOSUB30000:EE$=JS$:IFLEN(FF$)=2T
    HENFF$=FF$+" "
803 IFLEN(DD$)=2THENDD$=DD$+"
    {SHIFT-SPACE}"
804 L=GG:GOSUB30000:GG$=JS$:IFLEN(FF$)=1T
    HENFF$=FF$+"{2 SPACES}"
805 L=INT(FF*GG):GOSUB30000:HH$=JS$
808 PRINT"STOCK{2 SPACES}";AA$:PRINT"DATE
    {3 SPACES}";BB$:PRINT"BUY/SELL ";CC$:
    PRINT"NUM{3 SPACES}";DD$
809 PRINT"$NET{3 SPACES}";EE$:PRINT"CUR#
    {2 SPACES}";FF$:PRINT"MARKET ";GG$:PR
    INT"VALUE{2 SPACES}";HH$
810 PRINT"HIT SHIFT TO CONTINUE"
811 IF(PEEK(653)AND1)=0THEN811
812 PRINT"{CLR}"
815 T=T+FF*GG
820 RETURN
850 MP=FF(X)*P(X):R$(X)="H":MR=0
855 IFMP>SA(X)*1.1THENR$(X)="S":MP=MP-MP*
    0.1:MR=MP-SA(X)
856 IFMP<SA(X)*.9THENR$(X)="B":MP=MP+MP*0
    .1:MR=SA(X)-MP
858 IF (MR<300) AND (MR>-300) THEN R$(X)=
    "H"
865 RETURN
900 PRINT"{CLR}"
901 RETURN
920 INPUT"WHICH STOCK";WH$:V=0:RESTORE
925 FORX=1TO1000
930 READA$,B,C$,D,E,F,G
932 IFB>10000THEN940
935 IFWH$=A$THENV=V+1:TP(V)=G
936 IFA$="XXXX"THENGOTO945
940 NEXTX
945 REM-CREATE GRAPH
946 I=1:HI=0:LP=10
950 FORX=ITOV
951 IFHI<TP(X)THENHI=TP(X)
952 IFLP>TP(X)THENLP=TP(X)
953 NEXTX
960 PRINT"{CLR}{3 DOWN}"
962 FORX=1TO13:PRINTCHR$(182):NEXTX
964 FORX=1TO20:PRINTCHR$(162);:NEXTX
970 FORX=1TOV
975 GOSUB601
980 NEXTX
981 PRINT"{HOME}HIGH ";HI;" LOW";LP
982 PRINT"{3 RIGHT}STOCK IS ";WH$
983 PRINT"{15 DOWN}":FORX=1TOV:PRINTTP(X)
    ;:NEXTX
990 GETQQ$:IFQQ$=""THEN990
995 GOTO30
1000 DATA AGOL, 8301,H,0,0, 500, 5.5
1001 DATA TRVMF, 8301,H,0,0, 200, 4
1002 DATA EAL, 8301,H,0,0, 0, 6.5
1003 DATA SEAG, 8301,H,0,0, 100, 95
1004 DATA CASH, 8301,H,0,0, 1, 55
1005 DATA FLYT, 8301,H,0,0, 100, 35
1006 DATA SMKV, 8301,H,0,0, 1000, 5.5
1007 DATA AGOL, 8302,H,0,0, 500, 6
1008 DATA TRVMF, 8302,H,0,0, 200, 5
1009 DATA EAL, 8302,H,0,0, 0, 7
1010 DATA SEAG, 8302,H,0,0, 100, 100
1011 DATA CASH, 8302,H,0,0, 1, 58
1012 DATA FLYT, 8302,H,0,0, 100, 39
1013 DATA SMKV, 8302,H,0,0, 1000, 6
1014 DATA AGOL, 8303,H,0,0, 500, 4.5
1015 DATA TRVMF, 8303,H,0,0, 200, 6
1016 DATA EAL, 8303,H,0,0, 0, 4
1017 DATA SEAG, 8303,H,0,0, 100, 85
1018 DATA CASH, 8303,H,0,0, 1, 43
1019 DATA FLYT, 8303,H,0,0, 100, 37
1020 DATA SMKV, 8303,H,0,0, 1000, 7
1021 DATA AGOL, 830403,B, 100, 775, 600,
     {SPACE}7.5
20000 DATAXXXX,0,X,0,0,0,0,0
20030 REM A SHORT PROGRAM TO CLEAN OUT LI
     NES OF DATA USING SCREEN EDITOR
20040 PRINT"{CLR}{2 DOWN}"
20050 S= 1000
20100 FORX=STOS+2:PRINTX:NEXTX
20110 PRINT"20050{2 SPACES}S=";X
20115 PRINT"{HOME}"
20370 POKE198,5
20375 FORI=1TO5:POKE631+I,13:NEXT:END
30000 L=INT(L*100+.005)/100:JS$=STR$(L):J
     S$=MID$(JS$,2)
30010 JL=LEN(JS$):IFJL>2THENIF MID$(JS$,J
     L-2,1)="."GOTO30040
30020 IFJL>1THENIFMID$(JS$,JL-1,1)="."THE
     NJS$=JS$+"0":GOTO30040
30030 JS$=JS$+".00"
```


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```
30040 IF LEFT$(JS$,1)="."THENJS$="0"+JS$
30050 RETURN
```

Program 2:
Stock Market Analyzer — Atari Version

```
5 DIM AA$(10),BB$(10),CC$(10),DD$(10
  ),EE$(10),FF$(10),GG$(10),HH$(10),
  JS$(10),TT$(10),SO$(10),A$(10),D$(
  6)
7 DIM WH$(10),SS$(10),C$(10)
10 GRAPHICS 0:POKE 752,1:POSITION 9,
   10:PRINT "STOCK MARKET ANALYZER":
   FOR W=1 TO 900:NEXT W
15 OPEN #1,4,0,"K:"
25 DIM S$(500),SL(50),FF(50),P(50),S
   A(50),R$(50),TP(50)
30 PRINT "{CLEAR}":POKE 752,0:T=0:GO
   SUB 500
32 PRINT "{CLEAR}THESE ARE THE STOCK
   S I HAVE IN MEMORY":PRINT
35 X1=2:Y1=2:FOR X=1 TO Y
40 POSITION X1,Y1:PRINT S$(X*10+1,X*
   10+SL(X))
42 IF X=7 OR X=14 THEN X1=X1+10:Y1=1
45 Y1=Y1+1:NEXT X:Q=0
50 C=0:T=0
60 F=1022
95 POSITION 2,11:PRINT "CHOICES AVAI
   LABLE  [RET]":PRINT
96 PRINT "SEARCH STOCK{8 SPACES}1"
97 PRINT "STOCKS AT A DATE
   {4 SPACES}2"
98 PRINT "MONTHLY STK PRICES  3"
99 PRINT "BUY OR SELL ADVICE  4"
100 PRINT "STORE BUYS/SALES
    {4 SPACES}5"
101 PRINT "GRAPH A STOCK{7 SPACES}6"
102 PRINT "TRADES IN ANY YEAR  7"
105 GET #1,A:Q=A-48
106 ON Q GOTO 110,200,300,400,700,92
    0,650
107 GOTO 30
110 ? "WHICH STOCK";:INPUT A$
111 RESTORE
112 GOSUB 900
120 FOR X=1 TO 1000
130 READ AA$,BB$,CC$,TT$:DD=VAL(TT$)
    :READ TT$:EE=VAL(TT$):READ TT$:F
    F=VAL(TT$):READ TT$:GG=VAL(TT$)
140 IF A$=AA$ THEN GOSUB 800
150 IF AA$="XXXX" THEN X=1000:NEXT X
    :GOTO 160
155 NEXT X:GOTO 160
160 PRINT :PRINT "{5 SPACES}HIT ANY
    KEY "
170 GET #1,A
180 GOTO 30
200 PRINT
205 RESTORE
210 PRINT "STOCKS DATE YRMM":INPUT D
    $
215 IF LEN(D$)<>4 THEN 210
216 D=VAL(D$):GOSUB 900
220 FOR X=1 TO 1000
221 READ AA$,BB$,CC$,TT$:DD=VAL(TT$)
    :READ TT$:EE=VAL(TT$):READ TT$:F
    F=VAL(TT$):READ TT$:GG=VAL(TT$)
222 BB=VAL(BB$)
223 IF BB=D THEN GOSUB 800
226 IF AA$="XXXX" THEN X=1000:NEXT X
    :GOTO 240
228 NEXT X
240 PRINT "TOTAL IS ";T:PRINT "
    {5 SPACES}HIT ANY KEY"
241 GET #1,A
242 GOTO 30
300 PRINT "{CLEAR}{2 DOWN}TO CALCULA
    TE TODAY'S VALUES AND":PRINT "CR
    EATE DATA STATEMENTS I NEED"
306 GOSUB 500
307 PRINT "TODAY'S DATE (YRMM)";:INP
    UT G
308 PRINT "YOU HAVE ";Y;" STOCKS-"
309 PRINT "FROM STOCK# TO STOCK#":IN
    PUT T,U
310 FOR X=T TO U
312 PRINT "PRICE OF  ";S$(X*10+1,X*1
    0+SL(X))
315 INPUT ZZ:P(X)=ZZ
320 NEXT X:PRINT "{CLEAR}{4 DOWN}"
325 FOR X=T TO U
335 PRINT F;"DATA";S$(X*10+1,X*10+SL
    (X));",";G;",H,0,0,";FF(X);",";P
    (X)
338 F=F+1
339 PRINT
340 NEXT X
345 PRINT "60 F=";F:PRINT "RUN"
350 PRINT "HIT Y TO INPUT DATA"
351 GET #1,A
355 IF A=ASC("Y") THEN POSITION 2,0:
    END
356 GOTO 300
400 PRINT "{CLEAR}{3 DOWN}THE PATTER
    N FOR RECOMMENDING SALES IS BASE
    D ON INCREASING AND DECREASING"
401 PRINT "PRICES.{DOWN}"
405 PRINT "TODAYS PRICES ARE"
410 FOR X=1 TO Y
411 PRINT :? :?
412 PRINT S$(X*10+1,X*10+SL(X));:PRI
    NT "  TODAYS PRICE=":INPUT ZZ:P(
    X)=ZZ
415 NEXT X
420 FOR X=1 TO Y
425 GOSUB 850
440 PRINT S$(X*10+1,X*10+SL(X));"  "
    ;R$(X,X);"{3 SPACES}";MR;"
    {4 SPACES}"
445 IF R$(X,X)="H" THEN PRINT "{UP}
    {15 RIGHT}NO TRADE RECOMMENDED"
450 NEXT X
480 PRINT "DONE":PRINT :PRINT "HIT A
    NY KEY TO CONTINUE"
485 GET #1,A
499 GOTO 30
500 S$(11)="AGOL":SL(1)=4:FF(1)=600:
    SA(1)=3375
501 S$(21)="TRVMF":SL(2)=5:FF(2)=200
    :SA(2)=726.6
503 S$(31)="EAL":SL(3)=3:FF(3)=0:SA(
    3)=0
504 S$(41)="SEAG":SL(4)=4:FF(4)=100:
    SA(4)=9280
505 S$(51)="CASH":SL(5)=4:FF(5)=1:SA
    (5)=55
506 S$(61)="FLYT":SL(6)=4:FF(6)=100:
    SA(6)=3020
507 S$(71)="SMKV":SL(7)=4:FF(7)=1000
    :SA(7)=5220
549 Y=7
```


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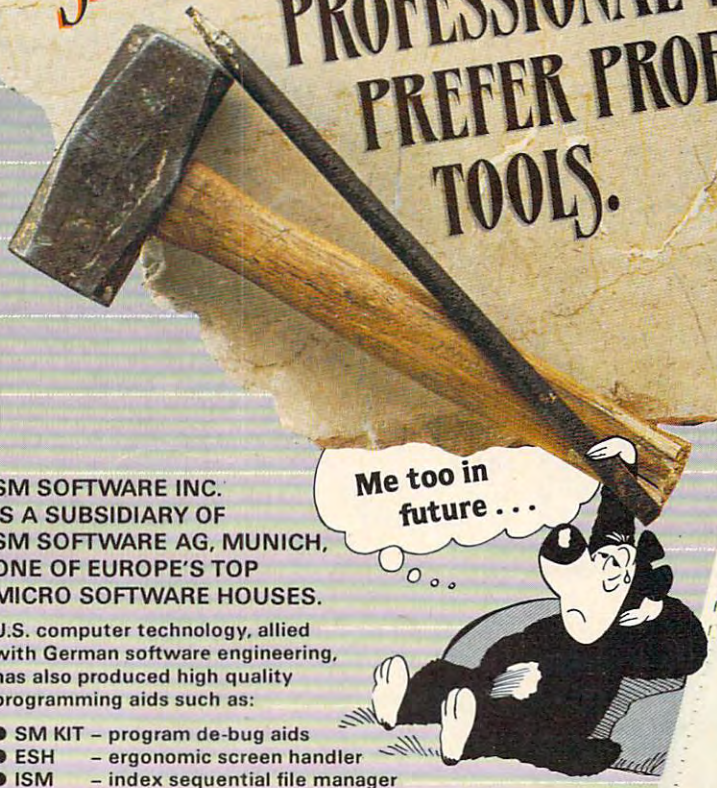

