

The Year Ahead: Interviews With Industry Experts

# COMPUTE!

\$2.50  
August  
1983  
Issue 39  
Vol. 5, No. 8  
\$1.85 UK \$3.25 Canada  
63379  
ISSN 0194-357X

The Leading Magazine Of Home, Educational, And Recreational Computing

## Summer Consumer Electronics Show New Products And Computers For Fall

**First Math And Clues:  
Educational Games  
For Your  
Home Computer**

**Weather Forecasting  
For Timex/Sinclair,  
VIC-20, TRS-80 Color  
Computer, Commodore 64,  
PET/CBM, And Apple**

**Tape Verification  
For The Atari**

**Plotting On  
The Apple**

**Ready To Play Games  
For VIC-20, Atari,  
TI-99/4A, Commodore 64  
And Others**

**Plus Reviews,  
Tutorials, New Products**



YEP, THAT'S TAPE ALRIGHT.



COUGH!

BLAIR





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# GUIDE TO ARTICLES AND PROGRAMS

VIAT  
VI64/TI/C/AP  
AT/64  
P/VI64/TI  
TI

V  
AT  
V  
TI  
64  
AT  
P  
C  
T/S

AT  
TI

P

V  
AT  
A  
V  
64

VI64  
AT  
C

VI64  
AT  
V

AP  
64

FORTH

AT  
V  
V  
FORTH

AP, Apple AT, Atari, P, PET/CBM, V, VIC-20, C, Radio Shack Color Computer, 64 Commodore 64, T/S, Timex/Sinclair, TI, Texas Instruments. \*All or several of the above.

**COMPUTE! The Journal for Progressive Computing** (USPS: 537250) is published 12 times each year by COMPUTE! Publications, Inc., P.O. Box 5406, Greensboro, NC 27403 USA. Phone: (919)275-9809. Editorial Offices are located at 505 Edwardia Drive, Greensboro, NC 27409. Domestic Subscriptions: 12 issues, \$20.00. Send subscription orders or change of address (P.O. form 3579) to Circulation Dept., **COMPUTE!** Magazine, P.O. Box 5406, Greensboro, NC 27403. Second class postage paid at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright © 1983 by COMPUTE! Publications, Inc. All rights reserved. ISSN 0194-357X.

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the device number via software is to turn on one of the drives and the computer, load and run the "DISK ADDR CHANGE" program on the demonstration diskette supplied with the drive, then turn on the other drive (which will then be device 8).

Since Commodore's standard device number for disk drives is 8, software that reads or writes to disk will probably make this assumption, which means that to use those programs without modification you'll have to use only the first drive. Having multiple drives becomes profitable at the point where the convenience of not having to constantly switch disks becomes worth the cost of a second drive. The example you cited, using one drive for programs and the second for data files, is a very common one. Also, some tasks, such as duplicating disks, are inherently less complicated when you have more than one drive.

For dual drive units such as Commodore's 4040 and 8050, both drives have the device number 8. To distinguish between them, one is designated as drive 0 and the other as drive 1. Drive numbers are not truly relevant to single drives (where the unit is always drive 0); however, this feature was retained in the DOS (disk operating system) for the 1541 to maintain compatibility with the Commodore dual drives, and to leave open the possibility of dual drive units for the VIC and 64.

It is possible to copy whole disks from one 1541 to another as long as the device number of one of them has been changed. A program called "COPY/ALL" by **COMPUTE!** Associate Editor Jim Butterfield, which copies the contents of a disk in device 8 to a disk in device 9, is provided on the demonstration disk which comes with the 1541 drive.

---

## More On TI Memory

Many owners of the TI-99/4A would be interested in determining the exact amount of available memory (in bytes). This two-line program is very simple and can save a lot of hair pulling when you write programs which fill the memory. Here is the program:

### STEP 1

Enter the following:

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

Do not use a variable that has already appeared in the program. For example, if you have used the variable "A" within the program, choose another. Second, the program must work correctly before using this mini-program.

### STEP 2

Once this is entered into the memory, enter the RUN command. The process will take between 15 and 30 seconds to execute, depending upon the length of your program. After execution, MEMORY FULL IN 1 will appear. Now enter PRINT A (no line number) and a value will appear on the

screen. This value is the number of bytes remaining in the computer's memory.

To determine the total amount of free memory available, clear the memory (store your program first) and repeat Steps 1 and 2. The value displayed will be 14536. There are 14536 free bytes available (the mini-program itself uses 40 bytes, so add 40 to the 14536). The computer is advertised as having 16K bytes. 1424 are used for screen display, etc. So, when a program is stored in the memory and you want to determine how many bytes the program used, enter the following:

```
PRINT 14576-A
```

Howard Patlik

---

## 80 Columns For The Commodore 64

The February "Readers' Feedback" discussion of Commodore 64 add-ons stated 80-column format could be achieved by use of other manufacturers' products, but would "require a separate video monitor" instead of a TV set.

I am considering a color monitor to use with my Commodore 64 and will eventually want to use it as a word processor with 80 columns. The Commodore 64 will only work with a composite input color monitor. I am confused as to the capabilities of that type of monitor. Will it handle the 80-column format, or will I have to get an RGB type color monitor along with some type of interface converter?

R. C. Freytag

*The good news is that composite input color monitors give a reasonably good display for 80-column format. The bad news is that, at present, the 80-column boards all have black and white output, so the color monitor is no particular advantage. Also some word processing programs are not designed to work with the 80-column add-ons, so make sure before you buy that the items you are purchasing will work together.*

---

## Flashing Atari Prompt

I was intrigued by Glenn Murray's "Flashing Prompt For VIC and PET" (**COMPUTE!**, December 1982). It was just the thing for a number of my programs. It was easily adjusted for my Atari. I offer the re-worked program for your readers:

```
10 POKE 752,1
20 DIM A$(30), B$(30), X$(30)
30 A$="PRESS ANY KEY TO CONTINUE"
40 B$="{CLEAR}"
50 X$=A$
60 FOR R=1 TO 100
70 POKE 656,2: PR. X$: REM ***PRINTS MESSAGE
  IN WINDOW***
80 FOR W=1 TO 333:NEXT W
90 IF PEEK(764)=255 THEN 110
```

```

100 IF PEEK(764) <> 255 THEN RETURN :REM
    ***THIS GOS. RETURNS**
110 IF X$ = A$ THEN X$ = B$:NEXT R
120 IF X$ = B$ THEN X$ = A$:NEXT R

```

*Note:* Line 100 returns this GOS. routine to the main program. When you return the first entry should be, POKE 764,255:PR. B\$.

Barry E. Krischer

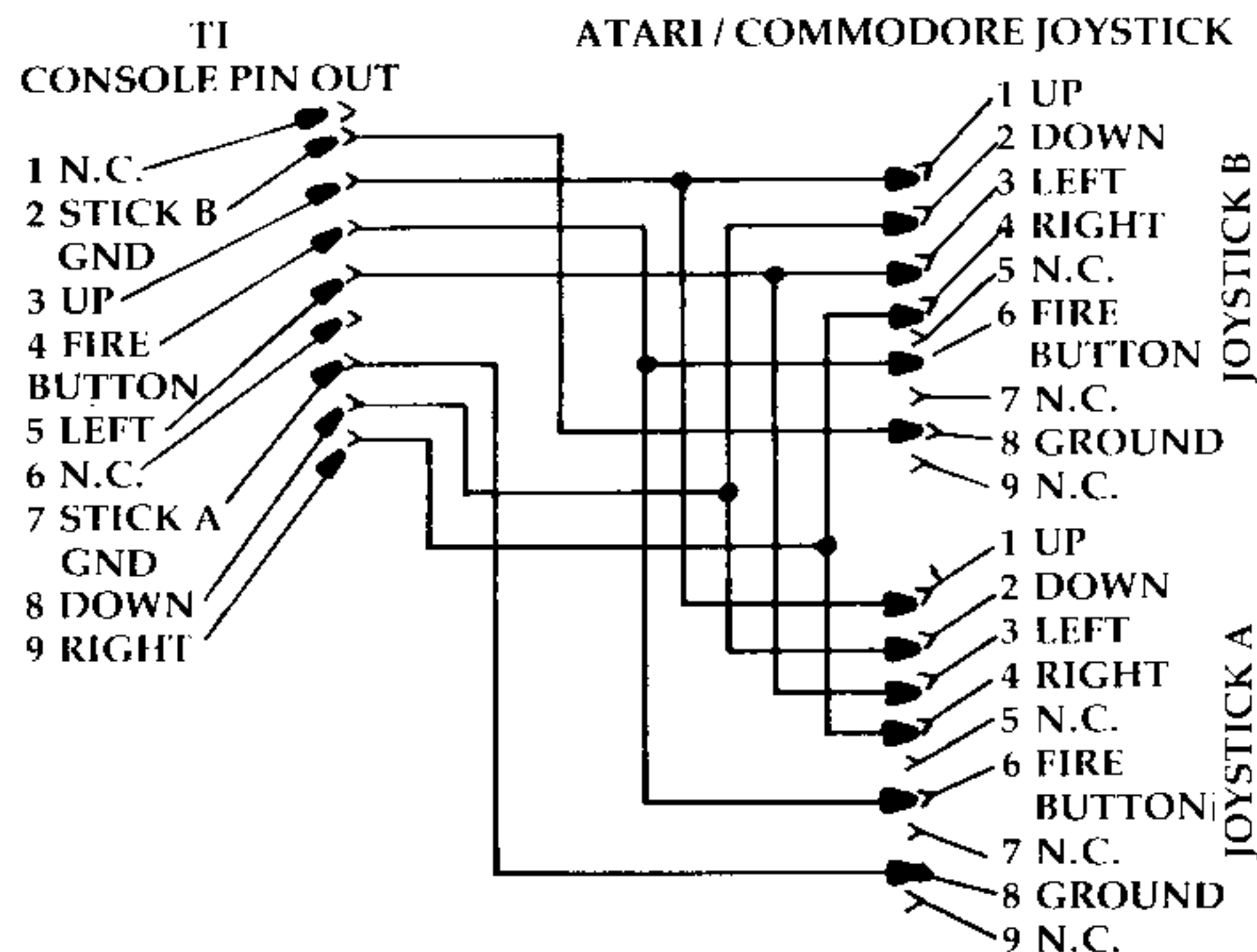
## How To Build Your Own TI-99/4A Joystick Adapter

As an owner of a TI-99/4A, I decided I wanted a joystick to go with it. To save time and money, I got the Atari pin configuration from a friend and TI's configuration from the TI toll-free information line. After that it was a simple matter of buying three nine-pin "D" connectors (two male and one female), a small box, and some wire. Following this wiring diagram, you can make this adapter in about an hour and be able to select any joystick from the wide variety of Atari-compatible joysticks sold.

Gary Cook



*Thanks for the suggestion. We built it here and it works perfectly.*



## Extended BASIC For The 64?

Is there an extended BASIC available for the Commodore 64? If so, does the extended version include commands for the superb graphics capabilities of the 64?

David J. McKeehan

The 64 comes with a version of Commodore BASIC called "Upgrade" or 2.0 BASIC. This version does not contain disk commands like the newer PETs, nor does it contain special commands for graphics as on the Atari or the TI with extended BASIC.

Fortunately, there are several ways that BASIC on the 64 can be improved. By plugging in cartridges, you can effectively increase your amount of ROM memory. Commodore has plans to release a VSP (Video Support Package) cartridge that will add the graphics commands BASIC presently lacks. There are also cartridges available commercially that add disk commands of BASIC 4.0.

Another way to extend BASIC is with programs that "patch" into it through a machine language program like BASIC AID 64 that will appear in an upcoming issue of **COMPUTE!**

The last and most ambitious method is to make the ROM "invisible" and replace BASIC with another program running in the RAM underneath. This should make it possible to run languages such as Pascal or the new BASIC in the Commodore P128 series computers, without much sacrifice of RAM memory.

## Atari Assembler Graphics

I have an Atari 800 and I'm currently using the Assembler Editor cartridge. I can't seem to instruct the computer to switch graphics modes. I've fiddled and faddled here and there with addresses, but it doesn't display a mode that doesn't have garbage all over it. When I read the "Boing" game in **COMPUTE!** ("Insight: Atari," August 1982) I typed in the subroutine and it didn't work. Using the BASIC cartridge and calling up the program after a graphics call seems like a cop out. Help!

Mark Macuirles

For information on calling graphics modes from machine language, refer to "Insight: Atari" (**COMPUTE!**, February 1982). Bill Wilkinson presents a modular set of routines for GRAPHICS, PLOT, DRAWTO, etc. It is not a program, but rather a series of routines that you can include in your programs.

**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.





# The Fall Computer Collection At The Summer Consumer Electronics Show

Tom R. Halfhill, Features Editor

*The flood continues: at least 17 new personal computers were introduced at the Summer Consumer Electronics Show in Chicago, and the end is not in sight. Among industry leaders, Atari made the biggest showing with a completely revised line, plus a radical new approach to software merchandising; among the newcomers, the strongest challenge came from Coleco.*

---

It's been only recently – maybe a year or two – since home computer shoppers have had more than a handful of machines to choose from. Apple, Atari, Commodore, Radio Shack, Texas Instruments. Still, people agonize over the decision.

By this Christmas – destined to be called the Christmas of the Computers – there should be 30 to 40 under-\$1000 personal computers for shoppers to sort out. Computers of almost every conceivable variation, from about \$40 for a minimal 2K memory machine to upwards of \$1000 for a full-blown 64K personal computer with built-in modem, speech synthesizer, and double-sided/double-density disk drive.

