The Year Ahead: Interviews With Industry Experts

COMPUTE!

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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

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August 1983 Vol. 5, No. 8

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REVIEWS

COLUMNS AND DEPARTMENTS

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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.

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EDITOR'S NOTES

The recent TI announcement of a pending second quarter loss in the $100 million range sent shock waves through the consumer computer end of the stock market. In two days, TI stock dropped almost 50 points before beginning a gradual upturn. What's happening out there in the trenches of this economic warfare?

It would seem that Commodore is remaining profitable by constantly refining, redesigning, and maintaining rigorous internal cost controls. Various manufacturers, including TI, have been pulled into the trap of selling computers at loss leader prices. The expectation (perhaps more accurately the fervent hope) then becomes that money will be made on the software. With so much competition for software dollars only time will tell, but Commodore's recent and aggressive software price cuts don't bode well for the loss leader philosophy.

In Tom Halfhill's noteworthy article in this issue you'll discover an incredible array of information on the Consumer Electronics Show. Items of particular note: Atari has completely revamped their computer line, and Coleco introduces "Adam," a computer package of tremendous significance.

Random Bits and Rumors: With the advent of "Adam," we can expect to see new packaged systems to appear, most notably in the $500-$700 range. One recent concern we heard voiced regarding price cutting for computers: do people treat them less seriously as prices drop (e.g., is a $299 VIC-20 "more" of a computer than an $85 VIC-20)? It would seem that the manufacturers will have to convey the message that these are powerful, capable computers, and back that up with useful software. Commodore's *Magic Desk* (see Tom's article) is a good case in point.

IBM's new home computer is still under the tightest wraps. We still expect it by September or October and still expect a price in the $700 ball park. There's always the chance that IBM will sit back and watch the battle for a while to let things shake out a bit, but we think not. The IBM home computer would appeal to many on name alone, and IBM's well aware of that.

Robert Lock

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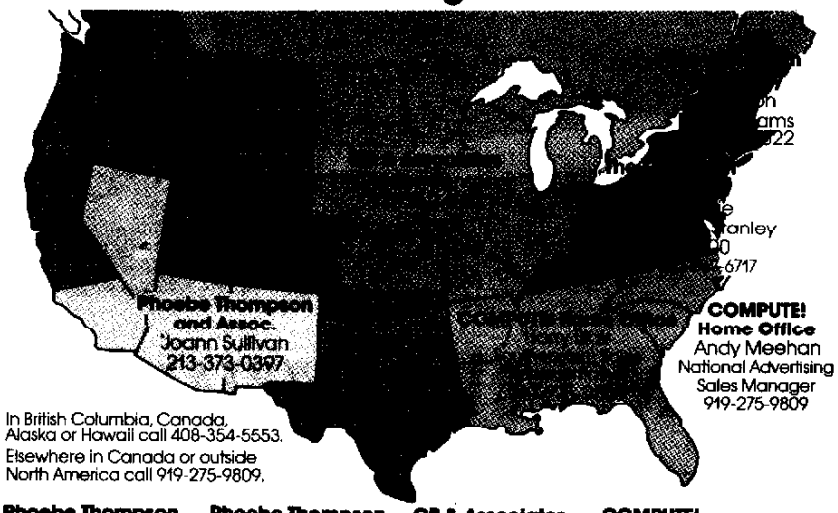

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the device number via software is to turn on one of the drives and the computer, load and run the "DISK ADDR CHANGE" program on the demonstration diskette supplied with the drive, then turn on the other drive (which will then be device 8).

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$,

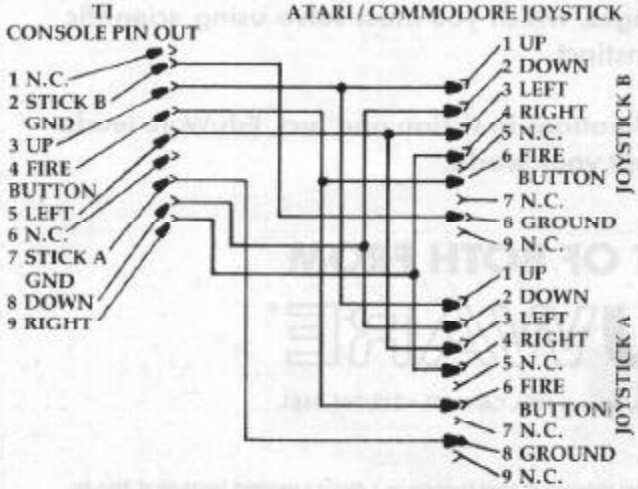
Barry E. Krischer

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.* ©

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 Alphatronic PC

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

Called the Alphatronic 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 Alphatronic 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. C

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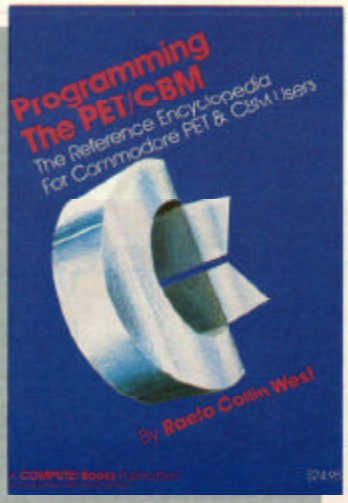

