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# PERMA-LINE

## For the C-64

### By Buck Childress

**E**ver type a line number, press the RETURN key, and start to scream—all at the same time? It's a normal reaction when you realize that a vital program line has been hurled into oblivion. Or maybe you've found that Aunt Blabby and Uncle Gabby running into your personal finances program. Soon the whole town will know when the last time you bought a double-scoop ice cream cone was.

Wouldn't it be great if you could have program lines that couldn't accidentally be edited or dumped? And how about run-proof programs that would thwart the snoopy ones, too? Now you can...with *Perma-Line*!

*Perma-Line* enables you to enter program lines that cannot be deleted in the normal manner. In addition, it lets you endow your programs with the inability to run, even though they'll load and list. *Perma-Line* makes it easy to protect valuable program lines and safeguard your programs from unauthorized use! Here's how to use it.

After saving a copy of *Perma-Line*, run it. The loader will POKE the machine language data into memory and check for errors. The loader then NEWs itself, so be certain you have a copy saved before running it for the first time. To activate *Perma-Line*, type SYS 52000 and press

RETURN. You deactivate it the same way. The first SYS turns it on, the second turns it off, etc. You can load, save, and run programs with no interference.

*Perma-Line* takes advantage of the fact that the highest program line number allowed is 63999. If you try to enter a higher number, you'll get an error message. Consequently, no changes or deletions can be made to lines from 64000 up. If you put your valuable data in this range, it will be protected. With *Perma-Line* active, just enter the high program lines as you would any other lines. You can add, change, and delete lines in this range so long as *Perma-Line* is active. If *Perma-Line* is not active, the program lines are 'frozen' in place. If you (or someone else) should try to do anything to them, an error message will appear, but the lines will remain unscathed. Poor Aunt Blabby and Uncle Gabby. They won't be able to have fun fiddling with your program lines. Just lots of frustration! Now, here's how to keep them from using your program without your consent.

Programs with line numbers from 64000 up still run normally. Data in this area will be read, PRINT commands will print—everything works as it should, with one very interesting, and useful, exception. Any IF-THENs, GOTOs, or GOSUBs that reference a line number from 64000 up (e.g. GOSUB 65000) will bring the program to a screeching halt with a ?SYNTAX ERROR message staring the user in the face. As long as you avoid line references in this area, there's no problem. If prying eyes are of no consequence, this is fine. This would be a great place to put important data and the like. But if you're concerned that Aunt Blabby and Uncle Gabby can't wait to run your program, base your program up here. Put in as many IF-THENs, GOTOs, and GOSUBs referencing this area as you want (e.g. IF X=25 THEN 64000). When they try to run it, and the first line number reference is encountered...zap! ?SYNTAX ERROR! The sooner the reference appears, the sooner the program crashes. Remember, it has to reference a line number from 64000 up. Lower line numbers still work as usual (e.g. GOTO 500). For double protection, put the reference in a line number from 64000 up. As an example, if you enter

```
64000 GOTO 64005
```

the program will crash immediately and since the GOTO is in a line in our 'special' range, it cannot be edited.

Even though no one else can run your program, you can. Load and activate *Perma-Line* before you run your program. Now all those references will work like a Swiss watch. Even though your program can be loaded and listed, no one but you can run it.

*Perma-Line* allows you to add program lines from 64000 to 65535. This gives you more than 1500 additional program lines to use. All of them have the added benefits of being 'permanent' (except when using *Perma-Line*) and run-protected when you choose.

Experiment with *Perma-Line*. It's easy to use and really allows you to protect your programs. ☐

SEE PROGRAM LISTING ON PAGE 127

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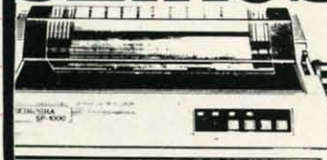
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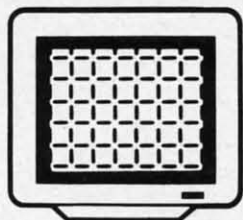
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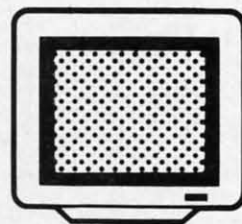
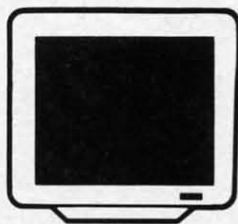


# SCREENS



## For the C-64

By Marie E. Coon



**H**ave you ever wished you could call up a screen full of information at the press of a key? *Screens* may be your answer. It can be used to make help screens of program instructions and other information, game scores, notes to yourself, and more. It has been structured so that it can be run either by itself or concurrently with a compatible BASIC or machine language program.

When used by itself, *Screens* is loaded and run just as any ordinary BASIC program. Upon running, the bulk of the program is transferred to begin at memory location 45056, which is under the BASIC ROM, and a small 114 byte subroutine is placed to start at location 828. The interrupt is started and the message "PRESS ← FOR SCREENS" is printed in the middle of the screen. Pressing the ← key activates the interrupt. In much less time than it takes to tell about it, the RAM memory from pages 147 through 159 is saved under the BASIC ROM, the *Screens* program is transferred from under the ROM to the just-freed RAM memory, the screen and color information currently on display is saved under the BASIC ROM, and a midscreen window opens to display the *Screens* Start menu. If all of this memory switching seems unnecessary for a program to operate by itself, it is. There are definite advantages when *Screens* is used with other programs, however.

The Start menu offers function key choices to make and/or save a screen, to view a screen previously saved, to view the screen that was saved under the ROM, or to exit the *Screens* program.

The f1 key selects the Make/Save screen option. The Start menu is replaced with the Make/Save menu, which also offers several function key choices. You can change the screen color, border color, and character color with f1, f3, and f5 respectively. F2 will save the screen on display under the filename you designate, while f8 will save the screen under a previously designated filename. Other options are to return to the Start menu, to erase the menu on display, and to recall the Make/Save menu if it has been erased. Erasing the menu provides a clear screen and a cursor which behaves much as it does in direct mode. To change the color of an individual character,

use the CTRL and Commodore keys plus a color key just as in direct mode. F5 will change the color of all of the characters on the screen to the next color. The Commodore and SHIFT keys pressed together switch character sets, just as in direct mode. When satisfied with your screen, press f2 to save it as a sequential file. To enable *Screens* to distinguish its files from other sequential files which may be on the disk, the given filename is automatically prefixed with an h followed by a space. The f8 key will save the screen with replace. This is the key to use if you have amended a previously saved screen and wish to save it under the same filename. This save with replace first erases the original screen file and then saves the new screen under the old filename. This avoids the infamous save with replace bug. F6 will return program control to the Start menu. If you have forgotten which function key does what, press f4 and the menu will be recalled.

When f3 is pressed from the Start menu, *Screens* immediately searches the disk for any sequential files having a filename beginning with an h followed by a space. All such files are listed on the screen with the first highlighted in yellow. The CRSR control keys will move the highlight up and down over the listed files. RETURN loads the highlighted file and D deletes the highlighted file. F3 will repeat the listing with the same or another disk and f5 will return program control to the Start menu.

If you load a file, it will be displayed under the View menu. F1 allows the just loaded file to be amended by transferring control to the make/save option described above. F3 repeats the file listing and loading sequence and f5 returns the program to the Start Menu. F7 and f4 control erasing and displaying this menu, respectively. F2 exits the *Screens* program by reversing the RAM/ROM memory switches.

To view, amend, or save the screen that was on display when *Screens* was activated, press f7 from the Start Menu. Viewing, amending, and/or saving is then accomplished the same as for a screen loaded from a disk file.

Since *Screens* operates on an interrupt, it can be run along with many other BASIC and machine language programs. However, since it is an interrupt driven program,

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*Screens* is not compatible with a program that also uses an interrupt. During the operation of the BASIC or other machine language program, all of the *Screens* program except the 114 byte permanent subroutine is safely tucked away under the BASIC ROM. This makes more memory available for the operation of the BASIC program. To increase the number of compatible programs, the permanent 114 bytes can be placed in three different locations. The "A" program location starts at 828 in the tape buffer, the "B" program location starts at 40845, and the "C" program at 53133. The "B" option is the top of RAM memory and if used with a BASIC program must be protected from being overrun with BASIC strings by the following POKEs: POKE 51,141:POKE 52,159:POKE 55,141:POKE 56,159. The "C" option is at the top of the 4K RAM block which begins at 49152. It is above the memory occupied by the C-64 DOS Wedge and will not interfere with it. To implement these options, the *Screens Data A* program must be loaded and run first. Then load and run either the *Screens Data B* or *Screens Data C* program. Running the *Data* program will create the corresponding *Screens* program.

To run a *Screens* program concurrently with another machine language program, first load and run the *Screens* program. Then load and run the other machine language program. If the second program does not also use an interrupt or occupy the same memory as the 114 byte permanent *Screens* subroutine, they should be compatible.

To use a *Screens* program with a BASIC program or a BASIC and machine language program, add the following lines to the beginning of the BASIC program:

```
1 IF A THEN 3
2 A=1:LOAD "SCREENS A",8,1
3 SYS 37742:CLR
```

If "SCREENS A" doesn't work, then try "SCREENS B" or "C". If the program still doesn't work, you may be out of luck.

To designate a different key as the activator key, change the 57 in line 1038 to the keyboard matrix value of the new key and the 95 in line 1354 to the CHR\$ code (ASCII code) of the new key. The keyboard matrix value is the value stored in location 197 whenever a key is pressed. This location carries a value of 64 when no key is pressed. The following line entered in direct mode will print out the matrix value of any pressed key:

```
FOR J=.TO10:PRINT PEEK(197): FORT=1TO10
00:NEXT:NEXT
```

Refer to Appendix C of the *Commodore 64 Programmer's Reference Guide* for a complete listing of the CHR\$ codes.

Give *Screens* a try. It may just put much needed information only a keystroke away, rather than buried in a stack of magazines. □

SEE PROGRAM LISTING ON PAGE 112



## Cadet's DOS Revisited

By Cheryl Peterson

In the July '86 *Ahoy!* we presented *Cadet's C-64 DOS* and *Cadet's C-128 DOS* in the column. I invited all of you to make changes and improvements and send them to me. Robert Wempe of Oregon did a bit of research and came up with some notable modifications for the 128 version of the program, which shorten the program considerably.

His letter introduces the changes that he made and which lines they replace. After sharing it with you, I'll try to explain how the modifications work.

Dear Ms. Peterson:

Your comments relative to the *RENAME* and *COPY* commands being difficult to use within a program are incorrect—but not your fault! I stumbled upon these undocumented "tricks" by a little experimentation. All of the following work (assume *O\$* = old filename; *N\$* = new filename; *D\$* = disk name; *I\$* = disk ID):

```
320 COPY""+O$+""TO""+N$+"":RETURN
    (Replaces 320 and 330)
```

```
750 HEADER""+D$+", "+I$+"":RETURN
    (Replaces 750 and 760)
```

```
820 RENAME""+O$+""TO""+N$+"":RETURN
    (Replaces 820 & 830)
```

```
430 PRINT"HIT Y TO VALIDATE - ANY OTHER
KEY TO RETURN."
```

```
440 GETKEY Q$
```

```
450 IF Q$="Y" THEN COLLECT:SCNCLR:RETUR
N:ELSE SCNCLR:RETURN
    (Replaces 430 through 460)
```

```
620 IF DS>0 THEN PRINT DS$:RETURN;ELSE
RETURN
    (Replaces 620-640 & 670)
```

Note that only a single set of quotes bracket the comma in the *HEADER* command.

By the way, the double quote convention also works to read or write a sequence file from within a program. Assume *S\$* is assigned to a typed-in filename. All of the following work:

```
10 DOPEN #2,""+S$+"" (to read file)
```

```
20 DOPEN #2,""+S$+"" (to write file)
```

Surprisingly, a full 16 character filename can be used, because apparently none of the quotes or pluses are counted!

Also, it is not necessary to create a full screen window to get back to normal. The following will erase the window and clear the screen:

```
1010 PRINT"[CLEAR HOME] [HOME] [HOME] [C
LEAR HOME]"
```

In addition, compare the following (ref. your line 250):

### BASIC 2.0

```
10 PRINT"DO YOU AGREE? (Y/N)"
20 GET A$; IF A$ = "" THEN 20
30 IF A$ = "Y" THEN 200
40 IF A$ = "N" THEN 300
50 IF A$ <> "Y" OR A$ <> "N" THEN 20
```

### BASIC 7.0

```
10 PRINT"DO YOU AGREE? (Y/N)"
20 GETKEY A$
30 IF A$ = "Y" THEN 200
40 IF A$ = "N" THEN 300: ELSE 20
```

Enclosed is a listing of my modifications to your program; note line 100.

Signed,

Robert Wempe



## COPY, RENAME, HEADER, COLLECT

In the first section of modifications (lines 320, 430-450, 620, 750, and 820), Mr. Wempe is making use of the C-128's modified and extended disk commands.

Lines 320 and 820 use the modified COPY and RENAME commands. By using these commands, he eliminates the need to open and close the channel to the disk drive.

Lines 430-450 make use of the COLLECT command, again eliminating the need to open and close the channel.

Line 750 does the same thing but uses the HEADER command in place of the old FORMAT command.

## CHECKING DISK ERROR STATUS

Line 620 is used in the section where we are checking the disk drive for an error message. His modification eliminates about three lines. It also does not report the error status if there is nothing wrong. The reason this works is that DS (Disk status) is a built-in variable created by the 1571. It represents the numeric value of the disk error reported. If no error occurs, the drive puts a 0 in the variable DS. So the program checks DS to see if it is greater than zero and if so prints the error status. (IF DS>0 THEN PRINT DS\$). If it is zero, it returns without printing anything. DS\$ is another built-in variable for the character string that explains what DS means.

## PERSONAL PREJUDICE

The next change that Mr. Wempe points out has to do

with clearing windows and the screen. He corrects my statement that to clear the screen one must create a window that encompasses the full screen. And he's right.

Even knowing this, I would still use my method for clearing the screen. The reason is that the Commodore computers are the only ones that allow you to PRINT a clear or a home. In almost every other version of BASIC you use a command similar to SCNCLR to erase the screen. Most BASICs use either CLEAR or HOME as a keyword.

Admittedly, when dealing with a disk access program on the Commodore there is no chance that anyone would want to translate it for use on another machine. But just as a matter of principle I try not to use Commodore-specific oddities when programming. It's only my opinion, but I think finding weird graphic characters and statement words in the middle of PRINT statements is very disconcerting. So wherever possible I avoid them.

Many times in my column I have said that there is no such thing as correct BASIC programming. Each programmer has little idiosyncracies that set his programs apart from others. This is one of mine.

## AN ADMIRABLE INPUT ROUTINE

The two routines that Mr. Wempe presents to us for taking in one key input and analyzing it are fine. I generally use similar routines myself. In fact, I introduced and explained this kind of routine in my May '86 column. GET and GETKEY both take one character from the keyboard. For any input where you only need one key, this is ideal.

The example here does illustrate a good programming practice, though. When doing a comparison test on the value that has come in, it is a good idea to consider all the possible options, preventing the program from bombing out and disappointing the user. If you are expecting only one of two answers, for instance, be sure that any other answers are trapped out so that the program doesn't fall through to the next section.

A word about GETKEY in 7.0 BASIC. Though it functions much like GET in BASIC 2.0, it eliminates the need to repeat the line until a key is pressed, since it waits for valid input. GET on the other hand will indicate that no key was pressed and carry on to the next line of the program, unless you use a comparison test and repeat the line until a key is actually pressed.

I didn't use GETKEY in *Cadet's DOS* because I felt it would just be one more element that C-128 users would have to change if they were going to try typing in both versions. There were four places where it could be used, and I thought most people would be just as happy with an INPUT statement.

## ANALYZING LINE 100

Line 100 of Mr. Wempe's version saves a lot of programming space. I don't know how many of you remember my explanation for using ON-GOSUB in the Feb. '86 issue, but line 100 makes good use of this command.

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First we must make an adjustment to input though, because the ON-GOSUB routine needs a numeric value. This value is used to determine which subroutine the program jumps to.

For instance, if X=1 the program will branch to the first subroutine specified. If X=2 it will jump to the second routine specified. If X=5 it will branch to the fifth routine specified, and so forth.

But all of our choices are characters rather than numeric values. There are two ways to get around this. Mr. Wempe chose to use the X=ASC(X\$) to change the character into its numeric equivalent. ASCII values are offset from zero by 64. If you take a look at an ASCII table you will find that A=65, B=66, C=67, etc. So we need to subtract 64 from the value of X to get the correct value to jump to.

Another way to do the same thing would be to change the main menu and reassign the choices.

### CADET'S C-128 DOS

- |   |                      |
|---|----------------------|
| 1 | ACCESS DIRECTORY     |
| 2 | BACKUP FILES         |
| 3 | COLLECT FILES        |
| 4 | DELETE FILES         |
| 5 | EXIT TO BASIC        |
| 6 | FORMAT DISK          |
| 7 | GIVE FILE A NEW NAME |

ENTER THE NUMBER OF YOUR CHOICE  
WHAT IS YOUR REQUEST?

For this to work, we would need to modify the variable that holds the user's choice, since it was originally written to hold a string variable. If we didn't change the variable from X\$ to X we would get a TYPE MISMATCH error.

### SMILING FACES

The Independent Computer User's Group has moved from PlayNET to The Source. Call 1-800-336-3366 and tell them you'd like to sign up. They'll provide you with the current rates, and if you mention ICUG you may even get a special deal. Cherp's Library has been reconstructed in the newly expanded CHAT Area, and will be open Monday and Wednesday nights at 10 p.m. Eastern Standard Time. If you see someone with the handle Cherp, it's probably me. So say hi and I'll introduce you around. If you should have any problems, feel free to ask any ICUG member for help or leave mail to SIG025. (Yup, that's me.)

Beginners to telecommunicating may have a hard time understanding some of the shorthand used by veterans. Consider for example the following "emotion indicators" commonly seen on all the major online services. To understand what the face represents just turn your head to one side. The : is the face's eyes. The rest is the mouth.

There are a whole family of these that represent different emotions. Here's a little sample.

- |     |  |
|-----|--|
| :)  | smiling or happy   |
| :(  | frowning or sad  |
| ;)  | winking (flirting or sharing a joke)                                 |
| :(' | crying or very sad   |
| :p  | Sticking tongue out  |
| :P  | Also sticking tongue out   |
| :D  | Laughing   |
| :O  | Surprised  |
| :.) | Someone wearing a hat  |
| :I  | Poker face (used in card games)                                      |
| :*  | Kissing (usually accompanied by the name of the person being kissed) |

There are a few abbreviations that confuse newcomers to telecommunications. Some, like C U L8er, are easy enough to figure out. Others are a bit rougher. Here are a few of them.

- |         |   |
|---------|---|
| BRB!    | Be right back!                                  |
| NTTO    | Not touching that one                           |
| ::otf:: | On the floor (reaction to something very funny) |
| BBL     | Be Back Later                                   |
| LOL     | Laughing online                                 |
| OLM     | Online message                                  |

SEE PROGRAM LISTING ON PAGE 142

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AHOY! 87



## By Tim Little

My family just purchased a C-64 system with a modem and are unsure of the function of the little slide switch on the side of the modem. The manual was very vague. Can you provide any information?

*On most Commodore modems the small switch controls the answer/originate mode of the modem. Simply put, most modems can only either call other computers or answer calls from other computers. In order for the modem to know whether to initiate the "conversation," you must tell it whether to call another computer or answer the phone.*

*The typical setting for your modem should be ORIGINATE or O. This is usually closer to the computer. This is used for systems such as PlayNET and QuantumLink.*

*The ANSWER is used mainly if you are planning to run a BBS of your own or if you intend to get a call from your friend's computer (his must be set on O).*

Having typed in some of your programs, I am skeptical of all this PEEKing and POKEing around. I did not think I could hurt the machine from POKEing from the keyboard; perhaps I am wrong. Two of my friends said they do not own C-64s because of this reason. Can POKEing, as from within a program, hurt my 64?

—G. King  
Iowa City, IA

*Entering POKEs in the direct mode as well as programs containing POKEs can in no way permanently affect your machine. The very worst that can happen is that your machine will lock up, requiring you to either turn off your computer or use a reset switch in order to use the machine. It is possible, if you have a printer or disk drive attached, to either damage some data or cause the printer to do strange things. Otherwise there is no way a program can hurt your C-64, even random POKEs are harmless.*

1) How can I transfer *Penguins* (an ML game from *Ahoy!*, Oct. '86) from the disk I saved it on over to my games disk?

2) When running programs or games, and I want to quit and run something else, I typically have to shut the computer off and power up again to reload the next game. Is this correct?

—J. Fisher  
Lindenhurst, NJ

*Starting with your first question, I will assume that you have a copy of *Flankspeed* and the October '86 issue of *Ahoy!* First, you must LOAD and RUN *Flankspeed*, entering the starting and ending addresses as stated in the beginning of the listing of *Penguins*. Then when you see*

*the C000:— you load *Penguins* from your old disk using the f3 key. When that is finished loading, you insert your games disk and hit f1 to save a copy onto it.*

*I have bad news as to the answer to your second question. Some programs utilize a form of copy protection that renders the RUN STOP/RESTORE combination useless, thus requiring you to either turn off the machine or reset the machine somehow should you want to run another application.*

*If the RUN STOP/RESTORE combination won't work, you have only two choices, one hardware and the other software. The hardware involves grounding certain pins on the user port or connecting a couple of wires in the serial cable momentarily. Both can be easily built and installed or jury-rigged, but if you don't feel confident enough to tinker with your C-64 you may elect to buy such a switch.*

*The software method won't work on many sophisticated copy-protected programs but might serve your purpose. Enter the following line before you load your program and it will allow the RUN STOP/RESTORE key to act as a RESET for one shot. After you reset you must enter the line again.*

POKE792, PEEK(65532):POKE793, PEEK(65533)

All the books and magazines I've read about bit-mapped graphics state only that it requires eight kilobytes and not how to actually access this feature of the C-64. I know how to turn off a pixel as it was printed in the November '86 installment of *S.O.S.*

Do I need to program in ML to use it? If not, how do I use the bit-mapped mode?