How will people choose from this bewildering array of equipment? According to industry analysts, the majority will stick with the established leaders – Commodore, Texas Instruments, and Atari. “The window is closing,” says one consultant, “for new entrants in the low-end home

market.” They expect many, if not most, of the new arrivals to be forced out within the next year. In other words, the rich will get richer as the poor get poorer (perhaps a misleading expression, given the aggressive price wars which are driving even the Big Three toward the corporate poorhouse).

Yet, a few of the newcomers are making strong challenges, as evidenced by the hardware they displayed at the recent Summer Consumer Electronics Show in Chicago. In particular, the talk of the show was Coleco's entry into the field with an integrated system that includes an 80K computer with detachable keyboard, high-speed tape drive, letter-quality printer, and software, complete for under \$600 – only \$450 if you already own a Colecovision game machine. But no one was ignoring Atari, either. Atari scrapped its entire home computer line – including the brand-new but much-maligned 1200XL – in favor of a completely new line of four computers and numerous accessories. Considering the financial problems dogging Atari and TI, plus the approaching entry of IBM into the home market, it appears that the next 12 months will be a make-it-or-break-it year even for the “established leaders.” In short, no one can afford to sit back and rest easy. And no one is.

Here's a rundown of the most significant developments at the Summer CES:



## Atari Publishing

Realizing that there can be a greater market for home computer software than hardware – especially with the price wars going on – Atari's biggest software news of the show was its decision to sell programs for competing computers. Although this will help alleviate one of the problems with the competition that Atari cites in its advertising, the profits will be welcome. The new Atari Publishing subsidiary will sell hit games for the TI-99/4A, the Commodore 64 and VIC-20, the Apple, and the IBM PC.

All these computers will get versions of *Pac-Man*, *Centipede*, *Defender*, *Dig Dug*, and *Donkey Kong*. In addition, there will be versions of *Stargate* for the VIC-20, Commodore 64, Apple, and IBM PC; *Robotron* for the VIC-20 and 64; and (licensed from Synapse) *Shamus*, *Protector*, *Picnic Paranoia*, and *Slime* for the TI.

The games will come on cartridges for the TI, VIC, and 64, and on disks for the Apple and IBM. Prices range from \$34.95 for disks to \$44.95 for cartridges.

## Commodore Strengthens Software

On the hardware front, Commodore was relatively quiet at this CES, at least compared to the blockbusters they dropped at the last two shows. No new computers were announced. A few previously announced but still-to-be-introduced computers and peripherals were shown again, and one computer was dropped before reaching the market.

But even when Commodore is "quiet," it is far from silent. Fueling the price wars further, Commodore chopped the wholesale cost of the Commodore 64 from about \$360 to \$200, which means retail prices at some outlets should be \$250 or less by mid- to late summer.

In addition, prices on printers and disk drives were cut up to \$100, and software prices were cut up to 50 percent.

Commodore's biggest news was its efforts to strengthen software support for its computers. A beefed-up software division has been formed, and more than 70 new packages for the VIC-20 and 64 were announced at new low prices. Examples are *Easyscript 64*, a word processor for under \$50, *Multiplan*, a spreadsheet for under \$100, a small business accounting package of five programs for under \$250, and *Magic Desk I – Type and File*, an under-\$100 program that one spokesman called "Commodore's answer to Apple's Lisa."

*Magic Desk I*, a cartridge for the 64, is the first of a series of programs aimed primarily at home users. The screen comes up with a picture of a room containing a desk, typewriter, index file, telephone, calculator, ledger, wastebasket, artist's

easel, file cabinet, and a digital clock. Floating in the air is a hand with a pointing finger. Using a joystick, trackball, or "mouse" (not yet available), you can move the hand to point to any object in the room. Pressing the fire button selects that option.

For instance, pointing at the typewriter and pressing the fire button loads a typewriter-like word processing program from disk. The screen really looks like a typewriter carriage, with margin stops, paper guides, and a blank sheet of paper. You can type a document, then return to the room by pressing fire. Back at your desk, you can file the document in the cabinet, toss it in the wastebasket, or do various other things. The other options represented by objects in the room will be enabled by further programs in the *Magic Desk* series. Eventually, you'll even be able to define your own objects in the room.

Some other interesting software announcements for the 64 were six adventure games, including the popular *Zork* series; *Wizard of Wor*, the first talking game using the speech module introduced at previous shows; *Super Expander 64*, a cartridge with extended commands for graphics and sound; *Music Machine* and *Music Composer*, which use the plug-in synthesizer keyboard announced at the Winter CES; and *Logo* and *PILOT* languages on disk.

The bulk of the software seemed to be for the 64, but new VIC programs included *VICwriter*, a word processor; *SimpliCalc*, a spreadsheet; *VICfile*, a data base manager; *Know Your Child's IQ*; and *Number Nabber*, *Shape Grabber*, a teaching game for children.

On display was the previously announced portable version of the Commodore 64, known as the Executive 64 (formerly called the SX-100). The current prototype has a built-in, six-inch color monitor and disk drive, and is priced at \$995. A second drive is optional. Commodore has moved the delivery date back to sometime this fall.

Not on display was a new computer announced at last summer's CES, variously known as the P Series, P128, or P-500. Intended to be a souped-up version of the Commodore 64, with 128K RAM expandable to 256K, a larger keyboard, and sleeker styling, the P was dropped without official explanation. Unofficially, Commodore wanted to concentrate on other projects. The P is being transformed into an 80-column machine without color or graphics, and will be aimed instead at the small business market. Commodore says it may be available later this year, along with the closely related B and BX Series announced last summer.

## Texas Instruments

Pre-show rumors were that TI would introduce



one or two new computers, possibly the TI-99/4B and the TI-99/8. So much for rumors.

The 99/8, however, is said to be very near. Insiders say it will come with 80K RAM, built-in speech, and sell for roughly \$500. BASIC, Forth, Logo, and UCSD Pascal will be the available languages. The 99/4B, they say, will fall somewhere between the 99/4A and 99/8 in features and price.

It could be that TI is somewhat gun-shy after its recent experience with the 99/2. Introduced at the Winter CES, the 99/2 was an economy version of the 99/4A without color or sound. It was designed to sell for \$99. Unfortunately for TI, the ongoing price war with Commodore and Atari heated up a little faster than anticipated. To compete, TI slashed the price of the 99/4A again and started another rebate program. This brought the 99/4A to under \$100. Unable to cut the 99/2's price accordingly, TI was forced to drop the new model it had spent months (and millions) developing. Now that each one of the Big Three has been burned in a similar way - Atari with its 1200XL and Commodore with its P128 and Max Machine - they may be more circumspect about making splashy introductions of new computers.

Although TI unveiled no new machines at CES, the company did introduce a 99/4A with a redesigned white housing. Word is the new plastic case is cheaper to manufacture, and that it will match the design of the coming 99/8.

The most interesting TI news, though, was a plug-in speech and *voice recognition* device for the 99/4A. Called the Milton Bradley MBX Expansion System, it works with ten software packages available from MB and TI. We saw it used with an educational game for children, *I'm Hiding*. Wearing a small headset with a microphone, the child names an object on the screen which might be hiding a tiny creature. The program responds to these verbal commands and even talks back with a remarkably human-like voice. The MBX will be available later this year for \$129. Versions also may be adapted for other computers.

TI also introduced a 300-baud, direct-connect modem for \$99; *TI-Mini-Writer*, a cassette-based word processor for \$19.95; four games (*M\*A\*S\*H*, *Sneggit*, *Moonmine*, and *Entrapment*); and six educational packages, including three games based on *E.T. the Extra-Terrestrial*.

## NEC Portable Computer

The almost overnight success of Radio Shack's Model 100 portable computer seems to have caught many in the industry off guard. Watch for several similar computers to be introduced in the coming year.

The 100's sudden success also was reportedly a large factor in NEC's decision to export its version of the Model 100 to the United States. The

NEC PC-8200, still being redesigned for the American market, looks almost exactly like the Model 100. This is not surprising, because NEC makes part of the Model 100 for Radio Shack. Therefore, the specifications, and even the built-in programs, are nearly identical.

NEC is departing a bit from the Model 100's design, however. Preliminary specs call for 16K RAM standard instead of 8K, expandable to 96K instead of 32K. The onboard modem found in the Model 100 may be removed, but a spreadsheet program added. The keyboard is slightly changed, with five special function keys instead of eight, and the cursor keys arranged in an efficient diamond pattern. As for pricing, NEC says only that it will be "competitive" with the Model 100. It's scheduled for delivery late this year.

## Unitronics Sonic

Another interesting computer was the Unitronics "Sonic." Display models were early prototypes not yet fully functional, and this is the computer that was upgraded right at the show in response to Coleco's stunning introduction. Nevertheless, the Sonic has its own distinguishing features.

It comes with 80K of user-available RAM, plus another 16K to support its TI graphics chip. The TI chip gives the Sonic 32 sprites and 16 colors. The Sonic also has a built-in Waferdrive, a very fast mass storage device that uses Exatron Stringy Floppy technology. A wafer the size of a business card can store up to 128K. A 12K operating system and Applesoft-compatible BASIC load from one of these wafers each time the computer is switched on.

Other features: 6502 CPU chip (the same as Apple, Atari, and Commodore); upper/lowercase, 40-column screen; 70-key typewriter-style keyboard with 16 function keys; three sound channels with music synthesis; three different expansion ports, one Atari-style joystick port, and a VIC-20-compatible serial port. In addition, the Sonic will come with some software, including *Frogger*, the *Magic Window* word processor, Applesoft-compatible BASIC, the operating system, and blank wafers. Unitronics says the Sonic will be available this fall for \$400.

Also planned are a Z80 Card Module to add CP/M capability, interface modules for the Atari 2600 VCS and Colecovision game machines, the Unimodem, and other peripherals and software.

## Timex Computers

Timex displayed two improved versions of the Timex/Sinclair 2000 introduced at the Winter CES, plus a completely new model, the T/S 1500.

The T/S 2000 series computers are basically upgraded versions of the Sinclair ZX Spectrum, a popular machine in the United Kingdom. The



and a 6809 CPU (as in the Radio Shack Color Computer). A Stringy Floppy drive will be optional. The BASIC has special sound commands such as NOTE, AMPLITUDE, ENVELOPE, and NOISE. A light pen introduced for the game machine also will work with the computer.

Another accessory may also work with this new computer: the new 3-D Imager. Designed for the Vectrex game machine, the 3-D Imager is a pair of heavy glasses that you wear while peering into the vector screen. One lens is blue, the other red, just like the 3-D movie glasses of the 1950s, except some kind of motorized disc spins in front of the lenses. When you look at the screen without the glasses, the vector lines appear to be vibrating. But when you look through the glasses, the lines are stable and the 3-D effect is incredible. Just imagine the games this computer could produce.

## Video Technology Computers

Video Technology, which introduced the first under-\$100 color computer at the Winter CES (the VZ-200), showed two new computers at this CES. Both are more advanced models:

- *Laser 2001*. Standard features are 80K RAM expandable to 144K (16K is consumed by the graphics chip); 16K ROM Microsoft BASIC; 6502A CPU; cartridge slot; rubber half-stroke, typewriter-style keyboard; user-definable keys; upper/lowercase; full-screen editing; 16 colors; two Atari-style joystick ports; 36-column text mode; 256 x 192 hi-res graphics; four sound channels; 300-baud standard cassette interface; Centronics-standard parallel port; and a rear expansion slot. Video Tech says it will be available in the United States by January for \$299.

- *Laser 3000*. Standard features are 64K RAM expandable to 192K onboard; 24K ROM with Applesoft-compatible BASIC; 6502A CPU; 81-key full-stroke keyboard with numeric keypad and eight special function keys; upper/lowercase; selectable 40- or 80-column screen; hi-res graphics modes of 560 x 192 and 280 x 192; eight colors; four sound channels with six octaves; outputs for TV, composite video monitors, and RGB (Red-Green-Blue) hi-res monitors; Centronics-standard parallel interface; cassette interface; and a rear expansion slot. Video Tech says the Laser 3000 will be available by January for \$699.

Optional accessories will include disk drives, a CP/M cartridge, an RS-232C interface, a modem, joysticks, and an expansion box. Video Tech is a Hong Kong-based company which exports its products to subsidiaries throughout the world.

## Royal Alpatronic PC

Royal, known for its typewriters and printers, will import a Japanese-made computer to the United States this fall.

Called the Alpatronic PC, it has a Z80A CPU; 64K RAM and 32K ROM with BASIC; interfaces for Centronics-parallel, RS-232C, cassette, and system expansion; a hidden cartridge slot; CP/M compatibility; selectable 40- or 80-column screen; eight colors; an 85-key, full-stroke keyboard with numeric keypad and six special function keys; outputs for TV, composite video, and RGB monitors; and TRS-80-style line editing.

One unusual feature is a high-pitched beeper which emits a constant tone whenever you hit more than one key at a time – inevitable during fast touch-typing. The tone does not stop until you press a key in the lower-left corner of the keyboard, or else turn off the computer.

Accessories will include 320K slim-line disk drives. Royal says the Alpatronic PC will sell for \$695.

## Tomy Tutor

Tomy, a large toy manufacturer, introduced the "Tomy Tutor," a 16-bit home computer that can generate attractive game graphics.