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```
550 RETURN
601 POSITION 2,17
610 FOR S=1 TO X:PRINT "{2 RIGHT}";:
    NEXT S
615 IF HI=0 THEN GOTO 640
620 FOR T=1 TO INT(15/HI)*TP(X):PRIN
    T "{UP}";:NEXT T
625 IF S>20 THEN PRINT "{UP}";:GOTO
    20040
630 PRINT "*";
635 POSITION 2,1
640 RETURN
650 RESTORE
652 PRINT "YEAR OF PORTFOLIO-YR";:IN
    PUT D
654 IF D=0 THEN 210
656 GOSUB 900
658 FOR X=1 TO 1000
660 READ AA$,BB$,CC$,TT$:DD=VAL(TT$)
    :READ TT$:EE=VAL(TT$):READ TT$:F
    F=VAL(TT$):READ TT$:GG=VAL(TT$):
    BB=VAL(BB$)
662 IF D=INT(BB/10000) THEN GOSUB 80
    0
664 IF AA$="XXXX" THEN GOTO 680
668 NEXT X
670 GOTO 780
675 C=0:GET #1,A:D$=CHR$(A)
676 GOTO 668
680 ? "{4 SPACES}HIT ANY KEY "
681 GET #1,A
685 GOTO 30
700 PRINT "{CLEAR}{3 DOWN}STORING NE
    W TRANSACTIONS"
710 PRINT "THERE ARE SEVERAL LINE ST
    ATEMENTS THAT MUST BE CHANGED"
725 PRINT "TODAYS DATE-YYMMDD":INPUT
     DA
728 PRINT "WHICH STOCK":INPUT SO$
730 PRINT "BUY(B)  OR SELL(S)":INPUT
     SS$
735 PRINT "HOW MANY SHARES":INPUT SH
737 PRINT "PRICE PER SHARE ";:INPUT
    P
741 FOR X=1 TO Y:IF SO$=S$(X*10+1,X*
    10+SL(X)) THEN TE=X:X=Y:NEXT X:G
    OTO 745
742 NEXT X
745 ? "NET COST OR PROCEEDS";:INPUT
    NP
747 IF SS$="B" THEN NW=SA(TE)+NP:NF=
    FF(TE)+SH:GOTO 750
748 NW=SA(TE)-NP:NF=FF(TE)-SH
750 PRINT "FF(X) BETWEEN 500-600 IS
    ";NF
752 PRINT "SA(X) SHOULD BE ";NW
755 PRINT "IT SHOULD BE ABOUT ";TE-1
    ;" DOWN"
760 PRINT F;" DATA ";SO$;",";DA;",";
    SS$;",";SH;",";NP;",";NF;",";P
768 PRINT "60 F=";F+1
770 PRINT "RUN"
775 PRINT "HIT ANY KEY BUT N TO ENTE
    R DATA"
780 GET #1,A
782 IF A=ASC("N") THEN 700
783 END
800 REM ROUNDING
801 DD$=STR$(DD):FF$=STR$(FF):IF LEN
    (DD$)=1 THEN DD$(2)="  "
802 L=EE:GOSUB 30000:EE$=JS$:IF LEN(
    FF$)=2 THEN FF$(LEN(FF$)+1)=" "
803 IF LEN(DD$)=2 THEN DD$(3)=" "
804 L=GG:GOSUB 30000:GG$=JS$:IF LEN(
    FF$)=2 THEN FF$(3)="  "
805 L=INT(FF*GG):GOSUB 30000:HH$=JS$
808 PRINT "STOCK  ";AA$:PRINT "DATE
    {3 SPACES}";BB$:PRINT "BUY/SELL
    ";CC$:PRINT "NUM{3 SPACES}";DD$
809 PRINT "$NET{3 SPACES}";EE$:PRINT
     "CUR#  ";FF$:PRINT "MARKET ";GG
    $:PRINT "VALUE  ";HH$
810 PRINT "HIT ANY KEY TO CONTINUE"
811 GET #1,A
812 PRINT "{CLEAR}"
815 T=T+FF*GG
820 RETURN
850 MP=FF(X)*P(X):R$(X,X)="H":MR=0
855 IF MP>SA(X)*1.1 THEN R$(X,X)="S"
    :MP=MP-MP*0.1:MR=MP-SA(X)
856 IF MP<SA(X)*0.9 THEN R$(X,X)="B"
    :MP=MP+MP*0.1:MR=SA(X)-MP
858 IF (MR<300) AND (MR>-300) THEN R
    $(X,X)="H"
865 RETURN
900 PRINT "{CLEAR}"
901 RETURN
920 ? "WHICH STOCK";:INPUT WH$:V=0:R
    ESTORE
925 FOR X=1 TO 1000
930 READ A$,BB$,C$,TT$:D=VAL(TT$):RE
    AD TT$:E=VAL(TT$):READ TT$:F=VAL
    (TT$):READ TT$:G=VAL(TT$):B=VAL(
    BB$)
932 IF B>10000 THEN 940
935 IF WH$=A$ THEN V=V+1:TP(V)=G
936 IF A$="XXXX" THEN GOTO 945
940 NEXT X
945 REM -CREATE GRAPH
946 I=1:HI=0:LP=10
950 FOR X=I TO V
951 IF HI<TP(X) THEN HI=TP(X)
952 IF LP>TP(X) THEN LP=TP(X)
953 NEXT X
960 PRINT "{CLEAR}{3 DOWN}"
962 FOR X=1 TO 13:PRINT CHR$(1):NEXT
     X
964 FOR X=1 TO 38:PRINT CHR$(24);:NE
    XT X
970 FOR X=1 TO V
975 GOSUB 601
980 NEXT X
981 POSITION 2,0:? " HIGH ";HI;"
    {6 SPACES}LOW ";LP
982 PRINT "{3 RIGHT}STOCK IS ";WH$
983 PRINT "{15 DOWN}":FOR X=1 TO V:P
    RINT TP(X);" ";:NEXT X
985 POSITION 14,22:PRINT "HIT ANY KE
    Y"
990 GET #1,A
995 GOTO 30
1000 DATA AGOL,8301,H,0,0,600,5.5
1001 DATA TRVMF,8301,H,0,0,200,4
1002 DATA EAL,8301,H,0,0,0,6.5
1003 DATA SEAG,8301,H,0,0,100,95
1004 DATA CASH,8301,H,0,0,1,55
1005 DATA FLYT,8301,H,0,0,100,35
1006 DATA SMKV,8301,H,0,0,1000,5.5
1007 DATA AGOL,8302,H,0,0,600,6
1008 DATA TRVMF,8302,H,0,0,200,5
1009 DATA EAL,8302,H,0,0,0,7
1010 DATA SEAG,8302,H,0,0,100,100
1011 DATA CASH,8302,H,0,0,1,58
1012 DATA FLYT,8302,H,0,0,100,39
```


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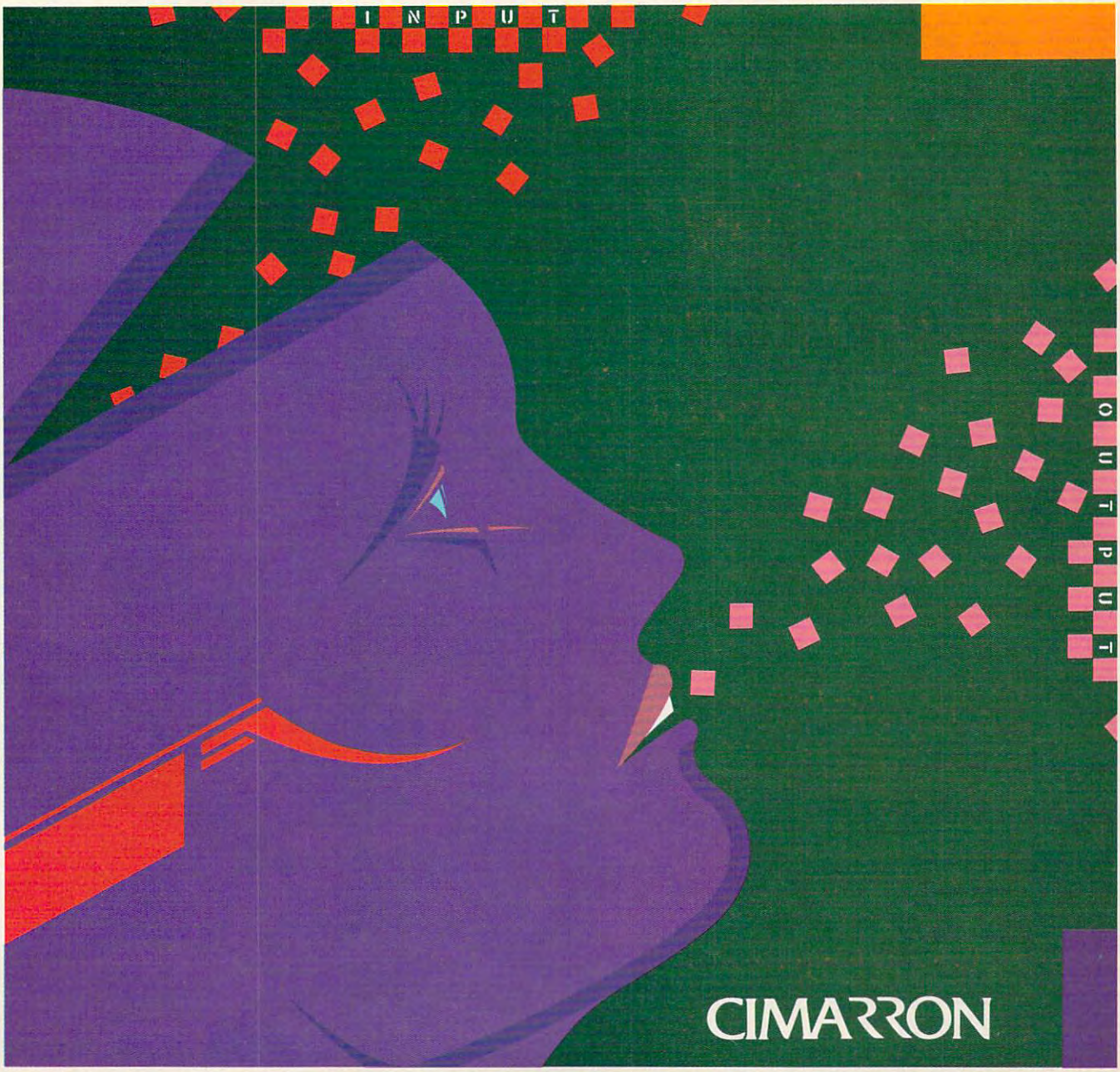

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```
1013 DATA SMKV,8302,H,0,0,1000,6
1014 DATA AGOL,8303,H,0,0,600,4.5
1015 DATA TRVMF,8303,H,0,0,200,6
1016 DATA EAL,8303,H,0,0,0,4
1017 DATA SEAG,8303,H,0,0,100,85
1018 DATA CASH,8303,H,0,0,1,43
1019 DATA FLYT,8303,H,0,0,100,37
1020 DATA SMKV,8303,H,0,0,1000,7
1021 DATA AGOL,830403,B,100,775,600,
     7.5
20000 DATA XXXX,0,X,0,0,0,0,0
20030 REM A SHORT PROGRAM TO CLEAN O
     UT LINES OF DATA USING SCREEN
     EDITOR
20040 PRINT "{CLEAR}{3 DOWN}"
20050 S=1000
20100 ? "{CLEAR}{3 DOWN}";:FOR X=S T
     O S+2:PRINT X:NEXT X
20115 PRINT "20050 S=";X:? "POKE842,
     12":POSITION 2,0
20370 POKE 842,13
20375 END
30000 L=INT(L*100+5.0E-03)/100:JS$=S
     TR$(L)
30010 JL=LEN(JS$):IF JL>2 THEN IF JS
     $(JL-2,JL-2)="." THEN 30040
30020 IF JL>1 THEN IF JS$(JL-1,JL-1)
     "." THEN JS$(LEN(JS$)+1)="0":
     GOTO 30040
30030 JS$(LEN(JS$)+1)=".00"
30040 IF JS$(1,1)="." THEN TT$="0":T
     T$(2)=JS$:JS$=TT$
30070 RETURN                    ©
```

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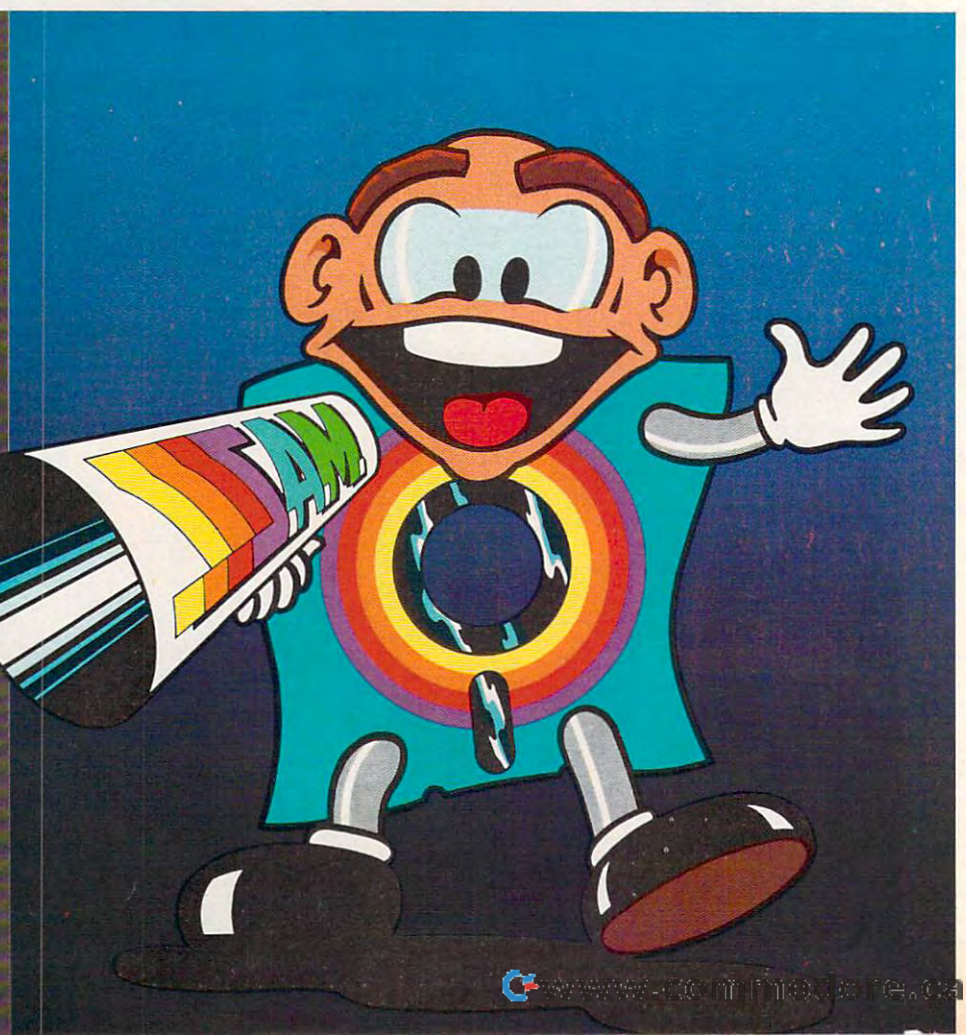

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Norman Overpeck

As you wend your way through the cemetery on a black and tempestuous night, beware of the tombstones. If you run into one, lightning will strike – and it only strikes once. The game includes five difficulty levels. Written for the unexpanded VIC, Atari and 64 versions are also included.

It's a dark, stormy night with howling winds and bolts of lightning. You've got to get home – but first you must cross through the cemetery.

Since you don't believe in ghosts, you won't have to worry about them. But the graveyard is very old and there are lots of tombstones. You have to hurry, but you can't bump into a grave marker – if you do, you'll be struck by lightning and it's goodbye, Charlie.

How To Play

"Goodbye Charlie" was originally written for the unexpanded VIC. The Atari and 64 versions include instructions within the programs.

In the VIC version, four keys (Q, A, S, Z) are used to control movement. The L key is used to light up the screen when you need to peek at the graveyard.

Success in this game depends on memory and perception. At the start, the computer will randomly place the tombstones and briefly light up the screen so you can see the obstacles. Get a good look. The first look is free, but any after that will cost you points.

You will have to move across a dark screen relying only on your memory of the tombstones' locations. Remember – if you lose your nerve, you can get additional glimpses of the cemetery by pressing L, but this will subtract points from your score.