*Unfortunately in BASIC bit-mapped graphics are unbearably slow due to the repetitious procedures and calculations involved. Since many articles have been printed in this magazine on the subject, I cannot again repeat all of the information you may need, but you might wish to check out *Commodore Roots* or other features in our other back issues for articles relating to bit-mapped graphics. I will point out the registers needed to use this mode.*

1) POKE 53272, PEEK(53272) OR 8 sets the bit map to the 8192 area in RAM.

2) POKE 53265, PEEK(53265) OR 32 activates the bit-mapped mode.

3) Use a loop to set the memory from 8192 to 16192 to zeroes.

4) Use another loop to set the background colors. Normal screen area (1024-2023) is where the colors are stored.

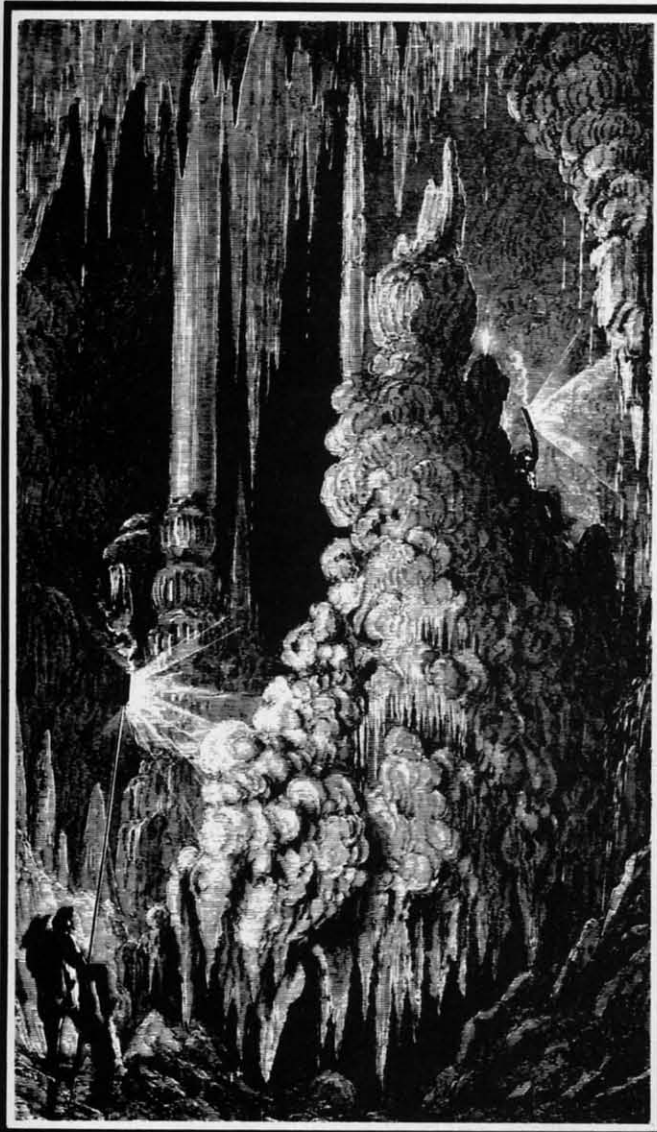
5) Now just use the plotting or unplotting as described in any of the articles.



# CATACOMBS

For the C-64

By Cleveland M. Blakemore



**B**eing the ardent treasure hunter that you are, you had a hard time resisting the stories about the Catacombs of Darkness and the fantastic caches of gold hidden there by the mysterious builders of the underground fortress.

Armed with only a torch, you descended the steps leading down to the catacombs without hesitating, ignoring the weird cries emanating from the dimly lit crypt, images of bulging chests of ill-gotten lucre swimming in your mind.

*Catacombs* is a game I created with the intention of experimenting with one of the 64's least appreciated graphic modes—extended background color mode (EBC). Most people refer to it as a useless novelty of the VIC

chip, but I have always thought that the ability to change the background color of a whole screen with a single POKE had to have a good game hiding in it somewhere. So far I have created a machine language game and this BASIC program using the VIC's EBC mode, and have yet to run short on ideas for future projects.

Basically EBC mode works like this: your character set is cut down to one quarter of its usual 255 shapes, giving you only 64 to work with, the first 64 in the set. These first 64 characters consist mostly of alphanumeric codes, so if you are planning on writing a game, you will probably have to redefine your character set to substitute one of your shapes for one of the Commodore's 64 default characters.

In EBC the first 64 characters of this set are displayed normally, getting their foreground color from color memory and their background color from the register at 53281. But the codes from 63 to 127, 128 to 191, and 192 to 255 get their background colors from registers 53282, 53283, and 53284 respectively. Although the colors are different, the characters still come from the shape tables of the first 64 codes!

And at first glance we say, "So what?"

But the game possibilities are really staggering, especially pertaining to a slow language like BASIC.

In *Catacombs*, you wander around in a huge underground labyrinth that is bigger than the screen itself. The



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**AHOY! 89**



map of the dungeon is 50 rows by 80 columns, with 10 levels. The screen scrolls in all four directions around you whenever you move against the border. This scroll is accomplished by a short ML routine that sits in an unused portion of memory.

Your purpose on each level is to avoid the traps and monsters, get as many gold chests as possible, and find the key that unlocks the door leading to the next level.

On the first five levels, this is relatively easy, since the catacombs are illuminated. But on the next five levels the lights are out, and the only things you can see are the objects which are within range of your torch. It takes an extensive search, as well as caution, to avoid the traps and monsters while you look.

There are five types of critters living in the catacombs: skulls, wizards, bats, spirits, and snakes. There are three of these guardians on each level, and they are quite intelligent and relentless in their efforts to catch you. If one of the monsters catches you the game ends.

The chests are worth 50 gold points each. A key adds a 100 gold point bonus to your booty. Each level is worth 25 gold points.

There are two types of doors in the dungeons. One is white, the door you came in, and one is gray, the one you need to unlock. You cannot go back through the white door. You cannot go through the gray door until you have the key.

The traps in the dungeon are detectable if you keep your eyes open. The tripwires look like single pixels on

your screen. If you set off a trap, you lose 50 gold points—but worse than that, the lights go out in the level you are on. You can get through the first five levels a lot easier by avoiding the traps, but levels 5-10 are dark anyway, so you only lose 50 gold points.

If you complete all 10 levels, the game ends, prints your total of gold points, and asks you if you wish to play again. Press "Y" or "N" at the prompt.

While you are playing *Catacombs*, watch how interesting EBC mode is. The walls of the catacombs are always visible in one color. The border of stones that surrounds the dungeon is always dark gray, and so is the door to the next level. The door you enter through is white.

The most exciting feature is that traps, monsters, and treasure are always black, so they are invisible when the dungeon is dark, and the only way you can see them is to illuminate them with your torch, which is an expanded sprite which has its priority behind the background.

The EBC mode is highly effective in this program because of the ML scrolling routine. If this program was not in EBC, I would have to scroll both the video screen and color memory to have a color display—but this way I only have to scroll the video screen, since the characters get their color from registers 53281-53284 instead of color memory.

Enjoy *Catacombs*. I hope to have another interesting game in machine language for you soon, also using the Commodore 64's extended background color mode. □

SEE PROGRAM LISTING ON PAGE 121

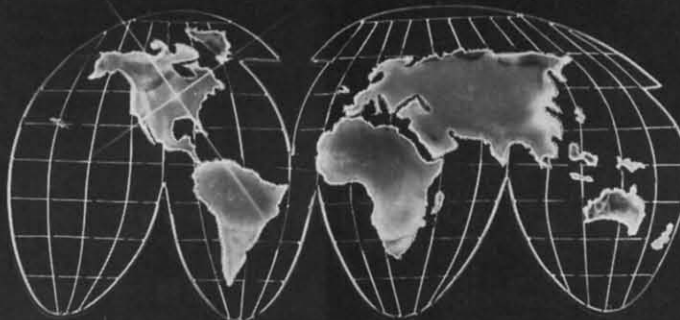
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# TIPS AH-OY!

Compiled by Michael R. Davila

As is evidenced by its jump to five full pages this month, *Tips Ahoy!* has become one of our most popular features. We'd like to remain the Commodore community's number one forum for short, helpful programming routines. To that end, we invite you to forward your best efforts to:

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## AUTO-RUN 64

Many times someone using your program might cause it to crash due to an Overflow Error, or some error that the user causes. With the following program, if an error occurs, the program will Re-run itself. This sort of program works nicely with BBS's, as they are most vulnerable to crashers. It will work nicely with many other programs too. SYS 49152 activates it; SYS 49201 disables it.

—Barry Allyn  
Arlington, WA

```
10 FORT=49152TO49213:READA:POKET,A:C=C+A
:NEXT:IFC<>6535THEN PRINT"DATA ERROR!"
20 DATA 120,169,13,141,20,3,169,192,141,
21,3,88,96,165,157,201,128,240,3,76,49
30 DATA 234,169,5,133,198,169,82,141,119
,2,169,85,141,120,2,169,78,141,121,2,169
40 DATA 13,141,122,2,76,49,234,120,169,4
9,141,20,3,169,234,141,21,3,88,96
```

## 64 SOFTWARE RESET

Don't have a RESET switch installed on your 64 yet? Well, type this program in, type SYS 49152, and presto, you have one. To reset the system, hit SHIFT-CONTROL. It's never been this easy, folks.

—Barry Allyn  
Arlington, WA

```
10 FORT=49152TO49177:READA:POKET,A:C=C+A
:NEXT:IFC<>2854THENPRINT"DATA ERROR!"
20 DATA 120,169,13,141,20,3,169,192,141,
21,3,88,96,173,141,2,201,5,240,3,76,49
30 DATA 234,76,226,252
```

## SLOW PRINTING AT ML SPEED

There are many occasions when it would be desirable to control the speed of printed text. How many times have you listed a program and it just zoomed on by? Or, what about the last time the direction for a program zipped

past? And then there is the time when...and the printing just would not slow down! With *Slow ML Print*, you have the choice of 256 printing speeds. The utility works with the C-128, C-64, and VIC 20 (it will probably work with other Commodore computers as well).

Make sure the utility is stored in a safe area of RAM in your computer by changing the value of S, if necessary. Once the utility is activated, everything that is printed will range from standard to extremely slow by POKEing (from direct or program mode) a value from 0 (fastest) to 255 (slowest) into location 252. *Slow ML Print* can be quickly disabled with RUN STOP and RESTORE. A SYS to the starting address will reactivate it.

—Shawn K. Smith  
Bronx, NY

```
100 REM* SLOW (ML) PRINT -SHAWN K. SMITH
110 S=5120:REM START ADDRESS OF ROUTINE!
120 FORD=STOS+34:READY:POKED,Y:NEXT
130 DATA 169,000,162,255,141,038,003,142
140 DATA 039,003,096,072,138,072,152,072
150 DATA 174,252,000,240,008,160,000,136
160 DATA 208,253,202,208,250,104,168,104
170 DATA 170,104,076:P=S+11:H=INT(P/256)
180 POKES+3,H:POKES+1,P-256*H
190 POKED,PEEK(806):POKED+1,PEEK(807)
200 PRINT:PRINT:PRINT"SYS"S"ENABLES
210 PRINT"RUN STOP-RESTORE DISABLES
220 PRINT"POKE252,SPEED (0-255)
230 REM SYS(S)
```

## MENU HILITER

My favorite tip for producing an easy to use menu having lots of colorful pizzazz is to first fill a string array with each array element being equal to a menu item. Then, POKE location 53283 with the highlight color you want and turn on extended background color mode. With extended color on, any screen lettering done in reverse mode appears on the screen with the character color unchanged and the background color of each character in the highlight color. I use f5 and f7 respectively to move the color bar up and down, with SPACE to make a choice. To use different control keys, change the PEEK (197) values in Lines 1030 through 1050. To use a joystick with the fire button making the choice, replace Lines 1030 through 1050 with:

```
1030 JV=PEEK(56320) AND 31: IF JV=29 THE
N 1080:REM HILITE DOWN
1040 IF JV=15 THEN POKE BL,PEEK(BL) AND
191:RETURN:REM TURN OFF EXTENDED BACKGRO
UND MODE: # OF CHOICE IN VARIABLE N
```

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```

•1050 IF JV <> 30 THEN 1030: REM HILITE U
P

```

To adapt the subroutine to a multiple menu program, simply establish more variables to control those features you wish to vary from menu to menu, such as the screen printing locations, the spacing between menu options, the number of menu items, and the regular and high-light character colors. The menu string array should be dimensioned to accommodate the menu having the most selections.

An added touch would be to replace the short delays in Lines 1020 and 1100 with a pip sound. This would require a new line 1002 to clear the sound registers and turn up the volume:

```

•1002 SO=54272:FOR J=0 TO 27:POKE SO+J,0:
NEXT:POKE 54296,15

```

Then replace the delays with

```

POKE SO+6,240:POKE SO+4,17:POKESO+H,90:
FOR T=1 TO 3:NEXT:POKE SO+4,16

```

—Marie E. Coon  
Bothell, WA

```

•10 REM *** MENU HILITER ***
•15 M$(1)="SET MENU SELECTIONS":M$(2)="EQ
UAL TO ELEMENTS OF
•20 M$(3)="[RIGHT][RIGHT]MENU (M$) ARRAY.
":M$(4)="[3"[RIGHT]]MENU CHOICE IS
•25 M$(5)="[RIGHT]HELD IN VARIABLE N
•30 PRINT"[CLEAR]"TAB(134)"[c 5]MENU HILI
TER[c 4]"
•55 Y=5:GOSUB1000:STOP:REM ON N GOTO HERE
•1000 FORJ=1TOY:PRINTTAB(50)M$(J):NEXT:RE
M PRINT MENU
•1005 R=53280:BL=53265:X=4:N=1:POKER,1:PO
KER+1,15
•1010 POKER+3,7:POKEBL,PEEK(BL)OR64:REM T
URN ON EXTENDED COLOR (YELLOW)
•1015 POKE214,X:PRINT:PRINTTAB(10)"[RVSON
][RED]"M$(N):REM HIGHLIGHT TOP CHOICE
•1020 FORT=.TO50:NEXT:REM SHORT DELAY
•1030 IFPEEK(197)=3THEN1080:REM F7 DOWN
•1040 IFPEEK(197)=60THENPOKEBL,PEEK(BL)AN
D191:RETURN:REM TURN OFF EXT BACKGROUND
•1050 IFPEEK(197)<>6THEN1030:REM F5 UP
•1060 IFN=1THEN1030:REM TOP CHOICE
•1070 POKE214,X:PRINT:PRINTTAB(10)"[RVSO
F][c 4]"M$(N):N=N-1:X=X-2:GOTO1010
•1080 IFN=YTHEN1030
•1090 POKE214,X:PRINT:PRINTTAB(10)"[RVSO
F][c 4]"M$(N):N=N+1:X=X+2:POKE14,X:PRINT
•1100 PRINTTAB(10)"[RVSON][RED]"M$(N):FOR
T=.TO50:NEXT:GOTO1030

```

92 AHoy!

## CUSTOM BIT MAPS FOR THE C-128

I have invented a routine that enables you to create a custom-made background on the bit map of the Commodore 128 by using a technique I call sprite stamping. The program allows you to take any readily made sprite from memory and transfers it to the bit map. Once the bit map has been filled up, you can add such things as text, etc. The space left between each sprite is chosen by the user. You may overlap and reverse the sprites by selecting the number of the GSHAPE VALUE when it is asked. To do all this, enter the following program:

```

•5 GRAPHIC 0,1
•10 INPUT" SPRITE NUMBER TO USE ";N
•15 INPUT" CLEAR BIT MAP[4" "]Y [3"[LEFT]
"]";Y$
•20 IF Y$="Y" THEN C=1
•25 IF C=1 THEN INPUT" BACKGROUND COLOR #
";K: COLOR0,K
•30 INPUT" BORDER COLOR # ";B: COLOR4,B
•35 INPUT" PIXEL COLOR # ";P: COLOR1,P
•40 INPUT" X INCREMENT # ";X2
•45 INPUT" Y INCREMENT # ";Y2
•50 INPUT" GSHAPE VALUE # ";V
•55 INPUT" OK[4" "]Y [3"[LEFT]]";O$
•60 IF O$ <> "Y" THEN RUN
•65 GRAPHIC 1,0
•70 SPRSAV N,A$
•75 A$=A$+CHR$(23)+CHR$(0)+CHR$(20)+CHR$(
0)
•80 FOR Y=1 TO (200-Y2) STEP Y2
•85 FOR X=1 TO (320-X2) STEP X2
•90 GSHAPE A$,X,Y,V
•95 NEXT:NEXT
•100 GETKEY B$:GRAPHIC 0,1:END

```

If you do not currently have a sprite in memory, either quickly design one, preferably one that has a 3-D effect to it, or load a binary sprite file of yours into memory. When choosing the X and Y increments, remember a sprite is 24 x 21 pixels. So if you want to display a sprite that takes up its whole space, you may want to set the increments higher than the sprite boundaries, such as X=25, and Y=22.

If you are not sure about the GSHAPE VALUES, a small reference list is given below:

- # Outcome
- 0 Place SPRITE as is
- 1 REVERSE SPRITE
- 2 OR SPRITE (COMBINE IT) WITH THE AREA
- 3 AND SPRITE (OVERWRITE IT) OVER THE AREA
- 4 EOR EXCLUSIVE OR SPRITE IT WITH THE AREA

If you are satisfied with the outcome of the hi-res screen, you may save it by using the following statement.



Make sure you have a disk in the drive that has at least 50 blocks on it so no errors will occur.

BSAVE"name of hi-res screen",B0,P7168,P16192

To load the file, you may type the following command in either direct mode or from your BASIC program:

BLOAD"name of hi-res screen"

Notice the parameters are no longer needed since they have been saved to disk. Happy bitmapping!

—Robert J. Tiess  
Middletown, NY

## TWO ITALIC CHARACTER SETS

Tired of the same old Commodore 64 character set? Designing one's own set would be extremely time consuming and a waste of programming memory. This amazing relocatable machine language routine will end this problem. It will have the ability to design not one, but two new italic character sets, in both upper and lower cases. This is made possible by manipulating existing character definitions already in the C-64's ROM. Very simply, what the code does is shift the upper four bytes of each character definition to either the left or the right, creating two new fonts in the process. By changing one value, marked in the listing, and reexecuting the code, you can create left shifted italics (42), right shifted italics (106), or go back to the original set (234). However, if the ML code is already POKEd in memory, one can change fonts by the commands:

POKE ADD+63,either 42,106,234:SYS ADD

where the start of the ML routine, 'ADD', is defined in the BASIC program. The new character set will be located at 12288 - 16383 (\$3000 - \$3FFF), so a BASIC program will be limited to 10K. If you feel this is not enough room for your application, you may want to move the start of BASIC above the new character set with the commands:

POKE16384,0:POKE44,64:POKE52,160:POKE56,160:NEW

giving you now about 24K. Be sure to save the original program before this last instruction is executed.

—Andrew Vajoczki  
Brantford, ONT

```
•100 IFPEEK(44)=8THENPOKE52,48:POKE56,48:
CLR
•110 ADD=828:REM RELOCATE ANYWHERE
•120 FORX=0TO116:READA:POKEADD+X,A:NEXT
•130 SYS ADD
•200 DATA169,208,133,140,169,48,133,142
```

```
•210 DATA173,14,220,41,254,141,14,220
•220 DATA165,1,41,251,133,1,169,0
•230 DATA133,251,133,252,170,168,133,141
•240 DATA133,139,232,224,9,208,2,162
•250 DATA1,138,201,5,176,23,165,252
•260 DATA201,4,144,9,201,8,144,4
•270 DATA201,12,144,1,56,177,139
•271 :
•275 DATA106:REM 42,106 ITALICS, 234 OFF
•276 :
•280 DATA145,141,24,144,4,177,139,145
•290 DATA141,200,208,4,230,140,230,142
•300 DATA230,251,208,2,230,252,165,252
•310 DATA201,16,208,198,165,1,9,4
•320 DATA133,1,173,14,220,9,1,141
•330 DATA14,220,173,24,208,41,240,9
•340 DATA12,141,24,208,96
```

## SYSPLOT AND SYSCLEAR

Perusing a disassembly of Commodore BASIC 2.0 ROM, I discovered that the C-64 has routines used by BASIC not available in BASIC that would be very useful in BASIC programs. The following are two machine language subroutines that make the BASIC ROM subroutines to plot the cursor and clear lines of the screen a snap to use in your BASIC programs. Both are very short and fully relocatable; they can be placed in any available memory location without modification. The parameters used when the routine is called can be complex statements, such as SYSLOT(X\*Y+(FNA(B)),(Y AND (A/2))), and will be evaluated before the routine is called. Please note that these listings contain elements included for clarity and demonstration that are not essential to the operation of the routines. To incorporate them into your own programs, you may combine lines 100, 110, and 120 into one line and, provided you type the DATA statements carefully, eliminate 140 and 150 (and 160 in SYSLOT). Please note also that while these routines check for and abort on syntax errors, there is no range checking: Attempting to plot the cursor to a non-existent screen location or clearing lines less than 0 or greater than 26 can cause catastrophic (but interesting) results.

—Paul Sobolik  
Pittsburgh, PA

### SYSLOT