The only other 16-bit home computer is the TI-99/4A. The Tutor has 16K RAM expandable to 64K; 32K ROM with extended BASIC; a rubber, half-stroke, typewriter-style keyboard; 16 colors; upper/lowercase; 256 x 192 hi-res graphics; 32-column screen; three sound generators with eight octaves each, plus a noise generator; cassette interface; TV and monitor outputs; and a cartridge slot for plug-in software. Accessories include a recorder, joysticks and controllers, a voice synthesizer, disk drive, and printer.

Tomy says the Tutor should be available this fall for under \$150.

## Spectra Video

At the Winter CES, Spectra Video introduced its impressive SV-318 and gave **COMPUTE!** a peek at a mock-up of their forthcoming SV-328 computer. Working models of the SV-328 finally appeared at the Summer CES.

The SV-328 should satisfy those who prefer a full-stroke, professional keyboard to the half-stroke, rubber keyboard on the SV-318. It also replaces the cursor joystick with a numeric keypad, has built-in CP/M capability, 80K of RAM expandable to 256K, and an unusually large amount of ROM, 48K expandable to 96K. Why so much ROM? Besides a super-extended Microsoft BASIC, it contains a word processor and a terminal program.

The SV-328 shares all the other SV-318 features, such as 16 colors, 32 sprites, Z80A CPU, topside cartridge slot, and three-channel, eight-octave sound. Spectra Video says the SV-328 should be available within a few months for \$595.



# CLUES

Mevin Billik

*An excellent teaching tool for preschoolers on up – with options to tailor the program for different age groups. For TI-99/4A and all Commodore computers.*

As a teacher-administrator, I have found my PET extremely useful in creating programs for courses I teach, such as BASIC Programming and Statistics. In addition, other programs help me with administrative tasks, such as grading, transcript evaluation, teacher scheduling, and attendance.

However, as a parent of two preschoolers, I get the most satisfaction from writing programs for them. One such program is "Clues." It is fairly simple and can easily be modified for other microcomputers.

The youngster is asked his or her name, followed by a series of questions. A correct response by my son will yield a flashing message, "OKAY – GREAT, KEITH!" For an incorrect response, the question will be repeated. For two consecutive incorrect responses, the answer will be given and a new question will be asked.

For the Commodore version, the data is listed (question first, then answer) from line 700 on up. Line 1, the DIM statement, sets a maximum of 200 questions and answers. You can change this as your computer's memory size dictates. The program itself counts the number of questions and answers. Note the flag in line 1940.

## Modifications

The program picks the questions at random. However, you can easily adjust the program so that no question is asked more than once by adding a new array variable as a flag (a value of 0 indicates

the question has not yet been asked). For the Commodore version, add:

```
1 DIM CS(200), CA$(200), FL(200)
45 IF FL(X%) <> 0 THEN 40
55 FL(X%) = 1
```

As more and more questions are asked, program execution time is slowed considerably (as the program searches for unasked questions). However, as long as you've asked less than 90 percent of your available questions, time delay is not a problem.

The game will continue until the player decides to quit, either by pressing the RETURN key in response to a question or by turning off the machine. If you made the previous program modification, the game can continue until all the questions have been asked. You can modify the Commodore version of the program to ask a specific number of questions as follows:

```
230 PRINT "HOW MANY QUESTIONS, MAX
OF ";N
240 INPUT NQ: IF NQ > N THEN 230
250 RETURN
19 FOR II = 1 TO NQ
70 IF AS = CA$(X%) THEN I = 10:GOSUB 500:
GOTO 100
100 NEXT II
```

You can also adjust the level of questions to be suitable for a user's educational level. The subroutine starting in line 500 of the Commodore version, while exciting for a preschooler, might not be appropriate for an older child. An alternative might be to include a number of cute sayings and print one at random for a correct response. For example, we can replace the subroutine with:



```

500 Z=INT(3*RND(TI)+1)
510 ON Z GOSUB 520,530,540
515 FOR I=1 TO 1000: NEXT
519 PRINT "CLR": RETURN
520 PRINT "NOT BAD"
525 RETURN
530 PRINT "BET YOU CAN'T DO IT AGAIN"
535 RETURN
540 PRINT "BOY, ARE YOU LUCKY TODAY!"
545 RETURN

```

Also, Clues can be a good teaching tool: you can store a few hundred questions and using the modifications, generate a 10-25 question quiz. No two students would have the same quiz.

### BEFORE TYPING...

If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

## Program 1: Clues - TI Version

```

90 RESTORE
100 RANDOMIZE
110 DIM C$(201)
111 DIM CA$(201)
120 GOSUB 440
130 CALL CLEAR
140 CALL SCREEN(5)
150 INPUT "WHAT IS YOUR NAME?":N$
160 PRINT ::
170 CALL CLEAR
180 PRINT "OKAY, ";N$;" USE THE FOLLOWING CLUE"
190 PRINT "TO SPELL THE WORD"
200 I=0
210 XE=INT(N*RND+1)
250 PRINT ::
260 PRINT C$(XE)
270 INPUT A$
280 IF A$<>CA$(XE) THEN 320
290 I=I+1
300 GOSUB 510
310 GOTO 160
320 I=I+1
330 IF I<>1 THEN 370
340 PRINT "NO, ";N$;
350 PRINT " TRY AGAIN"
360 GO TO 270
370 IF I<>2 THEN 410
380 PRINT "NO, ";N$
390 PRINT "THE CORRECT ANSWER WAS ";
400 PRINT CA$(XE)
410 FOR M=1 TO 1000
420 NEXT M
430 GOTO 170
440 FOR K=1 TO 200
450 READ C$(K)
460 IF C$(K)<>"END" THEN 485
470 N=K-1
480 K=200
482 GOTO 490
485 READ CA$(K)
490 NEXT K
500 RETURN
510 FOR I=1 TO 11
520 CALL CLEAR
530 PRINT TAB(10)

```

```

540 PRINT ::
550 PRINT "OKAY GREAT--";N$
560 FOR T=1 TO 50
570 NEXT T
580 NEXT I
590 RETURN
600 DATA YOUR DAD'S NAME IS
610 DATA MEL
620 DATA YOUR SISTER'S NAME IS
630 DATA TARA
640 DATA YOUR MOM'S NAME IS
650 DATA CHERYL
660 DATA YOUR DOG'S NAME IS
670 DATA BRANDY
680 DATA THE OPPOSITE OF YES IS
690 DATA NO
700 DATA SOMETHING YOU SLEEP ON
710 DATA BED
720 DATA SOMETHING YOUR DOG LIKES TO CHEW ON
730 DATA BONE
740 DATA WHERE YOU LEAVE A STORE OR {4 SPACES}RESTAURANT THE SIGN SA
YS
750 DATA EXIT
760 DATA SOMETHING YOU LIKE TO CHEW
765 DATA GUM
770 DATA WHAT DOES A CRANKY KID DO
780 DATA CRY
790 DATA HOW MANY FINGERS DO YOU HAVE?
800 DATA TEN
810 DATA END

```

## Program 2:

### Clues — For All Commodore Computers

```

1 DIM C$(200),CA$(200)
10 X= RND(-TI)
15 GOSUB 200
18 INPUT "{CLR}WHAT IS YOUR NAME";N$
20 PRINT:PRINT "{CLR}OKAY, ";N$;" USE THE FOLLOWING CLUE"
30 PRINT"TO SPELL THE WORD."
40 I=0:X%= N*RND(TI)+1
50 PRINT:PRINT:PRINTC$(X%)
60 PRINT:PRINT:INPUT A$
70 IF A$= CA$(X%) THEN I =I+1:GOSUB 500:GOTO 20
80 I=I+1: IF I=1 THEN PRINT:PRINT"NO, ";N$;" TRY AGAIN":GOTO 60
90 IF I = 2 THEN PRINT"NO, ";N$;" THE CORRECT ANSWER":PRINT"WAS "; CA$(X%)
97 FOR M = 1 TO 3500:NEXT
100 GOTO 20
200 FOR I = 1 TO 200
210 READ C$(I)
212 IF C$(I) ="END" THEN N=I-1:GOTO 230
215 READ CA$(I)
220 NEXT
230 RETURN
500 FOR I = 1 TO 11
505 PRINT"{CLR}"{2 SPACES}: FOR J = 1 TO 100:NEXT
510 PRINT"{12 DOWN}{10 RIGHT}OKAY--GREAT, ";N$
520 FOR J = 1 TO 100:NEXT J
530 NEXT I
540 RETURN
600 PRINT"{CLR}"{7 DOWN}"
700 DATA YOUR DAD'S NAME IS
710 DATA MEL

```

# Gold Miner For TI-99/4A

James Dunn

*Dig your way into the Lost Mine and search for gold in this exciting TI-99/4A translation of a game first published in **COMPUTE!**, July 1982.*

"Gold Miner" will run in TI BASIC, using about 5K. It won't run in Extended BASIC because of the character definition using ASCII 144 and above.

Most of the program was translated quite easily from Joseph Weber's original VIC-20 version except for formatting the display of the score and the charges. Extended BASIC contains commands to display at any position on the screen. But TI BASIC will print only at the bottom of the screen, which scrolls the whole display up. Since I wanted this program to run in TI BASIC, I had to use string manipulation to format the score and charges using their ASCII representations. Then, using HCHAR, printing at specific screen locations was possible without disturbing the rest of the display (see lines 1450-1640).

The only other modification is to the main character. I designed a small pick-ax to represent the miner, and animated it, so it would seem to chop its way into the mine. This is done in the main loop, lines 640 - 660, and slows execution only slightly. But it doesn't matter in this game because speed is unimportant. In fact, you can walk away from the game, come back an hour

later, and take up where you left off.

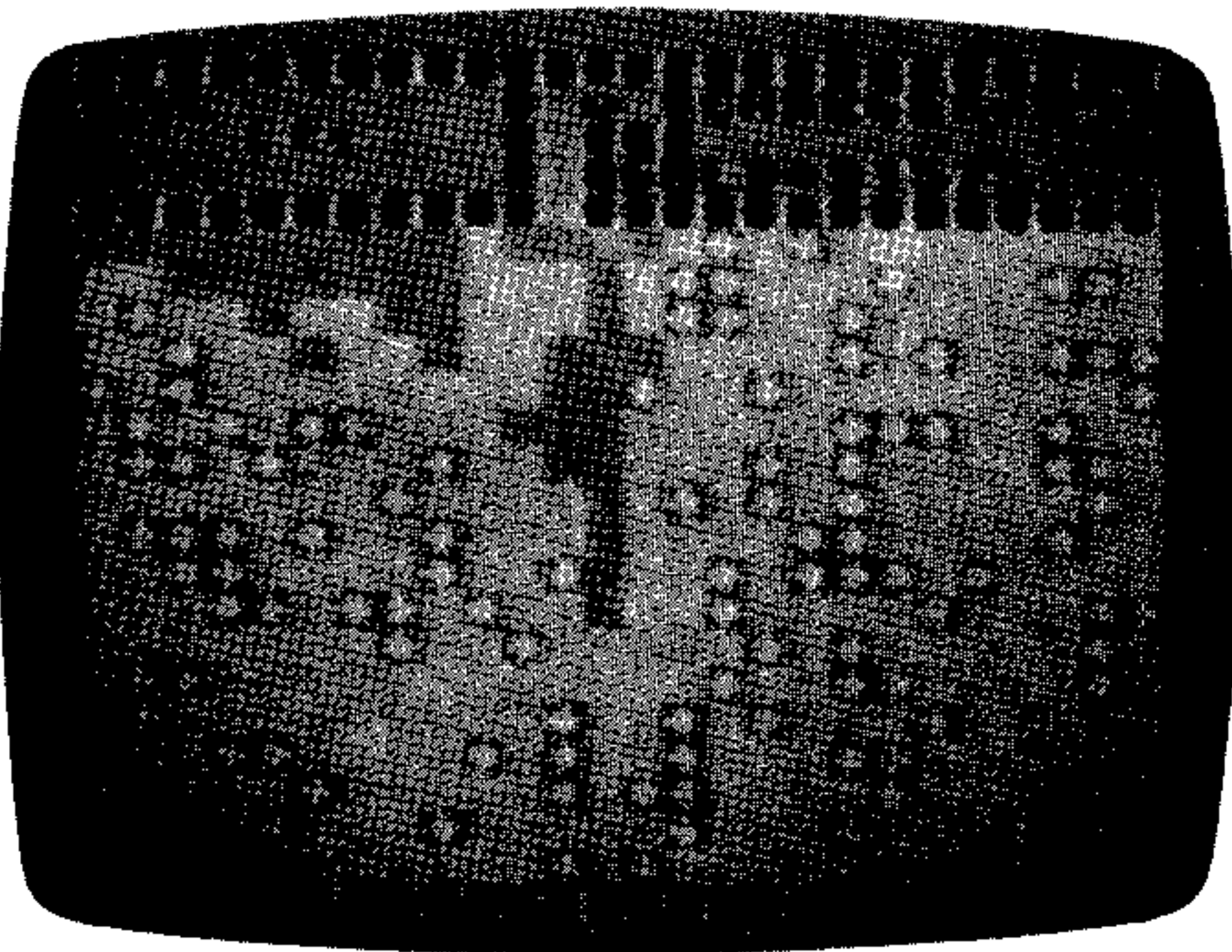
One other point: You must hold down the key, joystick, or fire button until the program calls the routine to read the input. It makes the joystick a bit awkward, but this doesn't affect the game because reflex time is unimportant with "Gold Miner."