Goodbye Charlie has five difficulty levels. After typing in and saving the program, try the

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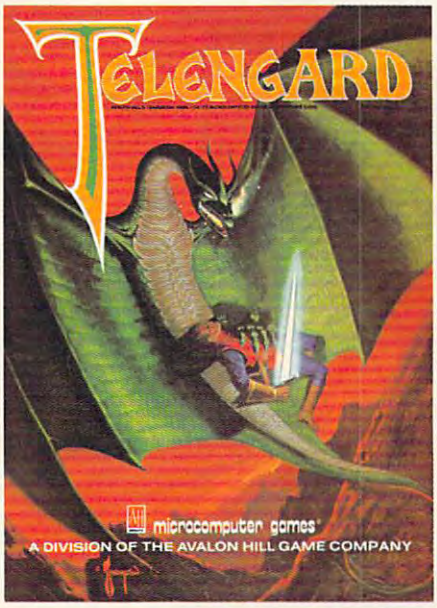
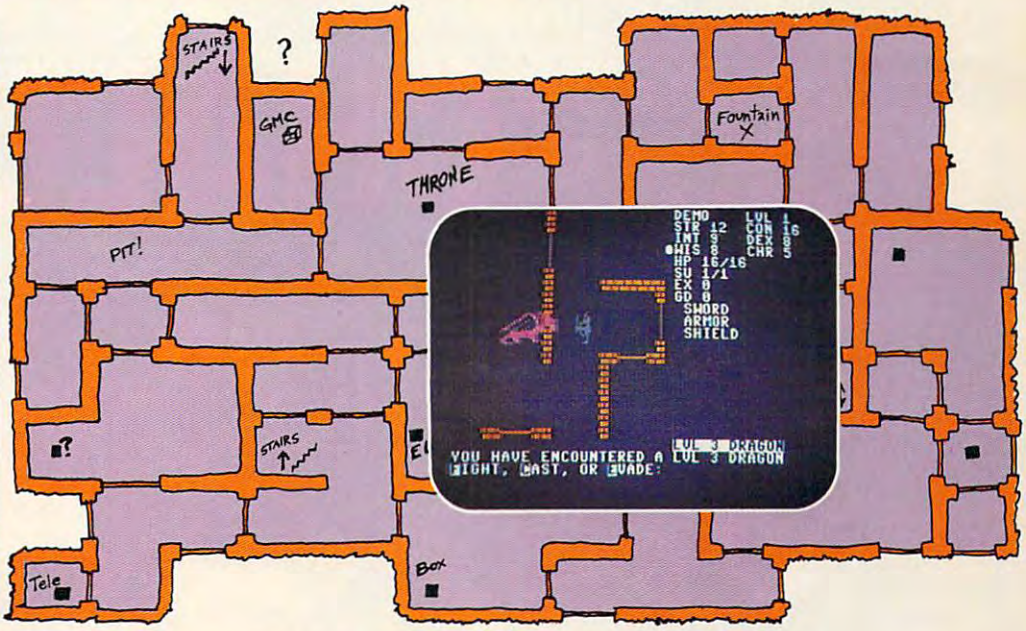
Be Amazed!





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Each labyrinthine level holds hundreds of dark chambers and tomb-like corridors for the mighty adventurer to explore. It goes without saying that a shifting collection of hideous monsters with unpredictable behavior patterns can make life in the TELENGARD maze quite interesting—and frequently quite short!

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NUKEWAR: Defend your country by massive espionage efforts, or by building jet fighter bombers, missiles, submarines and ABM's. Your cold and calculating computer will choose its own strategy! Cassette for Commodore 64, VIC-20 (16K), TRS-80 Mods. I/III (16K) and Atari Home Computers just $16.00.

FOOTBALL STRATEGY: Animated action on a scrolling field. A head-to-head challenge or solitaire as you select the best offensive or defensive plays in response to your opponent. Commodore 64, Atari Home Computers (32K) and TRS-80 Models I/III/IV (16K) cassette for $16.00. Atari (32K), IBM (64K) and TRS-80 Models I/III/IV (32K) diskettes available at $21.00.

T.G.I.F.: Thank Goodness It's Friday! Avalon Hill's new party game for one to four players recreating an often-not-so-typical week in the lives of the working class. Half the fun is just making it from Monday to Sunday. Commodore 64, Atari Home Computers (40K) cassette for a meager $20.00. Atari diskette (48K) for $25.00.

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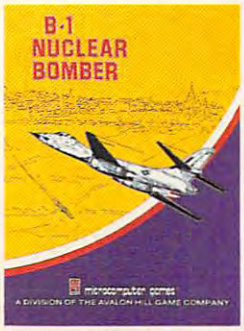

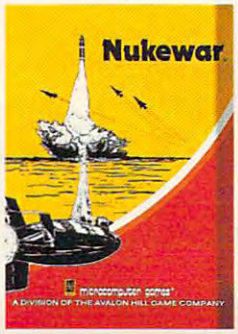

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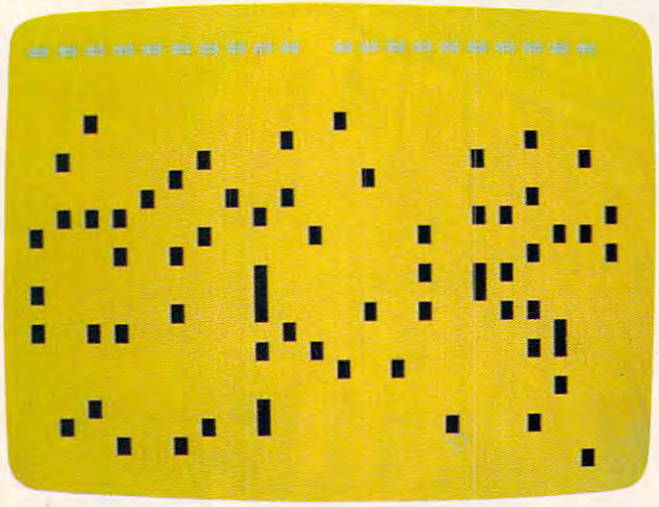
first level so you can acquaint yourself with the game.



You get a brief look at the graveyard before continuing your night stalk in the VIC version of "Goodbye Charlie"

Program 1: Goodbye Charlie – VIC Version

```
5 CL=30720
6 PRINT"{CLR}"
7 PRINTTAB(2)"{2 DOWN} GOODBYE CHARLIE"
10 FORA=7680TO7701:POKEA,43:POKEA+CL,6:NE
   XT
15 FORA=7701TO8185STEP22 :POKEA,43:POKEA+
   CL,6:NEXT
25 FORA=8185TO8164STEP-1:POKEA,43:POKEA+C
   L,6:NEXT
30 FORA=8164TO7680STEP-22:POKEA,43:POKEA+
   CL,6:NEXT
32 FORI=1TO2800:NEXT
35 PRINT"{BLU}{CLR}{2 DOWN}IT IS A DARK,C
   OLD AND":PRINTSPC(4)"RAINY NIGHT
36 PRINT"{DOWN}AND YOU HAVE CHOSEN":PRINT
   SPC(1)"TO CROSS A GRAVEYARD"
37 PRINTSPC(5)"TO REACH HOME"
38 PRINT"{DOWN}{RIGHT}THERE IS A VIOLENT
   {4 SPACES}STORM AND THE GRAVE"
39 PRINTTAB(2)"YARD IS MOMENTARILY
   {3 SPACES}LIT UP ";
40 PRINT"BY LIGHTNING
42 PRINTTAB(2)"{DOWN}IF YOU BUMP INTO A
   {2 SPACES}TOMBSTONE YOU WILL BE HIT BY
   THE LIGHTNING"
44 PRINT"{3 DOWN}{3 SPACES}DIRECTIONS? Y/
   N"
45 GETA$:IFA$=""THEN45
46 IFA$="N"THEN89
48 PRINT"{CLR}{2 DOWN}"
50 PRINTTAB(8)"Q=UP{2 DOWN}"
55 PRINTTAB(2)"A=LEFT{5 SPACES}S=RIGHT"
60 PRINTTAB(8)"{2 DOWN}Z=DOWN"
65 PRINT"{2 DOWN}PRESS L";
70 PRINT"{3 RIGHT}FOR A QUICK":PRINT
72 PRINT"LOOK AT THE GRAVEYARD"
75 PRINT"{3 DOWN}EACH LOOK WILL LOWER
   {9 SPACES}YOUR SCORE
80 PRINT"{2 DOWN}PRESS RETURN TO CONT
85 GETA$:IFA$<>CHR$(13)THEN85
89 PRINT"{CLR}{GRN}"
90 PRINT"{YEL}{CLR}{3 DOWN}LEVEL OF DIFFI
   CULTY":SC=0:C=30720
91 PRINTTAB(6)"{2 DOWN}1 2 3 4 5"
92 GETA$:IFA$<>"1"ANDA$<>"2"ANDA$<>"3"AND
   A$<>"4"ANDA$<>"5"THEN92
93 IFPEEK(197)=0THEN300
94 IFPEEK(197)=56THEN310
95 IFPEEK(197)=1THEN320
96 IFPEEK(197)=57THEN330
97 IFPEEK(197)=2THEN340
98 POKE36879,8:GOSUB200:GOSUB200:PRINT"
   {CLR}":GOTO410
100 PRINT"{CLR}"
105 PRINTTAB(15)"NN"
110 PRINTTAB(13)"NZNN"
115 PRINTTAB(12)"NNMN"
120 PRINTTAB(9)"NZNN"
125 PRINTTAB(8)"NNMN"
130 PRINTTAB(7)"NN"
135 PRINTTAB(6)"NN"
140 PRINTTAB(6)"Z"
145 PRINTTAB(5)"N"
146 PRINT"{CLR}":RETURN
148 PRINT"{CLR}":PRINTTAB(15)"NN"
150 PRINTTAB(13)"NZNN"
152 PRINTTAB(12)"NNMN"
155 PRINTTAB(9)"NZNN"
160 PRINTTAB(9)"NMN"
162 RETURN
165 PRINT"{CLR}": PRINTTAB(15)"NN"
170 PRINTTAB(13)"NZNN"
175 PRINTTAB(13)"NMN"
178 RETURN
180 PRINT"{WHT}"
200 PRINT"{WHT}":FORT=1TO3:GOSUB165:FORR=
   1TO30:NEXTR,T
205 FORT=1TO3:GOSUB148:FORR=1TO30:NEXTR,T
210 FORT=1TO9:GOSUB100:NEXT
222 POKE649,1
225 FORT=1TO9:POKE36879,59:POKE36879,25:P
   OKE36879,8:NEXT
230 POKE36877,220:FORL=15TO0STEP-3:POKE36
   878,L:FORM=1TO275:NEXTM,L
235 POKE36877,0:POKE36878,0:RETURN
300 Z=55:CU=8175:DF=.2:GOTO98
310 Z=80:CU=8179:DF=.25:GOTO98
320 Z=110:CU=8169:DF=.3:GOTO98
330 Z=130:CU=8182:DF=.35:GOTO98
340 Z=160:CU=8165:DF=.4:GOTO98
410 FORK=1TO2
415 X=INT(RND(1)*440)+7746
420 POKEX,97:POKEX+C,8:NEXT
425 POKECU,15:POKECU+C,1:POKECU-22,32:POK
   ECU+1,32:POKECU-1,32
430 FORT=7680TO7767:POKET,32:NEXT
435 FORT=7680TO7700:POKET,35:POKET+C,1:NE
   XT
440 POKE7690,32
442 GOSUB800:SC=SC+(INT(SC/10))
445 GETA$:IFA$=""THEN445
446 IFPEEK(7690)=15THEN700
447 POKE649,1
450 IFA$="Q"THEN500
455 IFA$="A"THEN520
460 IFA$="S"THEN540
465 IFA$="Z"THEN560
470 IFA$="L"THENGOSUB800
475 GOTO445
500 IFPEEK(CU-22)=97THEN600
505 IFPEEK(CU-22)=35THENCU=CU+22
515 POKECU,32:CU=CU-22:POKECU+CL,1:POKECU
   ,15:S=CS+10:GOTO445
520 IFPEEK(CU)=97THEN600
```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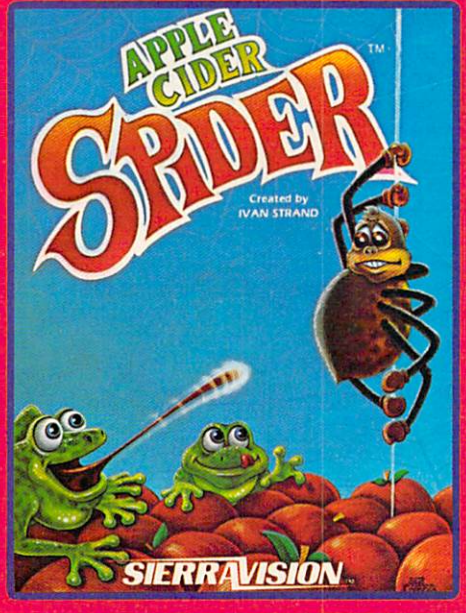

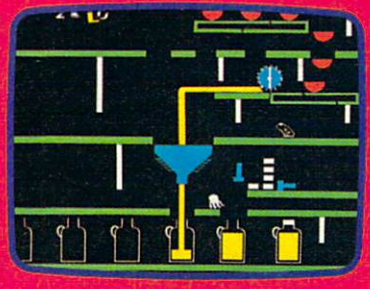

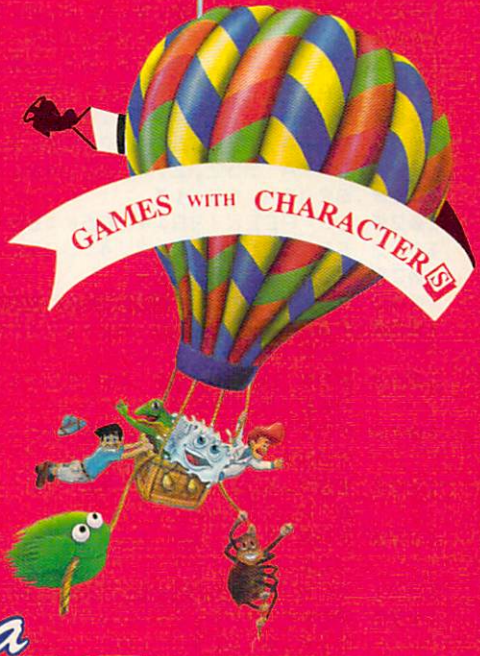

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```
525 POKECU,32:CU=CU-1:POKECU+CL,1:POKECU,
    15:SC=SC+10:GOTO445
540 IFPEEK(CU)=97THEN600
545 POKECU,32:CU=CU+1:POKECU+CL,1:POKECU,
    15:SC=SC+10:GOTO445
560 IFPEEK(CU)=97THEN600
565 POKECU,32:CU=CU+22:POKECU+CL,1:POKECU
    ,15:SC=SC-10:GOTO445
600 PRINT"{CLR}{2 DOWN}{BLU}"
605 PRINTTAB(7)"{4 DOWN}R.I.P.
610 GOSUB230
615 PRINTTAB(2)"{PUR}{8 DOWN}TOO BAD CHAR
    LIE!!"
620 FORT=1TO2500:NEXT:PRINT"{2 DOWN}
    {2 RIGHT}ANOTHER GAME? Y/N"
625 GETA$:IFA$=""THEN625
628 IFA$<>"Y"ANDA$<>"N"THEN625
630 IFA$="Y"THEN90
640 PRINT"{CLR}"
645 PRINTTAB(3)"{3 DOWN}GOODBYE CHARLIE"
650 END
700 PRINT"{CLR}{2 DOWN}SCORE=";INT(SC*DF)
    *10
710 POKE36879,140:PRINT"{7 DOWN}{2 RIGHT}
    YOU MADE IT HOME
720 PRINT:PRINT"{3 RIGHT}SAFE CHARLIE!
730 FORT=1TO2500:NEXT:PRINT"{4 DOWN}NEW G
    AME? Y/N"
735 GETA$:IFA$=""THEN735
740 IFA$="Y"THEN90
745 GOTO640
800 SC=SC-(INT(SC/10))
805 FORT=1TO4:POKE36879,127:FORD=1TO70:NE
    XTD:POKE36879,8:NEXT:GOSUB225:RETURN
```

Program 2: Goodbye Charlie – Atari Version