```
•10 REM SYSLOT
•20 REM SYNTAX: SYS PLOT,XPOS,YPOS
•30 PLOT=828
•40 FORX=0TO15
•50 READ BYTE:POKE PLOT+X,BYTE
•60 CK=CK+BYTE:NEXT
•70 IF CK<>2443 THEN PRINT"ERROR IN DATA
STATEMENTS":END
•80 PRINT"[CLEAR]":SYSLOT,10,9:PRINT"TYPE
SYSLOT,XPOS,YPOS"
•90 SYSLOT,12,13:PRINT"TO PLOT CURSOR":S
```



```

YSPLOT,0,0:END
•100 DATA 32,155,183,134,251,32,155,183
•110 DATA 138,168,166,251,24,76,240,255

```

## SYSCLEAR

```

•10 REM SYSCLEAR
•20 REM SYNTAX: SYS CLEAR,ROW1,ROW2
•30 CLEAR=828
•40 FORX=0TO28
•50 READ BYTE:POKE CLEAR+X,BYTE
•60 CK=CK+BYTE:NEXT
•70 IF CK<>5020 THEN PRINT"ERROR IN DATA STATEMENTS":END
•80 SYSCLEAR,8,12:PRINT"[CLEAR]TYPE SYSCLEAR,ROW1,ROW2 TO CLEAR BETWEEN ROWS":END
•90 DATA 32,155,183,134,251,32,155,183
•100 DATA 232,134,252,166,251,32,255
•110 DATA 233,232,228,252,208,248,166
•120 DATA 251,160,0,24,76,240,255

```

## SAFE INPUT BASIC ROUTINE

Everybody has seen, I'm sure, those "short little routines" printed in magazines that provide foolproof BASIC input. Usually they are two pages in length and can sometimes be longer than the program itself, and are often in machine language.

The routine below is the one I always use in BASIC for any input that I cannot afford to have tampered with. It is short enough that I can merely list it on the screen, type NEW, and then load my program. Then I can cursor back up to the lines, and enter them into the program in direct mode just by hitting RETURN on each line.

It only accepts alphanumeric input, with no cursor control. You can include commas in your string, and set the number of characters desired in the line in the variable "A", then GOSUB to it from anywhere in your program. IN\$ is the input string it returns. The best part about it is that it flashes the cursor, just like regular input, to let the user know the computer is waiting. It will clear the line it starts on before it prints the prompt. By changing the size of this string that clears the line it starts on, and limiting the number of characters in A, you could set up input windows in BASIC very easily. Since it is entirely in BASIC, it can be easily modified to your program requirements, unlike machine language. I have found the routine very useful, and have included it in just about all my programs for the C-64 that require an input.

—Cleveland M. Blakemore  
Richmond, VA

```

•6000 REM TAMPERPROOF INPUT
•6010 REM CHARACTER MAXIMUM IN "A"
•6015 A=20
•6020 PRINT"[41" "][UP]";
•6030 IN$="":POKE198,0:POKE204,0
•6040 WAIT198,15:GETZ$:Z=ASC(Z$):IFZ>95THEN6040

```

```

•6050 ZL=LEN(IN$):IFZL>ATHEN6070
•6060 IFZ>31THENIN$=IN$+Z$:PRINTZ$;:GOTO6040
•6070 IFZ=13ANDZLTHENPOKE204,1:PRINT" ":RETURN
•6080 IFZ=20ANDZLTHENIN$=LEFT$(IN$,ZL-1):PRINT" [LEFT][LEFT] [LEFT]";
•6090 GOTO6040

```

## REM TAMER!

There was a time when the REM command was very peaceful. When one found a program containing REMs, he was usually rewarded with some insight into the working of the program by its creator. Now, however, REMs are not just used for providing information about a program. In fact, more and more, REMs are being used to deceive, deprive, and frustrate. Many individuals have found that by placing SHIFTed and special characters after the REM, almost anything could be accomplished, including having a program display a Syntax error when listed. Not long ago, when my older sister started altering the REMs in my programs with SHIFTed L's and ESC characters, I knew it was time to tame those REMs!

*REM Tamer!* will search a program looking for REMs and replacing any SHIFTed or special characters after the REM with a !. The utility is fully relocatable by changing the value of S. In its present form, the utility is written for the 128. However, if the numbers 45 and 46 in line 140 are changed to 43 and 44, respectively, the utility will work with the VIC and 64.

Load and Run *REM Tamer!*, then load the program to be tamed and SYS to the starting address of the utility. Within seconds, the program will be tamed!

—Shawn K. Smith  
Bronx, NY

```

•100 REM* REM TAMER! ----- SHAWN K. SMITH
•110 S=5555:REM RELOCATABLE WITH 'S'
•120 FORD=STOS+55:READY:POKE,Y:NEXT
•130 PRINT"TO TAME REMARKS: SYS"S:END
•140 DATA 165,045,072,165,046,072,160,000
•150 DATA 104,133,252,104,133,251,177,251
•160 DATA 072,200,177,251,208,002,104,096
•170 DATA 072,200,200,200,177,251,240,230
•180 DATA 201,143,208,247,200,177,251,240
•190 DATA 221,201,032,144,004,201,096,144
•200 DATA 243,169,033,145,251,208,237,234

```

## USR JOYSTICK

There are many great programs available for the C-64 which utilize joysticks—especially games! Nevertheless, if the joystick routine was written in BASIC, chances are the entire program lacks speed because of the formula which must be employed to read the joystick correctly. If you own one of these programs or are writing a program of your own that will employ joysticks, *USR Joystick* may be the speed you are looking for.

*USR Joystick* is written in machine language, which



is at least 100% faster than BASIC. And since the utility uses the USR vector, there is no need to memorize a SYS number to retrieve the current value of the joystick. The following statement returns a value depending on the direction of the joystick:

```
J=USR(X)
```

X should equal 1 for port 1, or two for port 2. The value that J returns is based on which direction the joystick is facing and if the fire button is pressed:

8	1	2
7	0	3
6	5	4

For instance, if the joystick is facing north (forward), the value of J will be 1. 128 is added to the value of J if the fire button is pressed. Using the example above, J will equal 129 if the button is pressed.

C-128 owners may have noticed that the value returned for J by *USR Joystick* is the same as that returned by the C-128's JOY command. —Shawn K. Smith  
Bronx, NY

```

100 REM* USR JOYSTICK --- SHAWN K. SMITH
110 S=49152:REM RELOCATABLE WITH 'S'
120 FORD=STOS+58:READY:POKE786,Y:NEXT
130 DEFFNH(S)=INT(S/256):POKE786,FNH(S)
140 DEFFNL(S)=S-256*FNH(S)
150 POKE785,FNL(S):T=S+32:S=S+43
160 POKET,FNL(S):POKET+1,FNH(S)
170 DATA 032,247,183,170,240,003,076,072
180 DATA 178,136,192,003,176,248,152,234
190 DATA 073,001,168,169,255,141,000,220
200 DATA 185,000,220,170,041,015,168,185
210 DATA 043,192,168,138,041,016,208,004
220 DATA 152,009,128,168,076,162,179,234
230 DATA 004,002,003,000,006,008,007,000
240 DATA 005,001,000
250 PRINT"USR JOYSTICK IS ACTIVATED":END

```

## SPLIT SCREEN

This program generates a split screen in C-64 mode. You will have four rows of text at the bottom and the rest will be in high-resolution mode.

To activate it type RUN, and the split screen will be activated.

The starting location for plotting pixels (picture elements) is 8192.

—Ernest Croot  
Bevinsville, KY

```

10 X=49152
20 READ A:IFA=-1THEN40
30 POKEX,A:X=X+1:GOTO20
40 SYS 49152:END
50 DATA 120,169,28,141,20,3,169,192,141,
21,3,169,1,141,26,208,169,27

```

```

60 DATA 141,17,208,169,127,141,13,220,88
,96,169,1,141,25,28,173,18,208
70 DATA 201,218,16,0,176,21,169,218,141,
18,208,169,28,141,24,208,173
80 DATA 17,208,9,32,141,17,208,76,81,192
,169,0,141,18,208,169,21,141
90 DATA 24,208,169,223,45,17,208,141,17,
208,173,13,220,41,1,240,3,76,49
100 DATA 234,76,188,254,-1

```

## SPRITE DATA MAKER

The sprite designer built into the 128 is very easy to use, but lacks certain features that are helpful. This program can be appended to the program you're working on and will make data statements for the sprite you choose. To use type RUN 60000, then RETURN, and the program will ask for the starting line, line increment, and sprite number. The data statements will automatically be entered into the program. —Joseph Bedard  
Hyde Park, MA

```

60000 PRINT"[CLEAR] [3"*"] SPRITE DATA M
AKER [3"*"]"
60001 PRINT"[DOWN](STARTING LINE),(LINE
INCREMENT),SPRITE # (1-8)":INPUT SL,IN,S
N:L=0:SN=(SN+55)*64:PRINT"[CLEAR][DOWN][
DOWN]";
60002 FORX=0TO63STEP8:PRINTSL+L"DATA ";
60003 FORY=0TO7:P=PEEK(SN+X+Y):P$=STR$(P
):N=LEN(P$):N$=RIGHT$(P$,N-1):PRINTN$;:I
FY<7THENPRINT",":ELSEPRINT
60004 NEXTY:L=L+IN:NEXTX
60005 PRINT"[HOME]";:FORT=0TO7:POKE842+T
,13:NEXT:POKE208,8:END

```

## KOALA DRAW 128

This program is for the 128 and the Koala pad. The graphic screen is in multicolor, but you can't draw in true multicolor. The function keys are defined as follows: f1—change background; f3—change cursor color; f5—clear screen; f7—exit program.

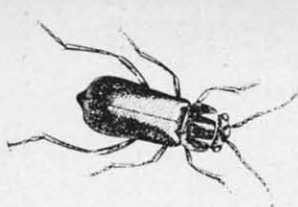
—Joseph Bedard  
Hyde Park, MA

```

10 REM KOALA DRAW 128
20 GRAPHIC3,1:SCALE1,480,240:C=2:B=1
30 FORT=1TO8:KEYT,CHR$(T+132):NEXT
40 COLOR0,B:COLOR4,C:COLOR1,C
50 X=(POT(1)-16):Y=(POT(2)-16)
60 IF X>-1ANDY>-1THENDRAW1,X,Y
70 GETA$
80 IF A$=CHR$(133)THENB=B+1
90 IF A$=CHR$(135)THENC=C+1
100 IF A$=CHR$(137)THENGGRAPHIC3,1
110 IF A$=CHR$(139)THENCOLOR0,12:COLOR4,
14:GRAPHIC0,1:PRINT"[HOME][LEFT]";:END
120 IFC>16THENC=1
130 IFB>16THENB=1
140 GOTO40

```





# BUGOUT For the C-64

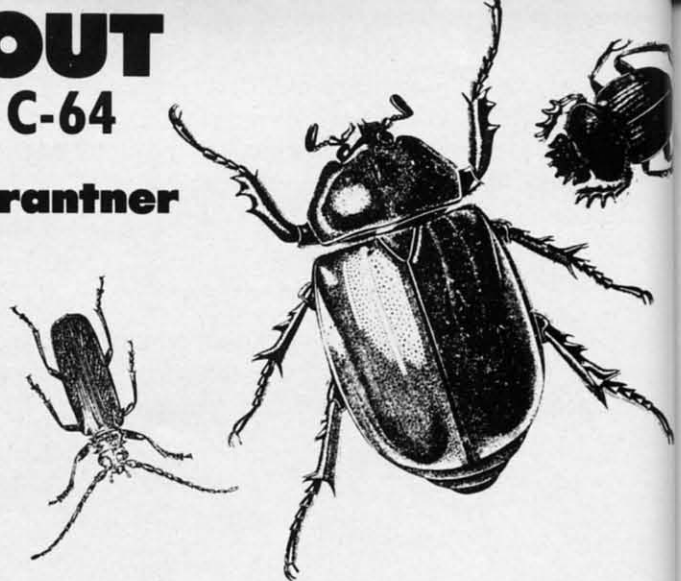
By Tony Brantner

**B**ugout is a fast-paced arcade style game in which you guide our hero, Smilin' Stan the exterminator, against an endless swarm of giant insects.

After typing in and saving a copy of *Bugout* using *Ahoy's Flankspeed* program (see page 111), SYS 49152 to start. The object of the game is to destroy as many bugs as you can before too many get behind you.

The game begins with Stan's entrance from the left side of the screen, armed with a can of the strongest insecticide known to man. Use a joystick plugged into Port 2 to move Stan up and down the screen, and press the fire button to spray a stream of repellent at any bug that gets within range.

All the bugs run away from you at different speeds. Bumping into an insect from behind causes it to run faster for a few moments. Since you can't move vertically when using the spray can, you can use this technique to keep the bugs out in front of you. This applies to all the insects except bees. Since the bees aren't as easily intimidated, they tend to fly toward you instead of away.



And any contact with a bee results in a sting which paralyzes you for a few moments, giving the other bugs a chance to slip by.

At the bottom of the screen you will find the score, the number of bugs missed, and the high score for the current session. Scoring begins at 10 points for each bug, but increases as the game speeds up. You can use the SHIFT-LOCK key to freeze the action. The game ends once three bugs are missed. □

SEE PROGRAM LISTING ON PAGE 142

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Continued from page 75

combined with the foolproof nature of the product itself and its lucid, fact-filled manual, makes the use of help screens unnecessary.

Besides *Planner*, the disk also includes two other programs—*Reporter* and *Disk*. The former makes it possible to manipulate the project schedule, meeting actual environmental conditions in the process. The disk routine accesses DOS so you can format disks, delete files, or rename them. It is easier to use than Commodore DOS because there are prompts every step of the way.

The owner's manual should be sent to 90% of the software houses in the country. They could use it as a model for their documentation. It not only explains project management techniques and philosophies, but also runs through every step in such a fundamental manner that you'd have to read it with your eyes closed not to understand.

Every screen displays active function keys and mnemonic commands (f6 starts a new project, "C" calculates the critical path). Such attention to detail obviates the need for a pull-out reference card or keyboard template. It also saves a lot of time because users don't have to continually search the manual for clues on what to do next.

## The Specs

*Project Planner/Reporter* handles projects with up to 99 activities of up to 999 duration days per activity. (A task can last almost three years!) Except for start events (the beginning), any event can have from one to five predecessors (preceding events). You can choose between five or seven day work weeks for any project.

The system calculates the critical path (tasks whose delay will delay the entire project) based on activity entries and checks for improper logic (loops, more than one start or ending). The project schedule displays or prints out; a Gantt Chart can be printed but not be displayed. (See the **What It All Means** sidebar for terms definitions.)

The *Reporter* accepts time-phased

information concerning activity progress. It updates the schedule, allowing new critical path calculations. You simply enter projected or actual finish dates for remaining activities and the routine calculates remaining activity float time and remaining total project float time.

## WHAT IT ALL MEANS

What follows is a brief introduction into the world of project management terminology. Every discipline has its own language; do you remember how foreign computerese sounded at first?

Activity—a single task.

Critical—an activity whose delay will cause the project to be delayed.

Early/Late Start—the earliest/latest time a task can start.

Early/Late Finish—the earliest/latest time a task can finish.

Free Float—the amount of time a task can be delayed without delaying another.

Gantt Chart—a graphic portrayal of project tasks displaying early and late start dates, early and late finish dates, and free and total float.

Network—the logical sequence of events that comprises a project.

Predecessor—a directly linked prior activity. If Task A is the project starting point and Task B follows directly, then A is B's predecessor.

Successor—a directly linked following activity. In above example, B is A's successor.

Total Float—the amount of time an activity can be delayed without delaying an entire project.

## Planning a Project

About 80% of the data entry is intuitive or prompted. Users familiar with project management concepts probably won't need the manual after the first session. Inexperienced planners who review the demo can be effective in 30 minutes.

The first step is to diagram (flow chart) the project tasks and relationships on paper. Even simple networks should not be entered directly into the program: experience demonstrates that it is easier to establish and main-

tain the proper flow on paper. Users with an outliner like *Brainstorm 128* might prefer creating the relationships with it. Regardless of the actual means, you should not attempt direct entry of any project networks; the confusion and frustration will be overwhelming.

After making desired entries, press "C" to calculate the critical path. The program checks for input errors such as no start or ending points, multiple start or ending points, and loop errors. Loops occur when a group of tasks are locked into a circular reference, repeating forever. (My first attempt produced a multiple end error even though I double checked the hard copy diagram. Correcting the problem was easy because the program alerted me to the specific problem.)

Once the errors have been edited out, you attempt another critical path calculation. If all is well, *Planner* produces a schedule complete with early and late start data, early and late

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finish information, and total and free float timeframes.

The schedule screen also indicates selected work week (5 or 7 days), project duration, current data, individual activity number, activity description, and the person responsible for completing the task.

Progress is keyed into the *Reporter* to update timeframes. Simply enter actual or projected start/completion dates and recalculate. Since the screen layouts and procedures are nearly identical to those in the *Planner* portion of the package, there is no need to learn anything new.

Just like *Planner*, *Reporter* uses a function key to save data to disk. Reports (schedules) are also printed in the same manner, though *Reporter's* output contains additional information about actual project status (completed tasks, behind, ahead, scheduled, etc.). Two options are available, *Early Finish* or *Late Finish*. By printing both you can quickly compare the ramifications of delayed tasks.

## The Bottom Line

Nothing in this world is perfect, and even *Planner/Reporter* could stand a little improvement. For one thing, the activity description field should be longer. The space provided is adequate only if you are very good with abbreviations or coded messages. The other problem concerns the non-integration of the disk's four programs. While having to load the tutorial and *Reporter* separately is acceptable, rebooting to access the disk commands is ludicrous. These functions should be available from within *Planner* and *Reporter*.

Despite these two shortcomings, *Project Planner/Reporter* is a must-have tool for anyone who controls or oversees multiple resources. Programs as complete, refined, and well-behaved as this one are rare. Add its remarkable cost effectiveness into the equation and you have true value, the like of which few programs can equal. It is one of the best C-64 productivity titles in a long time.

B.E.S.T., Inc., P.O. Box 852, McMinnville, OR 97128 (phone: 503-472-9512).

—Ted Salamone

# LIXTER

## For the C-64

By Tim Little

I'm sure all the advanced users out there have wanted a utility that prints out SEQ files, like word processor or terminal buffers, to the screen or printer. Or checks a file that hasn't been accessed in a while to determine whether it was the ML game you were working on or just the sprite data.

If you've ever tried to print an auto-start program you were faced with a problem right at the start: once it loaded, it was already running. Or maybe the latest version of your program is now loading with a disk error near the end (if you're lucky) of the load; as you know, listing it will mess it up as soon as it's done. Trying to delete the erroneous lines will be to no avail, as such errors tend to screw up vital pointers.

Alas, there is a solution: Print the program without loading it. Some programming necromancy is in order here. I reasoned that if the computer can read and understand my program, I can too. So by using memory maps, DOS manuals, and every utility book I had on hand, I wrote *Lixter*.

*Lixter* will allow you to print a disassembly, BASIC LIST, hex dump, or simple PETSCII dump (with control characters translated), all without loading the program into memory. It works by getting one byte at a time from the disk file and interpreting it, proceeding until the end of the file is reached at which time it gracefully bows out.

## HOW TO USE

After running the program, just enter the program name (no quotes or ,8,1 needed) or \$ for the directory. Should you want to quit, type the period at this point. If you wish to access the same file again, hit RETURN (actually this was a bug in the

BASIC interpreter, but now serves as a nice feature). If you didn't choose the QUIT, LAST FILE, or DIRECTORY options, you will be prompted for the file type, i.e. SEQ or PRG. At this point you must enter either S or P; if you wish to print an REL or DEL just change the program.

Now the fun part begins. The starting address was printed to the device you just selected. The printer will print twice the number of hex entries per line as does the screen; this should present cosmetic problems on 40-column printers. You will now be asked for the format for the display. An ASCII dump is actually a PETSCII dump with control characters printed out as their English representations. Undocumented codes are printed as periods, as are Commodore key combinations. Hex dumps are useful for determining the type of file you are dealing with.

Disassemblies may be printed out with different starting addresses than the one originally specified. But you must enter the new starting address in decimal. All branches will be corrected if this option is chosen. I have left the DATA statements structured so that the undocumented opcodes may be inserted instead of the ???s.

The only annoying feature about this program is the speed at which the output is printed. As I originally structured the program it printed much slower than 300 baud, so I did a major rewrite and played around with a ML subroutine for buffering disk I/O. But I found no significant increase in speed, and so I present you with the fastest version of *Lixter*.

Hacker notes: Control codes may be redefined as may keywords, but beware of changing mnemonics that start with the letter B as they are critical in the program. □

SEE PROGRAM LISTING ON PAGE 136



# DARK FORTRESS

For the C-128

By Cleveland M. Blakemore

A double screen game for the C-128. Requires both 80 and 40 column monitors and two joysticks.



If you have not purchased one by now, I would highly recommend the C-128 to you as a very sharp buy. Although it may seem to be nothing more than a hyperactive C-64 at first, you will soon discover (as I did) that you have acquired a rather remarkable piece of hardware for a ridiculously low price. It will take a while for the applications software to build up a market, because many developers are not quite sure how they should take advantage of the extra memory and power the C-128 possesses.

The next time somebody asks you what your C-128 can do that your C-64 can't, show them this game!

Almost every review I have read of the machine has casually mentioned the possibility of "double screen

games"—an idea just waiting for someone to come along and implement it. Because the C-128 can maintain both 80 and 40 column screen displays independently, it follows that you could create some very interesting games controlled by separate players, each with a display screen hidden from the other player.

It just so happens that this type of game has long been the pipe dream of fantasy adventurers. Almost every computerist has dreamed of a fantasy adventure orchestrated by a single computer, with a monitor and controls for each player, so everyone could participate independently in a game controlled by an ultimately objective, flawless "Dungeon Master."

Well, not only is this pipe dream a possibility, it is now

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a reality with this fantasy adventure game, *Dark Fortress*.

As of this writing, there is no commercial software (that I know of) that uses the two screen capabilities like this game.

*Dark Fortress* is a menu-driven text game that is played on a massive map of ShadowThorn Mountain. The object of the game is to find the three precious treasures in the game (DIAMOND, EMERALD, PEARL) and return them to the trophy case beneath the "Adventurer's Lounge" before the other player.

The game is filled with monsters, magic, myths, and mayhem—enough to keep almost any dungeon explorer happy. There are complex puzzles to solve, creatures both friend and foe, and even an underworld beneath the Fortress.

The game is in BASIC, and runs fairly slowly, but not so slow as to be annoying. You should have the 40/80 column key on the top of your keyboard locked down before you load the program. To play the game, you will need either a composite monitor or TV hooked up to the composite output, and an 80 column device, either monochrome or color, hooked up to the RGB output. If you have a Commodore 1902, you can hook that up to the RGB, and use any old black-and-white (or color) TV set you might have sitting around for the composite. Any configuration with both an 80 and 40 column monitor will work. The game uses no graphics, so color is not important. You should set the two monitors up so that neither player can see the other's screen.

Players alternate turns, controlling their moves with the joystick that applies to their player number. A chime sounds each time the computer changes players.

Player one will use the joystick plugged into Port 1. Player two will use the joystick in Port 2. Whichever screen the game is initially run from, either 80 or 40 columns, that monitor will correspond to "Player ONE."

Each player has a total of 18 different verbs he can command from the menu in the game. Discovering what the commands do and how to use them is part of the game. They are as follows:

Six Directions: N,S,E,W,Up and Down	Speak Lock/Unlock
Inventory: Displays possessions.	Use
Attack	Drink
Take, Drop	Trade
Incant, Cast Spell	Read

There are 13 different kinds of objects in the game, which you can pick up, drop, or use in some way which is beneficial. You can never carry more than four objects at a time.

To choose options from the menu, move the joystick up or down. When the option you want to use is highlighted, push the joystick button. All choices during the game will be in the same menu format. To exit any menu without a choice, highlight the last command, which will usually be "NOTHING".

This program makes extensive use of the windowing feature of the C-128. There are three basic windows in

the game.

The upper five lines of the screen are reserved for location descriptions, directions, and messages.

The lower left window is always the menu window. Your menu options will always appear in this window.

The lower right window is used either for inventory, or a description of items or monsters present in the room with you. Player inventory displays objects currently in possession, and the amount of gold the player is carrying.

The bar at the bottom of the screen is the status bar. It will tell you whether it is your turn (waiting for option) or the program is processing the other player's turn.

The game does not allow combat between players, only between players and monsters. It does tend to encourage cooperation, though, and often requires compromises between players. Trading is a necessity here.

Supplies and magic can be purchased from the trading post outside the lounge if you have enough gold. Each player begins the game with one RESURRECTION spell in the event he is killed. After that he is on his own. Many of the magic spells are very useful. Others are helpful, but unnecessary. You will have to experiment to find which does what.

If you are killed, you will have to find a way out of Hades, or be doomed to remain there forever. The other player can get you out of Hades if he does the right thing in the right place, which he may be willing to do if you have something in your possession he wants. Otherwise you remain there indefinitely.

Some of the creatures in the game are neutral or friendly. But most are lethal unless you fight back with either a sword or staff (or both) and kill them. Slaying creatures brings you increased strength and riches. The more powerful the creature you slay, the more gold he will have.

If you and the other player team up on a single monster, the one who delivers the killing blow gets the gold and extra stamina.

If you exit a room during combat and return, the creature will be rested up when you come back. The really tough creatures are best fought in tandem with your opponent at the other monitor.

Hints and riddles can be found throughout the game. Think logically and use your wits to solve them. Most problems need special equipment to tackle. Talk to the inhabitants, read anything you see (or don't see), and experiment with different approaches until you succeed. Important tools can only be bought at the trading post when you have enough gold. Even after you have won the game, I guarantee there will be mysteries in the game yet to return to!

When you have all three treasures, go to the trophy room, unlock the case, and drop all three treasures to win the game.

Because there could be a great deal of dissent as to when to save the game, I did not include a save feature in *Dark Fortress*. Playing a complete game could take two to three hours. Perhaps if this game is received well I will include a separate file save for both players in a



future double screen game.

Game strategy varies enormously. Since you can only carry four objects at a time, you will often try to find a safe place to hide your important stuff while you venture off into the Fortress. You can try locking it up in different places, in the hope your opponent will not find the right key. You may have to trade, bargain, or plead with the other player to get his help. If you lose your lantern, you may have to follow the other player out, or wander in darkness. You may have to make several repeat trips to different locations, or even double back to get something you left behind.

When you are killed, be persistent. There is a way out of Hades, in fact several ways. The sooner you escape, the less time your opponent has to work unhindered by your presence in the game. If you are really sharp, there is a way to punch a permanent exit out of the "Land of Hades."

As with all text games, the key is to think in an orderly fashion. What type of key do you think would open a silver door—a copper key, an iron key, or a silver key? Read the room descriptions well; is there a possible hiding place in the area you are in? How do you uncover it?

A map of the *Dark Fortress* will be published in a future issue for despondent adventurers; or send a stamped and self-addressed envelope to *Ahoy!/Dark Fortress Map*, Ion International Inc., 45 West 34th Street—Suite 407,

New York, NY 10001 to receive the map immediately. But most mapping of the game is simple, with the exclusion of the HedgeMaze, which can be very confusing. Dropping objects in the maze can help you keep track of where you are.

The game has REM statements at all the major routines, so you should be able to modify it with ease if you are a middling to advanced BASIC programmer. Adding new rooms should be very simple, which I imagine you may want to do if you have thoroughly explored ShadowThorn Mountain. The memory capacity of the C-128 being what it is, a good programmer could expand this game to a size exceeding *Zork*, or even larger. The 160 space line length of the C-128 makes it possible to give much more explicit room descriptions than text games on the C-64. Many times while programming on the C-64 I have wished for just another line or two of text in a DATA statement.

I am considering a science fiction game in the same format as this one, which you may see in an upcoming issue of *Ahoy!* Give the editors some feedback, and they will let me know whether or not to proceed! Would you like to see something larger? Smaller? More complex, or less challenging? A save feature? Graphics?

I hope that you find the *Dark Fortress* immensely entertaining. See you at the Trading Post! □

SEE PROGRAM LISTING ON PAGE 128

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# COMMODORES

## PROGRAMMING CHALLENGES

By Dale Rupert

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Programs on diskette (1541 format only) are welcome, but they must be accompanied by listings. You must enclose a stamped, self-addressed envelope if you want any of your materials returned. Solutions received by the middle of the month shown on the magazine cover are most likely to be discussed, but you may send solutions and comments any time. Your original programming problems, suggestions, and ideas are equally welcome. The best ones will become *Commodares*!

### PROBLEM #37-1: MAGIC SQUARE

This problem was submitted by Karen Middaugh (San Diego, CA). Let your computer do the thinking to put 5, 10, 15, 35, 40, and 45 in the appropriate blank squares so that the sum in each direction (horizontal, vertical, and diagonal) is 75.

20		
	25	
		30

### PROBLEM #37-2: OUTCAST ORDER

Here is a tough one from Thomson Fung (San Diego, CA). There are N persons, numbered 1 through N, arranged in a circle. Beginning with person number 1, go

around the circle and cast out every Mth person. The circle closes after each person is cast out, and counting resumes with the next person. Write a program to print out the order of being cast out for specified values of M and N.

For example, let N=4 and M=3. Assume the people are numbered clockwise 1 through 4, and counting begins at #1. The first outcast is #3 (count 1,2,3). Now the circle consists of #1, #2, and #4. Since counting stopped at #3, it begins with #4. Count 4, 1, 2, and the next outcast is #2. Counting resumes with #4, and #4 is the next outcast (count 4,1,4). Consequently #1 is the last outcast. Your program should display the order of outcasts as 3, 2, 4, 1. For N=5 and M=3, the order is 3, 1, 5, 2, 4.

### PROBLEM #37-3: POWER PRODUCT

Oren Dalton (El Paso, TX) said that this problem was solved by C.W. Trigg in the 1930's without a computer. See if you can solve it with a computer. Find all solutions for digits A, B, C, and D, if any, to make this expression true:  $[ABCD] = (A \uparrow B) * (C \uparrow D)$  where the quantity on the left represents a four-digit number, not the product of four single-digit numbers.  $A \uparrow B$  means A raised to the B power.

### PROBLEM #37-4: PHRASE REVERSER

Here is one for novices and experts alike, suggested by Leo Brenneman (Erie, PA). The user types a sentence or phrase and presses RETURN. The computer reprints the phrase in reverse order. For novices, the entire phrase should be reversed. For experts, the reversal occurs on a word-by-word basis. For example, "WE LOVE COMMODORES" becomes

Novice: SERADOMMOC EVOL EW

Expert: EW EVOL SERADOMMOC

This month we will reveal the best solutions to the September 1986 *Commodares*. Bill Okerblom (Providence, RI) suggested *Problem #33-1: Variable Log*. The problem was to generate a checklist of all unique floating-point variable names. The first character must be a let-

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ter, and the second character, if any, must be a letter or a one-digit number. (According to the *Programmer's Reference Guide*, anyway. More on that later.)

Here are two approaches suggested by Joe Wright (Louisville, KY):