## BEFORE TYPING...

If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

## Gold Miner For TI-99/4A

```
50 REM INITIALIZE
60 CALL CLEAR
70 GOSUB 730
80 GOSUB 880
90 M=4
100 S=0
110 W=0
120 GO SUB 1090
130 T=250
140 REM MAIN LOOP
150 CALL HCHAR(B,A,32)
160 IF X=4 THEN 210
170 IF X=-4 THEN 230
180 IF Y=4 THEN 300
190 IF Y=-4 THEN 320
200 GOTO 460
210 A=A+1
220 GOTO 390
230 A=A-1
240 CALL GCHAR(B,A,Q)
250 IF Q=126 THEN 280
260 IF Q=35 THEN 280
270 GOTO 460
280 A=A+1
290 GOTO 600
300 B=B-1
310 GOTO 430
320 B=B+1
330 CALL GCHAR(B,A,Q)
340 IF Q=126 THEN 370
350 IF Q=35 THEN 370
360 GOTO 460
370 B=B-1
380 GOTO 600
390 CALL GCHAR(B,A,Q)
400 IF Q<>35 THEN 460
410 A=A-1
420 GOTO 460
430 CALL GCHAR(B,A,Q)
440 IF Q<>35 THEN 460
```



*Digging for golden nuggets in the TI version of "Goldminer."*



```

450 B=B+1
460 CALL GCHAR(B,A,Q)
470 IF Q=126 THEN 520
480 IF Q=152 THEN 580
490 IF Q=144 THEN 540
500 IF Q=136 THEN 560
510 GOTO 600
520 GO SUB 2140
530 GOTO 600
540 S=S+1
550 GOTO 600
560 GO SUB 1650
570 GOTO 600
580 S=S+1
590 CALL SOUND(50,4000,0)
600 IF RV<>18 THEN 640
610 GOSUB 1810
620 GOSUB 2190
630 GO SUB 1450
640 FOR Z=128 TO 131
650 CALL HCHAR(B,A,Z)
660 NEXT Z
670 CALL SOUND(100,200,0)
680 GO SUB 1020
690 IF C<1 THEN 710
700 GOTO 150
710 GOSUB 2390
720 GOTO 150
730 REM DEF SP CHARS
740 CALL CHAR(126,"AA55AA55AA55AA55"
)
750 CALL COLOR(12,15,1)
760 CALL CHAR(152,"00183C7E7E3C1800"
)
770 CALL COLOR(16,12,1)
780 CALL CHAR(136,"000000E742427E18"
)
790 CALL COLOR(14,13,1)
800 CALL CHAR(144,"00107C1010101010"
)
810 CALL COLOR(15,2,1)
820 CALL CHAR(128,"3854921010000000"
)
830 CALL CHAR(129,"000402011F010204"
)
840 CALL CHAR(130,"0000001010925438"
)
850 CALL CHAR(131,"204080F880402000"
)
860 CALL COLOR(13,5,1)
870 RETURN
880 REM PRINT INSTRUCTIONS
890 PRINT TAB(9);"GOLD MINER"
900 PRINT ::
910 PRINT TAB(4);CHR$(131);"= MINER"
::
920 PRINT TAB(4);CHR$(152);"= GOLD":
:
930 PRINT TAB(4);CHR$(144);"= DEAD M
INER"::
940 PRINT TAB(4);CHR$(126);"= DIRT":
:
950 PRINT TAB(4);CHR$(136);"= ASSAY
OFFICE"::
960 PRINT "USE FIRE BUTTON TO BLAST"
::
970 PRINT "HIT ANY KEY TO PLAY"::
980 CALL KEY(3,RV,ST)
990 IF ST=0 THEN 980
1000 CALL CLEAR
1010 RETURN
1020 REM CHECK JOY STICK
1030 CALL JOYST(2,X,Y)
1040 IF ABS(X)+ABS(Y)=4 THEN 1070
1050 X=0
1060 Y=0
1070 CALL KEY(2,RV,SV)
1080 RETURN
1090 REM DRAW BOARD
1100 CALL HCHAR(1,3,35,28)
1110 CALL HCHAR(5,4,35,11)
1120 CALL HCHAR(5,16,35,14)
1130 CALL HCHAR(24,4,35,26)
1140 CALL VCHAR(1,3,35,24)
1150 CALL VCHAR(1,30,35,24)
1160 CALL VCHAR(2,14,35,3)
1170 CALL VCHAR(3,16,35,2)
1180 CALL VCHAR(3,17,35)
1190 CALL VCHAR(2,18,35,2)
1200 FOR X=6 TO 23
1210 CALL HCHAR(X,4,126,26)
1220 NEXT X
1230 FOR GL=1 TO 180
1240 RANDOMIZE
1250 X=RND*25+4
1260 Y=RND*17+6
1270 CALL HCHAR(Y,X,152)
1280 NEXT GL
1290 REM
1300 GOSUB 1340
1310 GOSUB 1450
1320 CALL HCHAR(6,4,32,12)
1330 RETURN
1340 REM PLACE MINERS
1350 IF M<1 THEN 2570
1360 CALL HCHAR(3,7,32,5)
1370 CALL HCHAR(3,8,131,M-1)
1380 CALL HCHAR(4,15,131)
1390 C=10
1400 S=0
1410 CALL HCHAR(2,16,136)
1420 A=15
1430 B=4
1440 RETURN
1450 REM PRINT SCORE/CHARGES
(5 SPACES)
1460 A$="CHARGES="
1470 FOR I=0 TO 7
1480 B$=SEG$(A$,I+1,1)
1490 CALL HCHAR(2,19+I,ASC(B$))
1500 NEXT I
1510 FOR I=0 TO LEN(STR$(C))-1
1520 CG$=SEG$(STR$(C),I+1,1)
1530 CALL HCHAR(2,27+I,ASC(CG$))
1540 NEXT I
1550 A$="GOLD=$"
1560 FOR I=0 TO 5
1570 B$=SEG$(A$,I+1,1)
1580 CALL HCHAR(4,17+I,ASC(B$))
1590 NEXT I
1600 FOR I=0 TO LEN(STR$(W))-1
1610 SC$=SEG$(STR$(W),I+1,1)
1620 CALL HCHAR(4,23+I,ASC(SC$))
1630 NEXT I
1640 RETURN
1650 REM TALLY GOLD
1660 CALL HCHAR(2,19,32,11)
1670 CALL HCHAR(4,17,32,13)
1680 CALL SOUND(1,500,0)
1690 FOR DELAY=1 TO 5
1700 NEXT DELAY
1710 CALL SOUND(1,500,0)
1720 C1=C
1730 IF C1<>0 THEN 1750

```

```

1740 C1=1
1750 W=S*C1+W
1760 M=M-1
1770 GOSUB 1340
1780 GO SUB 1450
1790 CALL HCHAR(2,4,32,10)
1800 RETURN
1810 REM EXPLOSION
1820 CALL HCHAR(B,A,131)
1830 FOR I=0 TO 30 STEP 5
1840 CALL SOUND(100,-5,1)
1850 NEXT I
1860 CALL GCHAR(B+1,A,Q)
1870 IF Q=35 THEN 1890
1880 CALL HCHAR(B+1,A,88)
1890 CALL GCHAR(B-1,A,Q)
1900 IF Q=35 THEN 1920
1910 CALL HCHAR(B-1,A,88)
1920 CALL GCHAR(B,A+1,Q)
1930 IF Q=35 THEN 1950
1940 CALL HCHAR(B,A+1,88)
1950 CALL GCHAR(B,A-1,Q)
1960 IF Q=35 THEN 1980
1970 CALL HCHAR(B,A-1,88)
1980 REM
1990 CALL GCHAR(B+1,A,Q)
2000 IF Q=35 THEN 2020
2010 CALL HCHAR(B+1,A,32)
2020 CALL GCHAR(B-1,A,Q)
2030 IF Q=35 THEN 2050
2040 CALL HCHAR(B-1,A,32)
2050 CALL GCHAR(B,A+1,Q)
2060 IF Q=35 THEN 2080
2070 CALL HCHAR(B,A+1,32)
2080 CALL GCHAR(B,A-1,Q)
2090 IF Q=35 THEN 2110
2100 CALL HCHAR(B,A-1,32)
2110 C=C-1
2120 CALL HCHAR(2,19,32,11)
2130 RETURN
2140 REM SFX EXPLOSION
2150 FOR I=0 TO 30 STEP 5
2160 CALL SOUND(20,-1,I)
2170 NEXT I
2180 RETURN
2190 REM CAVE IN
2200 FOR I=1 TO 10
2210 RANDOMIZE
2220 B1=INT(RND*17)+6
2230 A1=INT(RND*25)+4
2240 CALL GCHAR(B1,A1,Q)
2250 IF Q=152 THEN 2280
2260 IF Q=131 THEN 2300
2270 CALL HCHAR(B1,A1,126)
2280 NEXT I
2290 RETURN
2300 GOSUB 2330
2310 RV=0
2320 GO TO 150
2330 REM SQUASH MINER
2340 M=M-1
2350 CALL HCHAR(B,A,144)
2360 S1=S
2370 GOSUB 1340
2380 RETURN
2390 REM GET OUT COUNTER
2400 IF T<128 THEN 2500
2410 A$="GET OUT"
2420 FOR I=0 TO 6
2430 B$=SEG$(A$,I+1,1)
2440 CALL HCHAR(2,4+I,ASC(B$))
2450 NEXT I

```

```

2460 CALL SOUND(-50,300,0)
2470 T=T-4
2480 RV=0
2490 RETURN
2500 CALL HCHAR(B,A,32)
2510 M=M-1
2520 IF M=0 THEN 2570
2530 GOSUB 1340
2540 GOSUB 1450
2550 CALL HCHAR(2,4,32,10)
2560 GOTO 130
2570 REM PLAY AGAIN LOOP
2580 GO SUB 1450
2590 FOR DELAY=1 TO 2000
2600 NEXT DELAY
2610 CALL CLEAR
2620 PRINT "PLAY AGAIN?"
2630 PRINT "Y OR N"
2640 CALL KEY(3,X,ST)
2650 IF ST=0 THEN 2640
2660 IF X=89 THEN 90
2670 IF X=78 THEN 2690
2680 GOTO 2610
2690 CALL CLEAR
2700 END

```

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# Space Station I For The TI

Tony Roberts, Assistant Managing Editor

*Space Station I* mixes the sprite movement and sound abilities of the TI-99/4A with an interesting space-attack scenario to produce a fluid and challenging arcade-quality game.

The program, available on disk or cassette from Data Force, requires that your TI be equipped with Extended BASIC and extra memory.

The action takes place in the year 2020. An invisible alien force has attacked and defeated a secret military outpost orbiting Saturn, and has turned its attention to Earth, which you must defend. The battle at Saturn, however, took its toll on the alien force, weakening its firepower, damaging its tactical computers, and making its drones visible 99 percent of the time.

Once the battle began, the Saturn outpost lasted only 34 seconds, but during that time, the station's tactical defense computer was able to transmit information back to Earth. The computer's report, which is printed in the instruction pamphlet, includes clues for developing the strategy you'll need to stave off the attackers.

## Watch Battle On Scanner

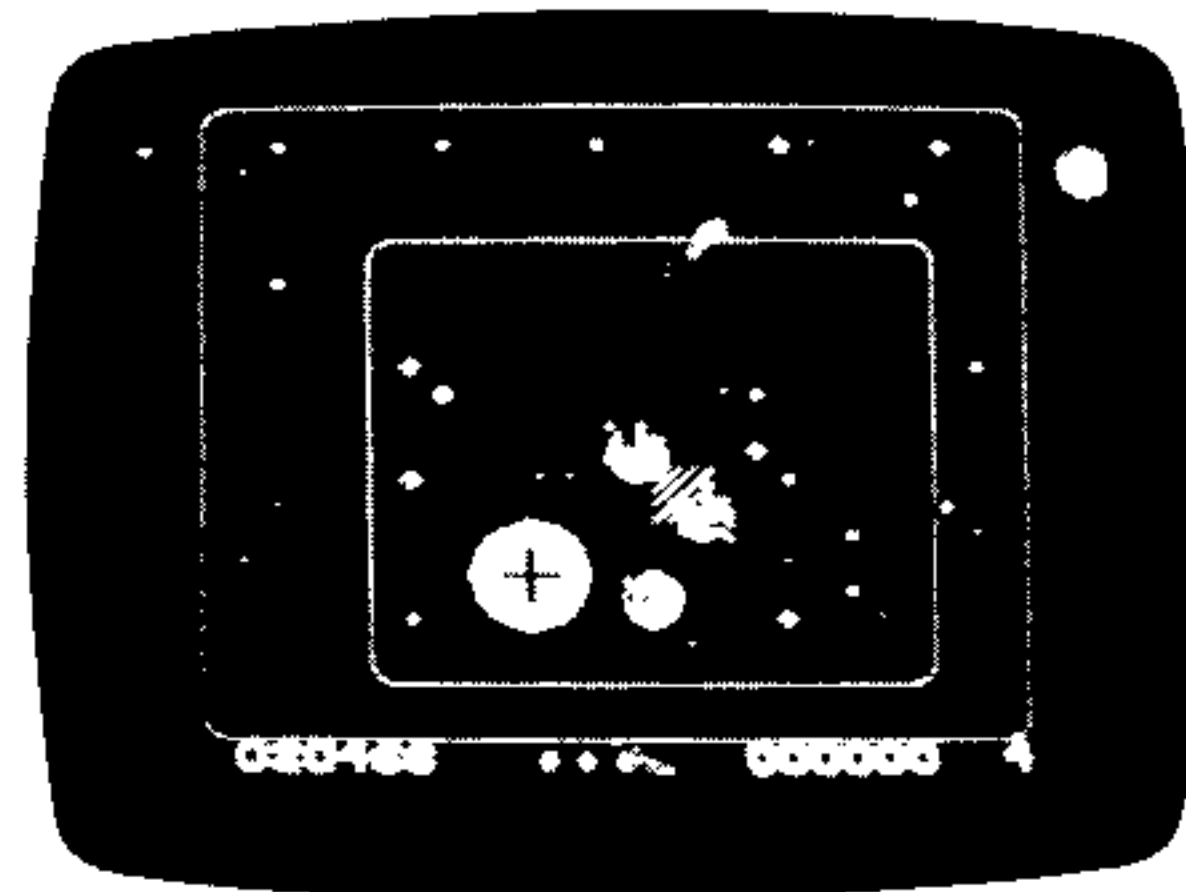
On your scanner screen, you see Space Station I, orbiting quietly. Two green boxes are drawn around it. Press ENTER, and the sprite display begins. The alien drones, attacking in groups of three, swoop in; misguided missiles and bombs fly past; an orange alien command ship may appear from out of nowhere.