```
1001 GRAPHICS 0:SETCOLOR 2,0,0:SETCO
     LOR 1,0,0:CH=PEEK(742)*256-1024
1002 FOR I=0 TO 55:READ A:POKE CH+I,
     A:NEXT I
1003 DATA 0,0,0,0,0,0,0,0
1004 DATA 24,24,126,126,24,24,24,24
1005 DATA 28,34,65,65,65,34,28,0
1006 DATA 34,255,34,255,34,255,34,34
1007 DATA 1,2,4,8,16,32,64,128
1008 DATA 128,64,32,16,8,4,2,1
1009 DATA 252,2,3,12,48,192,64,63
1010 GRAPHICS 17
1020 SC=PEEK(88)+PEEK(89)*256
1022 SETCOLOR 0,0,4:SETCOLOR 2,3,8
1025 POSITION 2,9
1030 PRINT #6;"GOODBYE  CHARLIE"
1050 FOR A=SC TO SC+19:POKE A,11:NEX
     T A
1060 FOR A=SC+19 TO SC+479 STEP 20:P
     OKE A,11:NEXT A
1070 FOR A=SC+479 TO SC+460 STEP -1:
     POKE A,11:NEXT A
1080 FOR A=SC+460 TO SC STEP -20:POK
     E A,11:NEXT A
1090 FOR I=1 TO 1500:IF STRIG(0)=1 T
     HEN NEXT I
1091 REM DISPLAY INSTRUCTIONS
1095 POKE 752,1:GRAPHICS 0:SETCOLOR
     2,0,0:SETCOLOR 1,0,6
1100 POSITION 2,1:PRINT "It is a dar
     k, cold, and rainy night,"
1110 PRINT "and you have chosen to c
     ross a":PRINT "graveyard to rea
     ch home."
1130 PRINT "{DOWN}There is a violent
      storm and the"
1140 PRINT "graveyard is momentarily
      lit up"
1150 PRINT "by lightning.":PRINT "
     {DOWN}If you bump into a graves
     tone"
1160 PRINT "you will be hit by the l
     ightning."
1170 PRINT "{DOWN}Steer with a joyst
     ick in port #1."
1175 PRINT "Use the firebutton for a
      quick look":PRINT "at the grav
     eyard."
1180 PRINT "{DOWN}Each look will low
     er your score."
1190 PRINT "{2 DOWN}{5 SPACES}DEGREE
      OF DIFFICULTY":SCORE=0:PRINT "
     {10 SPACES}1 2 3 4 5":X=0
1210 POSITION 11+X*2,20:PRINT "
     {RIGHT}";:GOSUB 5000
1212 IF STRIG(0)=0 THEN 1250
1215 A=STICK(0):IF A=15 THEN 1212
1220 IF A=7 THEN X=X+1:IF X>4 THEN X
     =0
1230 IF A=11 THEN X=X-1:IF X<0 THEN
     X=4
1240 GOTO 1210
1250 ON X+1 GOSUB 1430,1440,1450,146
     0,1470:GRAPHICS 17:POKE 756,CH/
     256:GOSUB 1280:GOSUB 1280
1255 PRINT #6;"{CLEAR}":SETCOLOR 4,0
     ,0:SETCOLOR 0,0,0:GOTO 1500
1260 REM FLASH LIGHTNING
1280 FOR T=1 TO 3
1290 PRINT #6;"{CLEAR}":POSITION 13,
     1:PRINT #6;"$$":POSITION 11,2:P
     RINT #6;"$&$$"
1300 POSITION 11,3:PRINT #6;"$%$"
1310 FOR R=1 TO 20:NEXT R:NEXT T
1320 FOR T=1 TO 3
1330 PRINT #6;"{CLEAR}":POSITION 13,
     1:PRINT #6;"$$":POSITION 11,2:P
     RINT #6;"$&$$":POSITION 10,3:PR
     INT #6;"$$%$"
1340 POSITION 7,4:PRINT #6;"$&$$":PO
     SITION 7,5:PRINT #6;"$%$"
1360 FOR R=1 TO 20:NEXT R:NEXT T
1370 FOR T=1 TO 9
1380 PRINT #6;"{CLEAR}":POSITION 13,
     1:PRINT #6;"$$":POSITION 11,2:P
     RINT #6;"$&$$":POSITION 10,3:PR
     INT #6;"$$%$"
1390 PRINT #6;"{7 SPACES}$&$$":PRINT
      #6;"{6 SPACES}$$%$":PRINT #6;"
     {5 SPACES}$$":PRINT #6;"
     {4 SPACES}$$":PRINT #6;"
     {4 SPACES}&"
1395 PRINT #6;"{3 SPACES}$":PRINT #6
     ;"{CLEAR}"
1400 NEXT T
1410 FOR T=1 TO 9:SETCOLOR 4,10,6:SE
     TCOLOR 4,0,6:SETCOLOR 4,0,0:NEX
     T T
1420 FOR L=15 TO 0 STEP -1:SOUND 0,1
     ,8,L:FOR J=1 TO 50:NEXT J:NEXT
     L:RETURN
1430 Z=55:CU=SC+470:DF=0.2:RETURN
1440 Z=80:CU=SC+474:DF=0.25:RETURN
1450 Z=110:CU=SC+464:DF=0.3:RETURN
1460 Z=130:CU=SC+477:DF=0.35:RETURN
```


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WELCOME TO APSHAI. YOU'RE JUST IN TIME FOR LUNCH.

Boy, have you taken a wrong turn. One moment you're gathering treasure and the next you're being eyed like a side of beef.

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Gateway has eight levels. And over 400 dark, nasty chambers to explore. And because it's joystick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy. Is it treasure you're after? Or glory? You'll live longer if you're greedy, but slaying monsters racks up a higher score.

The Apshai series is the standard by which all other adventure games are judged. And novices will not survive.

They'll be eaten.

One player; Temple of Apshai, disk/cassette; Gateway to Apshai, cartridge, joystick control.

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*Game Manufacturers Association, 1981

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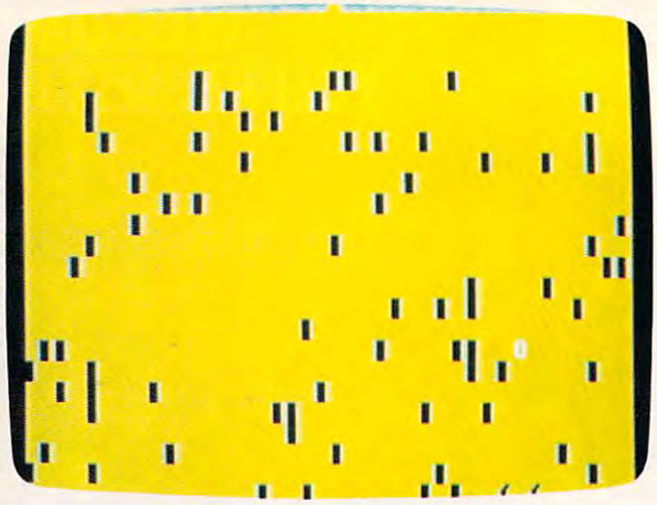
```
1470 Z=160:CU=SC+460:DF=0.4:RETURN
1490 REM SCREEN SETUP
1500 FOR K=1 TO Z
1510 X=SC+INT(RND(1)*400)+60
1520 POKE X,1:NEXT K
1530 POKE CU-20,0:POKE CU+1,0:POKE C
     U-1,0
1540 FOR T=SC TO SC+19:POKE T,131:NE
     XT T:FOR T=SC+20 TO SC+79:POKE
     SC,0:NEXT T:POKE SC+10,0
1550 POKE CU,66:GOSUB 4000:SCORE=SCO
     RE+INT(SCORE/10)
1555 REM PROGRAM MAIN LOOP BEGINS
1560 POKE CU,66:GOSUB 5000:IF CU=SC+
     10 THEN 2500
1565 IF STRIG(0)=0 THEN GOSUB 4000
1570 A=STICK(0):IF A=15 THEN 1565
1580 DR=20:IF A=14 THEN DR=-20
1590 IF A=7 THEN DR=1
1600 IF A=11 THEN DR=-1
1610 POKE CU,0:CU=CU+DR:IF PEEK(CU)=
     1 THEN 2000
1620 IF PEEK(CU)=3 THEN CU=CU-DR:GOT
     O 1560
1630 SCORE=SCORE+10:GOTO 1560
1990 REM LIGHTNING STRIKES CHARLIE
2000 POKE 756,224:PRINT #6;"{CLEAR}"
     :SETCOLOR 0,0,6:POSITION 7,7:PR
     INT #6;"R.I.P":GOSUB 1420
2010 POSITION 1,16:PRINT #6;"TOO BAD
     , CHARLIE!!"
2020 FOR T=1 TO 500:NEXT T:POSITION
     5,18:PRINT #6;"PRESS FIRE":PRIN
     T #6;"{4 SPACES}TO PLAY AGAIN";
2030 FOR I=0 TO 1500:IF STRIG(0)=1 T
     HEN NEXT I:PRINT "{CLEAR}
     {2 DOWN}GOODBYE CHARLIE!":END
2040 GOTO 1095
2490 REM THROUGH THE GATE
2500 POKE 756,224:PRINT #6;"{CLEAR}"
     :SETCOLOR 0,2,6:POSITION 0,2:PR
     INT #6;"{4 SPACES}SCORE = ";INT
     (SCORE*DF)*10
2510 POSITION 2,10:PRINT #6;"YOU MAD
     E IT HOME":POSITION 3,12:PRINT
     #6;"SAFE, CHARLIE!":GOTO 2020
3990 REM FLASH THE LIGHTNING
4000 SCORE=SCORE-INT(SCORE/10)
4010 FOR T=1 TO 4:SETCOLOR 0,14,6:FO
     R D=1 TO 40:NEXT D:SETCOLOR 0,0
     ,0:NEXT T:GOSUB 1410:RETURN
5000 FOR DD=1 TO 40:NEXT DD:RETURN
```

Program 3: Goodbye Charlie – 64 Version