```

•1 REM COMMODARES PROBLEM #33-1:
•2 REM     VARIABLE LOG
•3 REM SOLUTION BY
•4 REM     JOE WRIGHT
•5 REM
•9 REM === 1ST SOLUTION ===
•10 A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345
6789" : FOR X=1 TO 26 : FOR Y=1 TO 37
•20 PRINT MID$(A$,X,1);MID$(A$,Y,1);" ";
: NEXT : NEXT
•30 REM === 2ND SOLUTION ===
•40 FOR X=65 TO 90 : FOR Y=48 TO 90 : IF
Y=58 THEN Y=65
•50 PRINT CHR$(X);CHR$(Y);" ";
•60 NEXT : PRINT CHR$(X);"[3" " ]"; : NEXT

```

There are 26 possibilities for the first character (A-Z), and 37 possibilities for the second character (A-Z, space, 0-9). The two FOR-NEXT loops in the first solution simply pick every appropriate combination of two characters from A\$.

The second solution uses the ASCII values of the letters (65 - 90) and numbers (48 - 57) in the CHR\$ statements. Notice how the Y FOR-NEXT loop in line 40 skips over the unwanted ASCII values 58 through 64. Can you figure out the purpose of the second PRINT statement in line 60 between the two NEXT statements?

The purpose of the program is to make a checklist for keeping track of variables used in a program, so you might prefer to send the output to the printer instead of to the screen. For a printout, add an OPEN statement at the beginning of the program, such as OPEN 4,4. A clever way to build in the flexibility of screen or printer output is the following suggested by David Shobe:

```

6 INPUT "SCREEN OR PRINTER (S/P)";DV$
7 DV = 4 + (DV$="S")
8 OPEN 4,DV

```

If the user specifies P for printer output, the expression (DV\$ = "S") is false and thereby has a value of zero. The value of DV is then 4, and line 8 OPENS device 4, which is the printer. If the user specifies S, then (DV\$ = "S") is true and has a value of -1. Now device 3, the screen, is OPENed in line 8. Be sure to replace each "PRINT" statement with "PRINT#4," in lines 20, 50, and 60. You should add 70 PRINT#4 : CLOSE 4 as well.

David Shobe also sent an interesting tidbit regarding allowable variable names. He pointed out that "I F" is a valid variable name, since there is a space between the I and the F. See for yourself that "I F=3" is a valid statement, whereas "IF=3" gives a syntax error since "IF"

is a reserved word. Some experimentation will show you that "I < space > F" is different from "I < space > G", but that "I < space > G" is the same as "IG". Just when you thought you knew all there was to know about variable names!

There were numerous responses to *Problem #33-2: Sentence Disassembler*. The problem from Steven Steckler (Columbia, MD) was to display each word in a sentence along with a count of its letters, and also to show the total count of letters in the sentence. This solution from J.V. Henry (North Fork, CA) does just that:

```

•1 REM COMMODARES PROBLEM #33-2:
•2 REM     SENTENCE DISASSEMBLER
•3 REM SOLUTION BY
•4 REM     J.V. HENRY
•5 REM
•10 INPUT"[CLEAR]A PHRASE OR SENTENCE";S$
•20 L=LEN(S$) : H$=""
•30 FOR I=1 TO L : H1$=MID$(S$,I,1)
•40 IF H1$<>" " THEN H$=H$+H1$
•50 IF H1$=" " OR I=L THEN J=I : I=L
•60 NEXT
•70 IF LEN(H$)>0 THEN PRINT H$;TAB(25)LEN
(H$) : LE=LE + LEN(H$)
•80 S$=RIGHT$(S$,L-J) : IF L-J>0 THEN 20
•90 PRINT TAB(25);"[c T][c T]" : REM COMM
ODORE-T
•100 LE$=STR$(LE) : L2=LEN(LE$)
•110 PRINT CHR$(34)+"TOTAL CHARACTERS"+CH
R$(34)+" =" ;TAB(27-L2);LE

```

S\$ stores the entire sentence initially. The FOR-NEXT loop searches for the first space character delimiting the first word. The first word and its letter count are displayed by line 70. Line 80 chops the first word from S\$, and the process is repeated at line 20. LE keeps track of the total letter count. When all words have been removed from S\$, L-J > 0 in line 80 is false and line 90 is executed. Lines 100 and 110 format and print the bottom line. Line 110 shows how to put quotation marks (CHR\$(34)) in your printed output. The calculation in the TAB statement ensures that the bottom number is right-justified.

This solution from Jim Speers (Niles, MI) is for the C-128:

The INSTR function looks for the first occurrence of a space within S\$, beginning with the Bth character in S\$. If a space is found, then X is unequal to 0, and line 30 is executed. Line 30 prints the word and its count. B is incremented so that the next INSTR search starts with the next character in S\$.

Some of the fancier solutions to this problem looked for punctuation marks and deleted them from the output. You might enjoy modifying either of these programs to do that.

*Problem #33-3: Bouncing Balls* from M.N. Carswell (Eatonton, GA) was a good challenge. The idea is to



bounce a ball off the screen edges and off of graphics characters. This solution from David Shobe works on both the C-64 and the C-128 (40-column screen).

```

•1 REM COMMODARES PROBLEM #33-2:
•2 REM SENTENCE DISASSEMBLER
•3 REM SOLUTION BY
•4 REM JIM SPEERS
•5 REM --- C-128 ---
•10 POKE 842,34:POKE 208,1:INPUT"[CLEAR][
  DOWN]SENTENCE";S$: W$="" : B=1
•20 X=INSTR(S$," ",B):IF X=0 THEN PRINT M
  ID$(S$,B,99)TAB(18);LEN(S$)-B+1:T=T+LEN(
  S$)-B+1:PRINTTAB(19)"[3"[c T]"":PRINT"
  T
  OTAL"TAB(18);T:END
•30 PRINT MID$(S$,B,X-B)TAB(18);X-B : T=T
  +X-B : B=X+1 : GOTO 20

```

Jim uses the dynamic keyboard technique in line 10 to stuff a quotation mark into the input buffer. The keyboard buffer in the C-128 starts at location 842. The number of characters in the buffer is stored in location 208. POKEing the quotation mark character (34) into the input buffer allows the user to enter commas and colons (anything else?) into the input sentence without the ?EXTRA IGNORED error. Jim's program treats commas and other punctuation as letters.

```

•1 REM COMMODARES PROBLEM #33-3:
•2 REM BOUNCING BALLS
•3 REM SOLUTION BY
•4 REM DAVID SHOBE
•5 REM
•100 PRINT"[CLEAR]":X=RND(1-TI)
•110 POKE 53280,7:POKE 53281,2:PRINT"[WHI
  TE]"
•120 FOR C=55296 TO 56295:POKE C,0:NEXT
•130 FOR L=1 TO 25
•140 POKE 1024+INT(RND(1)*1000),102
•150 NEXT
•160 A=0:Q=100
•170 X=1:Y=1
•180 DX=1:DY=1
•190 POKE 1024+X+40*Y,81
•200 FOR T=1 TO 10:NEXT
•210 POKE 1024+X+40*Y,32
•220 X=X+DX
•230 IF PEEK(1024+X+40*Y)=102 THEN DX=-DX
  :GOSUB 400:GOTO 220
•240 IF X<=0 OR X>=39 THEN DX=-DX
•250 Y=Y+DY
•260 IF PEEK(1024+X+40*Y)=102 THEN DY=-DY
  :GOSUB 400:GOTO 250
•270 IF Y<=0 OR Y>=24 THEN DY=-DY
•280 GOTO 190

```

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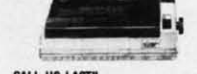
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```

•390 REM --- SOUND ---
•400 FOR L=54272 TO 54296:POKE L,0:NEXT
•410 POKE 54296,15
•420 POKE 54277,64
•430 POKE 54273,17 : POKE 54272,37
•440 POKE 54276,17 : FOR T=1 TO 200:NEXT
•450 POKE 54276,16 : FOR T=1 TO 50:NEXT
•460 RETURN

```

There are many ways to modify this program. Put some special shapes such as parallel lines, for example, on the screen to create rhythmic motion of the ball rather than just random motion. Modify the sound routine starting at line 400 to produce different sounds for different objects. The action is more realistic if the sound routine is not used or is shortened, since it takes a noticeable amount of time. Working with this program can be as much fun as watching it.

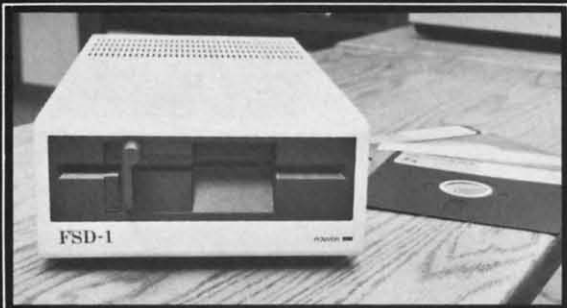
For C-128 users we have the following solution from Jim Speers (Niles, MI):

```

•1 REM COMMODORES PROBLEM #33-3:
•2 REM      BOUNCING BALLS
•3 REM SOLUTION BY
•4 REM      JIM SPEERS
•5 REM
•10 INPUT"SPEED (0=FAST TO 9=SLOW)";SP :

```

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```

SP=SP*50 : X=RND(-TI)
•20 COLOR 0,1:COLOR 4,3:COLOR 1,11:GRAPHIC
  C 1,1:CIRCLE 1,11,12,10,8:PAINT 1,11,11
•30 SSHAPE A$,0,0,23,20:SPRSV A$,1:FOR I
  =2 TO 8:SPRSV 1,I:NEXT:GRAPHIC 1,1
•40 FOR I=1 TO 8:SPRITE I,1,I+1,1:MOVSPR
  I,85+21*I,140:NEXT
•50 FOR I=1 TO 12:R=INT(RND(1)*25):C=INT(
  RND(1)*40):CHAR 1,C,R,"X":NEXT
•60 X=INT(RND(1)*360):FOR I=2 TO 8:A(I)=
  270:NEXT:A(1)=X:TM=TI+7200
•70 FOR I=1 TO 8:MOVSPR I,21:A(I):NEXT
•80 IF (BUMP(2)AND1)<>1 THEN 110
•90 SC=SC+1 :X=X+INT(RND(1)*120)-60 : IF
  X>360 THEN X=X-360
•100 IF X<0 THEN X=X+360
•110 FOR I=8 TO 2 STEP-1:A(I)=A(I-1):NEXT
•120 IF RSPPOS(1,1)>222 AND (X>=90)ANDX<=2
  70 THEN X=(360-2*X)/2:IFX<0 THENX=X+360
•130 IF RSPPOS(1,1)<50 AND (X<90 OR X>270
  ) THEN X=(360-2*X)/2:IFX<0 THENX=X+360
•140 IF RSPPOS(1,0)<21 AND X>=180 THEN X
  =360-X
•150 IF RSPPOS(1,0)>318 AND X<180 THEN X
  =360-X
•160 IF TI>TM THEN 220
•170 GET Z$:IF Z$="Q" THEN 220
•180 IF ASC(Z$)>47 AND ASC(Z$)<58 THEN SP
  =50*(ASC(Z$)-48)
•190 IF Z$="/" THEN X=X+15:IF X>360 THEN
  X=X-360
•200 IF Z$="Z" THEN X=X-15:IF X<0 THEN X=
  X+360
•210 FOR I=1 TO SP:NEXT:A(1)=X:GOTO 70
•220 FOR I=1 TO 8:SPRITE I,0:NEXT:GRAPHIC
  0,1:PRINT"SCORE:";SC:END

```

Jim admits he got carried away with this one. He has turned the program into a game in which you control the direction of motion of the eight sprites with the "/" and "Z" keys. You may try either to hit or to miss the graphics characters. After two minutes, your score is displayed. If you have never tried some of these fancy sprite control commands, here is your chance to get started. Some temptations which Jim was able to resist for this program include sound, control of sprites with a joystick, and multiple players. Perhaps your willpower is weaker.

Readers didn't have too much trouble solving *Problem #33-4: Counting Combinations* submitted by Jim Speers. Finding the best solution was more difficult. The problem was simply to calculate the number of ways of choosing R items from N possible choices, that is, calculate the number of combinations of N things taken R at a time. For example, a lottery game requires a person to choose 6 numbers from a total of 45 numbers. The order in which the numbers are chosen does not matter.

The formula for computing combinations is  $N!/(R!(N-R)!)$  where "!" means "factorial." Five factorial (5!)





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is  $5 \times 4 \times 3 \times 2 \times 1$  or 120. The number of combinations of 5 objects taken 3 at a time is

$$5! / (3! \times 2!) = 5 \times 4 \times 3 \times 2 \times 1 / (3 \times 2 \times 1 \times 2 \times 1) = 120 / 12 = 10$$

Consequently there are ten different groups of three digits each that can be chosen from the digits 12345. (Can you write them all down? Remember that order doesn't matter, so 123 is the same choice as 213.)

Some algebraic maneuvering simplifies the formula for combinations. Assume N is 8 and R is 5. The formula can be written  $8 \times 7 \times 6 \times (5!) / (5! \times 3!)$ . The 5! in numerator and denominator divide out, leaving  $8 \times 7 \times 6 / 3!$ . Instead of requiring seven multiplications in both the numerator and the denominator, we need only two in each.

Most readers calculated the numerator, then the denominator, and then their quotient. This can lead to overflow errors more quickly than a program which alternately divides and multiplies. Take the first term from the top, divide by the first term from the bottom, multiply by the second term on top, divide by the second term on bottom, and so forth. A much greater range of numbers can be handled this way, since the intermediate results are relatively small.

Jim Speers' solution to his own problem optimized the calculation:

```

•1 REM COMMODORES PROBLEM #33-4:
•2 REM COUNTING COMBINATIONS
•3 REM SOLUTION BY
•4 REM JIM SPEERS
•5 REM
•10 INPUT"ENTER N,R";N,R:IF N<R THEN 10
•20 N$=STR$(N) : R$=STR$(R)
•30 IF N=R THEN END
•40 IF N=R OR R=0 THEN T=1 : GOTO 70
•50 IF (N-R)<R THEN R=N-R
•60 T=1 : FOR I=1 TO R : T=T*N/I : N=N-1
: NEXT
•70 PRINT"[DOWN]THERE ARE";T;"COMBINATION
S OF"
•80 PRINT N$;" THINGS TAKEN ";R$;" AT A T
IME."
•90 PRINT"[DOWN][DOWN]" : GOTO 10

```

Since "N taken R at a time" is equivalent to "N taken (N-R) at a time," line 50 guarantees that the smaller number of terms (R or N-R) is used in the denominator. The running total is kept in T. Line 60 causes I to count up from 1 to R while N counts down from N to N-R, and T is updated with their quotient. Enter 0,0 to end the program.

Jim mentioned that a lottery game changed from picking 6 out of 40 numbers to picking 6 out of 44 numbers. To the uninitiated, this may not seem like a significant difference. In fact the difference is nearly two to one. There are 3,838,380 different combinations in the first game (N=40, R=6) whereas there are 7,059,052 combinations in the second game. The odds of the state picking your particular group of six numbers are roughly half as great in the second game as in the first. (Can you believe that people make money selling books telling how to pick numbers for these games? The size of the number of possible combinations tells me all I need to know.)

Test your intuition with these problems. If the game involved picking 7 out of 40 numbers instead of 6 out of 40, are your chances of winning greater or less, and by how much? Are you more likely to pick a winning combination by choosing 34 out of 40 numbers or by choosing 6 out of 40 numbers? Check your answers with Jim's program. Best of luck until next month. If you play games with these odds, you need it.

Congratulations also to these readers for their solutions this month:

C. Artino (Guilderland, NY)	Frank Michels (Deptford, NJ)
Leo Brenneman (Erie, PA)	Johnny Moon (Broxton, GA)
Steve Christensen (Manton, MI)	Jason Murphy (Baltimore, MD)
Curt Donofrio (Shelton, CT)	Ivan Rudyk
Craig Ewert (Crystal Lake, IL)	Robb Schermer (Zeeland, MI)
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Thomson Fung (San Diego, CA)	J.H. Smalley (Boulder, CO)
Charles Grady (Cleveland, TN)	Paul Sobolik (Pittsburgh, PA)
Chris Haywood (Naperville, IL)	S. Steckler (Columbia, MD)
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# PROGRAM LISTINGS

Attention new *Ahoy!* readers! You must read the following information very carefully prior to typing in programs listed in *Ahoy!* Certain Commodore characters, commands, and strings of characters and commands will appear in a special format. Follow the instructions and listing guide on this page.

**O**n the following pages you'll find several programs that you can enter on your Commodore computer. But before doing so, read this entire page carefully.

To insure clear reproductions, *Ahoy!*'s program listings are generated on a daisy wheel printer, incapable of printing the commands and graphic characters used in Commodore programs. These are therefore represented by various codes enclosed in brackets [ ]. For example: the SHIFT CLR/HOME command is represented onscreen by a heart . The code we use in our listings is [CLEAR]. The chart below lists all such codes which you'll encounter in our listings, except for one other special case.

The other special case is the COMMODORE and SHIFT characters. On the front of most keys are two symbols. The symbol on the left is obtained by pressing that key while holding down the COMMODORE key; the symbol on the right, by pressing that key while holding down the SHIFT key. COMMODORE and SHIFT characters are represented in our listings by a lower-case "s" or "c" followed by the symbol of the key you must hit. COMMODORE J, for example, is represented by [c J],

and SHIFT J by [s J].
































Additionally, any character that occurs more than two times in a row will be displayed by a coded listing. For example, [3 "[LEFT]"] would be 3 CuRSor left commands in a row, [5 "[s EP]"] would be 5 SHIFTEd English Pounds, and so on. Multiple blank spaces will be noted in similar fashion: e.g., 22 spaces as [22 " "].

Sometimes you'll find a program line that's too long for the computer to accept (C-64 lines are a maximum of 80 characters, or 2 screen lines long; VIC 20 lines, a maximum of 88 characters, or 4 screen lines). To enter these lines, refer to the *BASIC Command Abbreviations Appendix* in your User Manual.

On the next page you'll find our *Bug Repellent* programs for the C-128 and C-64. The version appropriate for your machine will help you proofread our programs after you type them. (Please note: the *Bug Repellent* line codes that follow each program line, in the whited-out area, should *not* be typed in. See the instructions preceding each program.)

Also on the following page you will find *Flankspeed*, our ML entry program, and instructions on its use. □

Call *Ahoy!* at 212-239-0855 with any problems.

When You See	It Means	You Type	You Will See	When You See	It Means	You Type	You Will See
[CLEAR]	Screen Clear	SHIFT CLR/HOME		[BLACK]	Black	CNTRL 1	
[HOME]	Home	CLR/HOME		[WHITE]	White	CNTRL 2	
[UP]	Cursor Up	SHIFT ↑ CRSR ↓		[RED]	Red	CNTRL 3	
[DOWN]	Cursor Down	↑ CRSR ↓		[CYAN]	Cyan	CNTRL 4	
[LEFT]	Cursor Left	SHIFT ← CRSR →		[PURPLE]	Purple	CNTRL 5	
[RIGHT]	Cursor Right	← CRSR →		[GREEN]	Green	CNTRL 6	
[SS]	Shifted Space	SHIFT Space		[BLUE]	Blue	CNTRL 7	
[INSERT]	Insert	SHIFT INST/DEL		[YELLOW]	Yellow	CNTRL 8	
[DEL]	Delete	INST/DEL		[F1]	Function 1	F1	
[RVSON]	Reverse On	CNTRL 9		[F2]	Function 2	SHIFT F1	
[RVSOFF]	Reverse Off	CNTRL 0		[F3]	Function 3	F3	
[UPARROW]	Up Arrow	↑		[F4]	Function 4	SHIFT F3	
[BACKARROW]	Back Arrow	←		[F5]	Function 5	F5	
[PI]	PI	π		[F6]	Function 6	SHIFT F5	
[EP]	English Pound	£		[F7]	Function 7	F7	
				[F8]	Function 8	SHIFT F7	



## BUG REPELLENT By MICHAEL KLEINERT and DAVID BARRON

*Bug Repellent* is a checksum program used for proofreading BASIC listings typed in from *Ahoy!* magazine. For each program line you enter, *Bug Repellent* will produce a two-letter code that should match the code listed beside that line in the magazine.

Type in, save, and run the *Bug Repellent*. (If you have a C-64, type in the C-64 version. If you have a C-128, you will need to type in the C-64 version for use with C-64 programs, and the C-128 version for use with C-128 programs.) If you have typed in *Bug Repellent* properly, you will get the message BUG REPELLENT INSTALLED; otherwise you will get an error message. If you get an error message, double check the *Bug Repellent* program for typing mistakes. Type NEW and hit RETURN. Then type in and save, or load, the *Ahoy!* program you wish to check. Type in SYS 49152 for the C-64 version or SYS 3072 for the C-128 version and hit RETURN (this will begin execution of *Bug Repellent*). You will see the prompt SCREEN OR PRINTER ? Hit S if you want the codes listed on the screen, or P if you want them listed on the printer. To pause the listing depress and hold the SHIFT key.

Compare the codes your machine generates to those listed to the right of the corresponding program lines. If you spot a difference, that line contains an error. Write down the numbers of the lines where the contradictions occur. LIST each line, locate the errors, and correct them.

### COMMODORE 64 VERSION

```

100 FOR X = 49152 TO 49488:READY:S=S+Y      AB
110 IF Y<0 OR Y>255 THEN 130                EA
120 POKE X,Y:NEXT:GOTO140                   ID
130 PRINT"[CLEAR][DOWN]**ERROR**":PRINT"[DOWN
]PLEASE CHECK LINE"PEEK(64)*256+PEEK(63):END ID
140 IF S<>44677 THEN PRINT"[CLEAR][DOWN]**ERR
OR**":PRINT"[DOWN]PLEASE CHECK DATA LINES 170
-500":END                                    HJ
150 PRINT"[CLEAR]":POKE53280,0:POKE53281,6:PO
KE646,1                                     NP
160 PRINT"[RVSON][6" "]C-64 BUG REPELLENT INS
TALLED[6" "]"                               LF
170 DATA32,161,192,165,43,133,251,165,44,133 DL
180 DATA252,160,0,132,254,32,37,193,234,177 DB
190 DATA251,208,3,76,138,192,230,251,208,2 OF
200 DATA230,252,76,43,192,76,73,78,69,32 KN
210 DATA35,32,0,169,35,160,192,32,30,171 CA
220 DATA160,0,177,251,170,230,251,208,2,230 CE
230 DATA252,177,251,32,205,189,169,58,32,210 JE
240 DATA255,169,0,133,253,230,254,32,37,193 CL
250 DATA234,165,253,160,0,76,13,193,133,253 NB
260 DATA177,251,208,237,165,253,41,240,74,74 MB
270 DATA74,74,24,105,65,32,210,255,165,253 EP
280 DATA 41,15,24,105,65,32,210,255,169,13 GH
290 DATA32,220,192,230,63,208,2,230,64,230 AN
300 DATA251,208,2,230,252,76,11,192,169,153 NG
310 DATA160,192,32,30,171,166,63,165,64,76 BF
320 DATA231,192,96,76,73,78,69,83,58,32 EP
330 DATA0,169,247,160,192,32,30,171,169,3 PJ
340 DATA133,254,32,228,255,201,83,240,6,201 FK
350 DATA80,208,245,230,254,32,210,255,169,4 FL
360 DATA166,254,160,255,32,186,255,169,0,133 CL
370 DATA63,133,64,133,2,32,189,255,32,192 GC
380 DATA255,166,254,32,201,255,76,73,193,96 NN
390 DATA32,210,255,173,141,2,41,1,208,249 NH
400 DATA96,32,205,189,169,13,32,210,255,32 IM
410 DATA204,255,169,4,76,195,255,147,83,67 KC
420 DATA82,69,69,78,32,79,82,32,80,82 DC
430 DATA 73,78,84,69,82,32,63,32,0,76 ML
440 DATA44,193,234,177,251,201,32,240,6,138 GN
450 DATA113,251,69,254,170,138,76,88,192,0 JK
460 DATA0,0,0,230,251,208,2,230,252,96 NA
470 DATA170,177,251,201,34,208,6,165,2,73 DM
480 DATA255,133,2,165,2,208,218,177,251,201 JA
490 DATA32,208,212,198,254,76,29,193,0,169 FM
500 DATA13,76,210,255,0,0,0 PA

```

### COMMODORE 128 VERSION

```

100 FAST:FOR X = 3072 TO 3520:READ Y:POKE X,Y
:S=S+Y:TRAP110:NEXT:SLOW                    IH
110 SLOW:IF S<>49057 THEN PRINT"[CLEAR][DOWN]
**ERROR**":PRINT"[DOWN]PLEASE CHECK DATA LINE
S 140-390":END                              JA

```

```

120 PRINT"[CLEAR][DOWN] C-128 BUG REPELLENT
INSTALLED"                                  II
130 PRINT"[4" "]TYPE SYS 3072 TO ACTIVATE" IN
140 DATA 32,161,12,165,45,133,251,165,46,133,
252,160,0,132,254,32,37                    OF
150 DATA 13,234,177,251,208,3,76,138,12,230,2
51,208,2,230,252,76,43                      NC
160 DATA 12,76,73,78,69,32,35,32,0,169,35,160
,12,32,80,13,160,0,177                      OL
170 DATA 251,170,230,251,208,2,230,252,177,25
1,32,89,13,169,58,32,98                      EF
180 DATA 13,169,0,133,253,230,254,32,37,13,23
4,165,253,160,0,76,13                      JO
190 DATA 13,133,253,177,251,208,237,165,253,4
1,240,74,74,74,24                          LC
200 DATA 105,65,32,98,13,165,253,41,15,24,105
,65,32,98,13,169,13,32                      DE
210 DATA 220,12,230,65,208,2,230,66,230,251,2
08,2,230,252,76,11,12                      GM
220 DATA 169,153,160,12,32,80,13,166,65,165,6
6,76,231,12,96,76,73,78                      CP
230 DATA 69,83,58,32,0,169,247,160,12,32,80,1
3,169,3,133,254,32,107                      HC
240 DATA 13,201,83,240,6,201,80,208,245,230,2
54,32,98,13,169,4,166                      GK
250 DATA 254,160,255,32,116,13,169,0,133,65,1
33,66,133,250,32,125,13                      LB
260 DATA 32,134,13,166,254,32,143,13,76,73,13
,96,32,98,13,165,211                      JF
270 DATA 234,41,1,208,249,96,32,89,13,169,13,
32,98,13,32,152,13,169,4                      GD
280 DATA 76,161,13,147,83,67,82,69,69,78,32,7
9,82,32,80,82,73,78,84,69                      PL
290 DATA 82,32,63,32,0,76,44,13,234,177,251,2
01,32,240,6,138,113,251,69                      OK
300 DATA 254,170,138,76,88,12,0,0,0,230,251
,208,2,230,252,96,170,177                      FJ
310 DATA 251,201,34,208,6,165,250,73,255,133,
250,165,250,208,218,177                      GA
320 DATA 251,201,32,208,212,198,254,76,29,13,
0,169,13,76,98,13,0,0,32                      FI
330 DATA 170,13,32,226,85,76,180,13,32,170,13
,32,50,142,76,180,13,32                      OF
340 DATA 170,13,32,210,255,76,180,13,32,170,1
3,32,228,255,76,180,13,32                      AK
350 DATA 170,13,32,186,255,76,180,13,32,170,1
3,32,189,255                      BP
360 DATA 76,180,13,32,170,13,32,192,255,76,18
0,13,32,170,13                      FP
370 DATA 32,201,255,76,180,13,32,170,13,32,20
4,255,76,180,13,32,170                      ID
380 DATA 13,32,195,255,76,180,13,133,67,169,0
,141,0,255,165,67,96                      BJ
390 DATA 133,67,169,0,141,1,255,165,67,96,0,0
,0                      IF

```



# FLANKSPEED FOR THE C-64 By GORDON F. WHEAT

*Flankspeed* will allow you to enter machine language *Ahoy!* programs without any mistakes. Once you have typed the program in, save it for future use. While entering an ML program with *Flankspeed* there is no need to enter spaces or hit the carriage return. This is all done automatically. If you make an error in a line a bell will ring and you will be asked to enter it again. To LOAD in a program Saved with *Flankspeed* use LOAD "name",1,1 for tape, or LOAD "name",8,1 for disk. The function keys may be used after the starting and ending addresses have been entered.

f1—SAVEs what you have entered so far.

f3—LOADs in a program worked on previously.

f5—To continue on a line you stopped on after LOADING in the previous saved work.

f7—Scans through the program to locate a particular line, or to find out where you stopped the last time you entered the program.

f7 temporarily freezes the output as well.

100 POKE53280,12:POKE53281,11	LL 5	HD
105 PRINT"[CLEAR][c 8][RVSON][15" "]FLANKSPEED[15" "]";	ED -390 PRINT:PRINT"ADDRESS NOT WITHIN SPECIFIED RANGE!":B=0:	OK
110 PRINT"[RVSON][5" "]MISTAKEPROOF ML ENTRY PROGRAM[6" "	GOTO415	FN
115 PRINT"[RVSON][9" "]CREATED BY G. F. WHEAT[9" "]";	MC -395 PRINT:PRINT"NOT ZERO PAGE OR ROM!":B=0;GOTO415	PP
120 PRINT"[RVSON][3" "]COPR. 1984, ION INTERNATIONAL INC.	DM -400 PRINT"?ERROR IN SAVE":GOTO415	PO
[3" "]";	-405 PRINT"?ERROR IN LOAD":GOTO415	PG
125 FORA=54272TO54296:POKEA,0:NEXT	DH -410 PRINT:PRINT"END OF ML AREA":PRINT	BH
130 POKE54272,4:POKE54273,48:POKE54277,0:POKE54278,249:PO	IM -415 POKE54276,17:POKE54276,16:RETURN	IM
KE54296,15	-420 OPEN15,8,15:INPUT#15,A,A\$:CLOSE15:PRINTA\$:RETURN	PC
135 FORA=680TO699:READB:POKEA,B:NEXT	NH -425 REM GET FOUR DIGIT HEX	GM
140 DATA169,251,166,253,164,254,32,216,255,96	KO -430 PRINT:PRINTB\$;:INPUTT\$	NP
145 DATA169,0,166,251,164,252,32,213,255,96	HJ -435 IFLEN(T\$)<>4THENGOSUB380:GOTO430	FJ
150 B\$="STARTING ADDRESS IN HEX":GOSUB430:AD=B:SR=B	JB -440 FORA=1TO4:A\$=MID\$(T\$,A,1):GOSUB450:IFT(A)=16THENGOSUB	GF
155 GOSUB480:IFB=0THEN150	KA 380:GOTO430	EH
160 POKE251,T(4)+T(3)*16:POKE252,T(2)+T(1)*16	GN -445 NEXT:B=(T(1)*4096)+(T(2)*256)+(T(3)*16)+T(4):RETURN	KP
165 B\$="ENDING ADDRESS IN HEX":GOSUB430:EN=B	KE -450 IFA\$>"@":ANDAS\$<"G":THENT(A)=ASC(A\$)-55:RETURN	NP
170 GOSUB470:IFB=0THEN150	LO -455 IFA\$>"/":ANDAS\$<":":THENT(A)=ASC(A\$)-48:RETURN	LI
175 POKE254,T(2)+T(1)*16:B=T(4)+1+T(3)*16	EE -460 T(A)=16:RETURN	LB
180 IFB>255THENB=B-255:POKE254,PEEK(254)+1	MN -465 REM ADDRESS CHECK	KC
185 POKE253,B:PRINT	GE -470 IFAD>ENTHEN385	MG
190 REM GET HEX LINE	HN -475 IFB<SRORB>ENTHEN390	IM
195 GOSUB495:PRINT": [c P][LEFT]";:FORA=0TO8	IL -480 IFB<256OR(B>4096)ANDB<49152)ORB>53247THEN395	EB
200 FORB=0TO1:GOTO250	NH -485 RETURN	FD
205 NEXTB	MP -490 REM ADDRESS TO HEX	PE
210 A\$(A)=T(1)+T(0)*16:IFAD+A-1=ENTHEN340	ME -495 AC=AD:A=4096:GOSUB520	MI
215 PRINT" [c P][LEFT]";	LE -500 A=256:GOSUB520	IL
220 NEXTA:T=AD-(INT(AD/256)*256):PRINT" "	IK -505 A=16:GOSUB520	IM
225 FORA=0TO7:T=T+A\$(A):IFT>255THENT=T-255	PD -510 A=1:GOSUB520	PE
230 NEXT	LK -515 RETURN	JP
235 IFA\$(8)<>TTHENGOSUB375:GOTO195	IA -520 T=INT(AC/A):IFT>9THENA\$=CHR\$(T+55):GOTO530	AC
240 FORA=0TO7:POKEAD+A,A\$(A):NEXT:AD=AD+8:GOTO195	LE -525 A\$=CHR\$(T+48)	LH
245 REM GET HEX INPUT	BI -530 PRINTA\$:AC=AC-A*T:RETURN	EO
250 GETA\$:IFA\$=""THEN250	AB -535 A\$="**SAVE**":GOSUB585	CM
255 IFA\$=CHR\$(20)THEN305	HK -540 OPEN1,T,1,A\$:SYS680:CLOSE1	CL
260 IFA\$=CHR\$(133)THEN535	HF -545 IFST=0THENEND	NE
265 IFA\$=CHR\$(134)THEN560	KH -550 GOSUB400:IFT=8THENGOSUB420	MF
270 IFA\$=CHR\$(135)THENPRINT" ":GOTO620	JM -555 GOTO535	LC
275 IFA\$=CHR\$(136)THENPRINT" ":GOTO635	EG -560 A\$="**LOAD**":GOSUB585	AN
280 IFA\$>"@":ANDAS\$<"G":THENT(B)=ASC(A\$)-55:GOTO295	AB -565 OPEN1,T,0,A\$:SYS690:CLOSE1	CL
285 IFA\$>"/":ANDAS\$<":":THENT(B)=ASC(A\$)-48:GOTO295	DL -570 IFST=64THEN195	FG
290 GOSUB415:GOTO250	MD -575 GOSUB405:IFT=8THENGOSUB420	OM
295 PRINTA\$"[c P][LEFT]";	JJ -580 GOTO560	DD
300 GOTO205	OA -585 PRINT" ":PRINTTAB(14)A\$	DF
305 IFA>0THEN320	CF -590 PRINT:A\$=""INPUT"FILENAME":A\$	IG
310 A=-1:IFB=1THEN330	PG -595 IFA\$=""THEN590	BO
315 GOTO220	OI -600 PRINT:PRINT"TAPE OR DISK?":PRINT	IM
320 IFB=0THENPRINTCHR\$(20);CHR\$(20);:A=A-1	BM -605 GETB\$:T=1:IFB\$="D":THENT=8:A\$="@0:"A\$:RETURN	OH
325 A=A-1	HG -610 IFB\$<>"T":THEN605	GH
330 PRINTCHR\$(20);:GOTO220	BE -615 RETURN	PH
335 REM LAST LINE	LK -620 B\$="CONTINUE FROM ADDRESS":GOSUB430:AD=B	FA
340 PRINT" ":T=AD-(INT(AD/256)*256)	AD -625 GOSUB475:IFB=0THEN620	IB
345 FORB=0TOA-1:T=T+A\$(B):IFT>255THENT=T-255	GJ -630 PRINT:GOTO195	PP
350 NEXT	PL -635 B\$="BEGIN SCAN AT ADDRESS":GOSUB430:AD=B	NK
355 IFA\$(A)<>TTHENGOSUB375:GOTO195	IA -640 GOSUB475:IFB=0THEN635	EC
360 FORB=0TOA-1:POKEAD+B,A\$(B):NEXT	NF -645 PRINT:GOTO670	GN
365 PRINT:PRINT"YOU ARE FINISHED!":GOTO535	HN -650 FORB=0TO7:AC=PEEK(AD+B):GOSUB505:IFAD+B=ENTHENAD=SR:G	LI
370 REM BELL AND ERROR MESSAGES	JA OSUB410:GOTO195	IF
375 PRINT:PRINT"LINE ENTERED INCORRECTLY":PRINT:GOTO415	FL -655 PRINT" ":NEXTB	
380 PRINT:PRINT"INPUT A 4 DIGIT HEX VALUE!":GOTO415	DA -660 PRINT:AD=AD+8	
385 PRINT:PRINT"ENDING IS LESS THAN STARTING!":B=0:GOTO41	FF -665 GETB\$:IFB\$=CHR\$(136)THEN195	
	-670 GOSUB495:PRINT" ":GOTO650	



## BASIC MAGIC FROM PAGE 32

### POINTER PRINTER