Using the keyboard or a joystick, you bring your target beam into play. Place it over an alien ship or missile and fire a torpedo. The torpedo, which is

released from the bottom of the screen, flies to the point designated by the target beam and detonates. The beam can be moved to a new target before the first torpedo detonates.

Most of the alien missiles are harmless. Those released by the drone ships or the command ship, however, are not. Your main concern is stopping the drones. They attack in groups of three, and sometimes hide off the edges of the screen. You'll learn to listen for the characteristic sound that tells you the drones are nearby.

The drones will fire only from within the inner green boundary, and once a missile is



The green targeting beam is used to zero in on the aliens in Space Station I.

fired, the drones are helpless until the missile hits Space Station I or flies past the boundary area. If a missile is off course, it is best to attack the drones while they are helpless, then drop back on defense. Your station can survive five hits before the game ends.

## The Command Ship

Your other concern, the command ship, has neither lost its invisibility nor its long-range firing ability. It must become visible to launch an attack, but after it fires, it disappears again. The command ship's foghorn-like sound, however, is its weak-

ness. When you hear it coming, search for it with your targeting beam (you'll see its shadow if you find it), and fire.

*Space Station I* starts out rather slowly, giving you a chance to find your way around. But with each 10,000 points you accumulate, the aliens step up the attack. If you manage to accumulate 100,000 points, your hit counter will be reset to one, giving you four chances to play at high speed.

To play the game successfully, you'll have to develop a sound strategy, and you'll have to be capable of reacting to assaults from all parts of the screen. It's quite a challenge.

Space Station I  
Data Force Incorporated  
10 S. 312 Hampshire Lane East  
Hinsdale, IL 60521  
(312)323-0179  
\$34.95



## Calc Result

August Schau

"Spreadsheet" programs have proven to be among the most popular software for microcomputers over the past several years. Essentially, a spreadsheet is a specialized language — complete with rules and commands — designed to help with simulations and modeling. They let you set up complex arrays of interrelated information and then, by changing one aspect of the model, you can watch the effects throughout the entire structure. Spreadsheets are especially useful in analyzing budgets, finance, and other systems which are based upon mathematical relationships.

*Calc Result* is a spreadsheet program for the Commodore 64. It organizes information on a grid made up of 63 columns labeled A-BK, by 254 rows. Individual cells within the grid are identified by referring to the column and row that intersect at

# PROGRAMMING THE TI

C. Regena

## DATA, READ, And RESTORE Statements

Let's look at DATA and READ – what do these statements do and how do you use them? Using DATA statements in a program can save memory and may be more efficient than using many equivalent lines of code. However, a DATA statement can be more difficult to decode or understand because it can look like just a random group of numbers.

DATA statements are used in conjunction with READ statements. Together they assign numbers or strings to variable names.

```
100 READ N
110 DATA 5    is equivalent to    100 N=5
```

The DATA-READ concept becomes efficient when you assign several values to a variable name for a particular procedure. Let's look at an example:

```
100 READ A
110 PRINT A,A*A
120 IF A=7 THEN 140 ELSE 100
130 DATA 3,2,6,8,7
140 END
```

When the program comes to READ A, the computer looks for the first DATA statement and assigns the first value, 3, to the variable A. The program continues, then comes to the statement READ A again. The computer has already read the first number, so it assigns the very next number, 2, to A. The process continues. Each time a READ statement is encountered, the *very next* data item in the DATA list is read, whether it is in the same DATA statement or the next DATA statement.

### DATA Varieties

DATA statements may be placed anywhere in the program. They are ignored until a READ statement is executed. A "marker" is remembered by the computer so it knows exactly which data item has most recently been READ – and therefore which item the next READ statement will act upon.

A DATA statement may contain one item only or several items separated by commas. Data items may be numeric constants (numbers) or

strings. Numbers may be positive or negative and may contain a decimal. Numbers may not be variable names and may not contain operators (such as 5/3). String variables do not need to be in quote marks unless there are leading spaces, trailing spaces, or embedded commas as part of the string. You may specify a null string by "", or ,, in a series. Example:

```
300 DATA " ",JOHN,,,JIM," "
```

Line 300 contains six data items – null, JOHN, null, null, JIM, and null.

You may combine numbers and strings in the same DATA statements, but you must be careful that the data items in order match the READ statements. If the READ statement specifies a numeric variable, a string will not be accepted. You must have at least as many data items as the READ statements will try to access (or you will get an OUT OF DATA error). If you happen to have extra data items, they will be ignored.

A READ statement may specify one or several items. The items may be a combination of numeric and string variables. Keep in mind that READ statements only read the data and assign values to variables – later program lines would actually print, calculate, sort, or manipulate the data.

Following are some examples:

#### String Variables

```
100 FOR C=1 TO 5
110 READ A$
120 PRINT A$
130 NEXT C
140 DATA ED,BILL,JOHN,JIM,KELLY
150 END
```

#### Subscripted Numeric Variables

```
200 FOR I=1 TO 4
210 READ A(I)
220 PRINT "A(";I;")=";A(I)
230 NEXT I
240 DATA 32,-42,48,69,-73,89
250 END
```

#### Multiple Variables

```
300 FOR I=1 TO 3
310 READ A,B,C
```



```

320 CALL HCHAR(A,B,C)
330 NEXT I
340 DATA 12,24,42,8,8
350 DATA 35,20,15,38
360 END

```

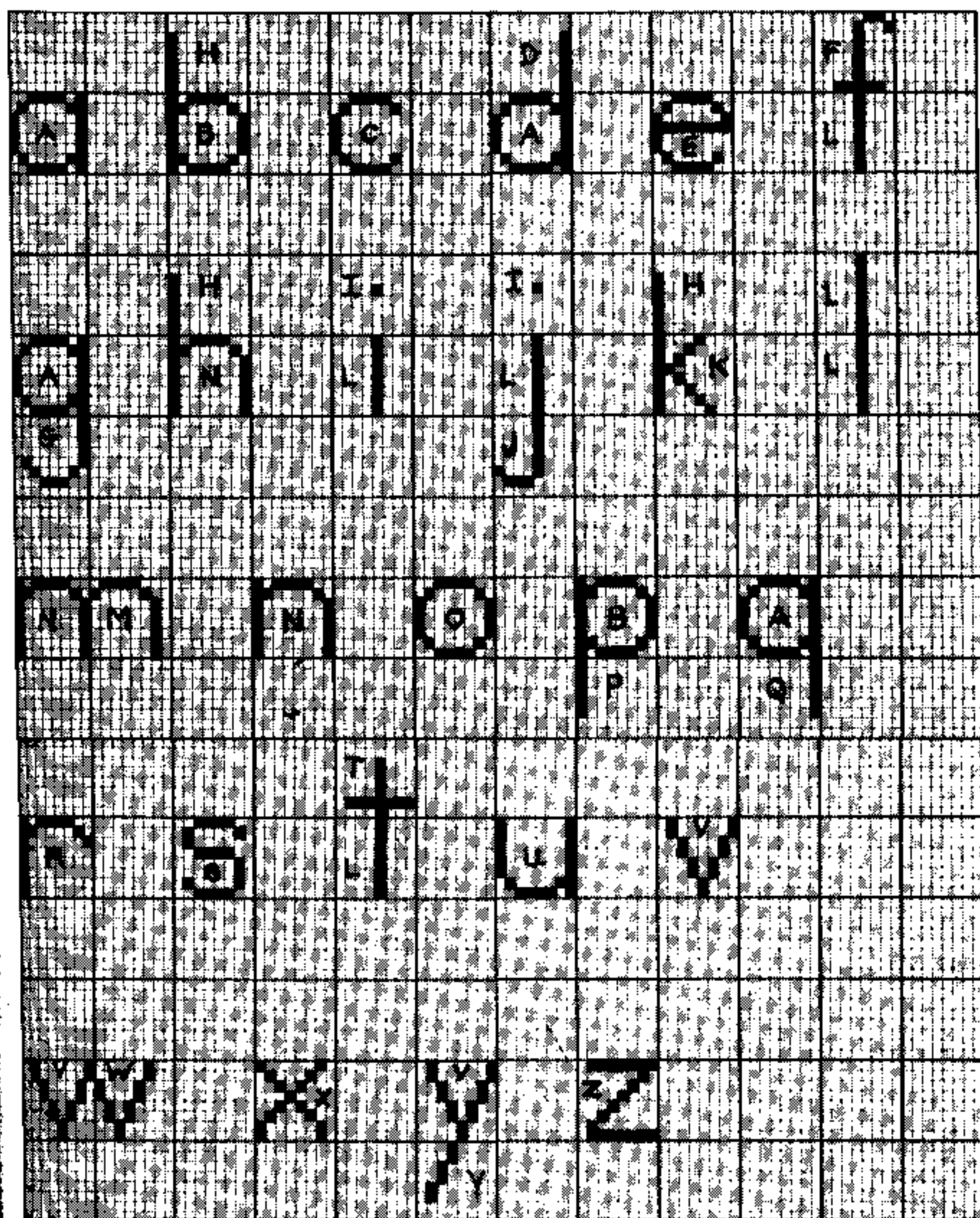
To help conserve memory, a DATA statement can be up to four screen lines long (112 characters). You can edit and insert to make the line even longer. One exception is that if you have quite a few items separated by a lot of commas, the computer will accept only a little over three lines.

### Printing Lowercase As An Example

The following program illustrates how DATA and READ statements are used to save memory in defining graphics characters. To specify each character number and definition in a separate CALL CHAR statement would require 26 statements. Using DATA and READ, four lines READ and define the graphics characters, and five data lines are used.

Program 1 redefines the small capital letters in characters 97 through 122 to graphics characters which can print actual lowercase letters. Letters with ascenders or descenders will require two letters to be printed. The chart shows which small capital letter (release the alpha lock key to print these) represents which graphic character. Lines 200-300 in the program illustrate how to print the lowercase letters.

### Small Capital Letters And The Graphics Characters They Represent.



### Program 1: Lowercase Letters

```

100 CALL CLEAR
110 FOR C=97 TO 122
120 READ C$
130 CALL CHAR(C,C$)
140 NEXT C
150 DATA 3D4381818181433D,BCC2818181
      81C2BC,3C4280808080423C,00000101
      01010101,3C4281FF8080423C
160 DATA 060908080808083E,0101010141
      221C,000080808080808,00000008,08
      08080808887,8890A0C0A0908884
170 DATA 0808080808080808,7884020202
      020202,BCC2818181818181,3C428181
      8181423C,80808080808,010101010101
180 DATA BCC281808080808,3C42403C020
      2423C,000008080808087F08,818181818
      181433D,4141222214140808,0404888
      85050202
190 DATA 8244281028448282,1010202040
      4,7F0204081020407F
200 PRINT TAB(4);"1"
210 PRINT TAB(4);"1 o v w e r
      {3 SPACES}c a s e"
220 PRINT :TAB(9);"1{3 SPACES}h
      {3 SPACES}h{3 SPACES}t"
230 PRINT TAB(7);"a l b n a b e l"
240 PRINT TAB(11);"p"
250 PRINT :::" h{3 SPACES}d
      {3 SPACES}f{3 SPACES}h i i h l"
260 PRINT "a b c a e l a n l l k l n
      m"
270 PRINT TAB(13);"g{5 SPACES}j"
280 PRINT :TAB(13);"t"
290 PRINT "n o b a r s l u v v w x v
      z"
300 PRINT TAB(5);"p q";TAB(24);"y"
310 GOTO 310
320 END

```

### RESTOREing

Now let's say you want to use a DATA statement to list some numbers. First you want to add the numbers, and then you want to multiply the numbers. The list of numbers for both processes is the same. To save memory (and typing effort), the TI allows you to RESTORE data. The RESTORE statement indicates that for the very next READ statement the computer will go back to the first DATA item in the program. RESTORE resets that "marker" to zero.

```

100 FOR I=1 TO 5
110 READ M,N
120 PRINT M;"+";N;"=";M+N
130 NEXT I
140 PRINT
150 DATA 3,2,5,7,4,4,2,1,9,7
160 RESTORE
170 FOR I=1 TO 5
180 READ A,B
190 PRINT A;"*";B;"=";A*B
200 NEXT I
210 END

```

RUN this sample program to see how the data items are used, then RESTORED, then used again.