```
1 POKE 53281,12:POKE53280,13
5 CL=54272
6 PRINT"{CLR}"
7 PRINT TAB(10)"{10 DOWN}{BLK} GOODBYE CH
  ARLIE"
10 FORA=1024TO1063:POKEA,43:POKEA+CL,1:NE
   XT
15 FORA=1063TO2023STEP40 :POKEA,43:POKEA+
   CL,1:NEXT
25 FORA=2023TO1984STEP-1:POKEA,43:POKEA+C
   L,1:NEXT
30 FORA=1984TO1024STEP-40:POKEA,43:POKEA+
   CL,1:NEXT
32 FORI=1TO2800:NEXT
34 POKE 53281,0:POKE53280,0
35 PRINT"{CYN}{CLR}{2 DOWN}{3 SPACES}IT I
   S A DARK,COLD AND RAINY NIGHT.
36 PRINT"{3 SPACES}{DOWN}YOU HAVE CHOSEN
   {SPACE}TO CROSS A GRAVEYARD {DOWN}";
37 PRINT"TO REACH HOME, BUT";
38 PRINT"{RIGHT}THERE IS A VIOLENT{DOWN}"
   :PRINT"STORM AND THE GRAVE";
39 PRINTTAB(2)"YARD IS MOMENTARILY{DOWN}
   {3 SPACES}LIT UP ";
40 PRINT"BY LIGHTNING.
42 PRINT"{4 SPACES}{DOWN}IF YOU BUMP INTO
    A{2 SPACES}GRAVESTONE YOU{DOWN}
   {2 SPACES}WILL BE HIT BY THE LIGHTNING
   "
44 PRINT"{3 DOWN}[5]{12 SPACES}DIRECTIO
   NS? Y/N"
45 GETA$:IFA$=""THEN45
46 IFA$="N"THEN90
48 PRINT"{CLR}{2 DOWN}"
50 PRINT"{2 DOWN}[5]{4 SPACES}STEER WIT
   H JOYSTICK IN PORT 2.
65 PRINT"{3 DOWN}{4 SPACES}YOU CAN PRESS
   {SPACE}THE {WHT}FIRE BUTTON[5]";
70 PRINT"{RIGHT}FOR{7 SPACES}{DOWN}A QUIC
   K";
72 PRINT" LOOK AT THE GRAVEYARD, BUT"
75 PRINT"{DOWN}{4 SPACES}EACH LOOK WILL L
   OWER YOUR SCORE.
80 PRINT"{2 DOWN}{WHT}{6 SPACES}PRESS
   {RVS}RETURN{OFF} TO CONTINUE
85 GETA$:IFA$<>CHR$(13)THEN85
90 PRINT"{WHT}{CLR}{3 DOWN}{8 SPACES}DEGR
   EE OF DIFFICULTY?":SC=0:C=30720
91 PRINTTAB(12)"{2 DOWN}{YEL}1 {PUR}2
   [6]3 [7]4 {CYN}5"
92 GETA$:IFA$<"1"ORA$>"5"THEN92
93 IF A$="1"THENZ=55:CU=2012:DF=.2
94 IF A$="2"THENZ=80:CU=2016:DF=.25
95 IF A$="3"THENZ=110:CU=2006:DF=.3
96 IF A$="4"THENZ=130:CU=2019:DF=.35
97 IF A$="5"THENZ=160:CU=2002:DF=.4
98 GOSUB200:GOSUB5000:GOSUB200:GOSUB5000:
   PRINT"{CLR}":GOTO410
100 PRINT"{CLR}"
105 PRINTTAB(25)"NN"
110 PRINTTAB(23)"NZNN"
115 PRINTTAB(22)"NNMN"
120 PRINTTAB(19)"NZNN"
125 PRINTTAB(18)"NNMN"
130 PRINTTAB(17)"NN"
```



64 version of "Goodbye Charlie!"

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```
135 PRINTTAB(16)"NN"
140 PRINTTAB(16)"Z"
145 PRINTTAB(15)"N"
146 PRINT"{CLR}":RETURN
148 PRINT"{CLR}":PRINTTAB(25)"NN"
150 PRINTTAB(23)"NZNN"
152 PRINTTAB(22)"NNMN"
155 PRINTTAB(19)"NZNN"
160 PRINTTAB(19)"NMN"
162 RETURN
165 PRINT"{CLR}": PRINTTAB(25)"NN"
170 PRINTTAB(23)"NZNN"
175 PRINTTAB(23)"NMN"
178 RETURN
180 PRINT"{WHT}"
200 PRINT"{WHT}":FORT=1TO3:GOSUB165:FORR=
    1TO30:NEXTR,T
205 FORT=1TO3:GOSUB148:FORR=1TO30:NEXTR,T
210 FORT=1TO9:GOSUB100:NEXT
222 POKE649,1
225 FORT=1TO9:POKE53281,3:POKE 53281,1
227 POKE53281,0:NEXT
230 REM MAKE SOME NOISE
235 REM KILL SOME NOISE
238 RETURN
410 FORK=1TOZ
415 X=INT(RND(1)*880)+1144
420 POKEX,97:POKEX+CL,0:NEXT
425 POKECU,15:POKECU+CL,1:POKECU-40,32:PO
    KECU+1,40:POKECU-1,40
430 FORT=1024TO1184:POKET,32:NEXT
435 FORT=1024TO1062:POKET,35:POKET+CL,3:N
    EXT
440 POKE1044,32
442 GOSUB800:SC=SC+(INT(SC/10))
445 IF PEEK(56320)=127 THEN 445
446 IFPEEK(1044)=15THEN700
447 POKE649,1
450 IF (PEEK(56320)AND1)=0 THEN500
455 IF (PEEK(56320)AND4)=0 THEN520
460 IF (PEEK(56320)AND8)=0 THEN540
465 IF (PEEK(56320)AND2)=0 THEN560
470 IF(PEEK(56320)AND16)=0THENGOSUB800
475 GOTO445
500 IFPEEK(CU-40)=97THEN600
505 IFPEEK(CU-40)=35THENCU=CU+40
515 POKECU,32:CU=CU-40:POKECU+CL,1:POKECU
    ,15:S=CS+10:GOTO445
520 IFPEEK(CU-1)=97THEN600
525 POKECU,32:CU=CU-1:POKECU+CL,1:POKECU,
    15:SC=SC+10:GOTO445
540 IFPEEK(CU+1)=97THEN600
545 POKECU,32:CU=CU+1:POKECU+CL,1:POKECU,
    15:SC=SC+10:GOTO445
560 IFPEEK(CU+40)=97THEN600
565 POKECU,32:CU=CU+40:POKECU+CL,1:POKECU
    ,15:SC=SC-10:GOTO445
600 PRINT"{CLR}{2 DOWN}[1]"
605 PRINTTAB(15)"{4 DOWN}R.I.P.
610 GOSUB230
615 PRINTTAB(11)"{PUR}{8 DOWN}TOO BAD CHA
    RLIE!!"
620 FORT=1TO2500:NEXT:PRINT"{2 DOWN}
    {11 RIGHT}ANOTHER GAME? Y/N"
625 GETA$:IFA$=""THEN625
628 IFA$<>"Y"ANDA$<>"N"THEN625
630 IFA$="Y"THEN90
640 PRINT"{CLR}"
645 PRINTTAB(13)"{3 DOWN}GOODBYE CHARLIE"
650 END
700 PRINT"{CLR}{2 DOWN}SCORE=";INT(SC*DF)
    *10
710 POKE53281,12:PRINT"{7 DOWN}{12 RIGHT}
    YOU MADE IT HOME
720 PRINT:PRINT"{13 RIGHT}SAFE CHARLIE!
730 FORT=1TO2500:NEXT:PRINT"{4 DOWN}
    {13 RIGHT}NEW GAME? Y/N"
735 GETA$ :IFA$=""THEN735
740 IFA$="Y"THENPOKE53281,0:GOTO90
745 GOTO640
800 SC=SC-(INT(SC/10))
805 FORT=1TO4:POKE53281,7:FORD=1TO70:NEXT
    D:POKE53281,0:NEXT:GOSUB225:GOTO 5000
5000 S=13*4096+4*256
5010 FORT=STOS+24:POKET,0:NEXT
5020 POKE S+24,15
5030 POKES+5,16*1+10:POKES+6,16*5 +11
5040 POKES+1,80 :POKES,80
5050 POKES+4;129:FORT=1TO300:NEXT:POKES+4
     ,128
5060 RETURN                                    ©
```


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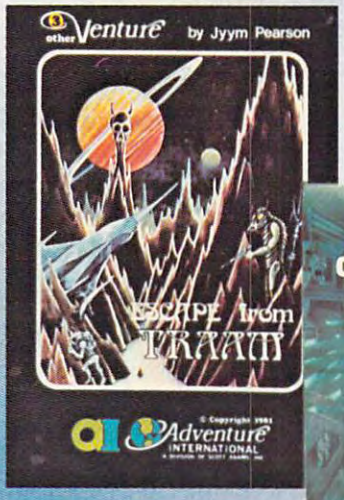

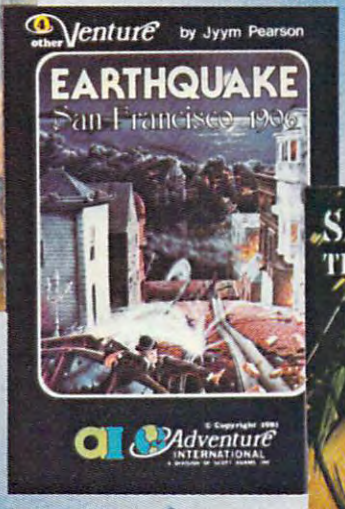

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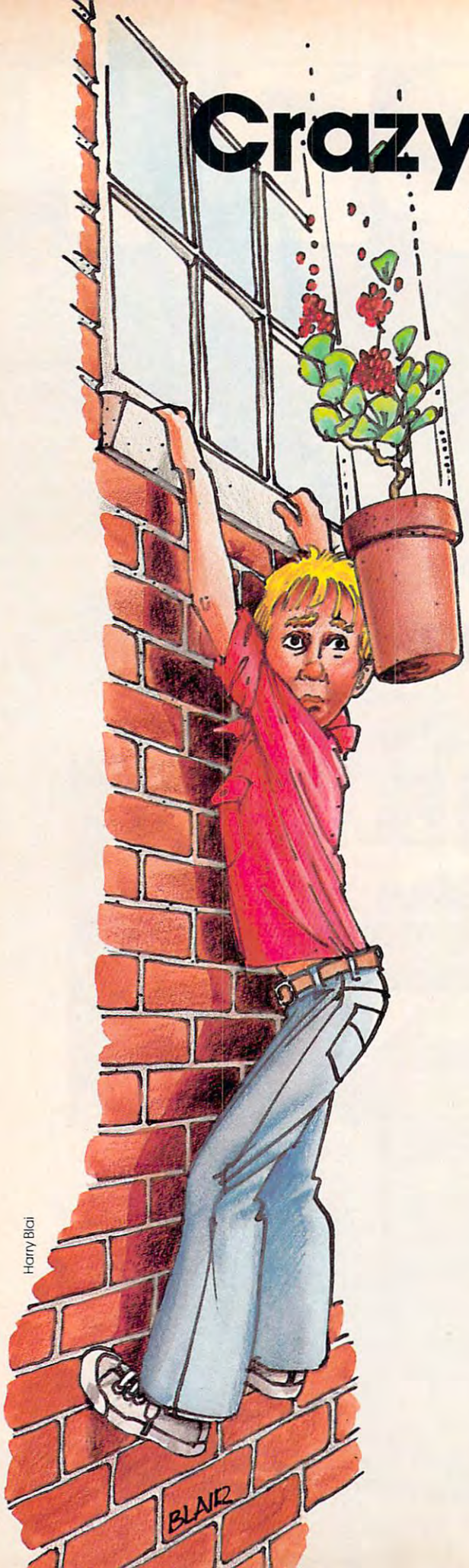
Crazy Climber

Ted Reynolds



Harry Blai

As you scale the side of a building, maneuvering around windows, watch out for the falling flowerpots and attacking birds. Originally written on the VIC with joystick, versions are included for the 64 (with joystick) and the TI-99/4A with Extended BASIC.

"Crazy Climber" is a game requiring manual dexterity and judgment. With a joystick, you control the Crazy Climber as he scales the side of a brick building, avoiding windows and falling objects. The higher he climbs, the higher your score.

The VIC Version

First, type in and save Program 1. Then type in Program 2 and save it immediately following Program 1 on the same tape. When Program 1 is RUN, it will cause Program 2 to be loaded from tape and RUN automatically.

When the game starts, you will see a demonstration of the Crazy Climber in action. After this brief display, he will come to a stop, and you can start play by pressing the fire button.

If the Crazy Climber falls, the game ends and your score is displayed. Simply press the fire button to start another game. The climber will fall if *any* contact is made with a window. It's easy going until your score reaches 100. At this point, you'll have to contend with falling flowerpots. At 300, the flowerpots will stop falling, but you'll have to watch out for birds flying from the left side of the screen. If you reach 600, you've made it to the top of the building, and you start at the bottom of the next building.

The 64 Version

In this version, there are some major differences in play. First, plug the joystick into Port 1. Hit the space bar to start the game. Unlike the VIC version, you can climb onto a window as long as you have some contact with the wall. A variety of objects are tossed down at you – TVs, pianos, barbells, safes (it's one of those wild and crazy apartment buildings) – and they come twice as fast after your score reaches 150.

This version also includes a high score feature. Pressing the space bar will start a new game.

If you'd rather not type in the program, I'll make a copy (VIC version only) if you send a blank tape or disk, SASE, and $3 to:

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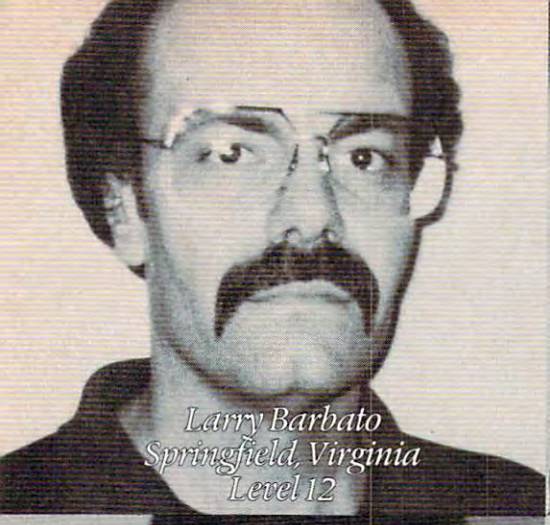

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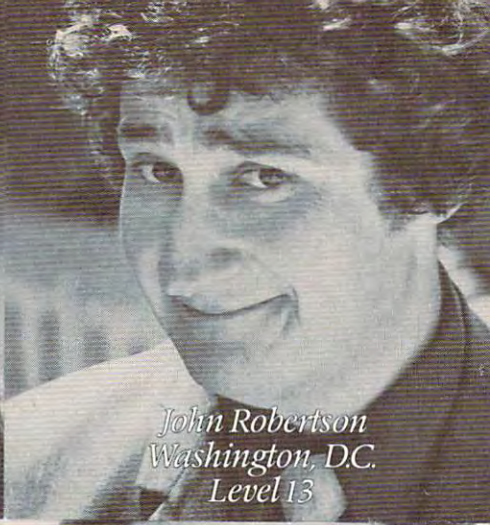
Springfield, Virginia
Level 12

Cindy Horne
Portland, Oregon
Level 11



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Washington, D.C.
Level 13

Mark E. Renne
Bozeman, Montana
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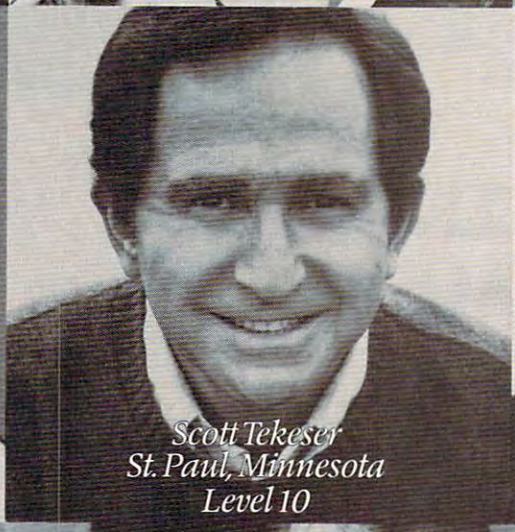

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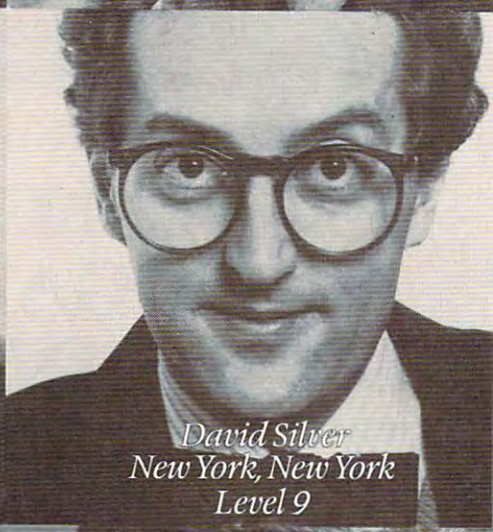

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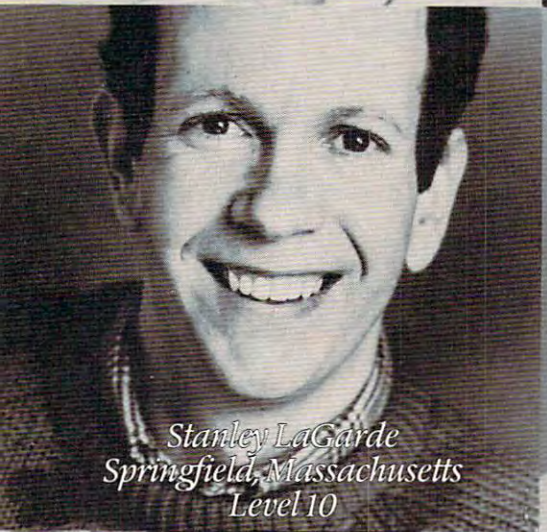

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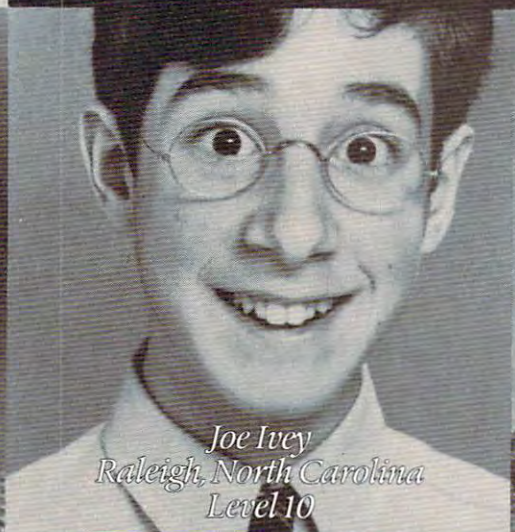