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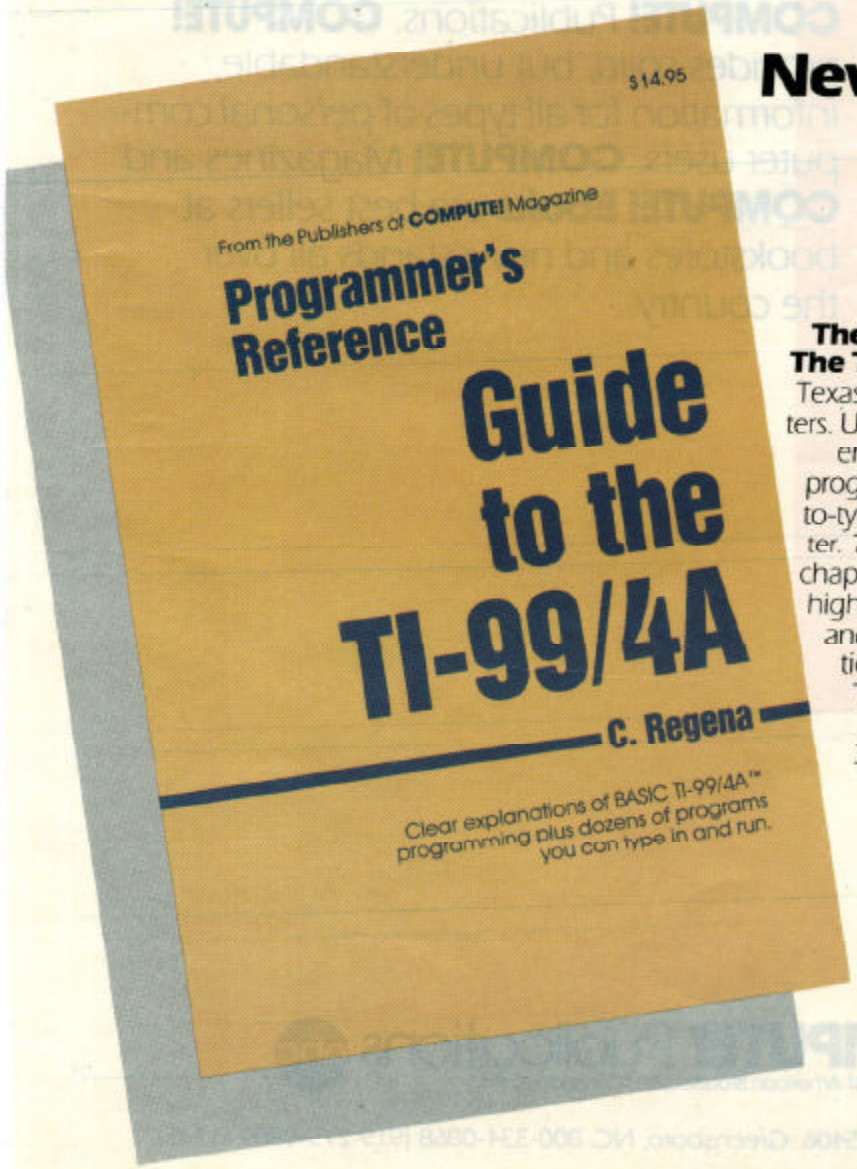

New From COMPUTE!

$14.95
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The Programmer's Reference Guide To The TI-99/4A. The comprehensive guide to the Texas Instruments 99/4 and 99/4A home computers. Useful for everyone from beginners to experienced programmers. Contains instructions for programming in BASIC as well as over 40 ready-to-type-in programs for this best-selling computer. *The Programmer's Reference Guide* includes chapters about using variables in files and arrays, high-resolution graphics, music, speech, editing and debugging programs, mathematical functions, sorting, conserving memory, and more. This book offers many ideas for home applications, educational programs, and games. 312 pages, paperback. Spiral bound for easy access to programs.

First Math

Steve Hamilton

This math game for children features graphics, color, and sound. In addition to displaying the correct answer after a child has entered an incorrect one, there's a small fanfare for ten consecutive correct answers. Versions for VIC, 64, TI, Radio Shack Color Computer, and Apple.

I was introduced to home computing last May when I bought the VIC-20. I got one partly for my two boys, so they would grow up with some knowledge about a computer. Since the older boy was just approaching kindergarten, I thought it would be at least a year or so before he would be ready to operate the VIC. He was ready long before I had anticipated.

The following is a simple math exercise that I developed for him. In this program, the user is given a choice of exercises: addition, subtraction, multiplication or division. Then, a choice of upper and lower limits is specified for each of the two numbers in each question. Since the computer will generate random numbers, the parameters you choose will become the limits for each number pair. This is how you can adjust the difficulty level.

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."