RESTORE can be very useful. TI BASIC also allows you to RESTORE to a certain line of data by specifying a line number. If you have a long program with lots of DATA statements, you can use a RESTORE *n* where *n* is a line number to make sure that each READ statement will read the correct data starting with the specified line of data.

This sample program illustrates the use of the RESTORE command. The DATA statements here contain duration factors and frequencies to be used in CALL SOUND statements. Ordinarily the first READ statement would read the first data items from the very first DATA statements. However, line 130 says to start reading the data in line 260 with the very next READ statement. Ten sounds are played; then we RESTORE 260 again so the ten sounds are repeated. Line 190 says RESTORE 240 so the data will start with line 240 for the very next READ statement.

### Program 2: Sounds

```

100 CALL CLEAR
110 PRINT "SOUNDS"
120 FOR A=1 TO 2
130 RESTORE 260
140 FOR I=1 TO 10
150 READ T,F
160 CALL SOUND(T*50,F,2)
170 NEXT I
180 NEXT A
190 RESTORE 240
200 FOR I=1 TO 22
210 READ T,F
220 CALL SOUND(T*100,F,2)
230 NEXT I
240 DATA 2,1046,2,784,2,659,4,523,2,
440
250 DATA 2,392,2,349,3,392,2,330,4,2
62
260 DATA 6,330,4,262,4,330,6,392,4,5
23,4,494,6,523
270 DATA 4,392,4,330,6,392
280 DATA 4,330,8,262
290 END

```

This "Southern States" program illustrates a variety of uses of DATA and READ statements. Keep in mind that the DATA statements can go anywhere in the program and are ignored until a READ statement is executed.

*Note:* As you are typing in programs from listings, the most likely place for bugs (errors) is in DATA statements. Be sure you copy DATA statements carefully. Watch particularly the placement of commas. Do not accidentally put a comma at the end of a DATA statement. If your data list consists of graphics definitions, those rounded characters are zeros, not the letter O. If your program stops with a BAD VALUE message, you can PRINT some of the variable names to see if you can pinpoint which DATA statement may be causing an error.

In any case, Southern States is an educa-

tional program that draws a map of the United States. One of the Southern States is outlined, and the user must type the name of the state. If the state is correct, the user must then type the name of the capital city. States are chosen in a random order. If you get the state and the capital right, that state will not appear again. However, if you miss an answer twice, the correct answer will be given and the state will appear again.

The data in lines 270-310 defines graphics characters for the map. We're using small capital letters so they can be printed, a faster method of drawing than using CALL HCHAR or CALL VCHAR. Be sure to release the alpha lock key to type in lines 320 and 480-510.

Line 330 (RESTORE 370) is not necessary the first time through the program because the data in line 370 would be the next data anyway. However, the program branches back to line 330 to RESTORE data if you'd like to try a "new" quiz. Lines 340-390 read the names of the states and the capital cities as the S\$ array and C\$ array.

### Outlining States

Lines 540-560 randomly choose one of the states that has not previously been chosen and identified. The S\$ value is set to " " (null) if the state is identified correctly. Depending on which state is chosen, certain data is RESTORED (line 570 then lines 1500-2070).

Each state's data contains first a number representing the number of graphics characters that need to be defined. This number is READ in line 590 (READ N). Lines 600-630 then read the next data items to define the graphics characters. Line 640 reads N, the number of graphics characters that need to be placed on the map, and then lines 650-680 read the row coordinate, column coordinate, and character number from data to outline the state. To erase the state, line 1250 reads N, the number of characters needed to erase the state, and lines 1260-1290 read from the data the row coordinate, column coordinate, erasing graphic character, and number of repetitions. Most of the clearing is done with character 96, the plain yellow square, so repetitions can be used.

### Program 3 Explained

#### Lines

110	Clear screen.
120-170	Define colors for graphics.
180-210	Print title screen.
230-310	Define graphics characters for map.
320	Define L\$ for use in printing the map.
330-390	Read names of states in S\$ array and corresponding capital cities in C\$ array.
400-460	Print instruction screen and wait for user to press ENTER.
470-510	Clear screen and print map of United States.
520	Perform quiz for 11 states.
530	Initialize T, which keeps track of errors.



540-560 Randomly choose a state which has not previously been identified correctly.

570 Depending on state chosen, branch to appropriate RESTORE statement.

580 Clear four lines under map where answers will be typed.

590-630 Define graphics characters for particular state.

640-680 Outline state on map.

690-710 Ask for state.

720 Clear previous answer if incorrect.

730-810 Receive user's answer.

820-830 Beep then test answer.

840-940 If answer is incorrect, sound "uh-oh" and return for another answer. If answer is incorrect twice, print correct answer, wait for user to press ENTER.

950 If answer is correct, play arpeggio.

960-1230 Similar to state, ask for capital city, receive answer, test answer, branch appropriately.

1240 If state and capital are correct, S\$(R) is set equal to null, "", so the state will not be chosen again.

1250-1290 Erase the state.

1300 Return for next state to be identified.

1310 Clear printing.

1320-1370 Print option to try again and branch appropriately.

1380-1440 Subroutine to print "PRESS ENTER" and wait for user to press ENTER.

1450-1490 Subroutine to play music for correct answer.

1500-1560 RESTORE data for Texas.

1570-1620 RESTORE data for Oklahoma.

1630-2060 RESTORE data for Arkansas, Louisiana, Tennessee, Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina.

2070 END.

```

290 DATA F8FCFEFE7F3E,FFFFFFFFFEFCF8
F,F0FBFBFCFCFEFEFF,008080C0C0E0E
0F,F0E0C08,FCFCFBFBF0F0F0F0F
300 DATA 8080C0C0E0E0F0F,0F1F3F7FFFF
FFFF,00000000030F3FFF,000000000
0010307,E0E0E0F0FBFCFEFF,0000000
00080C0E
310 DATA 00E0F0FEFFFFFFFFF,0000000000
E0FBFE,E0E0E1E3FFFFFFFFEFC
320 L$=" "
330 RESTORE 370
340 FOR G=0 TO 10
350 READ S$(G),C$(G)
360 NEXT G
370 DATA TEXAS,AUSTIN,OKLAHOMA,OKLAH
OMA CITY,ARKANSAS,LITTLE ROCK,LO
UISIANA,BATON ROUGE,TENNESSEE,NA
SHVILLE
380 DATA MISSISSIPPI,JACKSON,ALABAMA
,MONTGOMERY,FLORIDA,TALLAHASSEE,
GEORGIA,ATLANTA
390 DATA SOUTH CAROLINA,COLUMBIA,NOR
TH CAROLINA,RALEIGH
400 CALL CLEAR
410 PRINT "ONE OF THE UNITED STATES"
: "WILL BE OUTLINED." : : "TYPE TH
E NAME OF THE STATE"
420 PRINT : "THEN PRESS <ENTER>." : : "
IF THE STATE IS CORRECT,"
430 PRINT : "TYPE THE CAPITAL CITY" : :
"THEN PRESS <ENTER>."
440 PRINT : : "NAMES MUST BE SPELLED"
: : "CORRECTLY TO BE ACCEPTED." : : :
TAB(15); "PRESS <ENTER>";
450 CALL KEY(0,K,S)
460 IF K<>13 THEN 450
470 CALL CLEAR
480 PRINT TAB(27); "ts": " i "
" 'yz(7 SPACES)u'e": " ";L$;"yx
(3 SPACES)t'r": "h";L$;"'w vt'{"
490 PRINT "f";L$;"' t'nq": "f";L$;"
't'": "f";L$;"'x": "f";L$;"
' 'e": "g";L$;" "
500 PRINT " c";L$;" 'n": " g";L$;"
'nq": " j";L$;" 'e": "
(4 SPACES)kj'1'": T
AB(10); "a'ndj'p"
510 PRINT TAB(11); "bdc'ndddm
(3 SPACES)co": TAB(13); "a'
(8 SPACES)a'": TAB(14); "b"; TAB(24
); "b": : : :
520 FOR C=0 TO 10
530 T=0
540 RANDOMIZE
550 R=INT(11*RND)
560 IF S$(R)="" THEN 550
570 ON R+1 GOTO 1500,1570,1630,1690,
1730,1780,1840,1890,1930,1980,20
20
580 CALL HCHAR(20,1,96,160)
590 READ N
600 FOR I=128 TO 127+N
610 READ G$
620 CALL CHAR(I,G$)
630 NEXT I
640 READ N
650 FOR I=1 TO N
660 READ X,Y,G
670 CALL HCHAR(X,Y,G)
680 NEXT I
690 FOR I=1 TO 7

```

If you prefer to save typing effort, you may receive a copy of Program 3 by sending \$3, a blank cassette or diskette, and a stamped, self-addressed mailer to C. Regena, P.O. Box 1502, Cedar City, UT 84720. Be sure to specify "Southern States" for the TI-99/4A computer.

### Program 3: Southern States

```

100 REM SOUTHERN STATES
110 CALL CLEAR
120 FOR G=9 TO 12
130 CALL COLOR(G,12,1)
140 NEXT G
150 CALL COLOR(13,1,12)
160 CALL COLOR(14,1,12)
170 CALL COLOR(15,2,11)
180 PRINT " *****
": " *";TAB(25); "*"
190 PRINT " * IDENTIFY THE STATES *
": " *";TAB(25); "*"
200 PRINT " *****
"
210 PRINT : : :TAB(7); "SOUTHERN STATES
"
230 FOR G=96 TO 123
240 READ G$
250 CALL CHAR(G,G$)
260 NEXT G
270 DATA FFFFFFFFFFFFFFFFFF,3F1F0F0707
030301,7F3F1F0F,FFFF7F7F3F3F3F3F
,FFFFFF3C,F0F0F0E0E0C0C08,0F0F0F0
F0F0F0F0F
280 DATA 0F0F070703030101,0101030307
070F0F,0F0F0F0FFFFFFFFF,FFFFFFFF
7F1F0701,FF3F0F03,FFFFFFFFFFFF0F0F690

```

```

700 CALL HCHAR(21,2+I,ASC(SEG$("STAT
  E ?",I,1)))
710 NEXT I
720 CALL HCHAR(21,11,96,15)
730 S1$=""
740 CALL SOUND(150,1397,2)
750 FOR L=1 TO 15
760 CALL KEY(0,K,S)
770 IF S<1 THEN 760
780 IF K=13 THEN 820
790 CALL HCHAR(21,10+L,K)
800 S1$=S1$&CHR$(K)
810 NEXT L
820 CALL SOUND(100,880,2)
830 IF S$(R)=S1$ THEN 950
840 CALL SOUND(100,330,2)
850 CALL SOUND(100,262,2)
860 T=T+1
870 IF T<2 THEN 720
880 CALL HCHAR(21,11,96,15)
890 FOR L=1 TO LEN(S$(R))
900 CALL HCHAR(21,10+L,ASC(SEG$(S$(R)
  ),L,1)))
910 NEXT L
920 GOSUB 1380
930 C=C-1
940 GOTO 1250
950 GOSUB 1450
960 FOR I=1 TO 9
970 CALL HCHAR(23,2+I,ASC(SEG$("CAPI
  TAL ?",I,1)))
980 NEXT I
990 T=0
1000 CALL HCHAR(23,13,96,15)
1010 S1$=""
1020 CALL SOUND(150,1397,2)
1030 FOR L=1 TO 15
1040 CALL KEY(0,K,S)
1050 IF S<1 THEN 1040
1060 IF K=13 THEN 1100
1070 CALL HCHAR(23,12+L,K)
1080 S1$=S1$&CHR$(K)
1090 NEXT L
1100 CALL SOUND(100,880,2)
1110 IF C$(R)=S1$ THEN 1230
1120 CALL SOUND(100,330,2)
1130 CALL SOUND(100,262,2)
1140 T=T+1
1150 IF T<2 THEN 1000
1160 CALL HCHAR(23,12,96,15)
1170 FOR L=1 TO LEN(C$(R))
1180 CALL HCHAR(23,12+L,ASC(SEG$(C$(
  R),L,1)))
1190 NEXT L
1200 GOSUB 1380
1210 C=C-1
1220 GOTO 1250
1230 GOSUB 1450
1240 S$(R)=""
1250 READ N
1260 FOR I=1 TO N
1270 READ X,Y,G,J
1280 CALL HCHAR(X,Y,G,J)
1290 NEXT I
1300 NEXT C
1310 CALL HCHAR(21,1,96,96)
1320 PRINT "TRY AGAIN? (Y/N)";
1330 CALL KEY(0,K,S)
1340 IF K=89 THEN 330
1350 IF K<>78 THEN 1330
1360 CALL CLEAR
1370 STOP
1380 FOR I=1 TO 11
1390 CALL HCHAR(24,20+I,ASC(SEG$("PR
  ESS ENTER",I,1)))
1400 NEXT I
1410 CALL KEY(0,K,S)
1420 IF K<>13 THEN 1410
1430 CALL HCHAR(24,21,96,11)
1440 RETURN
1450 CALL SOUND(100,262,2)
1460 CALL SOUND(100,330,2)
1470 CALL SOUND(100,392,2)
1480 CALL SOUND(200,523,2)
1490 RETURN
1500 RESTORE 1510
1510 DATA 11,00000001F10F0C0C,000000F
  F,8080808,808080808080808,FF808
  0808080808,F808080808080808,080
  80601
1520 DATA 00000000C03807,0000000000
  00FF,000000000000F00C,020201010
  1010101,12,14,12,128,14,13,129
1530 DATA 14,14,130,13,14,131,12,14,
  132,12,15,133,13,15,134,13,16,1
  35,13,17,136,13,18,137
1540 DATA 14,18,138,15,18,138,4,12,1
  4,96,2,13,14,96,5,14,12,96,7,15
  ,18,96,1
1550 DATA 5,5,96,2,3,6,96,1
1560 GOTO 580
1570 RESTORE 1580
1580 DATA 10,000000FF8080808,000000F
  F,000000FC04040404,040404040404
  0404,040404040404FC,0000000000
  00FF
1590 DATA 00000000C03807,08080601,F8
  08080808080808,FF,12,11,14,128,
  12,14,137,11,15,129,12,15,136
1600 DATA 13,15,135,11,16,129,13,16,
  134,11,17,129,13,17,133,11,18,1
  30,12,18,131,13,18,132,3
1610 DATA 11,14,96,5,12,14,96,5,13,1
  5,96,4
1620 GOTO 580
1630 RESTORE 1640
1640 DATA 9,000000000001F101,00000000
  00FF,00000000000F80404,08080F010
  1010102,040408081010101,2020E
1650 DATA 0000FF,1C0201,101010101010
  101,10,11,18,128,11,19,129,11,2
  0,130,12,20,131,13,20,132
1660 DATA 14,20,133,14,19,134,14,18,
  135,13,18,136,12,18,136,4,11,18
  ,96,3,12,18,96,3,13,18,96,3
1670 DATA 14,18,96,3
1680 GOTO 580
1690 RESTORE 1700
1700 DATA 5,0000FF808080808,0000F010
  10080808,08080403,000000E0110B0
  F0F,404040408080808,5
1710 DATA 14,19,128,14,20,129,15,20,
  130,15,21,131,15,19,132,3,14,19
  ,96,2,15,19,96,2,15,21,110,1
1720 GOTO 580
1730 RESTORE 1740
1740 DATA 7,0000000F1010204,003FC,00
  FF,00FF0204040810E,010102FC,000
  000FF,408080FF,9,11,19,128
1750 DATA 11,20,129,11,21,130,11,22,