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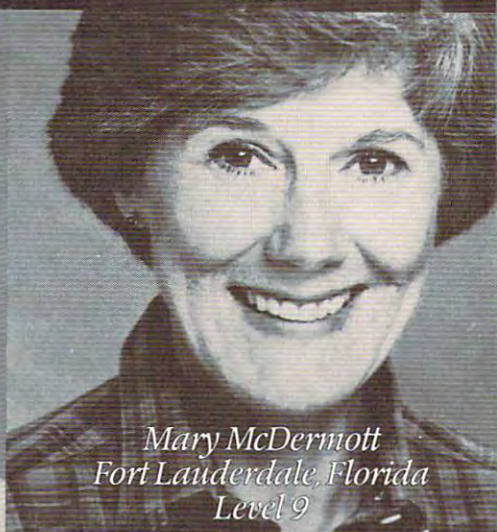

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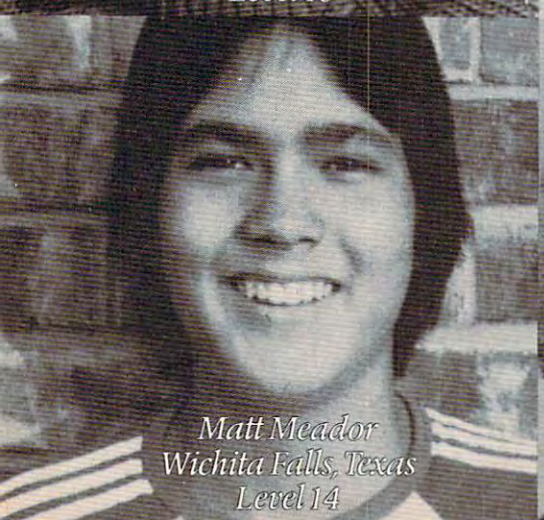

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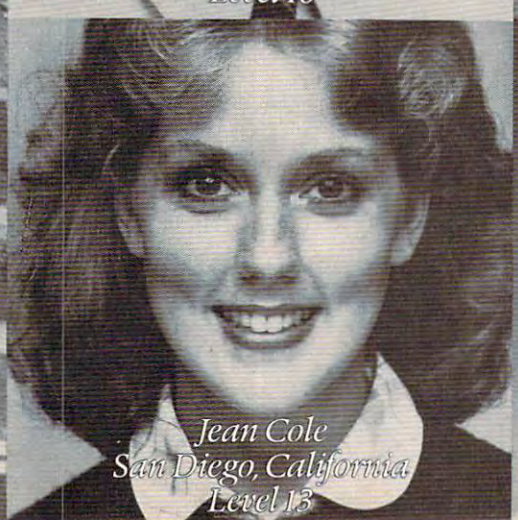

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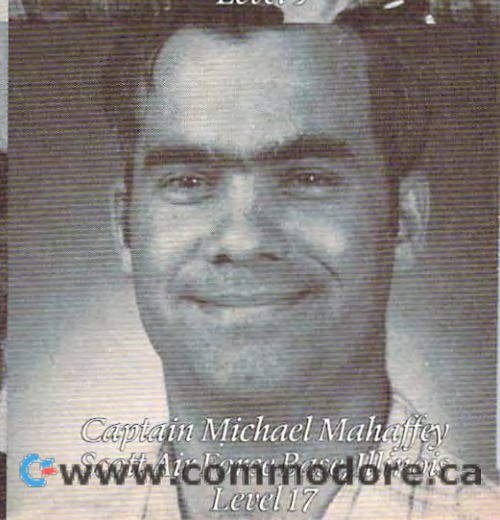

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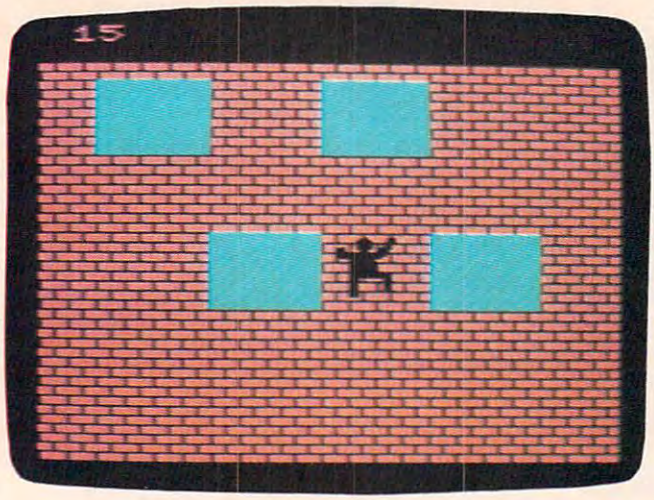

The climber is approaching an open window in the VIC version of "Crazy Climber."

Program 1:
VIC Crazy Climber, BASIC Loader

```
90 POKE56,28:POKE52,28:CLR
100 FORA=7168TO7432:READD:POKEA,D:NEXT
110 PRINT"{CLR}{4 SPACES}"CHR$(34)"CRAZYC
    LIMBER"CHR$(34)
115 POKE631,19:POKE632,131:POKE198,2:NEW
120 DATA0,247,247,247,0,127,127,127,0,119
    ,119,119,0,127,127,127
130 DATA0,247,199,199,0,67,99,97,0,247,22
    7,193,0,65,65,99
140 DATA0,247,227,227,0,71,7,15,0,247,247
    ,247,0,127,113,113
150 DATA0,247,227,193,0,65,65,99,0,247,24
    7,247,0,127,15,15
160 DATA64,170,85,42,60,60,60,24,191,85,1
    70,213,195,195,195,231
170 DATA0,240,244,247,0,127,127,127,0,0,0
    ,0,0,0,0,0
180 DATA0,23,55,247,0,127,127,127,0,240,2
    40,247,0,127,127,127
190 DATA0,0,0,0,0,0,0,0,0,7,7,119,0,127,1
    27,127
200 DATA143,135,195,225,240,0,0,240,255,2
    55,255,255,31,95,15,31
210 DATA0,247,247,247,0,127,127,127,0,0,0
    ,23,0,31,31,31
220 DATA0,7,7,199,0,71,71,71,0,224,224,22
    7,0,99,99,99
230 DATA0,0,0,240,0,120,120,120,0,247,247
    ,247,0,127,127,127
240 DATA255,255,255,255,248,250,240,248,2
    41,225,195,135,15,0,0,15
250 DATA0,247,247,247,0,127,127,127,0,23,
    23,247,0,127,127,127
260 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
270 DATA0,240,240,247,0,127,127,127,255,2
    55,255,255,255,255,255,255
280 DATA0,0,0,0,0,0,0,0,0
```

Program 2: VIC Crazy Climber, Main Program

```
1 BN=1:Z=1:GOTO8
2 PRINT"{HOME}{2 DOWN}";BK$:ONZGOTO27,55
3 PRINT"{HOME}{2 DOWN}";W$:ONZGOTO27,55
4 PRINT"{HOME}{2 DOWN}";W1$:ONZGOTO27,55
5 PRINTBK$:GOTO66
6 PRINTW$:GOTO66
7 PRINTW1$:GOTO66
8 FORA=828TO907:READD:POKEA,D:NEXTA
9 DATA169,233,133,1,169,31,133,2,169,2,13
  3,0,162,242,160,0
10 DATA177,1,160,22,145,1,198,1,169
11 DATA255,197,1,208,2,198,2,202,208,235,
   198,0,208,229,96
12 DATA169,233,133,1,169,151,133,2,169,2,
   133,0,162,242,160,0
13 DATA177,1,160,22,145,1,198,1,169
14 DATA255,197,1,208,2,198,2,202,208,235,
   198,0,208,229,96
15 P1=37151:P2=37152:LC=7922
16 PRINT"{CLR}":POKE36869,255:POKE36879,8
   :X=6:POKE36876,220:POKE37154,127
17 SN=36876:VL=36878
18 A$(1)="{RED}ECD{DOWN}{3 LEFT}MKL{DOWN}
   {2 LEFT}ST{DOWN}{2 LEFT}[":A$(2)="
   {RED}BCG{DOWN}{3 LEFT}JKO{DOWN}
   {3 LEFT}UV{DOWN}{LEFT}↑"
19 W$="{RED}@@{CYN}<<<<{RED}@@@@{CYN}
   <<<<{RED}@@@@@@@"
20 BL$="@@@{DOWN}{3 LEFT}@@@{DOWN}
   {3 LEFT}@@@{DOWN}{3 LEFT}@@@"
21 MP$="{HOME}{11 DOWN}"
22 BK$="{RED}@@@@@@@@@@@@@@@@@@@@@@"
23 W1$="{RED}@@@@@@{CYN}<<<<{RED}@@@@
   {CYN}<<<<{RED}@@@"
24 DN$="{22 DOWN}"
25 PRINT"{DOWN}";:FORA=0TO19:PRINTBK$:NEX
   T
26 PRINT"{HOME}{2 DOWN}":FORA=0TO3:PRINTW
   $:NEXT
27 PRINTMP$;TAB(X+M);A$(1+M):FORA=0TO100:
   NEXT
28 PRINTMP$;TAB(X+M);BL$:SYS828:SYS868:PR
   INT"{HOME}{RVS}";G
29 POKE36878,5:POKE36878,0
30 IFM=0THENM=1:GOTO32
31 IFM=1THENM=0:GOTO32
32 G=G+1:IFG>=50ANDG<58THENPRINT"{HOME}
   {2 DOWN}{RVS}{WHT} C{RED}R{CYN}A{PUR}Z
   {GRN}Y {BLU}C{YEL}L{WHT}I{RED}M{CYN}B
   {PUR}E{GRN}R":GOTO27
33 IFG=58THEN36
34 L=L+1:ONLGOTO2,2,2,2,3,3,3,3,2,2,2,2
35 L=0:GOTO34
36 PRINTMP$;TAB(X+M);A$(1+M)
37 FORA=1TO1000:NEXT:Y=7
38 PRINT"{CLR}{DOWN}":FORA=0TO19:PRINTBK$
   :NEXT
39 PRINT"{HOME}{2 DOWN}":FORA=1TO4:PRINTW
   1$:NEXT
40 PRINT"{HOME}{22 DOWN}";BK$;"{HOME}"
41 PRINTMP$;LEFT$(DN$,Y);TAB(X+M);A$(1+M)
42 IF(PEEK(37151)AND32)<>0THEN42
43 Z=2:G=0
44 J0=-((PEEK(P1)AND16)=0):J1=-((PEEK(P1)
   AND8)=0)
45 J2=-((PEEK(P1)AND4)=0):J3=-((PEEK(P2)A
   ND128)=0)
46 IFG>=100ANDG<299THEN67
47 IFG>=300ANDG<599THEN72
48 IFG>=600THEN77
49 IFPEEK(P1)+PEEK(P2)=373THEN44
50 PRINTMP$;LEFT$(DN$,Y);TAB(X+M);BL$;"
   {HOME}{RVS}";SC
51 IFJ0THENX=X-1:XL=1:IFX<0THENX=0
```


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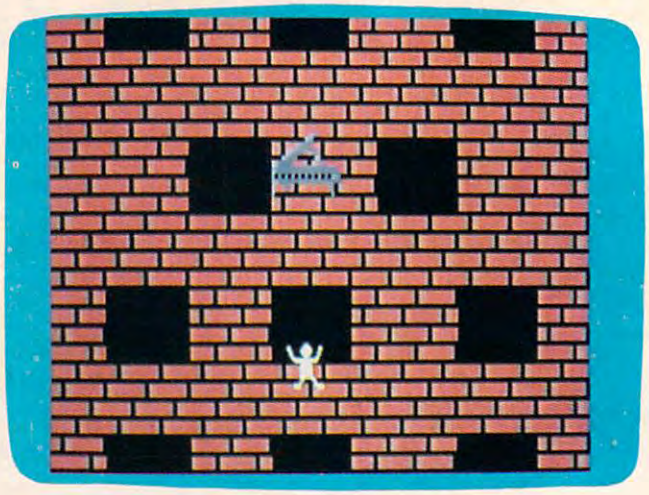
```
52 IFJ1THENG=G-1:SC=SC-1:YL=-1:Y=Y+1:IFY>
   7THENY=7:G=G+1:SC=SC+1
53 IFJ2THENG=G+1:SC=SC+1:YL=1:Y=Y-1:IFY<Ø
   THENY=Ø:GOTO59
54 IFJ3THENX=X+1:XL=-1:IFX>17THENX=17
55 M=(255-M)AND1:POKE36878,5:POKE36878,Ø
56 ZX=LC+X+M+(22*Y)
57 IFPEEK(ZX)ORPEEK(ZX+2)ORPEEK(ZX+66)ORP
   EEK(ZX+68)THEN63
58 PRINTMP$;LEFT$(DN$,Y);TAB(X+M);A$(1+M)
   :GOTO44
59 SYS828:SYS868:IFPT=1THENPP=PP+22:PM=PM
   +1
60 IFBD=1THENBP=BP+22
61 L=L+1:ONLGOTO2,2,2,2,3,3,3,3,2,2,2,2,4
   ,4,4,4
62 L=Ø:GOTO61
63 PRINT"{HOME}{22 DOWN}";:POKESN,250:POK
   EVL,10:FORA=1TOG
64 L=L+1:ONLGOTO6,6,6,6,5,5,5,5,7,7,7,7,5
   ,5,5,5
65 POKESN,PEEK(SN)-1:L=Ø:GOTO64
66 NEXTA:PRINT"{CLR}":X=6:L=Ø:POKESN,220:
   POKEVL,Ø:PRINT"{RVS}{WHT}SCORE:"G"
   {RED}":SC=SC-G:GOTO37
67 IFPT=1THENPM=PM+1:IFPM=>20THENPT=Ø:PM=
   Ø:POKEPP,PL
68 IFPT=ØTHENPP=INT(RND(1)*21)+7724:PT=1:
   PL=PEEK(PP)
69 POKEPP,PL:PP=PP+22:PL=PEEK(PP)
70 IFPL<>31ANDPL<>ØTHENPL=Ø:PP=7746:GOTO6
   3
71 POKEPP,9:GOTO49
72 IFBD=1THENBH=BH+1:IFBH>=19THENBD=Ø:BH=
   Ø:POKEBP,BL:POKEBP-1,B1
73 IFBD=ØTHENBP=INT(RND(1)*10)*22+7725:BD
   =1:BL=PEEK(BP):B1=PEEK(BP-1)
74 POKEBP,BL:POKEBP-1,B1:BP=BP+1:BL=PEEK(
   BP):B1=PEEK(BP-1)
75 IFBL<>31ANDBL<>ØTHENBL=Ø:BP=7746:GOTO6
   3
76 POKEBP,17:POKEBP-1,16:GOTO49
77 PRINT"{CLR}":POKE36869,240:BN=BN+1
78 PRINT"{3 RIGHT}YOU MADE IT!!":PRINT"NO
   W FOR BUILDING #";MID$(STR$(BN),2)
79 FORA=1TO2500:NEXT:POKE36869,255:GOTO37
```