```

•1 REM                               JD
•2 REM  -- POINTER PRINTER --       KN
•3 REM  DEMO FOR THE C-128          HC
•4 REM  RUPERT REPORT #37           OP
•5 REM                               JD
•6 REM  FUNCTIONS FIND DECIMAL VALUES OF LB
•7 REM  POINTER AT ADDRESS M (FNPTR) HF
•8 REM  AND ITS MSB (FNHI) & LSB (FNLO) EH
•9 REM                               JD
•10 DEF FNPTR(M)=PEEK(M)+256*PEEK(M+1) DM
•20 DEF FNHI(D)=DEC(LEFT$(HEX$(D),2)) FM
•30 DEF FNLO(D)=DEC(RIGHT$(HEX$(D),2)) DP
•40 M=45 : GOSUB 80 :REM TXTTAB      CM
•50 M=4624 : GOSUB 80 :REM TEXT-TOP FF
•70 END :- - - - - JK
•75 REM [M] IS THE VALUE OF THE POINTER HJ
•76 REM AT ADDRESS M.               LG
•77 REM IT IS SHOWN IN DECIMAL,      PM
•78 REM HEXADECIMAL, AND IN          GE
•79 REM MSB LSB FORM IN DECIMAL.     EG
•80 REM :- - - - - KN
•90 PTR=FNPTR(M)                    NE
•100 F$="M = [4"#" ][3" "][M] = [4"#" ] = $
    [4"#" ] = [3"#" ] [3"#" ]"      GL
•110 PRINT USING F$;M,PTR,HEX$(PTR),FNHI( DE
    PTR),FNLO(PTR)                  IM
•120 RETURN

```

## SCREENS FROM PAGE 82

### SCREENS DATA A

```

•1 REM *** SCREENS ***              HK
•5 REM PERMANENT ML BEGINS AT 828    MK
•10 PRINT"ENTERING MACHINE LANGUAGE" NB
•15 POKE52,147:POKE56,147:CLR:B=37691 OI
•20 FORK=.TO195                      AM
•25 FORJ=.TO15:READA:POKEB+J,A:X=X+A:NEXT PL
    :READA                          BD
•30 IFX<>ATHENPRINT"ERROR IN DATA LINE"PE
    EK(64)*256+PEEK(63):STOP        BA
•35 X=. :B=B+16:NEXT:POKE40827,3     HO
•40 PRINT"MACHINE LANGUAGE ENTERED"   DI
•45 :                                DN
•100 REM *** SAVE ML ***             DG
•105 PRINT"SAVING SCREENS A"         PM
•110 POKE780,8:POKE781,8:POKE782,255:SYS6
    5466

```