```



```

130, 11, 23, 131, 12, 22, 132, 12, 21, 1
33, 12, 20, 133, 12, 19, 134
1760 DATA 2, 11, 19, 96, 5, 12, 19, 96, 4
1770 GOTO 580
1780 RESTORE 1790
1790 DATA 9, 0000000101010204, 000000F
F, 000000F01010101, 1010101010101
010, 10101010FFFFFFF
1800 DATA 0000F0101113170F, 20203F, 08
0808080810202, 080808081010101, 1
0, 12, 20, 128, 12, 21, 129, 12, 22, 130
1810 DATA 13, 22, 131, 14, 22, 131, 15, 22,
132, 15, 21, 133, 15, 20, 134, 14, 20, 1
35, 13, 20, 136, 6, 12, 20, 96, 3
1820 DATA 13, 20, 96, 3, 14, 20, 96, 3, 15, 2
0, 96, 1, 15, 21, 110, 1, 15, 22, 100, 1
1830 GOTO 580
1840 RESTORE 1850
1850 DATA 6, 0000007F4040404, 000000F0
10080804, 0404040202020101, 02020
201010101FF, 44444444FFFFFFF
1860 DATA 404040404040404, 7, 12, 22, 12
8, 12, 23, 129, 13, 23, 130, 14, 23, 131
, 15, 22, 132, 14, 22, 133, 13, 22, 133
1870 DATA 4, 12, 22, 96, 2, 13, 22, 96, 2, 14
, 22, 96, 2, 15, 22, 100, 1
1880 GOTO 580
1890 RESTORE 1900
1900 DATA 5, 0F080808FFFFFFF, FF00000
0C0F0FCFF, 00FF000000000060E, 00F9
06, EFD0BF00BDFEFFF, 5, 15, 22, 128
1910 DATA 15, 23, 129, 15, 24, 130, 15, 25,
131, 16, 27, 132, 4, 15, 22, 100, 1, 15,
23, 106, 1, 15, 24, 96, 2, 16, 27, 32, 1
1920 GOTO 580
1930 RESTORE 1940
1940 DATA 7, 0000001F10080804, 000000F
808040203, 8040202018040202, 00F9
06, 80FF000000000060E, 02020201010
10101
1950 DATA 0404040202020101, 7, 12, 23, 1
28, 12, 24, 129, 13, 25, 130, 15, 25, 13
1, 15, 24, 132, 14, 23, 133, 13, 23, 134
1960 DATA 4, 12, 23, 96, 2, 13, 23, 96, 3, 14
, 23, 96, 1, 15, 24, 96, 2
1970 GOTO 580
1980 RESTORE 1990
1990 DATA 4, 0000030C08040203, 003CC3,
10EC040201010307, 80402020180402
02, 4, 12, 24, 128, 12, 25, 129, 12, 26,
130
2000 DATA 13, 25, 131, 3, 12, 24, 96, 2, 12,
26, 110, 1, 13, 25, 96, 1
2010 GOTO 580
2020 RESTORE 2030
2030 DATA 8, 00010204040810E, 00FF, FF,
00000000000000FF, 10EC0102010103
07, 003CC3, 000003FC, 01010207, 8
2040 DATA 11, 24, 128, 11, 25, 129, 11, 26,
130, 10, 27, 131, 12, 26, 132, 12, 25, 1
33, 12, 24, 134, 12, 23, 135, 4
2050 DATA 11, 24, 96, 3, 10, 27, 96, 1, 12, 2
3, 96, 3, 12, 26, 110, 1
2060 GOTO 580
2070 END

```

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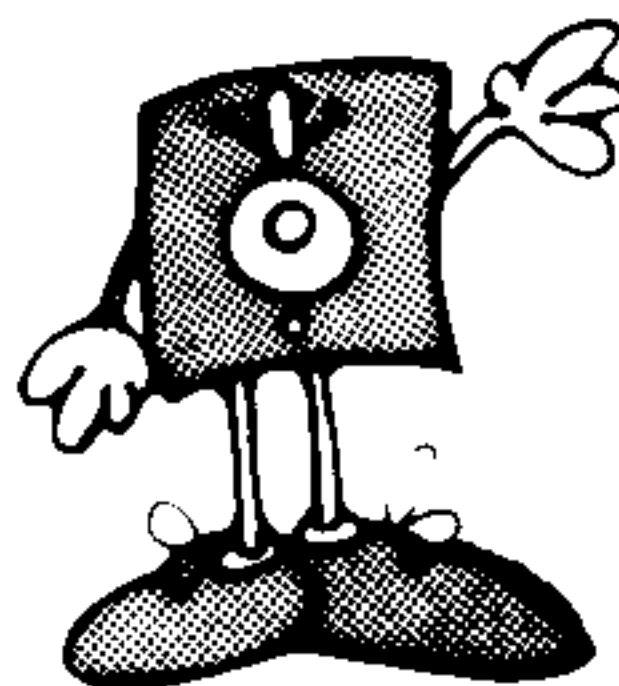
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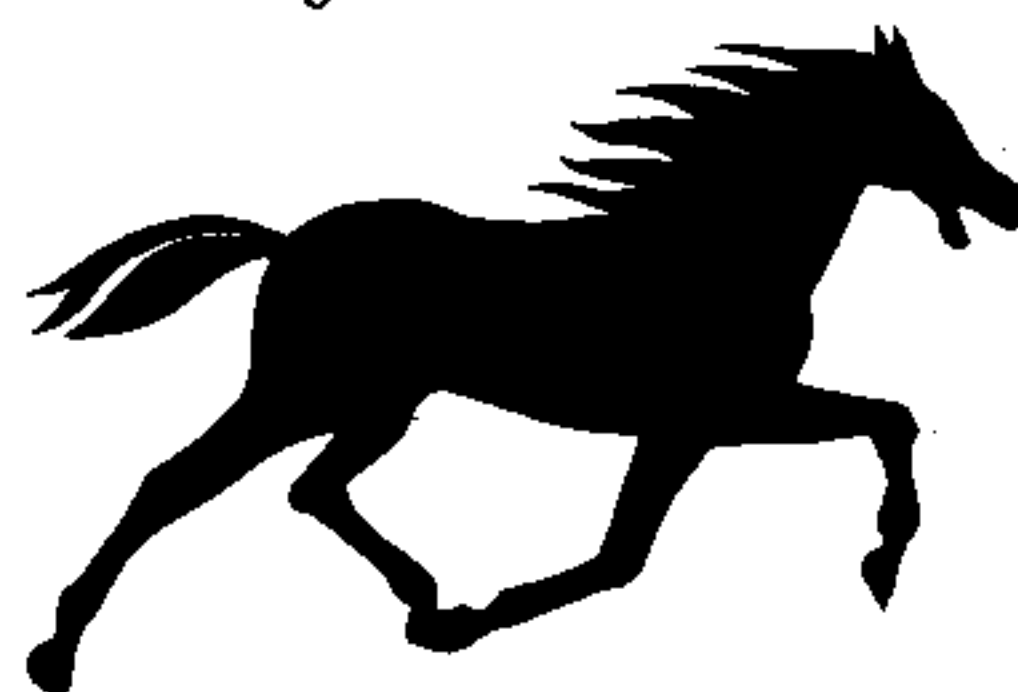


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# NEWS & PRODUCTS

## Atari Disassembler

*Ultra Disassembler*, a labelling disassembler for Atari computers, is available from Adventure International.

The program recreates the source code from which a machine language program was assembled. It can disassemble DOS files or code from a list of specified disk sectors.

Output may be written to the screen, printer, or disk file. The disassembly is reversible and may be edited and reassembled with any popular Atari assembler.

*Ultra Disassembler* sells for \$49.95.

Adventure International  
Box 3435  
Longwood, FL 32750

## Vocabulary Builder

*Power-of-Words*, a word learning game designed by Peter Funk, author of the "It Pays to Increase Your Word Power" column in *Reader's Digest*, is available for Apple computers.

Each volume includes 200 target words and their associated synonyms, antonyms, prefixes, and suffixes. The game features immediate scoring, and after an answer is scored, the program provides additional information about the words used in the quiz.

*Power-of-Words*, which sells for \$79.95, includes two diskettes of five games each, worksheets, and a final quiz covering the

words in all the games.

Funk Vocab-Ware  
Peter Funk, Inc.  
4825 Province Line Road  
Princeton, NJ 08540

## Memory Expansion And Printer Interface For TI-99/4A

Doryt Systems has introduced a 32K memory expansion unit and a parallel printer interface for the TI-99/4A, both of which can be used without the expansion box.

Paraprint 18A is a parallel 8-bit communication interface that connects directly to the computer and works without the RS-232 interface card. The interface sells for \$105.

Memory 32K adds RAM to the TI-99/4A, allowing the use of the Editor Assembler, TI Logo,



Doryt Systems Memory 32K and Paraprint 18A plug directly into the TI-99/4A and eliminate the need for an expansion box.

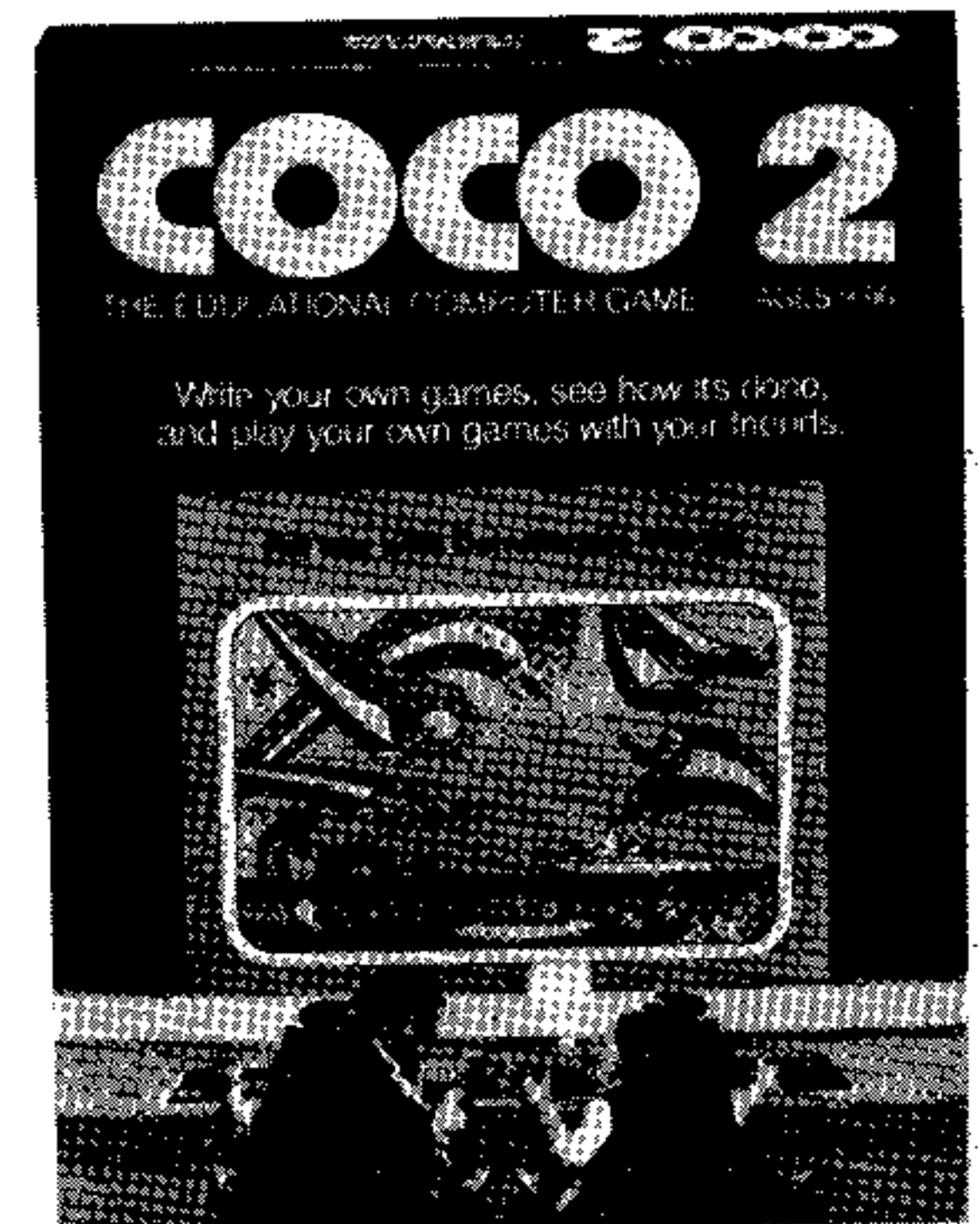
and other modules that require memory expansion. Like Paraprint 18A, it plugs directly into the computer and provides a daisy-chain connection for other

TI peripherals. Memory 32K is priced at \$175.