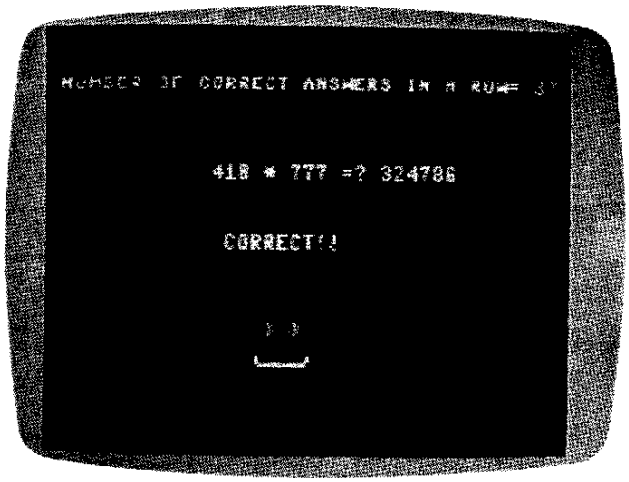
Program 1: First Math – VIC Version

```
10 POKE36879,111:PRINT"{CLR}{RVS}
   {9 DOWN}{CYN}{6 RIGHT}FIRST MATH":FOR
   I=1TO2000:NEXTI:D=0
30 PRINT"{CLR}{4 DOWN}TO ADD :TYPE +"
50 PRINT"{DOWN}TO SUBTRACT :TYPE -"
70 PRINT"{DOWN}TO MULTIPLY :TYPE *":PRIN
   T"{DOWN}TO DIVIDE :TYPE /":PRINT"
   {3 DOWN}YOUR CHOICE=?{2 SPACES}";
83 GETA$:IFA$<>CHR$(42)ANDA$<>CHR$(43)AN
   DA$<>CHR$(45)ANDA$<>CHR$(47) OR A$=""
   THEN83
84 PRINT"{LEFT}"A$:INPUT"{DOWN}HIGHEST N
   UMBER";UL:INPUT"{DOWN}LOWEST NUMBER";
   R1
90 R=UL+1-R1
95 C=INT(RND(1)*R)+R1:B=INT(RND(1)*R)+R1
100 IFA$=CHR$(43)THENDEF FNA(X)=B+C
110 IFA$=CHR$(45)THEN DEF FNA(X)=B-C
120 IFA$=CHR$(42)THEN DEF FNA(X)=B*C
125 IFA$=CHR$(47)ANDC=0 THEN 95
130 IFA$=CHR$(47)ANDINT(B/C)<>B/C THEN95
135 IFA$=CHR$(47) THEN DEFFNA(X)=B/C
140 PRINT"{CLR}{2 SPACES}NO. OF ANSWERS"
150 PRINT"CORRECT IN A ROW="D:IF D=10 TH
   EN 295
180 E=FNA(X):PRINT:PRINT B;A$;C;"=";:INP
   UTF:IFF<>ETHEN 250
210 PRINT"{7 RIGHT}{3 DOWN}CORRECT"
211 POKE7931,46:POKE7932,46:POKE7975,74:
   POKE7976,75
212 POKE38651,7:POKE38652,7:POKE38695,7:
   POKE38696,7
219 FORT=1TO1000:NEXTT:D=D+1:IFD=10 THEN
    PRINT"{BLK}":GOTO 140
240 GOTO95
250 PRINT"{DOWN} THAT IS NOT CORRECT"
260 PRINTB;A$;C;"=";E
261 POKE7931,46:POKE7932,46:POKE7975,85:
   POKE7976,73
262 POKE38651,7:POKE38652,7:POKE38695,7:
   POKE38696,7
270 FORT=1TO3500:NEXT:D=0:GOTO 140
295 POKE7931,46:POKE7932,46:POKE7975,74:
   POKE7976,75
296 POKE38651,1:POKE38652,1:POKE38695,1:
   POKE38696,1
299 POKE36878,15:FORT=255TO128STEP-1
301 POKE36879,T:POKE36876,T
304 FORT1=1TO5:NEXTT1:NEXTT:FORT=128TO25
   5
309 POKE36879,T:POKE36876,T
312 FORT1=1TO5:NEXTT1:NEXTT
323 POKE36878,0:POKE36879,27
325 PRINT"{4 DOWN}{RIGHT}PLAY AGAIN (
   {RVS}Y{OFF}/{RVS}N{OFF}) ? ";
327 GET A$:IF A$="" THEN 327
328 IF A$="Y" THEN 10
330 PRINT"{CLR}{BLU}":END
```

You get a happy face for a correct response in "First Math" – VIC version.

Program 2: First Math – 64 Version

```
5 GOTO 10
6 POKE 1720,81:POKE1722,81:POKE1799,74:P
  OKE1800,67:POKE1801,67
7 POKE 1802,67:POKE 1803,75
8 POKE55992,4:POKE55994,4:POKE56071,7:PO
  KE56072,7:POKE 56073,7:POKE 56074,7
9 POKE 56075,7:RETURN
10 POKE53280,7:POKE53281,6:PRINT"{CLR}
   {RVS}{9 DOWN}{CYN}{10 RIGHT}F I R S T
   {3 SPACES}M A T H":D=0
20 FOR I=1 TO 2000:NEXT I
30 PRINT"{CLR}{4 DOWN}{3 RIGHT}IF YOU WA
   NT TO ADD, TYPE +"
50 PRINT"{DOWN}{3 RIGHT}IF YOU WANT TO S
   UBTRACT, TYPE -"
70 PRINT"{DOWN}{3 RIGHT}IF YOU WANT TO M
   ULTIPLY, TYPE *"
72 PRINT"{DOWN}{3 RIGHT}IF YOU WANT TO D
   IVIDE, TYPE /"
75 PRINT"{3 DOWN}{3 RIGHT}YOUR CHOICE=?
   {2 SPACES}";
83 GETA$:IFA$=""THEN83
84 IF A$<>CHR$(42)ANDA$<>CHR$(43)ANDA$<>
   CHR$(45)ANDA$<>CHR$(47)THEN83
85 PRINT"{LEFT}"A$:INPUT"{2 DOWN}
   {3 RIGHT}HIGHEST NUMBER";UL:INPUT"
   {DOWN}{3 RIGHT}LOWEST NUMBER";R1
90 R=UL+1-R1
95 C=INT(RND(1)*R)+R1:B=INT(RND(1)*R)+R1
100 IFA$=CHR$(43)THENDEF FNA(X)=B+C
110 IFA$=CHR$(45)THEN DEF FNA(X)=B-C
120 IFA$=CHR$(42)THEN DEF FNA(X)=B*C
125 IF A$=CHR$(47) AND C=0 THEN 95
130 IF A$=CHR$(47) AND INT(B/C)<>B/C THE
    N 95
135 IF A$=CHR$(47) THEN DEF FNA(X)=B/C
140 PRINT"{CLR}{3 DOWN} NUMBER OF CORREC
    T ANSWERS IN A ROW="D:IF D=10 THEN 2
    95
180 E=FNA(X):PRINT:PRINT"{3 DOWN}
    {11 RIGHT}";B;A$;C;"=";:INPUTF:IFF<>
    ETHEN 250
210 PRINT"{13 RIGHT}{3 DOWN}CORRECT!!"
211 GOSUB 6
219 FORT=1TO1000:NEXTT:D=D+1:IFD=10 THEN
     PRINT"{BLK}":GOTO 140
240 GOTO95
250 PRINT"{DOWN}{5 RIGHT}...THAT IS NOT
    CORRECT"
260 PRINT"{11 RIGHT}{DOWN}";B;A$;C;"=";E
261 POKE1720,81:POKE1722,81:POKE1799,85:
    POKE 1800,67:POKE1801,67
263 POKE 1802,67:POKE 1803,73
265 POKE55992,4:POKE55994,4:POKE56071,7:
    POKE56072,7:POKE 56073,7:POKE 56074,
    7
267 POKE 56075,7
270 FORT=1TO3500:NEXT:D=0:GOTO 140
295 GOSUB 6:POKE 54276,17:POKE 54277,30:
    POKE 54278,200:POKE 54296,15
299 POKE 54272,220:FORT=120 TO 1 STEP-1
301 POKE 54273,T:POKE 53281,T
304 FORT1=1TO5:NEXTT1:NEXTT:FORT=1 TO120
309 POKE54273,T:POKE53280,T
312 FORT1=1TO5:NEXTT1:NEXTT
323 POKE54276,0:POKE54273,0:POKE54272,0:
325 PRINT"{6 DOWN}{8 RIGHT}PLAY AGAIN (
    {RVS}Y{OFF}/{RVS}N{OFF} ) ? ";
327 GET A$:IF A$="" THEN 327
328 IF A$="Y" THEN 10
330 SYS 2048:END
```