```

•115 N$="0:SCREENS A,P,W"           BJ
•120 L=LEN(N$):FORJ=1TOL:POKE849+J,ASC(MI
    D$(N$,J,1)):NEXT                KE
•125 POKE780,L:POKE781,82:POKE782,3:SYS65
    469                              HF
•130 POKE251,59:POKE252,147         CE
•135 POKE780,251:POKE781,124:POKE782,159:
    SYS65496                          CB
•140 IFSTTHENGOTO200                AH
•145 PRINT"SCREENS A SAVED. SYS37742 TO
    START                             JF
•150 PRINT"INTERRUPT OR LOAD AND RUN SCRE
    ENS A.":STOP                      AK
•155 :                               DI
•195 REM *** READ ERROR CHANNEL *** HA
•200 OPEN15,8,15                    AM
•205 INPUT#15,A,A$,B,C              NG
•210 PRINTA,A$,B,C                  GA
•215 CLOSE15:STOP                   NG
•995 :                               DI
•1000 DATA11,8,10,0,158,50,48,54,49,0,0,0
    ,169,13,133,87,790                BP
•1002 DATA169,8,133,88,160,71,132,89,160,
    0,169,147,133,90,162,13,1724      KN
•1004 DATA177,87,145,89,136,208,249,230,8
    8,230,90,202,48,2,208,240,2429    JB
•1006 DATA76,110,147,162,111,189,144,147,
    157,62,3,202,16,247,169,147,2089   BL
•1008 DATA32,210,255,24,162,9,160,10,32,2
    40,255,169,164,160,148,32,2062     II
•1010 DATA30,171,76,184,148,165,197,201,5
    7,240,3,108,60,3,120,169,1932      GB
•1012 DATA49,141,20,3,169,234,141,21,3,88
    ,169,160,133,88,169,145,1733       AP
•1014 DATA133,90,169,176,133,92,169,148,1
    33,94,160,0,132,87,132,89,1937     NP
•1016 DATA132,91,132,93,32,157,3,120,169,
    46,133,1,162,12,177,91,1551       LF
•1018 DATA145,93,136,208,249,230,92,230,9
    4,202,208,242,169,47,133,1,2479    HM
•1020 DATA88,76,93,158,120,169,46,133,1,3
    2,157,3,169,47,133,1,1426          GG
•1022 DATA88,108,60,3,162,15,177,89,145,8
    7,136,208,249,230,88,230,2075      ME
•1024 DATA90,202,208,242,96,169,128,141,1
    38,2,169,0,133,89,165,209,2181     OE
•1026 DATA133,87,24,165,210,105,212,133,8
    8,164,211,177,209,72,170,177,2337  IG
•1028 DATA87,133,91,173,134,2,145,87,24,1
    77,209,105,128,145,209,230,2079    KF
•1030 DATA89,24,165,162,105,20,133,90,32,
    228,255,208,21,165,90,197,1984     JF
•1032 DATA162,208,245,165,89,240,220,138,
    145,209,165,91,145,87,198,89,2596  EF
•1034 DATA240,223,170,104,164,211,145,209
    ,165,91,145,87,96,32,0,148,2230    B

```



	•1036 DATA138,201,133,144,5,201,141,176,1,96,32,210,255,208,238,169,2348	KH	•1094 DATA29,198,179,189,194,207,210,196,197,210,160,195,207,204,207,210,2992	AL
BJ	•1038 DATA63,133,87,133,91,169,0,133,89,133,93,169,5,133,88,169,1688	CO	•1096 DATA160,160,160,198,180,189,212,200,201,211,160,205,197,206,213,13,2865	JO
(MI	•1040 DATA147,133,90,169,217,133,92,169,146,133,94,160,240,165,2,240,2330	OA	•1098 DATA29,29,29,198,181,189,208,210,201,206,212,160,195,207,204,207,2665	LA
S65	•1042 DATA12,177,87,145,89,177,91,145,93,136,208,245,96,177,89,145,2112	II	•1100 DATA210,160,160,160,160,198,182,189,211,212,193,210,212,13,29,29,2528	OC
59:	•1044 DATA87,177,93,145,91,136,208,245,96,80,82,69,83,83,32,95,1802	DO	•1102 DATA29,198,183,189,197,210,193,211,197,160,205,197,206,213,160,160,2908	JJ
CB	•1046 DATA32,70,79,82,32,83,67,82,69,69,78,83,0,173,20,3,1022	LG	•1104 DATA160,160,160,198,184,189,211,193,214,197,175,210,197,208,204,193,3053	EF
TO	•1048 DATA141,60,3,173,21,3,141,61,3,120,169,62,141,20,3,169,1290	HA	•1106 DATA195,197,19,0,0,15,111,8,232,7,238,134,2,173,134,2,1467	CD
CRE	•1050 DATA3,141,21,3,88,32,16,158,162,12,177,91,145,93,136,208,1486	IC	•1108 DATA41,15,141,134,2,162,0,157,0,216,157,0,217,157,0,218,1617	BD
*	•1052 DATA249,230,92,230,94,202,208,242,96,0,0,0,0,0,0,169,1812	CH	•1110 DATA202,208,244,162,233,157,255,218,202,208,250,96,32,234,148,24,2873	OH
AM	•1054 DATA15,141,34,208,133,2,32,106,148,173,17,208,9,64,141,17,1448	OE	•1112 DATA162,9,160,3,32,240,255,169,15,160,150,32,30,171,169,0,1757	LL
NG	•1056 DATA208,169,11,141,134,2,169,63,133,87,169,5,133,88,160,240,1912	OO	•1114 DATA133,198,96,169,15,162,8,160,15,32,186,255,169,0,32,189,1819	JC
DI	•1058 DATA169,96,145,87,136,208,251,162,40,169,109,157,63,5,157,7,1961	MA	•1116 DATA255,32,192,255,162,15,96,198,179,189,210,197,208,197,193,212,2790	NK
0,0	•1060 DATA6,169,0,157,63,217,157,7,218,202,208,237,162,24,181,217,2225	KI	•1118 DATA160,160,160,198,181,189,211,212,193,210,212,0,0,32,206,150,2474	LB
60,	•1062 DATA9,128,149,217,202,208,247,169,39,133,213,96,0,198,201,204,2413	DO	•1120 DATA32,198,255,160,0,132,5,169,126,133,78,169,145,133,79,32,1846	MC
0,8	•1064 DATA197,206,193,205,197,160,168,177,173,177,180,160,195,200,193,210,2991	HA	•1122 DATA207,255,145,78,200,32,183,255,41,64,240,243,160,0,177,78,2358	JL
47,	•1066 DATA211,169,186,160,0,206,193,205,197,160,212,207,207,160,204,207,2884	IH	•1124 DATA201,48,208,1,96,201,54,208,20,200,177,78,201,51,208,13,1965	OH
2,2	•1068 DATA206,199,186,160,210,197,196,2070,48,58,72,32,44,83,44,1942	LO	•1126 DATA165,6,208,9,32,100,157,32,206,150,76,111,151,230,5,32,1670	IF
1,5	•1070 DATA87,157,160,157,162,3,189,107,149,32,210,255,202,208,247,96,2421	AH	•1128 DATA234,148,24,162,9,160,3,32,240,255,160,0,177,78,201,13,1896	ID
,88	•1072 DATA169,11,141,36,208,32,234,148,24,162,10,160,2,32,240,255,1864	PG	•1130 DATA240,8,9,128,32,210,255,200,208,242,32,210,255,24,162,11,2226	EI
8,1	•1074 DATA169,56,160,149,32,30,171,160,0,185,100,149,153,233,7,200,1954	KN	•1132 DATA160,10,32,240,255,160,150,169,226,32,30,171,169,15,32,195,2046	KN
69,	•1076 DATA192,4,208,245,132,95,32,0,148,164,95,138,201,13,240,38,1945	OP	•1134 DATA255,76,231,255,165,95,162,233,160,7,32,189,255,169,8,162,2454	GM
0,9	•1078 DATA201,20,208,12,192,4,240,238,136,198,95,32,111,149,208,230,2274	ON	•1136 DATA8,164,38,32,186,255,32,192,255,96,0,70,53,32,84,79,1576	GL
1,3	•1080 DATA41,127,201,32,144,224,138,153,233,7,200,230,95,9,128,32,1994	NG	•1138 DATA32,83,76,79,87,32,32,32,32,70,55,32,84,79,32,72,909	KI
5,8	•1082 DATA210,255,208,210,240,208,192,19,144,25,32,111,149,136,208,250,2597	BN	•1140 DATA65,76,84,32,76,73,83,84,73,78,71,0,32,183,150,133,1293	FH
1,1	•1084 DATA32,111,149,162,12,160,9,32,240,255,160,149,169,80,32,30,1782	DH	•1142 DATA6,133,3,164,3,240,5,32,88,148,208,5,32,228,255,240,1790	GC
3,8	•1086 DATA171,240,149,162,0,189,104,149,153,233,7,200,230,95,232,224,2538	EB	•1144 DATA251,201,133,144,238,208,14,238,33,208,173,33,208,41,15,141,2279	NE
4,1	•1088 DATA4,208,242,96,165,92,32,210,255,165,91,32,210,255,165,90,2312	PC	•1146 DATA33,208,76,174,151,201,134,208,14,238,32,208,173,32,208,41,2131	JA
32,	•1090 DATA32,210,255,96,198,177,189,211,195,210,197,197,206,160,195,207,2935	HG	•1148 DATA15,141,32,208,76,174,151,201,136,144,27,208,31,165,3,208,1920	IC
38,	•1092 DATA204,207,210,160,160,160,198,178,189,211,193,214,197,13,29,29,2552	PH	•1150 DATA194,169,0,133,198,133,2,173,17,208,41,191,141,17,208,32,1857	II
209				
BJ				



•1152 DATA106,148,230,3,208,173,32,149,150,76,174,151,201,138,144,8,2091	OO	•1210 DATA201,2,144,60,162,19,189,126,145,201,83,208,51,173,127,145,2036	GI	•1212 DATA201,72,208,44,173,128,145,201,32,208,37,162,0,189,126,145,2071	JE
•1154 DATA208,10,165,3,240,166,208,148,230,6,208,6,201,140,144,71,2154	ML	•1214 DATA32,210,255,232,224,18,208,245,230,92,32,250,152,165,197,201,2743	OG	•1216 DATA6,208,9,169,40,133,90,32,236,152,240,4,201,3,240,9,1772	KB
•1156 DATA208,145,165,3,133,2,32,106,148,165,6,208,13,165,4,240,1743	AC	•1218 DATA230,91,32,183,255,41,64,240,8,169,8,32,195,255,76,248,2127	KK	•1220 DATA150,32,207,255,201,34,208,234,160,0,76,187,153,0,13,32,1942	OP
•1158 DATA9,162,2,164,95,32,240,149,240,3,32,123,149,169,0,133,1702	GK	•1222 DATA32,67,82,83,82,95,61,72,73,76,73,84,69,32,68,79,1128	PJ	•1224 DATA87,78,32,32,32,32,67,82,83,82,94,61,72,73,76,73,1056	IL
•1160 DATA2,32,106,148,169,2,133,38,32,206,150,32,111,151,162,15,1489	AA	•1226 DATA84,69,32,85,80,13,32,32,82,69,84,85,82,78,61,76,1044	AA	•1228 DATA79,65,68,32,83,67,82,69,69,78,32,32,32,68,61,68,985	LJ
•1162 DATA32,251,150,165,5,240,17,165,197,201,5,208,6,32,186,150,2010	IM	•1230 DATA69,76,69,84,69,32,70,73,76,69,0,78,79,32,72,32,980	BL	•1232 DATA83,67,82,69,69,78,83,32,79,78,32,68,73,83,75,0,1051	LB
•1164 DATA76,170,151,201,6,208,240,96,162,8,32,201,255,173,33,208,2220	PH	•1234 DATA160,22,177,87,41,127,145,87,136,208,247,96,198,177,189,193,2290	AI	•1236 DATA205,197,206,196,160,211,195,210,197,197,206,160,160,160,198,3018	OK
•1166 DATA32,210,255,173,32,208,32,210,255,173,24,208,32,210,255,160,2469	FL	•1238 DATA178,189,197,216,201,212,160,208,210,207,199,210,193,205,13,160,2958	EM	•1240 DATA160,160,198,179,189,193,206,207,212,200,197,210,160,211,195,210,3087	NG
•1168 DATA0,132,87,169,4,133,88,162,3,177,87,32,210,255,136,208,1883	BI	•1242 DATA197,197,206,160,160,198,180,189,212,200,201,211,160,205,197,206,3079	HO	•1244 DATA213,13,160,160,160,198,181,189,212,207,160,211,212,193,210,212,2891	NK
•1170 DATA248,230,88,202,16,243,169,216,133,88,177,87,41,15,133,90,2176	CH	•1246 DATA160,160,160,160,160,160,160,160,198,183,189,197,210,193,211,197,2858	PK	•1248 DATA160,205,197,206,213,0,169,0,133,4,32,73,153,169,15,32,1761	NM
•1172 DATA162,3,132,91,132,92,177,87,41,15,197,90,240,13,72,32,1576	CE	•1250 DATA195,255,32,231,255,165,5,240,11,165,197,201,5,240,235,201,2633	HH	•1252 DATA6,208,246,96,165,92,208,36,32,234,148,24,160,10,162,9,1836	JJ
•1174 DATA255,149,104,133,90,169,0,133,91,133,92,230,91,208,2,230,2110	LF	•1254 DATA32,240,255,169,118,160,154,32,30,171,24,160,10,162,11,32,1760	BA	•1256 DATA240,255,160,150,169,226,32,30,171,76,20,155,24,162,1,160,2031	CG
•1176 DATA92,136,208,226,230,88,202,16,221,32,255,149,162,15,32,251,2315	OK	•1258 DATA10,32,240,255,169,226,160,150,32,30,171,169,41,160,154,32,2031	NF	•1260 DATA30,171,173,17,208,9,64,141,17,208,169,7,141,35,208,169,1767	HO
•1178 DATA150,165,5,240,3,76,79,152,133,4,169,15,32,195,255,76,1749	GP	•1262 DATA14,197,92,176,2,133,92,198,92,169,0,133,94,133,89,169,1783	PB	•1264 DATA209,133,87,169,4,133,88,160,20,177,87,9,128,145,87,136,1772	IJ
•1180 DATA231,255,211,195,210,197,197,206,160,196,197,204,197,212,197,196,3261	MO	•1266 DATA208,247,169,10,133,90,32,236,152,165,197,201,7,208,24,165,2244	OH		
•1182 DATA0,24,165,162,101,90,133,90,165,90,197,162,208,250,96,165,2098	EL				
•1184 DATA92,201,15,176,16,169,13,32,210,255,160,11,169,32,32,210,1793	GK				
•1186 DATA255,136,208,250,96,169,208,133,87,169,4,133,88,133,90,169,2328	EM				
•1188 DATA248,133,89,162,15,160,25,177,89,145,87,136,208,249,24,169,2116	DL				
•1190 DATA40,101,87,133,87,144,3,230,88,24,169,40,101,89,133,89,1558	BE				
•1192 DATA144,2,230,90,202,208,222,162,19,160,11,76,240,255,169,1,2191	IL				
•1194 DATA141,32,208,169,15,141,33,208,169,11,141,134,2,169,2,133,1708	GJ				
•1196 DATA95,169,36,141,233,7,169,48,141,234,7,169,0,133,38,169,1789	IF				
•1198 DATA147,32,210,255,162,3,160,3,32,240,255,169,134,160,151,32,2145	CN				
•1200 DATA30,171,32,111,151,169,8,32,195,255,32,248,150,169,15,32,1800	CP				
•1202 DATA195,255,32,231,255,165,5,240,11,165,197,201,5,240,208,201,2606	HB				
•1204 DATA6,208,246,96,32,111,151,162,8,32,198,255,162,5,160,11,1843	KB				
•1206 DATA32,240,255,160,0,132,91,132,92,32,207,255,201,0,240,14,2083	MO				
•1208 DATA201,32,144,245,201,128,176,241,153,126,145,200,208,235,165,91,2691	JL				



145	GI	•1268 DATA94,201,0,240,244,198,94,32,139,154,56,165,87,233,40,133,2110	NH	•1326 DATA185,232,7,201,44,240,3,200,208,246,132,183,162,4,189,144,2380	JE
01,3	JE	•1270 DATA87,176,212,198,88,208,208,201,2,208,24,165,94,197,92,240,2400	KP	•1328 DATA150,133,184,202,16,248,165,186,32,177,255,165,185,32,147,255,2532	JM
5,2	OG	•1272 DATA216,230,94,32,139,154,24,165,87,105,40,133,87,144,184,230,2064	CL	•1330 DATA160,0,185,232,7,32,168,255,200,196,183,144,245,32,174,255,2468	AK
5,15	KB	•1274 DATA88,208,180,201,5,208,6,32,139,154,76,1,155,201,6,208,1868	GD	•1332 DATA76,231,255,211,212,193,210,212,13,160,160,198,177,189,205,193,2895	MK
8,1	KK	•1276 DATA3,76,139,154,201,18,208,4,230,89,208,4,201,1,208,169,1913	HM	•1334 DATA203,197,175,211,193,214,197,160,211,195,210,197,197,206,160,160,3086	IN
4,1	OP	•1278 DATA169,48,141,233,7,169,58,141,234,7,160,3,162,2,177,87,1798	PH	•1336 DATA160,198,179,189,214,177,197,215,160,211,195,210,197,197,206,13,2918	EK
6,7	PJ	•1280 DATA41,127,201,64,176,8,201,32,176,19,9,64,208,15,201,96,1638	HG	•1338 DATA160,160,198,181,189,197,216,177,212,160,208,210,207,199,210,193,3077	OE
32,9	IL	•1282 DATA176,4,9,128,208,7,201,160,176,3,24,105,64,201,34,240,1740	HL	•1340 DATA205,160,160,198,183,189,211,193,214,197,160,208,210,207,199,160,3054	EG
9,8	AA	•1284 DATA7,157,233,7,200,232,208,214,169,44,157,233,7,169,83,232,2352	NC	•1342 DATA211,195,210,197,197,206,0,173,136,2,133,88,160,0,132,87,2127	AD
8,3	LJ	•1286 DATA157,233,7,232,134,95,32,139,154,165,89,240,24,32,100,157,1990	HH	•1344 DATA132,89,132,91,132,93,169,176,133,90,169,216,133,92,169,180,2196	OP
9,0	BL	•1288 DATA32,234,148,24,160,13,162,9,32,240,255,169,221,160,152,32,2043	EO	•1346 DATA133,94,162,4,96,169,145,133,88,169,160,133,90,169,148,133,2026	OO
8,3	LB	•1290 DATA30,171,76,53,155,169,0,133,38,32,111,151,169,8,32,195,1523	MG	•1348 DATA92,169,176,133,94,160,0,132,87,132,89,132,91,132,93,162,1874	HM
136	AI	•1292 DATA255,32,248,150,165,5,240,3,76,20,155,169,147,32,210,255,2162	EL	•1350 DATA15,96,173,248,147,141,24,208,173,247,147,141,134,2,32,242,2170	CN
210	OK	•1294 DATA32,111,151,162,8,32,198,255,32,207,255,141,33,208,32,207,2064	CG	•1352 DATA157,120,169,46,133,1,177,89,145,87,177,93,145,91,136,208,1974	HE
208	EM	•1296 DATA255,141,32,208,32,207,255,141,24,208,169,0,133,87,168,169,2229	ND	•1354 DATA245,230,88,230,90,230,92,230,94,202,208,234,169,47,133,1,2523	OD
207	NG	•1298 DATA4,133,88,162,3,32,207,255,145,87,136,208,248,230,88,202,2228	CO	•1356 DATA88,96,32,242,157,177,87,145,89,177,91,145,93,136,208,245,2208	EB
189	HO	•1300 DATA16,243,169,216,133,88,169,3,133,93,160,0,32,207,255,133,2050	JE	•1358 DATA230,88,230,90,230,92,230,94,202,208,234,162,25,181,217,157,2670	BO
89,	NK	•1302 DATA92,32,207,255,133,91,32,207,255,133,90,145,87,136,208,6,2109	KI	•1360 DATA177,145,202,16,248,162,125,181,0,157,0,145,202,16,248,173,2197	BL
160	PK	•1304 DATA230,88,198,93,48,23,198,91,208,241,165,92,208,9,32,183,2107	LI	•1362 DATA17,208,141,250,147,173,136,2,141,249,147,173,24,208,141,248,2405	MG
133	NM	•1306 DATA255,41,64,240,215,208,6,165,90,198,92,16,218,162,15,32,2017	JL	•1364 DATA147,173,134,2,141,247,147,162,4,189,32,208,157,251,147,202,2343	EH
1,11	HH	•1308 DATA251,150,165,5,240,3,76,20,155,169,15,32,195,255,32,231,1994	HG	•1366 DATA16,247,56,32,240,255,140,246,147,142,245,147,169,4,141,136,2363	ML
2,2	JI	•1310 DATA255,169,7,32,236,148,24,162,9,160,3,32,240,255,169,151,2052	JH	•1368 DATA2,169,27,141,17,208,32,129,255,169,21,141,24,208,169,1,1713	GI
2,3	BA	•1312 DATA160,154,32,30,171,169,0,133,198,133,3,32,228,255,240,251,2189	GD	•1370 DATA141,32,208,169,7,141,33,208,169,3,32,236,148,24,162,9,1722	PI
0,1	CG	•1314 DATA201,133,208,23,169,15,141,34,208,32,244,148,32,186,150,230,2154	AL	•1372 DATA160,17,32,240,255,169,158,160,157,32,30,171,169,0,133,198,2081	BP
0,3	NF	•1316 DATA4,169,0,133,2,32,106,148,76,167,151,201,134,208,13,169,1713	LN	•1374 DATA32,228,255,240,251,201,133,208,11,169,147,32,210,255,32,167,2571	MI
7,2	HO	•1318 DATA15,141,34,208,169,21,141,24,208,76,1,155,201,137,208,3,1742	PG	•1376 DATA151,76,193,158,201,134,208,19,169,15,141,34,208,169,0,133,2009	MN
2,1	PB	•1320 DATA230,39,96,201,135,208,1,96,201,138,208,6,165,3,240,187,2154	CK	•1378 DATA39,32,1,155,165,39,208,40,76,193,158,201,135,240,33,201,1916	EC
20,	IJ	•1322 DATA208,159,201,136,208,181,173,17,208,41,191,141,17,208,169,0,2258	CO	•1380 DATA136,208,201,173,251,147,141,32,208,173,252,147,141,33,208,32,2483	PM
15	OH	•1324 DATA133,2,32,106,148,230,3,208,167,169,83,141,232,7,160,0,1821	FE	•1382 DATA45,158,169,0,133,39,32,236,156,165,39,208,3,76,193,158,1810	IH



•1384 DATA162,4,189,251,147,157,32,208,20  
2,16,247,173,250,147,141,17,2343 AL  
•1386 DATA208,162,125,189,0,145,149,0,202  
16,248,32,45,158,173,249,2101 NF  
•1388 DATA147,141,136,2,162,25,189,177,14  
5,149,217,202,16,248,24,172,2152 FO  
•1390 DATA246,147,174,245,147,32,240,255,  
32,196,148,32,16,158,76,141,2285 DA  
•1392 DATA3,3 BO

### SCREENS DATA B

•5 REM \*\*\* SCREENS DATA B \*\*\* CH  
•10 REM LOAD AND RUN SCREENS DATA A FIRST  
PERMANENT ML BEGINS AT 40845 NE  
•100 A=159:FORK=1TO3:X=. ML  
•105 FORJ=1TO3:READB:READC:READD:X=X+B+C+  
D:POKEC,B:POKED,A:NEXT PO  
•110 READE:IFX<>ETHENPRINT"ERROR IN DATA  
LINE"PEEK(64)\*256+PEEK(63) PA  
•115 X=.:NEXT PG  
•150 DATA143,37748,37749,141,37783,37784,  
238,37824,37825,227235 ND  
•155 DATA238,37861,37862,141,37869,37870,  
141,38076,38077,228135 GG  
•160 DATA142,38082,38083,143,38086,38091,  
222,40826,40827,234502 KJ  
•165 : DI  
•595 REM \*\*\* SAVE SCREENS B \*\*\* FI  
•600 PRINT"SAVING SCREENS B" DF  
•605 POKE780,8:POKE781,8:POKE782,255:SYS6  
5466 PM  
•610 N\$="0:SCREENS B,P,W" DC  
•615 L=LEN(N\$):FORJ=1TOL:POKE849+J,ASC(MI  
D\$(N\$,J,1)):NEXT KE  
•620 POKE780,L:POKE781,82:POKE782,3:SYS65  
469 HF  
•635 POKE251,59:POKE252,147 CE  
•645 POKE780,251:POKE781,124:POKE782,159:  
SYS65496 CB  
•650 IFSTTHENGOTO700 AM  
•655 PRINT"SCREENS B SAVED":STOP JO  
•660 : DI  
•695 REM \*\*\* READ ERROR CHANNEL \*\*\* HF  
•700 OPEN15,8,15 AM  
•705 INPUT#15,A,A\$,B,C NG  
•710 PRINTA,A\$,B,C GA  
•715 CLOSE15:STOP NG

### SCREENS DATA C

•5 REM \*\*\* SCREENS DATA C \*\*\* CE  
•10 REM LOAD AND RUN SCREENS DATA A FIRST  
PERMANENT ML BEGINS AT 53133 IK

**116 AHoy!**

•100 A=207:FORK=1TO3:X=. LL  
•105 FORJ=1TO3:READB:READC:READD:X=X+B+C+  
D:POKEC,B:POKED,A:NEXT PO  
•110 READE:IFX<>ETHENPRINT"ERROR IN DATA  
LINE"PEEK(64)\*256+PEEK(63) PA  
•115 X=.:NEXT PG  
•150 DATA143,37748,37749,141,37783,37784,  
238,37824,37825,227235 ND  
•155 DATA238,37861,37862,141,37869,37870,  
141,38076,38077,228135 GG  
•160 DATA142,38082,38083,143,38086,38091,  
222,40826,40827,234502 KJ  
•590 : DI  
•595 REM \*\*\* SAVE ML \*\*\* DN  
•600 PRINT"SAVING SCREENS C" CI  
•605 POKE780,8:POKE781,8:POKE782,255:SYS6  
5466 PM  
•610 N\$="0:SCREENS C,P,W" DH  
•615 L=LEN(N\$):FORJ=1TOL:POKE849+J,ASC(MI  
D\$(N\$,J,1)):NEXT KE  
•620 POKE780,L:POKE781,82:POKE782,3:SYS65  
469 HF  
•635 POKE251,59:POKE252,147 CE  
•645 POKE780,251:POKE781,124:POKE782,159:  
SYS65496 CB  
•650 IFSTTHENGOTO700 AM  
•655 PRINT"SCREENS C SAVED":STOP LL  
•660 : DI  
•695 REM \*\*\* READ ERROR CHANNEL \*\*\* HF  
•700 OPEN15,8,15 AM  
•705 INPUT#15,A,A\$,B,C NG  
•710 PRINTA,A\$,B,C GA  
•715 CLOSE15:STOP NG

## STARFIGHTER FROM PAGE 25

•10 POKE53280,00:POKE53281,00:GOSUB1200:G  
OSUB4000 FL  
•20 FORI=0TO5:HI\$(I)="" :NEXTI FK  
•30 X=254:Y=222:V=53248 LL  
•40 POKE2040,251:POKE2041,252:FORI=2042TO  
2047:POKEI,253:NEXTI CA  
•50 POKEV,X:POKEV+16,0:POKEV+1,255 KD  
•60 POKEV+28,255:POKEV+27,0:POKEV+23,0:PO  
KEV+29,0:POKEV+40,1:POKEV+38,14 EK  
•70 POKEV+39,12:POKEV+37,0:POKEV+21,253:F  
ORI=V+41TOV+46:POKEI,02:NEXTI GM  
•80 FORI=V+4TOV+14STEP2:POKEI,0:NEXTI AJ  
•90 FORI=V+5TOV+15STEP2:POKEI,(I-V-5)\*19.  
9:NEXTI CE  
•100 POKE54280,8:POKE54279,0:POKE54282,0:  
POKE54281,0:POKE54284,25:POKE54285,0 CN



LL  
+C+  
TA  
PA  
PG  
34,  
ND  
GG  
01,  
KJ  
DI  
DN  
CI  
YS6  
PM  
DH  
(MI  
KE  
365  
HF  
CE  
59:  
CB  
AM  
LL  
DI  
HF  
AM  
NG  
GA  
NG  
0:G  
FL  
FK  
LL  
2TO  
CA  
KD  
PO  
EK  
3:F  
GM  
AJ  
19.  
CE  
0:  
CN

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•130 PRINT"[CLEAR]";:SYS49321:GOSUB1300:P
OKEV+1,Y EA
•140 POKE54296,15:POKE54277,9:POKE54278,0 KM
•145 POKE54273,16:POKE54272,0 HI
•180 SYS49152:I=PEEK(53278):POKE251,0 OM
•190 SYS49374:SYS65418 GN
•195 FORI=0TO15:POKEV+I,0:NEXTI GP
•200 SC$="" LC
•210 FORI=1176TO1182:SC$=SC$+CHR$(PEEK(I)
):NEXT CB
•220 POKE53269,0:PRINT"[CLEAR][DOWN][DOWN
]"CHR$(142)CHR$(8):GOSUB3000 EA
•221 SR=VAL(SC$):BN=INT(SR/10):GT=SR+BN GA
•230 PRINT"[DOWN][DOWN]"TAB(15)"[WHITE]SC
ORE "GT JE
•235 PRINT"[DOWN]"TAB(15)"[BLUE]BONUS="BN OI
•240 FORI=0TO4 JC
•250 IFSC$<HI$(I)THEN300 GG
•260 FORJ=5TOI+1STEP-1 CI
•270 HI$(J)=HI$(J-1) FB
•280 NEXTJ MM
•290 HI$(I)=SC$:I=4 BE
•300 NEXTI MN
•310 PRINT"[DOWN]"TAB(15)"[YELLOW]HIGH SC
ORES[DOWN]" BK
•320 FORI=0TO4 JC
•325 KK=VAL(HI$(I))+BN OO
•327 IF KK=BNTHENBN=0:KK=0 DH
•330 PRINTTAB(14)I+1KK IE
•340 NEXTI MN
•350 PRINT"[PURPLE]" HM
•460 PRINT"[DOWN]"TAB(10)"[PRESS [RED][RV
SON]FIRE[RVSOFF][PURPLE] TO PLAY]" HF
•465 FORCC=55951TO55959:POKECC,02:NEXTCC PC
•470 IF(PEEK(56320)AND16)<>0THEN470 JP
•480 GOTO30 OJ
•500 POKE56334,0:POKE1,51 KE
•510 OF=53248-12288 PD
•520 FORI=12288TO12288+250*8-1 GN
•530 POKEI,PEEK(I+OF) KJ
•540 NEXTI MN
•550 POKE1,55:POKE56334,1 ID
•560 FORI=12288+250*8TO12288+256*8-1:POKE
I,0:NEXTI BI
•570 POKE12288+253*8,8 DM
•580 POKE53272,29 DF
•590 RETURN IM
•900 I=251*64 LI
•910 READA:IFA=-1THEN5000 OM
•920 POKEI,A:I=I+1:GOTO910 DK
•999 REM***** DD
•1000 DATA0,32,0,0,32,0,0,32,0 GE
•1001 DATA0,32,0,0,152,0,0,152,0 IH
•1002 DATA0,152,0,0,152,0,0,168,0 IH
•1003 DATA2,170,0,130,170,8,138,170,136 NH
•1004 DATA41,169,160,166,170,104,154,170,
152 BC
•1005 DATA160,168,40,0,168,0,0,168,0 GK

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•1006 DATA2,170,0,10,170,128,10,34,128,0 NB
•1007 DATA0,32,0,0,32,0,0,32,0 GE
•1008 DATA0,32,0,0,32,0,0,32,0 GE
•1009 DATA0,32,0,0,32,0,0,0,0 NK
•1010 DATA0,0,0,0,0,0,0,0,0 JH
•1011 DATA0,0,0,0,0,0,0,0,0 JH
•1012 DATA0,0,0,0,0,0,0,0,0 JH
•1013 DATA0,0,0,0,0,0,0,0,0 NC
•1014 DATA8,0,128,10,154,128,2,154,0 LH
•1015 DATA0,152,0,0,152,0,2,170,0 MM
•1016 DATA1,169,0,9,169,128,41,169,160 MO
•1017 DATA169,169,168,160,168,40,128,152,
8 OD
•1018 DATA128,152,8,0,152,0,0,152,0 HE
•1019 DATA0,48,0,0,48,0,0,48,0 JD
•1020 DATA0,48,0,0,48,0,0,48,0 NK
•1021 DATA0,0,0,0,0,0,0,32,0 LL
•1022 DATA0,8,0,0,0,0,0,2,0 MB
•1023 DATA0,128,0,8,0,0,0,8,0 GL
•1024 DATA2,32,128,0,8,0,0,32,32 CM
•1025 DATA0,130,0,8,0,0,0,128 CG
•1026 DATA0,32,0,0,0,0,2,2,0 PH
•1027 DATA0,32,0,0,0,0,0,0,0 BG
•1028 DATA0,128,0,0,0,128,0,32,0 BD
•1029 DATA8,0,8,0,0,0,0,128,2 FB
•1030 DATA130,0,0,0,160,32,0,136,0 EP
•1031 DATA32,136,2,2,138,0,128,8,136 IE
•1032 DATA32,128,2,0,32,0,32,32,32 MN
•1033 DATA0,0,32,8,0,0,0,2,0 JP
•1034 DATA0,128,0,0,0,32,0,8,0,-1 AE
•1200 PRINT"[CLEAR][6"[DOWN]]"CHR$(142)C
HR$(8):GOSUB3000 MN
•1210 PRINT"[DOWN][DOWN]"TAB(13)"[PURPLE]
BY MICHAEL J. CARSTON" JG
•1215 PRINT"[DOWN]"TAB(18)"[BLUE]ONE MOM
E NT PLEASE[3".""] JJ
•1220 GOSUB900:RETURN PI
•1300 PRINT"[RED]";:FORI=0TO20:PRINTSPC(2
8)"[RVSON][c K][11" "[RVSOFF]";:NEXTI GN
•1302 PRINTSPC(32)"[c *][RVSON][7" "[RVS
OFF]"; MF
•1305 FORI=22TO23:PRINTSPC(33)"[RVSON][7"
"][RVSOFF]";:NEXTI DB
•1310 PRINTSPC(32)"[RVSON][sEP][6" "[RVS
OFF]"; GG
•1320 POKE56295,2:POKE2023,160 GH
•1330 PRINT"[HOME][DOWN][DOWN][c 7]"TAB(3
1)"[c K] SCORE [RVSON][c K][RVSOFF]"TAB(
71)"[c K][7"0"] [RVSON][c K][RVSOFF]" CD
•1340 PRINT"[DOWN][DOWN]"TAB(31)"[c K] SH
IPS [RVSON][c K][RVSOFF]"TAB(71)"[c K][3
" " ]2[3" " ] [RVSON][c K][RVSOFF]" JL
•1380 RETURN IM
•3000 PRINT"[RED][5" " ]S[5" " ] [YELLOW]T[5
" " ] [c 7]A[5" " ] [GREEN]R" JE
•3005 PRINT"[c 7][3" " ] [c R][3" [s C]] [c
S]" JA
•3010 PRINT"[GREEN][3" " ] [s -][5" " ] [c R]

```



```

[s U][s C][s C][s I] [c R] [c R] [c A]
[s C][c R][s C][c S] [c R][s C][s C][c S
] [c R][s *][s C][s I]"
MH
•3020 PRINT"[RED][3" "[s -][5" "[s -] [
s -][4" "[s -] [s -][3" "[s -][3" "[
s -][4" "[s -] [s -]"
FN
•3030 PRINT"[YELLOW][3" "[c Q][s C][s C]
[3" "[s -] [s -] [s C][c R] [c Q][s C][
s C][c W][3" "[s -][3" "[c Q][s C][s C
] [c Q][s *][c R][s K]"
ON
•3040 PRINT"[BLUE][3" "[s -][5" "[s -]
[s -] [s -] [s -] [s -][3" "[s -][3"
"][s -][4" "[s -] [s J][s I]"
CB
•3050 PRINT"[GREEN][3" "[s -][5" "[s -]
[s -] [s -] [s -] [s -][3" "[s -][3"
"][s -][4" "[s -] [s -]"
NB
•3060 PRINT"[RED][3" "[c E][5" "[c E] [
s J][s C][s C][s K] [c E] [c E][3" "[c
E][3" "[c E][s C][s C][c X] [c E] [c
E]"
NA
•3070 RETURN
IM
•4000 FORI=16384TO17383:POKEI,32:NEXTI
NJ
•4005 GOSUB500
CN
•4010 FORJ=16385TO16423STEP2
PC
•4015 I=INT(RND(1)*6)+250
LA
•4020 FORK=0TO960STEP40
BN
•4030 POKEJ+K,I:I=I+1:IFI=256THENI=250
DG
•4040 NEXTK,J
EE
•4050 FORI=1TO250:POKE16384+INT(RND(1)*10
00),32:NEXTI
FH
•4060 RETURN
IM
•5000 REM*****
CE
•5010 READA:IFA>255THENI=A:GOTO5010
HO
•5020 IFA=-1THENRETURN
JK
•5030 POKEI,A:I=I+1:GOTO5010
FK
•5040 REM*****
CE
•5090 DATA49152,162,13,160,192,120,142,20
,3,140,21,3,88,96,160,255,185,0,55,153
JD
•6000 DATA1,55,136,192,207,208,245,173,0,
56,141,208,55,160,2,173,0,220,41,4,208
BJ
•6010 DATA11,174,0,208,202,224,25,144,3,1
42,0,208,173,0,220,41,8,208,11,174,0
CG
•6020 DATA208,232,224,254,176,3,142,0,208
,162,0,254,5,208,232,232,224,12,208
NE
•6030 DATA247,136,208,206,165,251,208,9,1
65,162,41,1,208,3,76,49,234
BB
•6040 DATA162,0,173,0,208,201,230,176
OA
•6050 DATA46,189,4,208,201,25,144,33,189,
4,208,201,230,176,26,189,4,208,105,20
LG
•6060 DATA205,0,208,176,3,254,4,208,189,4
,208,233,20,205,0,208,144,3,222,4,208
FJ
•6070 DATA232,232,224,12,208,210
NE
•6080 DATA234,234,234,162,0,254,5,208,232
,232,224,12,208,247,76,49,234
KG
•6085 REM*****
CE
•6090 DATA169,1,162,0,157,0,216,157,250,2
16,157,244,217,157,238,218
PG
•6100 DATA232,224,250,208,239,162,0,189,0