Doryt Systems, Inc.  
14 Glen Street  
Glen Cove, NY 11542  
(516)676-7950

## Game Design Tutor

*Coco 2* is a teaching game that explores the fundamentals of computer game design with an approach that assumes no prior computer knowledge. The program follows a fully developed sample game and then helps the user alter the game's concept or



*Coco 2* teaches video game design skills.

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*Coco 2* is available for the 16K VIC for \$39.95. Versions also are available for the Commodore 64, the 32K Atari 400, and the Atari 800 for \$44.95.

Human Engineered Software  
71 Park Lane  
Brisbane, CA 94005



duct is fully software transparent with Apple's DOS 3.3 Operating System.

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195 W. El Camino Real  
Sunnyvale, CA 94086

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## Loss-of-Data Insurance

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The Association of Computer Users and the St. Paul Fire and Marine Insurance Companies have announced a new type of insurance for small computer owners that includes coverage for accidental loss of data.

The policy covers:

- Direct physical loss or damage to equipment, disks, programs, documentation, and source materials.

- Accidental erasure or loss of data.

- Dishonest acts, fraud, or misuse of equipment by employees or outside parties.

- Extraordinary damage to equipment caused by external electrical problems, such as spikes, brownouts, or power surges.

- Extra expenses incurred as a result of a covered loss.

The cost of coverage is \$175 per year for protection up to \$25,000, with a \$250 deductible.

Association of Computer Users  
P.O. Box 9003  
Boulder, CO 80301  
(303)443-3600

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## Computer Diet For T/S

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The *Personal Weight Control Program* is a computerized diet and nutrition program produced by International Publishing & Software for the Timex/Sinclair computers.

The program, which presents dieting as an exercise in

controlling eating habits, consists of three parts:

- **Present Status Assessment**, which analyzes the eating habits and nutritional needs of the user.

- **Menu Building**, in which the computer develops menus suited to the needs and tastes of the user.

- **Monitoring and Feedback**, which tracks progress and adjusts menus accordingly.

The program is available for \$29.95.

International Publishing & Software, Inc.  
3952 Chesswood Drive  
Downsview, Ontario  
Canada M3J 2W6

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## Music For Children

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Counterpoint Software has released *Early Games Music*, another program in its *Early Games for Young Children* series. This program, designed for children ages 4 through 12, is an assortment of games that introduce the basics of music.

Songs created with the program can be saved and played or revised later. *Early Games Music* is available for Apple II and Commodore 64 computers.

Counterpoint Software Inc.  
Suite 140, Shelard Plaza North  
Minneapolis, MN 55426

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## Computer Resources

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More than 215 new books are listed in the 16th edition of the *Annual Bibliography of Computer-Oriented Books*, published by the University of Colorado.

All introductory-type books published before 1980 have been deleted, but the bibliography still contains more than 1200 books from 170 publishers. The books are listed under 61 categories.

Copies of the bibliography are available for \$5, or \$6 if an invoice is required.

Computing Newsletter  
P.O. Box 7345  
Colorado Springs, CO 80933

The Micro Center has compiled a new *Time Saver* catalog of microcomputer courseware. The catalog lists 319 high-quality, high-value educational programs for the Apple, Atari, TRS-80, PET, VIC, and IBM PC.

Copies of the catalog are available free.

The Micro Center  
P.O. Box 6  
Pleasantville, NY 10570  
(800)431-2434

Computer Skill Builders has produced a free catalog of microcomputer resources for the classroom. The book contains 304 computer-related products for education, including software products, books, diskettes, and supplies.

Computer Skill Builders  
P.O. Box 42050, Dept. 7Z  
Tucson, AZ 85733  
(602)323-7500

*Selected Microcomputer Software*, a 64-page catalog of educational courseware for the Apple II, TRS-80, Commodore PET, and Atari microcomputers, is available free from Opportunities for Learning.

Programs listed in the catalog cover grade levels from primary through college and were selected based on their suitability for use in today's computer-enhanced classroom environment.

Opportunities for Learning, Inc.  
8950 Lurline Ave., Dept. L45  
Chatsworth, CA 91311

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## Games For The TI

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Vaughn Software has created an array of cassette programs for the TI-99/4A computer. They include:

- *Mariner*, a sea adventure

with seven game boards, mapped screens, and a sonar readout; \$12.99.

● *Red Dread*, an arcade-type board game in which you seek green gems while avoiding the Red Dread; \$9.99.

● *Digger Duck*, a colorful maze game that requires strategic planning; \$9.99.

● *Chromium Shuttle*, a space game in an endless starfield in which you control an onboard computer, warp drive, and asteroid analyzer; \$13.99.

● *Chopper Fireman*, a game that pits you – in an aging and temperamental helicopter – against raging forest fires; requires Extended BASIC, \$21.95.

● *Model Rocketry Performance*, an application program that provides the expected performance of model rockets, and allows for quick comparison of models on the drawing board; \$25.99.

Vaughn Software  
5460 Harlan #84  
Arvada, CO 80002

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## Educational Programs For Apple And Atari

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Random House has added several new reading, language arts, and mathematics programs to its library. All of the following programs require 48K computers with disk drives.

● *Fundamental Word Focus*: This series of ten programs for the Atari provides a game-like format to teach vowel identification, syllabication, compound words, and identification of word elements. It includes a record-keeping system and uses color graphics and sound.

● *Tutorial Comprehension*: This Apple program is designed to teach comprehension skills to second, third, and fourth graders. The five comprehension skills presented are details, sequence, main idea, inference, and critical reading.

● *Word Blaster*: This program for both Atari and Apple computers allows students to practice comprehension skills using context clues.

● *Fundamental Punctuation Practice*: This Apple program provides more than 30 lessons on basic punctuation skills. An off-line diagnostic placement test is included with the program.

● *Story Builder*: This Atari program, based on the concept of mix-and-match storybooks, allows students to experiment with sentence structure and to create new and often humorous story situations.

● *Galaxy Math Facts Game* and *Grand Prix*: These games, available in both Apple and Atari versions, put the student at the helm of a spaceship or at the controls of a Grand Prix racer. In each case, the student must show a mastery of basic math facts before he or she can complete the mission, or speed past the checkered flag.

Random House, Inc.  
7307 South Yale Avenue  
Suite 103  
Tulsa, OK 74136

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## T/S Game In 3-D

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Softsync has released *Mothership*, an arcade-style game for the Timex/Sinclair computers.

The game features one or two player options, three levels of play, on-screen scoring and a display that looks as if it's in 3-D.

In *Mothership*, which sells for \$16.95 plus \$1.50 for shipping and handling, players maneuver their Starlight Fighters down the Zarway space corridor toward the imposing Mothership, which is launching an all-out attack on the planet. Players use the keyboard as a control panel to move their ships through the corridor, while dodging the drone fighters launched by the Mothership.

Softsync, Inc.  
14 East 34th Street  
New York, NY 10016

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# CALENDAR

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**August 10-12, Madison, WI.** The second annual Microcomputers and High Technology Conference in Vocational Education. The conference includes beginning and advanced classes on programming, PILOT, CAD, courseware design, and administration. Discussions are planned on microcomputer development and application, and on existing vocational/educational programs using computers. For information, write Dr. Judith Rodenstein, 964 Educational Science Building, 1025 W. Johnson Street, Madison, WI 53706.

**August 28, Harrisburg, PA.** The Central Pennsylvania Repeater Association will sponsor its 10th Annual Hamfest/Computer Fest. The event, which will be held adjacent to Hersheypark, Chocolate Town, U.S.A., includes indoor dealer displays and a flea market area. Registration \$3; tables and table space available. For more information, write Timothy R. Fanus, 6140 Chambers Hill Road, Harrisburg, PA 17111.

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*New Product releases are selected from submissions for reasons of timeliness, available space, and general interest to our readers. We regret that we are unable to select all new product submissions for publication. Readers should be aware that we present here some edited version of material submitted by vendors and are unable to vouch for its accuracy at time of publication.*

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**COMPUTE!** welcomes notices of upcoming events and requests that the sponsors send a short description, their name and phone number, and an address to which interested readers may write for further information. Please send notices at least three months before the date of the event, to: Calendar, P.O. Box 5406, Greensboro, NC 27403. ○



# CAPUTE!

Modifications Or Corrections To Previous Articles

## TI Teeth Wisdom

Line 650 of this program from the July 1983 "Programming The TI" column (p. 199) should read:

```
650 PRINT " ";CHR$(156);"}e";CHR$(136)&CHR$(137)&CHR$(138);"e~";CHR$(127)&CHR$(157)
```

## Bee Trap For VIC

In the instructions for keyboard play on page 102 of the June 1983 issue, line 320 should read:

```
320 IFPEEK(KB)=35THEND1=D1+22:GOTO335
```

## Memory Trainer For TI

For the TI-99/4A version of this program (June 1983, p. 118) to work in standard TI console BASIC, the following changes must be made:

```
240 IF (DR<1)+(DR>10) THEN 140
270 IF SL<2 THEN 275 ELSE 280
275 SL=2
280 IF SL>90 THEN 285 ELSE 290
285 SL=90
```

Thanks to David Duffan and others who suggested this change.

## Atari P/M Graphics Simplified

The following lines in the moving ship example program developed on pages 175-178 of the June 1983 issue need corrections:

```
310 POKE VSA+ADD+1,PMHIGH
360 COLR1=25:COLR2=11:COLR3=74
370 POKE 704,COLR1:POKE 705,COLR2:POKE 706,COLR3
400 Y1=125:Y2=25:Y3=25
```

## Slow List On The VIC-20

The mysterious memory location 37879 described in this article from the June issue (p. 180) is actually location 37159, the high byte of the interrupt clock. Because of incomplete address decoding for the I/O chips, the contents of locations 37136-37167 appear to repeat several times in locations 37168-37887. The location normally contains 66, not 64 as stated in the article. For a thorough discussion

of the effects of changing the contents of location 37159, see the article "Versatile Data Acquisition With VIC" (**COMPUTE!**, May 1983, p. 244).

## UnNEW For VIC And 64

This utility program from the June 1983 issue (p. 213) will *not* work from disk. It must be SAVED to tape in the manner described in the article.

## Minefield For 64

The 64 version of this game from the June issue (p. 266) requires the following correction:

```
360 B3(J)=BT(J)+.5*BT(J):B4(J)=B3(J)+.25*BT(J)
```

## Checkers

To allow legal jumps with kings in this game for the Commodore 64 (May 1983, p. 90), the following line must be changed:

```
585 IFL1<=5ANDU1>=2THENIFS(LP,UM)<0ANDS(L1+2,U1-2)=0THEN600
```

## Crosswords For VIC

Line 860 of this program from the May issue (p. 82) should read:

```
860 GET F$:IF F$="" THEN 860
```

## TI General-Purpose Data Base

Line 203 of this data base management program for the TI from the May issue (p. 232) should read:

```
203 FOR IO=1 TO IR.
```

## 64 Odds And Ends

The article (May 1983, p. 237) noted that listing could be disabled by POKE 775,200. To restore the list feature, POKE 775,167.

## Retirement Planner For VIC

Robert A. Brown suggests modifications which make this program for calculating retirement saving needs from the April 1983 issue (p. 71) more accurate, and also allow calculations for any time period, not just multiples of five years. First, delete lines 120, 460-500, 590, and 600, then make the following changes:

```
510 D=AI/(1+AI/2):Q=((1+AI)^Y-1)/D
540 W=(SR-S1*(1+AI)^Y)/Q
```

We regret that we are no longer able to respond to individual inquiries about programs, products, or services appearing in **COMPUTE!** due to increasing publication activity. On those infrequent occasions when a published program contains a typo, the correction will appear on the CAPUTE! page, usually within eight weeks. If you have specific questions about items or programs which you've seen in **COMPUTE!**, please send them to Readers Feedback, P.O. Box 5406, Greensboro, NC 27403.