Program 3: Crazy Climber, 64 Version

By Gregg Peele, Assistant Programming Supervisor

```
100 GOTO190
110 S=54272:FORE=STOS+28:POKEE,Ø:NEXT
120 POKE54296,15 :POKE54277, 51 :POKE5427
    8, 252
130 POKE 54276, 129 :POKE 54273, 10 :POKE
    54272, 100
140 FORT=1TO 200:NEXT:POKE54276,128:RETUR
    N
150 S=54272:FORE=STOS+28:POKEE,Ø:NEXT
160 POKE54296,15 :POKE54277,52 :POKE54278
    ,244
170 POKE 54276,17:POKE54272,2:RETURN
180 FORHG=200TO0STEP-1:POKE54273,HG:NEXT
190 POKE53281,1:POKE646,Ø:SC=Ø:HS=Ø
200 TI$="000000"
210 PRINT"{CLR}"SPC(3)"ENTERING NECESSARY
     DATA FOR SPRITES"
220 PRINTSPC(8)"AND MACHINE LANGUAGE"
230 PRINT"{14 DOWN}{2 RIGHT}TAKE A BREAK
    {SPACE}FOR ABOUT FOUR MINUTES"
240 POKE2,Ø:POKE191,48
```



A piano is about to fall on the climber in the 64 version of "Crazy Climber."

```
250 K=43008:L=1024
260 FORT=12288TO13312+4*LSTEP3:POKET,239:
    POKET+1,239:POKET+2,250
270 PRINT"{HOME}";SPC(16)"{7 DOWN}";RIGHT
    $(TI$,3):NEXT
280 FORR=1TO24
290 READ DA
300 FORT=DA TO DA+5:POKET,32:POKET+40,32:
    POKET+80,32:POKET+120,32
310 NEXT:PRINT"{HOME}";SPC(16)"{7 DOWN}";
    RIGHT$(TI$,3):NEXT
320 DATA12332,12344,12358,12698,12712,130
    12,13024,13038
330 DATA13332,13344,13358,13698,13712,140
    12,14024,14038
340 DATA14332,14344,14358,14698,14712,150
    12,15024,15038
350 D1=Ø:D2=128:GOSUB620:GOSUB950:D1=64:D
    2=-128:GOSUB660:GOSUB1460:POKE50688,1
360 PRINT"{CLR}";:SYS49152:POKE53248,160:
    SYS49517
370 V=53248:SC=Ø:POKEV+21,255:POKEV+1,215
380 V=53248:POKEV+39,1:IFPEEK(700)=ØTHENS
    1=13:S2=15:POKE53272,20
390 IFSC>50ANDPEEK(V+1)>99AND((PEEK(56321
    )AND15)=14)THENPOKEV+1,(PEEK(V+1)-.3)
400 IF((PEEK(53278)AND1)OR(PEEK(53279)AND
    1)=Ø)THENQ=1:GOTO560
410 POKE700,Ø
420 IFSC>150THENPOKE50688,Ø
430 SYS49152+24
440 IFPEEK(52993)<20THENPOKE2041,228+RND(
    Ø)*4:POKEV+40,(PEEK(2041)-228)+4
450 POKEV+23,(PEEK(V+23)OR2):POKEV+29,(PE
    EK(V+29)OR2)
460 TR=ER:ER=RND(Ø)*320+24:IFPEEK(52993)<
    230THENER=TR
470 IF ER>255THENIFER-255<30THENPOKEV+16,
    (PEEK(V+16)OR2):POKEV+2,ER-255
480 IF ER<=255THENPOKEV+2,ER:POKEV+16,(PE
    EK(V+16)AND253)
490 IF(PEEK(56321)AND15)<>15THENPOKE2040,
    S1:POKE54296,5:POKE54296,Ø
500 IF((PEEK(53278)AND1)OR(PEEK(53279)AND
    1)=Ø)THENQ=1:GOTO560
510 POKEV+29,(PEEK(V+29)OR2):POKEV+23,(PE
    EK(V+23)OR2)
```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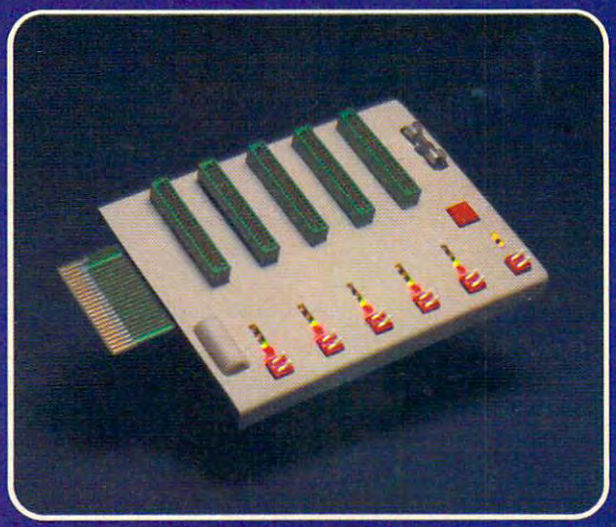

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```
520 IF(PEEK(56321)AND15)=15THENPOKE2040,1
    1
530 IFPEEK(700)THENS1=14:S2=11
540 IF((PEEK(53278)AND1)OR(PEEK(53279)AND
    1)=0)THENQ=1:GOTO560
550 Q=0:GOTO590
560 POKEV+21,PEEK(V+21)AND1
570 GOSUB150:FORT=1TO100:SYS49469:POKEV+1
    ,(PEEK(V+1)+1)AND230
580 POKE54273,ABS(T-100):NEXT:Q=0:POKE532
    78,0:GOSUB110:GOSUB1360
590 POKEV+21,255:SYS49152+24
600 IF(PEEK(56321)AND15)<>15THENPOKE2040,
    S2:SC=SC+1
610 GOTO380
620 I1=832
630 READ A:IF A=256 THEN 660
640 PRINT"{HOME}";SPC(16)"{7 DOWN}";RIGHT
    $(TI$,3)
650 POKE I1,A:I1=I1+1:GOTO 630
660 FORI=0TO20
670 FORJ=2TO0STEP-1
680 PRINT"{HOME}";SPC(16)"{7 DOWN}";RIGHT
    $(TI$,3)
690 M1=832+D1+I*3+J:M2=832+D2+I*3+(2-J)
700 FORK=7TO0STEP-1
710 PRINT"{HOME}";SPC(16)"{7 DOWN}";RIGHT
    $(TI$,3)
720 B1=2↑K:B2=2↑(7-K)
730 V=-((PEEK(M1)ANDB1)<>0)
740 POKEM2,PEEK(M2)OR(B2*V)
750 NEXTK,J,I:RETURN
760 DATA 0,0,0,0,56,0,0
770 DATA 124,6,0,254,6,0,254
780 DATA 12,0,124,12,0,56,24
790 DATA 7,255,240,15,255,224,24
800 DATA 254,0,96,254,0,192,254
810 DATA 0,0,254,0,0,254,0
820 DATA 0,255,224,1,255,240,3
830 DATA 0,24,6,0,14,12,0
840 DATA 14,120,0,0,120,0,0
850 DATA 122,0,0,0,0,56,0
860 DATA 48,124,6,48,254,6,24
870 DATA 254,12,24,124,12,12,56
880 DATA 24,15,255,240,7,255,224
890 DATA 0,254,0,0,254,0,0
900 DATA 254,0,0,254,0,0,254
910 DATA 0,0,254,0,1,254,0
920 DATA 3,6,0,6,3,0,124
930 DATA 1,224,120,1,224,0,0
940 DATA 0,122,0,256
950 I=14592
960 READ A:IF A=256 THEN RETURN
970 PRINT"{HOME}";SPC(16)"{7 DOWN}";RIGHT
    $(TI$,3)
980 POKE I,A:I=I+1:GOTO 960
990 DATA 0,0,0,0,6,0,0
1000 DATA 28,0,0,120,0,0,252
1010 DATA 0,3,230,0,15,131,0
1020 DATA 62,1,128,127,255,248,127
1030 DATA 255,252,85,85,92,127,255
1040 DATA 252,68,0,20,68,0,20
1050 DATA 64,0,16,0,0,0,0
1060 DATA 0,0,0,0,0,0,0
1070 DATA 0,0,0,0,0,0,0
1080 DATA 0,255,255,224,191,255,160
1090 DATA 192,0,96,223,255,96,223
1100 DATA 255,96,223,255,108,223,255
1110 DATA 124,223,31,248,222,15,224
1120 DATA 222,15,96,223,31,96,223
1130 DATA 255,96,223,255,96,223,255
1140 DATA 96,223,255,96,223,255,96
1150 DATA 128,0,32,255,255,224,224
1160 DATA 0,224,224,0,224,224,0
1170 DATA 224,255,0,0,0,0,0
1180 DATA 0,0,0,0,0,0,0
1190 DATA 0,0,0,0,0,0,16
1200 DATA 0,8,56,0,28,56,0
1210 DATA 28,255,255,255,255,255,255
1220 DATA 56,0,28,56,0,28,16
1230 DATA 0,8,0,0,0,0,0
1240 DATA 0,0,0,0,0,0,0
1250 DATA 0,0,0,0,0,0,0
1260 DATA 0,0,0,0,0,0,4
1270 DATA 0,32,2,0,64,1,0
1280 DATA 128,0,129,0,0,66,0
1290 DATA 0,36,0,15,255,240,8
1300 DATA 0,80,8,255,16,9,255
1310 DATA 144,9,153,144,9,231,144
1320 DATA 9,189,144,9,195,144,8
1330 DATA 255,16,8,0,16,15,255
1340 DATA 240,3,0,192,3,0,192
1350 DATA 3,0,192,0,159,256
1360 POKEV+21,0
1370 POKE53281,1:PRINTCHR$(147);"{BLK}
     {7 DOWN}{10 RIGHT}YOU HAVE FALLEN"
1380 PRINT"{9 RIGHT}{3 DOWN}YOUR SCORE WA
     S ";SC:IF SC>HSTHENHS=SC
1390 PRINT"{9 RIGHT}{3 DOWN}HIGH SCORE WA
     S ";HS
1400 PRINT"{DOWN}{7 RIGHT}{4 INST}HOLD FI
     RE TO PLAY AGAIN"
1410 FORT=1TO1000:GETA$:POKE198,0:NEXT
1420 POKE2,0:POKE191,48
1430 IFPEEK(V+3)>30THEN1430
1440 IFPEEK(197)=64ANDPEEK(V+3)>30THEN144
     0
1450 POKE50688,1:SYS49152:POKEV+21,255:GO
     TO370
1460 I=49152
1470 READ A:IF A=256 THEN RETURN
1480 PRINT"{HOME}";SPC(16)"{7 DOWN}";RIGH
     T$(TI$,3)
1490 POKE I,A:I=I+1:GOTO1470
1500 DATA 169,48,133,254,169,0,133
1510 DATA 253,141,252,207,141,253,207
1520 DATA 165,253,141,254,207,165,254
1530 DATA 141,255,207,173,254,207,133
1540 DATA 253,173,255,207,133,254,160
1550 DATA 0,177,253,153,0,4,200
1560 DATA 208,248,230,254,160,0,177
1570 DATA 253,153,0,5,200,208,248
1580 DATA 230,254,160,0,177,253,153
1590 DATA 0,6,200,208,248,230,254
1600 DATA 160,0,177,253,153,0,7
1610 DATA 200,192,232,208,246,173,1
1620 DATA 220,41,15,201,13,208,44
1630 DATA 24,169,40,109,254,207,141
1640 DATA 254,207,169,0,109,255,207
1650 DATA 141,255,207,56,173,254,207
1660 DATA 233,0,133,2,173,255,207
1670 DATA 233,52,5,2,144,10,169
1680 DATA 48,141,255,207,169,0,141
1690 DATA 254,207,173,1,220,41,15
1700 DATA 201,14,208,51,56,173,254
1710 DATA 207,233,40,141,254,207,173
1720 DATA 255,207,233,0,141,255,207
1730 DATA 56,173,254,207,233,0,133
1740 DATA 2,173,255,207,233,48,5
1750 DATA 2,176,17,24,173,254,207
1760 DATA 105,232,141,254,207,173,255
1770 DATA 207,105,3,141,255,207,169
```


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```
1780 DATA 216,133,252,169,0,133,251
1790 DATA 169,10,160,0,162,4,145
1800 DATA 251,200,208,251,230,252,202
1810 DATA 208,246,169,0,141,33,208
1820 DATA 173,1,220,41,15,201,7
1830 DATA 208,36,173,16,208,41,1
1840 DATA 240,7,173,0,208,201,60
1850 DATA 176,22,24,173,0,208,105
1860 DATA 16,141,0,208,173,16,208
1870 DATA 105,0,141,16,208,169,1
1880 DATA 141,188,2,173,1,220,41
1890 DATA 15,201,11,208,36,173,16
1900 DATA 208,41,1,208,7,173,0
1910 DATA 208,201,32,144,22,56,173
1920 DATA 0,208,233,16,141,0,208
1930 DATA 173,16,208,233,0,141,16
1940 DATA 208,169,1,141,188,2,96
1950 DATA 76,24,192,24,169,40,109
1960 DATA 254,207,141,254,207,169,0
1970 DATA 109,255,207,141,255,207,56
1980 DATA 173,254,207,233,0,133,2
1990 DATA 173,255,207,233,52,5,2
2000 DATA 144,10,169,48,141,255,207
2010 DATA 169,0,141,254,207,76,24
2020 DATA 192,120,169,122,141,20,3
2030 DATA 169,193,141,21,3,88,96
2040 DATA 165,161,166,161,142,0,207
2050 DATA 165,161,205,0,207,240,5
2060 DATA 169,0,141,1,207,238,1
2070 DATA 207,173,1,207,141,3,208
2080 DATA 173,0,198,208,9,238,1
2090 DATA 207,173,1,207,141,3,208
2100 DATA 76,49,234,256
```