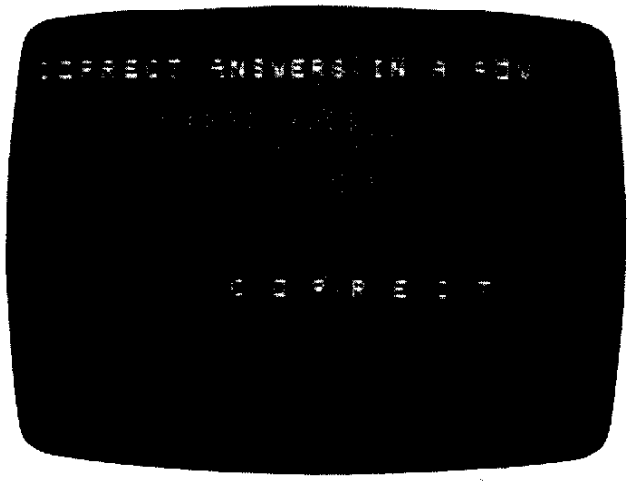


64 version.

Program 3: First Math – TI-99/4A Version

```
100 GOTO 330
110 REM MISTAKE IN INPUT
120 CALL HCHAR(6,18,32,10)
130 GOTO 950
140 FOR I=1 TO LEN(H$)
150 V=ASC(SEG$(H$,I,1))
160 CALL HCHAR(ROW,COL+I,V)
170 NEXT I
180 RETURN
190 ROW=14
200 COL=4
210 H$=CHR$(128)&CHR$(129)&CHR$(130
    )&CHR$(142)
220 GOSUB 140
230 ROW=15
240 H$=CHR$(131)&CHR$(132)&CHR$(133
    )&CHR$(141)&CHR$(143)
250 GOSUB 140
```

```
260 ROW=16
270 IF CORRECT=0 THEN 300
280 H$=CHR$(134)&CHR$(135)&CHR$(136
    )&CHR$(140)
290 GOTO 310
300 H$=CHR$(137)&CHR$(138)&CHR$(139
    )&CHR$(140)
310 GOSUB 140
320 RETURN
330 RANDOMIZE
340 GOSUB 1560
350 CALL CLEAR
360 FOR J=5 TO 8
370 CALL COLOR(J,16,5)
380 NEXT J
390 CALL SCREEN(4)
400 PRINT TAB(4);"F I R S T
    {4 SPACES}M A T H": : : : : : :
     : : : :
410 CALL SOUND(500,262,2,330,2,392,
    2)
420 CALL SOUND(500,262,2,349,2,440,
    2)
430 CALL SOUND(500,262,2,330,2,392,
    2)
440 CALL SOUND(500,247,2,349,2,392,
    2)
450 CALL SOUND(800,262,2,330,2,392,
    2)
460 FOR I=1 TO 300
470 NEXT I
480 CALL CLEAR
490 D=0
500 CALL SCREEN(12)
510 PRINT "TO ADD{12 SPACES}:TYPE +"
    : :
520 PRINT "TO SUBTRACT{7 SPACES}:TY
    PE -": :
530 PRINT "TO MULTIPLY{7 SPACES}:TY
    PE *": :
540 PRINT "TO DIVIDE{9 SPACES}:TYPE
     /": : :TAB(6);"YOUR CHOICE ? "
    ;
550 CALL KEY(0,A,ST)
560 IF (A<>43)*(A<>88)*(A<>45)*(A<>
    47)THEN 550
570 IF A<>88 THEN 590
580 A=120
590 PRINT CHR$(A): : : : : : :
600 INPUT "HIGHEST NUMBER ? ":UL
610 PRINT
620 PRINT
630 INPUT "LOWEST NUMBER ? ":LL
640 R=UL+1-LL
650 C=INT(RND*R)+LL
660 B=INT(RND*R)+LL
670 IF (A=120)+(A=45)+(A=47)THEN 70
    0
680 F=B+C
690 GOTO 790
700 IF (A=120)+(A=47)THEN 730
710 F=B-C
720 GOTO 790
730 IF A=120 THEN 780
740 IF C=0 THEN 650
750 IF INT(B/C)<>B/C THEN 650
760 F=B/C
770 GOTO 790
780 F=B*C
790 CALL CLEAR
```