Program 4: Crazy Climber For The TI-99/4A

Extended BASIC Version by Pat Parrish, Programming Supervisor

```
100 DIM D(7),E(7),G(4),C$(4)
110 GOTO 140
120 REM RANDOMLY PICK WINDOW & PRIN
    T SINISTER MAN
130 V=INT(RND*8):: CALL DELSPRITE(#
    1):: CALL SPRITE(#4,96,2,D(V)*8
    +1,E(V)*8+1):: R=-1 :: Q=-1 ::
    RETURN
140 HS=0 :: RANDOMIZE
150 GOSUB 480
160 GOSUB 790
170 GOSUB 670
180 T=0 :: U=.1 :: Q=0 :: R=0 :: SC
    =0 :: B=112 :: Z=-3 :: ROW=13 :
    : COL=15
190 CALL SPRITE(#2,B,2,ROW*8+1,COL*
    8+1)
200 IF R THEN CALL SPRITE(#1,G(INT(
    RND*5)),INT(RND*14)+3,(D(V)+4)*
    8+1,E(V)*8+1,15,0):: SC=SC+10 :
    : R=0 :: CALL DELSPRITE(#4)
210 IF (RND<U)*(R=0)*(Q=0)THEN GOSU
    B 130
220 CALL KEY(0,K,ST)
230 IF K=69 THEN ROW=ROW-1 :: IF (R
    OW=-1)THEN ROW=23 :: SC=SC+100
    :: U=U+SGN(1-U)/20 :: GOTO 280
    ELSE 280
240 IF K=83 THEN COL=COL-SGN(COL-2)
    *2 :: GOTO 280
250 IF K=68 THEN COL=COL+SGN(26-COL
    )*2 :: GOTO 280
260 IF K=88 THEN ROW=ROW+1 :: IF (R
    OW=24)THEN ROW=0 :: SC=SC-100 :
    : GOTO 280 ELSE 280
270 GOTO 290
280 B=228-B :: Z=197-Z :: CALL SPRI
    TE(#2,B,2,ROW*8+1,COL*8+1):: CA
    LL SOUND(10,Z,2)

290 CALL COINC(ALL,C1):: IF C1 THEN
     320
300 CALL POSITION(#1,XROW,XCOL):: I
    F XROW<180 THEN 200
310 CALL DELSPRITE(#1):: Q=0 :: GOT
    O 200
320 T=1 :: V=2 :: CALL DELSPRITE(#1
    ):: CALL SAY("UHOH"):: REM REMO
    VE "CALL SAY" IF W/OUT SPEECH S
    YNTHESIZER
330 IF TP THEN T=40
340 CALL SPRITE(#2,108,2,ROW*8+1,CO
    L*8+1,25,0):: FOR I=1 TO 95 ::
    NEXT I :: CALL MOTION(#2,10,0)
```

TI-99/4A Version Notes

Pat Parrish, Programming Supervisor

In the TI-99/4A version of this game (written in Extended BASIC), you are the Crazy Climber, scrambling up the face of a building while avoiding numerous objects (piano, iron, broom, safe, barbells) tossed from the windows above. These objects are actually *hurled* down upon you by a relentless, sinister fellow who appears just briefly before throwing each object. If you are quick, you can dodge these oncoming objects. No one knows why he throws things; it's a quirk. Be ready to meet the challenge. For as the game progresses, the villain strikes with greater frequency.

In this game, you move the Crazy Climber over a stationary building with the E, S, D, and X keys. The screen will wrap around when you reach the top or bottom. A hundred points are awarded for crossing the top of the screen, while an equal number are deducted for crossing the bottom. In addition, ten points are given for each falling object that you avoid.

The game ends when you are hit by a falling object or are pushed from a window by the villain. Thus, you are allowed to climb over windows in this version, but you're taking a chance. If the villain emerges while you are in a window, it's curtains for you. (You'll be relieved to discover that the Crazy Climber carries a parachute.)

One line in this program requires that you have a TI Speech Synthesizer connected to your TI-99/4A. If you don't have this peripheral, remove the CALL SAY("UHOH") statement in line 320.

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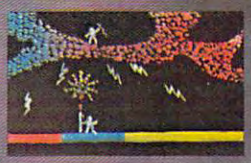

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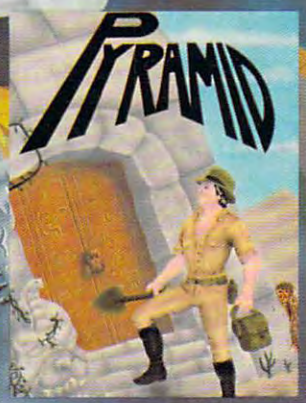

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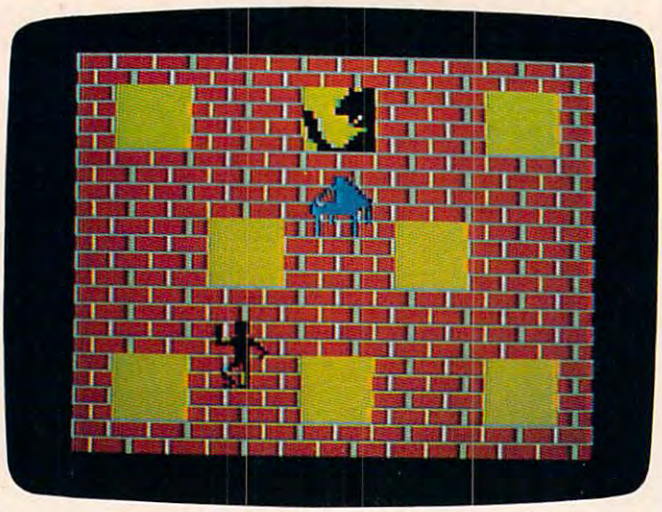

TI version of "Crazy Climber."

```
350 CALL SOUND(-50,-7,2):: CALL SPR
    ITE(#3,104,16,(ROW+2)*8+1,COL*8
    +1,10,0)
360 CALL SOUND(80,5000-T*40,V):: T=
    T+1 :: IF T<65 THEN 360
370 CALL POSITION(#1,DR,DC,#3,CR,CC
    ):: IF DR>192 THEN CALL DELSPRI
    TE(#1)
380 IF CR>165 THEN CALL DELSPRITE(#
    2,#3):: GOTO 400
390 GOTO 360
400 IF TP THEN GOTO 910
410 CALL DELSPRITE(ALL):: FOR L=1 T
    O 100 :: NEXT L :: CALL CLEAR :
    : CALL SCREEN(14)
420 DISPLAY AT(10,5):"YOUR SCORE :
    ";SC
430 IF SC>HS THEN HS=SC
440 DISPLAY AT(13,5):"HIGH SCORE :
    ";HS
450 DISPLAY AT(16,5):"PLAY AGAIN ?
    " :: ACCEPT AT(16,19)BEEP VALID
    ATE("YN")SIZE(1):ANS$
460 IF ANS$="Y" THEN 170
470 STOP
480 REM DEFINE CUSTOM CHAR
490 FOR I=120 TO 121
500 READ A$
510 CALL CHAR(I,A$)
520 NEXT I
530 DATA FF8080808080808080,FF0101010
    1010101
540 CALL MAGNIFY(4):: CALL CHAR(100
    ,"")
550 CALL CHAR(112,"03232321273F0303
    0303060810080409808080000C0E0908
    8908080808080808080")
560 CALL CHAR(116,"0101010003070911
    0901010101010101C0C4C484E4FCC0C
    0C0C0601008102090")
570 FOR I=0 TO 4 :: READ C$(I):: G(
    I)=124+4*I :: CALL CHAR(G(I),C$
    (I)):: NEXT I
580 DATA 2070FF702000000000000000000
    0000000040EFF0E040000000000000000
    0000000
590 DATA 000000003F3F3F3F3F3F3F3F3F
    3F3030000000000F8F8F9DAFCF8F8F8F
    8F81818
600 DATA 000001010305091127 3F3F1212
    1010100000C0E0F0F8FCFEFEFAF2121
    2101010
610 DATA 0300000F0F0F1F0000000000000
    000000E02020E0F0F0F8000000000000
    0000000
620 DATA 0000000000000000001031E3C7C
    FCF87001030606C183060C0800000000
    0000000
630 CALL CHAR(104,"01070F1F1F151008
    0804040202010100 80E0F0F8F858081
    0102020404080800 0")
640 CALL CHAR(108,"0204050701010101
    0202020600000000804040C0808080 8
    0404040600000000 0")
650 CALL CHAR(96,"0000000000001C1C0E
    0E0607070381C1F273F7FFFFFFFF37
    2F1F030F1F3F7FFF")
660 RETURN
670 CALL COLOR(12,1,1):: CALL COLOR
    (9,1,1):: REM SET UP WALL
680 CALL CLEAR :: CALL SCREEN(2)::
    ROW$="xyxyxyxyxyxyxyxyxyxyxyxyxy
    xy"
690 ROW2$="yxyxyxyxyxyxyxyxyxyxyxyx
    yxyx"
700 FOR ROW=1 TO 23 STEP 2 :: DISPL
    AY AT(ROW,1):ROW$ :: NEXT ROW
710 FOR ROW=2 TO 24 STEP 2 :: DISPL
    AY AT(ROW,1):ROW2$ :: NEXT ROW
720 FOR ROW=3 TO 6 :: FOR COL=5 TO
    25 STEP 10 :: CALL HCHAR(ROW,CO
    L,100,4):: NEXT COL :: NEXT ROW
730 FOR ROW=19 TO 22 :: FOR COL=5 T
    O 25 STEP 10 :: CALL HCHAR(ROW,
    COL,100,4):: NEXT COL :: NEXT R
    OW
740 FOR ROW=11 TO 14 :: FOR COL=10
    TO 20 STEP 10 :: CALL HCHAR(ROW
    ,COL,100,4):: NEXT COL :: NEXT
    ROW
750 CALL COLOR(12,15,7):: CALL COLO
    R(9,1,11)
760 E(0)=4 :: E(1)=14 :: E(2)=24 ::
     E(3)=9 :: E(4)=19 :: E(5)=4 ::
     E(6)=14 :: E(7)=24
770 D(0)=2 :: D(1)=2 :: D(2)=2 :: D
    (3)=10 :: D(4)=10 :: D(5)=18 ::
     D(6)=18 :: D(7)=18
780 RETURN
790 REM TITLE PAGE
800 CALL CLEAR :: CALL SCREEN(15)
810 ROW$="xyxyxyxyxy" :: ROW2$="yxy
    xyxyxyx"
820 CALL COLOR(12,15,15)
830 FOR ROW=7 TO 23 STEP 2 :: DISPL
    AY AT(ROW,2):ROW$ :: NEXT ROW
840 FOR ROW=8 TO 24 STEP 2 :: DISPL
    AY AT(ROW,2):ROW2$ :: NEXT ROW
850 CALL COLOR(12,15,7)
860 DISPLAY AT(6,19):"T H E" :: DIS
    PLAY AT(8,17):"C R A Z Y" :: DI
    SPLAY AT(10,15):"C L I M B E R"
870 FOR I=1 TO 100 :: NEXT I :: B=1
    16 :: Z=200 :: ROW=19 :: COL=6
880 CALL SPRITE(#2,B,2,ROW*8+1,COL*
    8+1):: CALL SOUND(10,Z,2)
```


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```
890 B=228-B :: Z=197-Z :: ROW=ROW-1
     :: FOR I=1 TO 50 :: NEXT I ::
    IF ROW>1 THEN 880
900 TP=-1 :: GOTO 320
910 TP=0 :: DISPLAY AT(16,13):"USE
    E,S,X,D KEYS" :: DISPLAY AT(17,
    13):"TO AVOID FALLING"
920 DISPLAY AT(18,13):"OBJECTS." ::
     DISPLAY AT(20,16):"GOOD LUCK!"
930 FOR I=1 TO 1000 :: NEXT I :: CA
    LL DELSPRITE(#2):: RETURN
940 END                          ©
```


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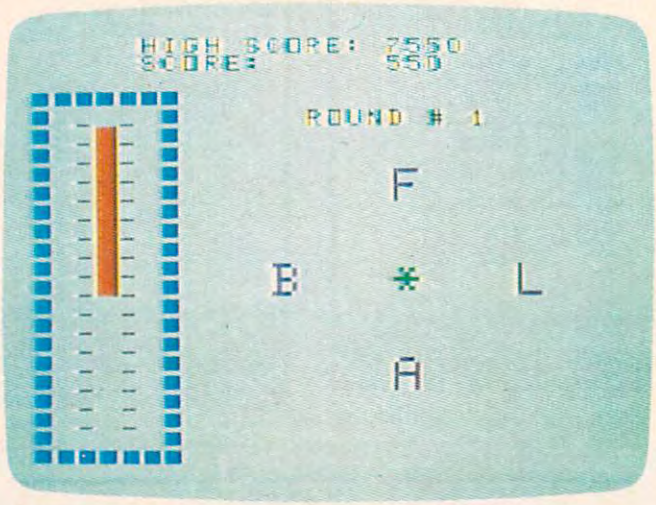
ALPHA BLAST

Dave Miller



Color Computer version of "Alpha Blast."

A test of judgment, speed, and accuracy, this game is a good educational tool for children and fun for adults. Originally written for the Atari, versions are also included for the VIC, TI-99/4A (with Extended BASIC), and Color Computer. Joystick required (optional for TI version).

This game is fun to play and will also sharpen your alphabetizing skills. How many times do you find yourself saying, "Q, R, S, T, U – yes, T comes before U"? I know I've often said it.

The object of "Alpha Blast" is to shoot the four letters displayed on the screen in alphabetical order. Sounds simple enough, but it isn't. And to make it more difficult, you're being timed. For each correct answer you are awarded points based on the internal character set value. Since I am using lowercase letter values, an A would give you 97 points, G would give you 103 points, and so on. If you fail to shoot a letter in the correct order, the value of that letter will be subtracted from your score. If you get all four letters right, you will advance to the next round with new letters to shoot and less time in which to do it. If time runs out before you complete a round, the game ends, giving you a final score and the high score.

This program uses a redefined character set for the gun you use to shoot the characters. Memory location 20 is the timer. You may safely remove lines which contain only REMarks (no GOTOs will reference them).

A challenge: See if you can get past round 25.

Program 1: Alpha Blast – Atari

```
100 GOSUB 630:REM TITLE ROUTINE
110 GOSUB 690:REM REDEFINE CHSET
120 DIM N(4):HIGH=0
130 ROUND=0:SCORE=0:TIME=50
140 GRAPHICS 18:POKE 756,CHSET/256:S
    ETCOLOR 2,6,5:SETCOLOR 0,0,10:SE
    TCOLOR 1,9,6:LASTNUM=0
141 POSITION 15,6:? #6;SCORE
145 REM **** USE INVERSE CONTROL 'F'
     IN 1ST PRINT
150 FOR T=1 TO 10:POSITION 2,T:? #6;
    "{■}":POSITION 1,T:? #6;"_":NEXT
     T
165 REM **** USE INVERSE '*' FOR PRI
    NT
170 POSITION 10,6:? #6;"■":SCRN=PEEK
    (88)+256*PEEK(89):ROUND=ROUND+1:
    POSITION 7,0:? #6;"ROUND ";ROUND
180 TIME=TIME-2:REM SET INCREMENT FO
    R TIMER
185 REM **** RANDOM LETTER GENERATOR
190 N(1)=INT(RND(0)*26)+97:POKE SCRN
    +46,N(1)
200 N(2)=INT(RND(0)*26)+97:POKE SCRN
    +54,N(2):IF N(2)=N(1) THEN 200
210 N(3)=INT(RND(0)*26)+97:POKE SCRN
```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