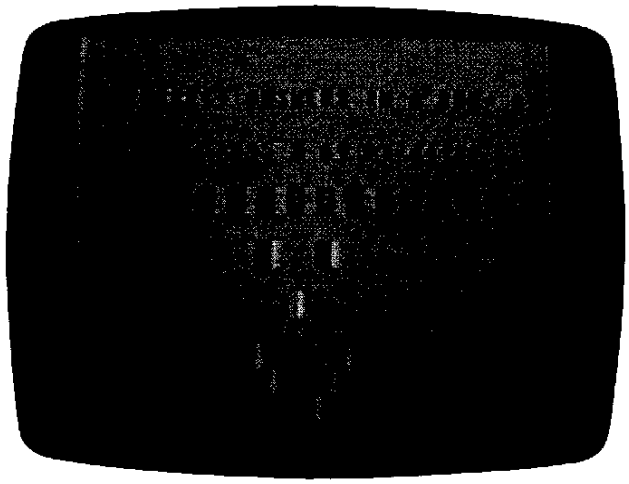
TI happy face for correct response.

```
800 CALL SCREEN(10)
810 ROW=3
820 COL=2
830 H$="CORRECT ANSWERS IN A ROW ="
840 GOSUB 140
850 COL=29
860 H$=STR$(D)
870 GOSUB 140
880 FOR I=1 TO 50
890 NEXT I
900 IF D=10 THEN 1390
910 ROW=6
920 COL=6
930 H$=STR$(B)&CHR$(A)&STR$(C)&CHR$
    (61)&CHR$(63)
940 GOSUB 140
950 H$=""
960 C$=""
970 K=0
980 CALL KEY(0,E,ST)
990 IF ST=0 THEN 980
1000 IF E=13 THEN 1090
1010 IF ((E<48)+(E>57))*(E<>45)THEN
     1110
1020 H$=CHR$(E)
1030 C$=C$&H$
1040 ROW=6
1050 K=K+1
1060 COL=18+K
1070 GOSUB 140
1080 GOTO 980
1090 E=VAL(C$)
1100 IF E<>F THEN 1230
1110 CORRECT=1
1120 GOSUB 190
1130 COL=11
1140 ROW=15
1150 H$="C O R R E C T ! !"
1160 GOSUB 140
1170 FOR I=1 TO 200
1180 NEXT I
1190 REM SMILE
1200 D=D+1
1210 IF D=10 THEN 790
1220 GOTO 650
1230 REM INCORRECT
1240 CORRECT=0
```

```
1250 GOSUB 190
1260 H$=" SORRY, BUT "
1270 ROW=15
1280 COL=9
1290 GOSUB 140
1300 H$=STR$(B)&CHR$(A)&STR$(C)&" "
     &CHR$(61)&" "&STR$(F)&"."
1310 COL=13
1320 ROW=19
1330 GOSUB 140
1340 REM FROWN
1350 FOR I=1 TO 800
1360 NEXT I
1370 D=0
1380 GOTO 790
1390 REM UP&DOWN SOUND,LIGHT
1400 CALL CLEAR
1410 FOR I=16 TO 1 STEP -1
1420 CALL SOUND(2,I*50+60,6)
1430 CALL SCREEN(I)
1440 NEXT I
1450 FOR I=1 TO 16
1460 CALL SOUND(2,I*50+60,6)
1470 CALL SCREEN(I)
1480 NEXT I
1490 CALL SCREEN(3)
1500 PRINT TAB(3);"Y O U{3 SPACES}D
      I D{3 SPACES}I T ! !"; : : :
     : :
1510 PRINT "{4 SPACES}TRY AGAIN (Y/
     N)?";
1520 CALL KEY(0,E,ST)
1530 IF ST=0 THEN 1520
1540 IF E=ASC("Y")THEN 480
1550 END
1560 REM DEFINE CUSTOM CHARACTERS
1570 FOR I=128 TO 143
1580 READ A$
1590 CALL CHAR(I,A$)
1600 NEXT I
1610 DATA 030F1F3F7F7FFFFE,FFFFFFFF
     FFFFFF3E,F0FCFEFFFFFFFF3F
1620 DATA FEFEFEFFFFFFFFFF,3E3E3EFF
     F7EFDFE3,3F3F3FFFFFFFFFFF
1630 DATA FFF97C3E1F0F0701,FFFFFF7F
     0080FFFF,FFCF9F3F7FFFEF8
1640 DATA FFFF7E3C1D0F0701,FF0000FF
     FFFFFFFF,FF7F3F9FDFFFEF8
1650 DATA F8F0E0C080000000,FC9E6FEF
     EF1FFEFC,00000080C0E0F0F8
1660 DATA 000080F8C0800000
1670 FOR J=13 TO 14
1680 CALL COLOR(J,14,1)
1690 NEXT J
1700 RETURN
```

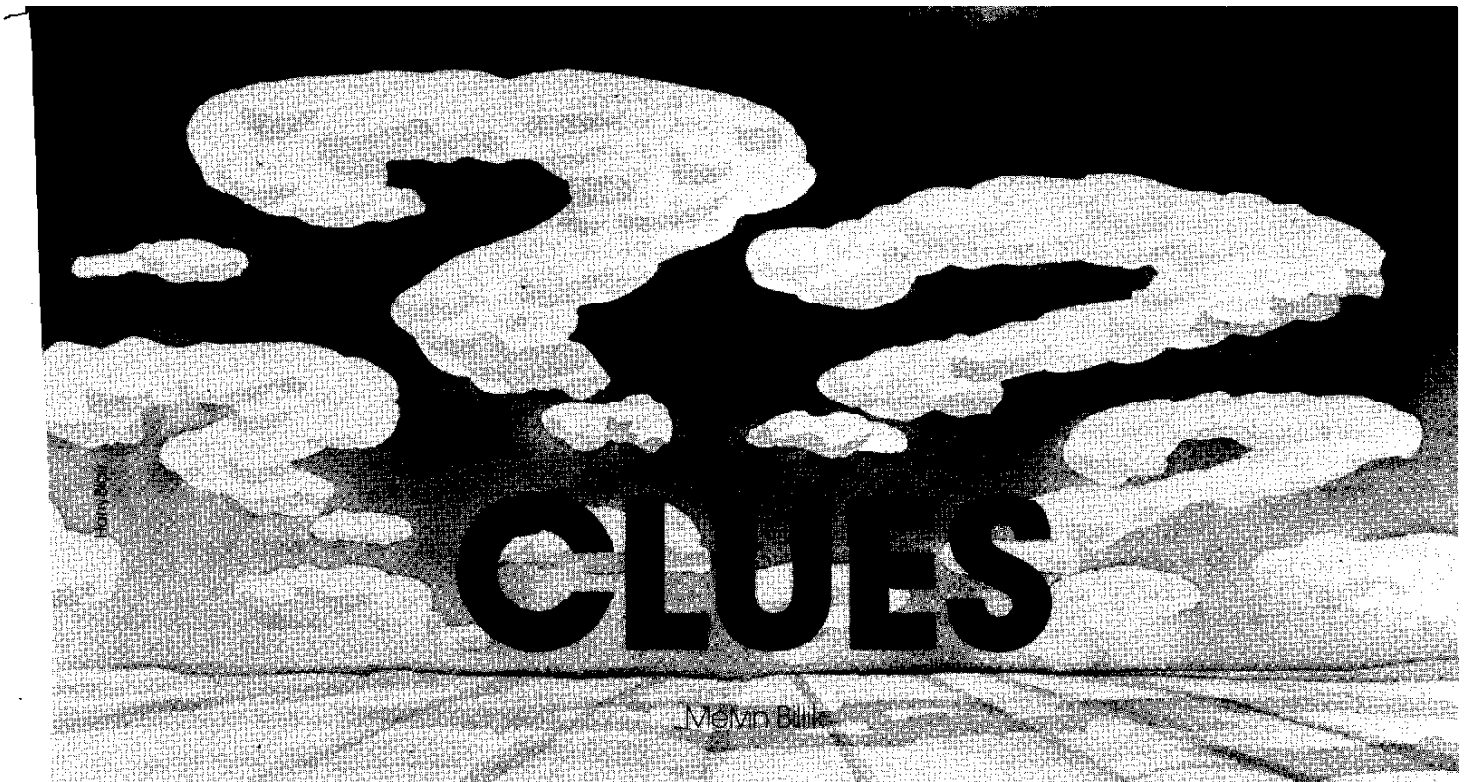
Program 4:
First Math — Color Computer Version

```
100 CE=128+16*2+15:CN=128+16*7+15:C
    M=128+16*3+15
110 CLS 7
120 PRINT@231,"F I R S T{3 SPACES}M
     A T H";:FOR I=1 TO 1200:NEXT I
130 CLS 3:PRINT@99,"TO ADD: TYPE +
    ";
140 PRINT@163,"TO SUBTRACT: TYPE -
    ";
150 PRINT@227,"TO MULTIPLY: TYPE *
    ";
160 PRINT@291,"TO DIVIDE: TYPE / ";
170 PRINT@387,"YOUR CHOICE ";:INPUT
     A$:IF A$<>("+") AND A$<>("-")
    AND A$<>("*") AND A$<>("/") THE
    N 170
180 PRINT@387,"HIGHEST NUMBER ";:IN
    PUT UL
190 PRINT@451,"LOWEST NUMBER ";:INP
    UT LL
200 R=UL+1-LL
210 B=INT(RND(R))+LL-1:C=INT(RND(R)
    )+LL-1
220 CLS:PRINT@67,"CORRECT ANSWERS I
    N A ROW=";D:IF D=10 THEN 430
230 IF A$="+" THEN E=B+C:GOTO 290
240 IF A$="-" THEN E=B-C:GOTO 290
250 IF A$="*" OR A$="X" THEN E=B*C:
    A$="X":GOTO 290
260 IF A$="/" AND C=0 THEN 210
270 IF A$="/" AND INT(B/C)<>B/C THE
    N 210
280 IF A$="/" THEN E=B/C
290 PRINT@137,B;A$;C;"=";:INPUT F:I
    F F<>E THEN 360
300 PRINT@200,"G O O D ! !";
310 PRINT@268,CHR$(CE);"{3 SPACES}"
    ;CHR$(CE):PRINT@334,CHR$(CN)
320 PRINT@395,CHR$(CM);"{5 SPACES}"
    ;CHR$(CM)
330 PRINT@428,CHR$(CM);"{3 SPACES}"
    ;CHR$(CM)
340 PRINT@461,CHR$(CM)+CHR$(CM)+CHR
    $(CM)
```



Color Computer version.

```
350 FOR I=1 TO 900:NEXT I:D=D+1:GOT
    O 210
360 SOUND 1,3:PRINT@196,"SORRY, BUT"
370 PRINT@207,B;A$;C;"=";E;"."
380 PRINT@268,CHR$(CE);"{3 SPACES}"
    ;CHR$(CE):PRINT@334,CHR$(CN)
390 PRINT@397,CHR$(CM)+CHR$(CM)+CHR
    $(CM)
400 PRINT@428,CHR$(CM);"{3 SPACES}"
    ;CHR$(CM)
```



Melvin Blake

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 C$(200), CA$(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 A$= CA$(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$;" USE THE FOLL
    OWING CLUE"
190 PRINT "TO SPELL THE WORD"
200 I=0
210 XE=INT(N*RND+1)
250 PRINT ::
260 PRINT C$(XE)
270 INPUT A$
280 IF A$<>CA$(XE)THEN 320
290 I=10
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 HAV
    E?
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$;", USE T
   HE FOLLOWING CLUE
30 PRINT"TO SPELL THE WORD."
40 I=0:X%= N*RND(TI)+1
50 PRINT:PRINT:PRINTC$(X%)
60 PRINT:PRINT:INPUT A$
70 IF A$= CA$(X%) THEN I =10:GOSUB 500:G
   OTO 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 C
   ORRECT 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 TO100: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

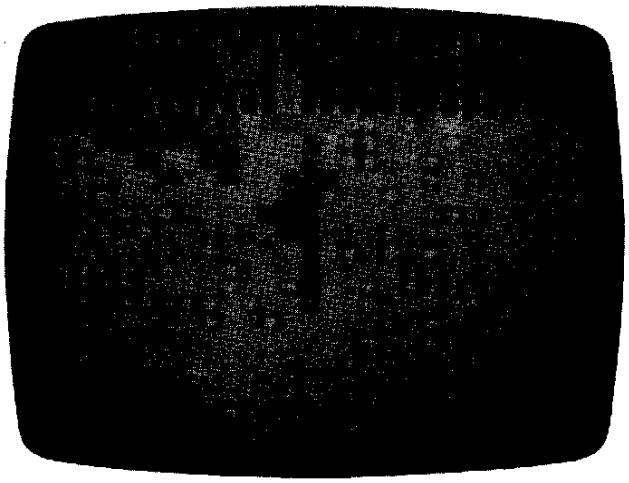
James Dunn

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.



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

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=124 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
```

```
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,"3854721010000000"
    )
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(1,300,0)
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
```

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.

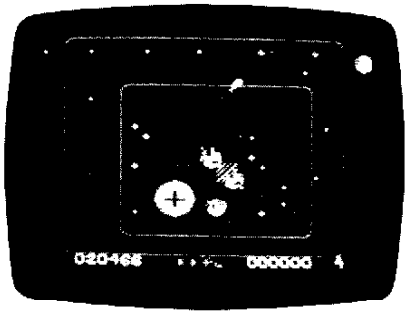
Watch Battle On Scanner

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 weakness. 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

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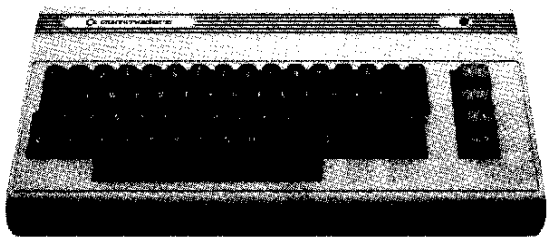

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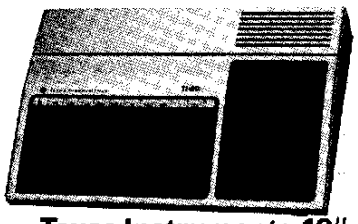

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PROGRAMMING THE TI

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
```

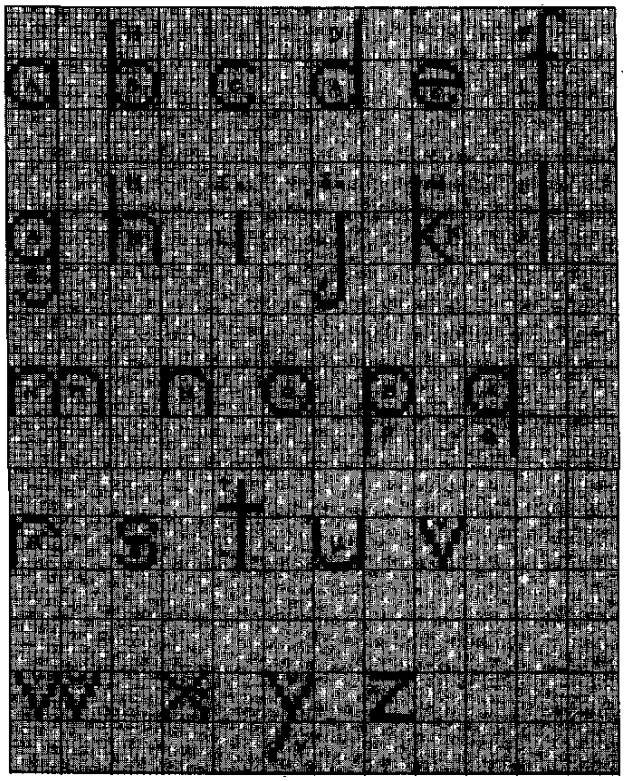
To help conserve memory, a DATA statement can be up to four screen lines long (112 characters). You can edit and insert to make the line even longer. One exception is that if you have quite a few items separated by a lot of commas, the computer will accept only a little over three lines.

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 0609080808080E,0101010141
    221C,0000808080808,00000008,08
    0808080888887,8890A0C0A0908884
170 DATA 0808080808080808,7884020202
    020202,BCC2818181818181,3C428181
    8181423C,8080808080808,0101010101
180 DATA BCC2818080808,3C42403C020
    2423C,0000080808087F08,818181818
    181433D,4141222214140808,0404888
    85050202
190 DATA 8244281028448282,1010202040
    4,7F02040810204 07F
200 PRINT TAB(4);"l"
210 PRINT TAB(4);"l o vw e r
    {3 SPACES}c a s e"
220 PRINT :TAB(9);"l{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 vw 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 educational 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.

```
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.

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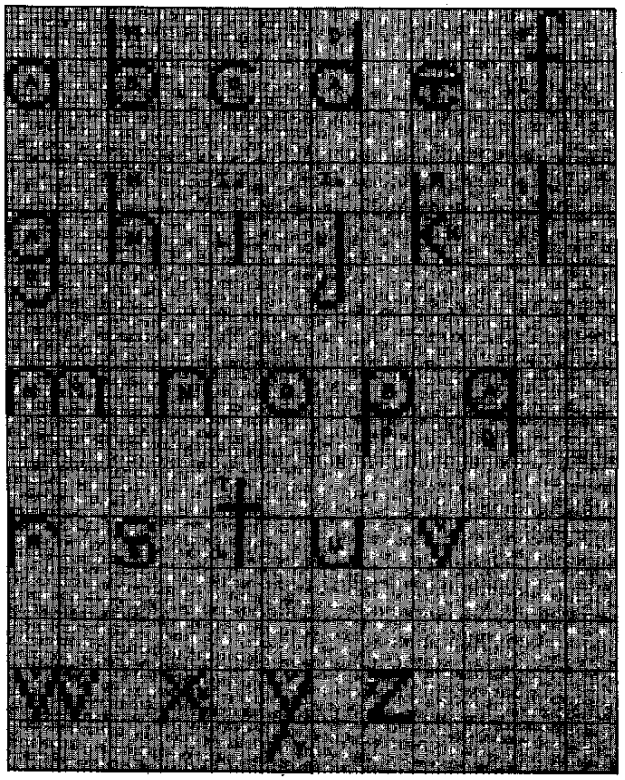
Small Capital Letters And The Graphics Characters They Represent.



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,0000080808080808,00000008,08
    0808080808887,8890A0C0A0908884
170 DATA 0808080808080808,7884020202
    020202,BCC2818181818181,3C428181
    8181423C,8080808080808,0101010101
180 DATA BCC2818080808808,3C42403C020
    2423C,0000080808087F08,8181818181
    81433D,4141222214140808,0404888
    85050202
190 DATA 8244281028448282,1010202040
    4,7F02040810204070F
200 PRINT TAB(4);"l"
210 PRINT TAB(4);"l o vw e r
    {3 SPACES}c a s e"
220 PRINT :TAB(9);"l{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 vw 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.

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.

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$)
260 NEXT G
270 DATA FFFFFFFFFFFFFFFF,3F1F0F0707
    030301,7F3F1F0F,FFFF7F7F3F3F3F3F
    ,FFFFF3C,F0F0F0E0E0C0C08,0F0F0F0
    F0F0F0F0F
280 DATA 0F0F0707070303010 1,0101030307
    070F0F,0F0F0F0FFFFFFFFF,FFFFFFFF
    7F1F0701,FF3F0F03,FFFFFFFFFFF0F0F
290 DATA F8FCFEFE7F3E,FFFFFFFFFEFCF8
    F,F0F8F8FCFCFEFEFF,00808 0C0C0E0E
    0F,F0E0C08,FCFCF8F8F0F0F0F
300 DATA 8080C0C0E0E0F0F,0F1F3F7FFFF
    FFFFF,0000000003 0F3FFF,0000000000
    0010307,E0E0E0F0F8FCFEFF,0000000
    000080C0E
310 DATA 00E0F0FEFFFFFFFF,0000000000
    E0F8FE,E0E0E1E3FFFFFEFC
320 L$="                    "
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$;"""""""
500 PRINT " r";L$;"""""n":" g";L$;"'
    ""nq":"  j";L$;"""e":"
    {4 SPACES}kj""l""""""""""""""":T
    AB(10);"a""""""""ndj""p"
510 PRINT TAB(11);"bdr'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
```

```
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$(R
    ),L,1)))
910 NEXT L
920 GOSUB 1380
930 C=C-1
940 GOTO 1250
950 GOSUB 1450
960 FOR I=1 TO 7
970 CALL HCHAR(23,2+I,ASC(SEG$("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 11,0000001F10F0C0C,000000F
    F,0000000,0808080808080808,FF808
    0808080808,F8080808080808,080
    80601
1520 DATA 00000000C03807,0000000000
    00FF,0000000000F00C,0202010101
    010101,12,14,12,128,14,13,129
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,000000FC0404040,0404040404040
    404,040404040404FC,0000000000
    00FF
1590 DATA 00000000C03807,08080601,F8
    0808080808080808,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 9,00000000001F101,00000000
    00FF,0000000000F80404,08080F010
    101010102,0404080810101010,2020E
1650 DATA 0000FF,1C0201,1010101010101
    01,10,11,18,128,11,19,129,11,2
    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 5,0000FF8080808080,0000F010
    10080808,08080403,000000E0110B0
    F0F,4040404080808080,5
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
      010,1010101FFFFFFFF
1800  DATA 0000F0101113170F,20203F,08
      0808080810202,0808080810101,1
      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
      100808004,0404040202020101,02020
      201010101FF,44444444FFFFFFFF
1860  DATA 4040404040404,7,12,22,12
      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 5,0F080808FFFFFFFF,FF00000
      0C0F0FCFF,00FF0000000000E,00F9
      06,EFDFBF00BFDFEFFF,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
      06,80FF00000000060E,0202020101O
      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 4,000003DC08040203,003CC3,
      10EC0402010103O7,8040202018040202
      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 8,000102040408102E,00FF,FF,
      0000000000000FF,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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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.

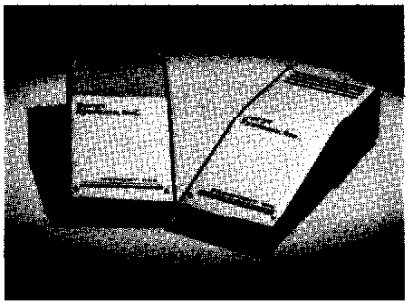
Funk Vocab-Ware
Peter Funk, Inc.
4825 Province Line Road
Princeton, NJ 08540

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,



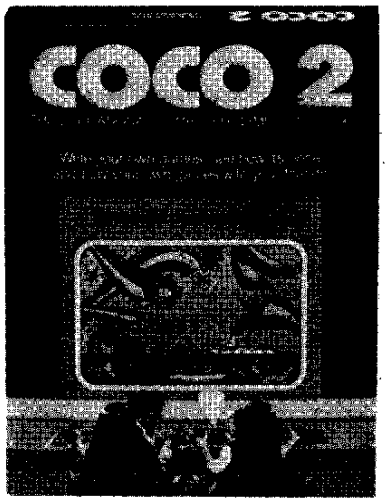
Doryt Systems Memory 32K and Paraprint 18A plug directly into the TI-99/4A and eliminate the need for an expansion box.

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.*

write a totally new game.

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.

List price for the drive is $299.

Multitech Electronics, Inc.
195 W. El Camino Real
Sunnyvale, CA 94086

Loss-of-Data Insurance

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

Computer Diet For T/S

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

Music For Children

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

Computer Resources

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

Games For The TI

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

Educational Programs For Apple And Atari

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

T/S Game In 3-D

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.
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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~";CH
    R$(127)&CHR$(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)<ØANDS(L1
    +2,U1-2)=ØTHEN6ØØ
```

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.* ©

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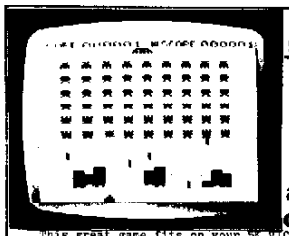

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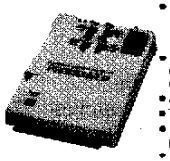

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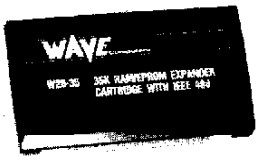

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