```

```

,64,157,0,4,189,250,64,157,250,4
GH
•6110 DATA189,244,65,157,244,5,189,238,66
JB
,157,238,6,232,224,250,208,227,96
CE
•6130 REM*****
•6140 DATA173,139,5,201,47,208,1,96,32,13
JO
3,193,162,0,189,5,208,201,30,176
•6150 DATA18,169,128,109,18,208,42,42,201
EJ
,25,144,7,201,230,176,3,157,4,208,232
•6160 DATA232,224,12,208,225,173,0,208,20
IM
1,240,176,62,173,0,220,41,16,208,55
•6170 DATA174,0,208,142,2,208,160,210,140
DH
,3,208,173,21,208,9,2,141,21
•6180 DATA208,169,128,141,4,212,169,129,1
BG
41,4,212,162,224,206,3,208
•6190 DATA32,133,193,202,208,253,172,3,20
KF
8,192,60,208,238
•6200 DATA173,21,208,41,253,141,21,208,76
GD
,222,192
•6210 REM*****
CE
•6220 DATA169,128,141,11,212,169,129,141,
11,212,162,151
NG
•6230 DATA160,4,134,253,132,254,160,5,177
IB
,253
•6240 DATA170,232,224,58,208,19,162,48,13
PP
8,145,253,192,4,208,7,238,139,5
•6250 DATA165,1,133,251,136,208,229,138,1
EB
45,253,96
•6260 REM*****
CE
•6270 DATA173,30,208,133,2,201,0,208,1,96
DN
,32,82,193
•6280 DATA169,253,141,21,208,162,0,165,2,
AG
41,1,240,5,169,254,157,248,7,102,2
•6290 DATA232,224,1,240,249,224,8,208,234
DG
,160,32,162,0,202,208,253,136
•6300 DATA208,248,162,0,189,248,7,201,254
CN
,208,5,169,255,157,248,7
•6310 DATA232,224,1,240,251,224,8,208,235
CG
,160,16,162,0,202,208,253,136
•6320 DATA208,248,162,0,160,0,189,250,7,2
LL
01,255,208,5,169,0,153,4,208,200
•6330 DATA200,232,224,6,208,237,173,248,7
DH
,201,255,208,9,141,0,208
•6340 DATA206,0,208,206,139,5
EM
•6350 DATA162,0,160,251,189,248,7,201,255
,208,4,152,157,248,7,160,253,232,224,1
BA
•6360 DATA240,251,224,8,208,234,160,16,16
BO
2,0,202,208,253,136,208,248
•6370 DATA160,60,140,3,208,173,30,208,96,
CN
-1

```

**Have the joints in your fingers begun to stiffen yet? If not, they surely will...you've got another 27 pages of program listings to go.**

**If your fingers had a will of their own, they'd flip to page 79, where you can find out how to receive all the programs in this magazine on disk.**



# IMPORTANT!

Letters on white background are **Bug Repellent** line codes. Do not enter them! Pages 109 and 110 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

## HANGER 14 FROM PAGE 23

```

1 PRINT"[CLEAR]
2 POKE53282,15:POKE53283,1
3 PRINT"[CLEAR][WHITE]"CHR$(8):POKE53280
  ,0:POKE53281,0:POKE53269,0
4 PRINT"[CLEAR][RED][10][DOWN]"][14][RIG
  HT]"HANGER 14
5 PRINT"[BLUE][DOWN][6""]ONE MOMENT LOA
  DING DATA[3""]":GOTO121
6 CD=1:HI=0000
7 GOSUB97
8 GOSUB91
9 GOSUB104:TI$=""0
10 X=0:POKEV,X:Y=123:POKEV+1,Y:POKEV+21,
  SP:FORX=1TO15:POKE2040,254:POKEV,X
11 POKE2040,255:NEXT:Z=PEEK(V+30):Z=PEEK
  (V+31)
12 IFJTHEN16
13 IFX>15AND(PEEK(56320)AND4)=0THENX=X-4
14 IF(PEEK(56320)AND8)=0THENX=X+4
15 IF(PEEK(56320)AND16)=0THENK=PEEK(5632
  0):J=1:POKE2040,255:GOSUB49
16 IFX>250THEN54
17 POKEV,X:POKEV+1,Y
18 IFJTHENGOSUB49:GOTO22
19 P=PEEK(56320):IFJ=0AND(PAND4)=4AND(PA
  ND8)=8THENPOKE2040,254:GOTO22
20 IFA=1THENA=2:POKE2040,255:GOTO22
21 POKE2040,254:A=1
22 ONLGOSUB25,26,27,28,29,30,31
23 IFHTHEN64
24 GOTO12
25 GOSUB32:RETURN
26 GOSUB40:RETURN
27 GOSUB37:RETURN
28 GOSUB43:GOSUB32:RETURN
29 GOSUB32:GOSUB37:RETURN
30 GOSUB37:GOSUB43:RETURN
31 GOSUB46:GOSUB32:GOSUB37:RETURN
32 IFBTHEN34
33 B=1:C=255:POKEV+2,C:POKEV+3,122:GOSUB
  75:POKEV+21,SP+2
34 C=C-7:IFC<0THENPOKEV+21,SP:B=0:C=255:
  POKEV+2,C:RETURN
35 POKEV+2,C:IFPEEK(V+30)=3THENH=1:C=255
  :POKEV+21,SP
36 RETURN
37 PRINT"[HOME][6""][DOWN]"]"SPC(18)D$(D):
  D=D+DO:IFD=6ORD=0THENDO=-DO
38 IFPEEK(V+31)=1THENH=1
39 RETURN

```

FH  
HA  
KG  
BE  
NJ  
LA  
AE  
PK  
DA  
AF  
NL  
ON  
KE  
KN  
AM  
FH  
AP  
JF  
OC  
CN  
LC  
BL  
OE  
PF  
MG  
LJ  
MD  
OO  
PN  
OP  
CI  
NN  
CC  
CG  
JL  
IM  
IA  
LJ  
IM

```

40 IFJTHENRETURN
41 IF(X>87ANDX<106)OR(X>144ANDX<161)OR(X
  >196ANDX<219)THENH=1
42 RETURN
43 IFJTHENRETURN
44 IF(X>97ANDX<124)OR(X>170ANDX<196)THEN
  H=1
45 RETURN
46 IFJTHENRETURN
47 IF(X>87ANDX<106)THENH=1
48 RETURN
49 Y=Y-U:IFY<111THENU=-U
50 IFY>123THENY=123:J=0:U=3:RETURN
51 IFX>15AND(KAND4)=0THENX=X-2.5:RETURN
52 IF(KAND8)=0THENX=X+2.5
53 RETURN
54 PO=INT(1000-(TI/2)):IFL=7THEN88
55 POKEV+21,SP
56 FORI=1TO4:POKE2040,254:FORJ=123TO113S
  TEP-1:POKE2040,255:POKEV,255
57 POKEV+1,J:NEXT:GOSUB76:FORJ=113TO123:
  POKEV,255:POKEV+1,J:NEXT:NEXT:X=X+255
58 POKEV+16,5:FORI=1TO75:POKEV,I:POKEV+1
  ,123:POKE2040,255:POKE2040,254:NEXT
59 POKEV+21,0:POKEV+16,4
60 PRINT"[CLEAR]":LE=LE+1:L=L+1:IFL>7THE
  NL=1
61 J=0:IFPO<0THENPO=0
62 SC=SC+100+PO:IFSC/1000=(INT(SC/1000))
  THENLI=LI+1:GOSUB86
63 FORI=1TO500:NEXT:GOTO9
64 SO=155:POKEV+21,SP:POKE2040,255
65 POKEV+1,Y:Y=Y+3:IFY>255THEN68
66 POKES+4,32:POKES+5,10:POKES+6,1:POKES
  +4,129:SO=SO-2:POKES+1,SO:POKES,SO
67 GOTO65
68 LI=LI-1:IFLI<0THENPOKEV+21,12:GOTO70
69 H=0:J=0:GOSUB86:GOTO10
70 G$="REVO EMAG":FORI=1TO10
71 FORJ=1TO(24-I):PRINT"[HOME][WHITE][8"
  ][DOWN]"]"TAB(J)"MID$(G$,I,1):NEXT:NEX
  T
72 FORI=1TO2000:NEXT:POKEV+21,0:PRINT"[C
  LEAR]":FORI=1TO500:NEXT
73 IFSC>HITHENHI=SC
74 GOTO7
75 POKES+4,128:POKES+5,12:POKES+6,10:POK
  ES+4,33:POKES+1,2:POKES,2:RETURN
76 POKES+4,16:POKES+5,12:POKES+6,10:POKE
  S+4,33:POKES+1,05:POKES,200:RETURN
77 PRINT"[HOME][GREEN][20][DOWN]"]";
78 A$=MID$(STR$(SC),2,LEN(STR$(SC))):SC$
  =LEFT$("[6""]",7-LEN(STR$(SC)))
79 SC$=SC$+A$:PRINTSPC(7);SC$
80 PRINT"[HOME][20][DOWN]"]";

```

BB  
JA  
IM  
BB  
GL  
IM  
BB  
HH  
IM  
NC  
CB  
GA  
EF  
IM  
JL  
MK  
CB  
MJ  
OI  
PN  
FE  
LP  
EH  
KE  
JD  
FM  
LM  
PB  
IB  
PC  
MJ  
JE  
LC  
OA  
MC  
GJ  
CN  
AJ  
DI  
AE  
NE



81 A\$=MID\$(STR\$(LE),2,LEN(STR\$(LE))):LE\$	GB	107 PRINT"[HOME][15"[DOWN]]"[RIGHT][7" "	GP
=LEFT\$("[3"0"]",4-LEN(STR\$(LE)))	JG	][DOWN][7"[LEFT]]"[7" "][DOWN][7"[LEFT]"	
82 LE\$=LE\$+A\$:PRINTSPC(22);LE\$	NE	108 PRINT"[BLUE][DOWN]SCORE:[9" "]LEVEL:	IO
83 PRINT"[HOME][20"[DOWN]]";	FG	[7" "]HSC:	DM
84 A\$=MID\$(STR\$(HI),2,LEN(STR\$(HI))):HI\$	LM	109 IFTS=1THENTS=0:RETURN	
=LEFT\$("[6"0"]",7-LEN(STR\$(HI)))	MO	110 PRINT"[HOME]"TAB(9)"[DOWN][GREEN][3"	OB
85 HI\$=HI\$+A\$:PRINTSPC(34);HI\$:RETURN	GA	"]H A N G E R[3" "]1 4	DF
86 LI\$="[s D] [s D] [s D]	DC	111 CD=CD+1:POKE53282,CD	DF
87 PRINT"[HOME][GREEN][22"[DOWN]]"LEFT\$	FO	112 ONLGOSUB113,114,115,116,117,118,119:	HI
(LI\$,LI*2)"[14" "]:RETURN	HG	GOSUB77:GOSUB86:RETURN	
88 POKEV+21,SP:POKEV+1,123:FORI=1TO5:FOR	IF	113 SP=13:RETURN	IM
X=20TO30STEP.5:POKEV+8,X:NEXT	PK	114 PRINT"[HOME][11"[DOWN]]"SPC(10)P\$P\$	NE
89 GOSUB76:FORX=30TO20STEP-.5:POKEV+8,X:	EC	C(3)P\$SPC(3)P\$:RETURN	IM
NEXT:GOSUB76:NEXT:SC=SC+2000	DC	115 RETURN	NE
90 POKEV+21,0:GOTO60	FI	116 PRINT"[HOME][11"[DOWN]]"SPC(12)P\$P\$	IM
91 TS=1:GOSUB104:POKEV+21,12:PRINT"[HOME]	DL	C(5)P\$:RETURN	NE
"TAB(9)"[DOWN][WHITE][3" "]H A N G E R[	AN	117 RETURN	CP
3" "]1 4	PN	118 PRINT"[HOME][11"[DOWN]]"SPC(12)P\$P\$	IC
92 GOSUB77	AJ	C(5)P\$:RETURN	CB
93 FORXL=1TO1000:NEXT	HN	119 PRINT"[HOME][11"[DOWN]]"SPC(10)P\$:P	PD
94 PRINT"[HOME][DOWN][6" "]PRESS FIRE BU	NF	OKEV+16,20:SP=29:CD=2:RETURN	JD
TTON TO BEGIN		120 END	ED
95 IF(PEEK(56320)AND16)=0THENPOKEV+21,0:		121 POKE52,48:POKE56,48:CLR:POKE56334,PE	DA
PRINT"[CLEAR]":FORI=1TO500:NEXT:RETURN		EK(56334)AND254:POKE1,PEEK(1)AND251	FG
96 GOTO95		122 FORI=0TO511:POKE12288+I,PEEK(I+53248	FM
97 V=53248:X=0:Y=123:POKEV,X:POKEV+1,Y:L		):NEXT:POKE1,PEEK(1)OR4	DC
=1:LE=1:SC=0:LI=2:A=1:DO=1:J=0:U=3		123 POKE56334,PEEK(56334)OR1	AP
98 B=0:H=0:C=255:SP=13		124 POKE53272,(PEEK(53272)AND240)+12:POK	BG
99 P\$="[4" "][DOWN][4"[LEFT]]"[4" "][DOW		E53270,216	JF
N][4"[LEFT]]"[4" "][UP]		125 FORI=0TO47:READQ:VU=VU+Q:POKE12808+I	KG
100 D\$(1)="[s F][DOWN][LEFT] [DOWN][LEFT		,Q:NEXT:IFVU<>3518THENGOTO156	FG
] [DOWN][LEFT] [DOWN][LEFT] ":D\$(2)="[s		126 Q=0:FORI=255TO250STEP-1:FORJ=0TO62:R	NJ
E][DOWN][LEFT][s F][DOWN][LEFT] [DOWN][L		EADQ:POKEI*64+J,Q:FV=FV+Q:NEXT:NEXT	AG
EFT] [DOWN][LEFT] ":D\$(3)="[s E][DOWN][L		127 IFFV<>17595THENGOTO157	BC
EFT][s E][DOWN][LEFT][s F][DOWN][LEFT] [		128 V=53248:POKEV+4,25:POKEV+5,97:POKEV+	HM
DOWN][LEFT]		16,20:POKEV+40,5:POKEV+41,15	EO
101 D\$(4)="[s E][DOWN][LEFT][s E][DOWN][		129 POKEV+42,2:POKEV+43,7:POKEV+6,36:POK	LM
LEFT][s E][DOWN][LEFT][s F][DOWN][LEFT]		EV+7,172:POKEV+8,20:POKEV+9,117	LF
"":D\$(5)="[s E][DOWN][LEFT][s E][DOWN][LE		130 POKEV+23,0:POKEV+29,9:POKE2040,255:P	4
FT][s E][DOWN][LEFT][s E][DOWN][LEFT][s		OKE2041,253:POKE2042,252:POKE2043,251	80
F]		131 POKE2044,250:GOTO6	L
102 H\$="[RED][9" "]H A N G E R[3" "]1 4		132 DATA170,149,149,149,149,149,149,128	90
103 S=54272:FORI=STOS+23:POKEI,0:NEXT:PO		133 DATA170,84,84,84,84,84,84,0	AE
KES+24,15:RETURN		134 DATA0,0,0,0,0,0,0,0	E
104 W\$="[c 4][s A][s B][s A][s B][s A][s		135 DATA16,56,16,120,88,72,120,48	10
B][s A][s B][s A][s B][s A][s B][s A][s		136 DATA66,66,66,66,66,66,66,66	Y=
B][s A][s B][s A][s B][s A][s B][s A][s		137 DATA66,66,66,66,66,66,66,126	11
B][s A][s B][s A][s B][s A][s B][s A][s		138 DATA0,20,0,0,30,0,0,56,0,0,56,0,0,30	(E
B][s A][s B][s A][s B][s A][s B][s A][s		,0,0,12,0,0,30,0,0,55,0,0,119,0,0,115	12
B][s A][s B][s A]		139 DATA0,0,62,0,0,4,0,0,10,0,0,4,0,0,0,	EF
105 W1\$="[c 4][s B][s A][s B][s A][s B][		0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	13
s A][s B][s A][s B][s A][s B][s A][s B][		140 DATA0,0	
s A][s B][s A][s B][s A][s B][s A][s B][		141 DATA0,10,0,0,30,0,0,56,0,0,56,0,0,30	
s A][s B][s A][s B][s A][s B][s A][s B][		,0,0,12,0,0,30,0,0,55,0,0,111,0,0,119	
s A][s B][s A]		142 DATA0,0,62,0,0,8,0,0,20,0,0,8,0,0,0,	
106 PRINT"[CLEAR][3"[DOWN]]"W\$:W1\$:W\$"		0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	
5"[DOWN]]";W\$:W1\$:W\$:W1\$:W\$:W1\$:W\$:W1\$		143 DATA0	



Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 109 and 110 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

C(X)=B+MX+TX+( (MY+TY)*R)	IJ
• 140 DEF FNCX(B)=CX(D)+(CX(D)<MX+X)*-1+(C X(D)>MX+X)*1	LL
• 150 DEF FNCY(B)=CY(D)+(CY(D)<MY+Y)*-1+(C Y(D)>MY+Y)*1	CF
• 160 DEF FNK(Q)=PEEK(FNC(.))=M(L)	BD
• 170 DEFFNCH(B)=(FNB(.)=M+8)*-1+(FNB(.)=M +9)*-2+(FNB(.)=M+13)*-3	EB
• 180 DEFFNET(B)=TX<10RTX>380RTY<20RTY>23	MG
• 190 DEF FNM(X)=(B+CX(D)+(CY(D)*R)):DEF F NW(X)=PEEK(FNM(.))<>M:GOSUB640	EL
• 200 POKEV+27,1:POKEV+39,7:POKEV+23,1:POK EV+29,1:POKEV,FNX(.):POKEV+1,FNY(.)	BA
• 210 POKE200,15:POKEV+21,1:POKEV+34,1:PO KEV+36,11	EH
• 220 FORD=SOTOSO+24:POKED,,:NEXT:POKESO,2 55:POKESO+1,27:POKESO+5,64	GE
• 230 POKESO+6,128:POKESO+24,10	CN
• 240 D=.:GOTO280	JA
• 250 REM JOYSTICK ROUTINE	EM
• 260 TX=MX+X(J):TY=MY+Y(J):IFTX<00RTX>410 RTY<00RTY>25THEN280	IO
• 270 POKESO+4,33:MX=TX:MY=TY	DM
• 280 SYS828,MX,MY:POKEFNA(.),.	LM
• 290 POKESO+4,,:J=FNJ(.):TX=X+X(J):TY=Y+Y (J):IFFNK(. )THEN440	KB
• 300 IFFNB(.)=MTHEN340	DF
• 310 ONFNCH(. )GOSUB510,520,530	CP
• 320 IFFNB(.)=EXANDKTHEN540	NB
• 330 GOTO390	CE
• 340 IFFNET(. )THEN260	IA
• 350 POKESO+4,129:IFX<>TXORY<>TYTHENPOKEF NA(.),M	ED
• 360 X=TX:Y=TY:POKEFNA(.),,:POKEV+16,FNE( .):POKEV,FNX(.):POKEV+1,FNY(.)	EF
• 370 POKESO+4,.	HE
• 380 REM MONSTER MOVEMENT	CJ
• 390 D=D+1+(D=2)*3	BJ
• 400 POKEFNM(.),M:TX=CX(D):TY=CY(D):CX(D) =FNCX(.):IFFNW(. )THENCX(D)=TX	DE
• 410 CY(D)=FNCY(.):IFFNW(. )THENCY(D)=TY	CP
• 420 POKEFNM(.),M(L)	CF
• 430 GOTO280	CG
• 440 GOSUB610:PRINT"[WHITE][RVSON][LEFT]C HOMP";:GOSUB620	EO
• 450 POKEV+21,,:POKEV+33,.	KA
• 460 PRINT"[CLEAR]"TAB(13)"[RVSON][3"[DOW N]]" GOLD = ";G:PRINT"[4"[DOWN]]"[7"[RIG HT]]"[RVSON] ANOTHER GAME ?[Y OR N]"	FP
• 470 POKE198,.	JP
• 480 GETA\$:IFA\$=""THEN480	HD
• 490 IFA\$="N"THENPOKE679,,:SYS679	BP
• 500 POKEV+24,21:POKEV+17,PEEK(V+17)AND19 1:RUN	MN
• 510 GOSUB610:PRINT"[RVSON]G 50":G=G+50:G OSUB620:RETURN	OA

```

.10 REM ***** DD
.20 REM *          CATACOMBS V1.0 * HA
.30 REM *          BY CLEVE BLAKEMORE * HG
.40 REM ***** DD
.50 POKE53281,.:POKE53280,.:PRINT"[CLEAR]
[6"[DOWN]]"TAB(14)CHR$(8)CHR$(142)"[BLU
E][RVSON] CATACOMBS " CB
.60 PRINTTAB(6)"[3"[DOWN]]"[RVSON][c 4] P
LEASE WAIT[3"."]LOADING DATA! ":GOSUB840 IP
.70 POKE53272,30:POKE53265,PEEK(53265)OR6
4 KG
.80 PRINT"[HOME][13"[DOWN]]"TAB(15)"SKUL
L #[DOWN]":PRINTTAB(15)"WIZARD $[DOWN]" KO
.90 PRINTTAB(15)"BAT[4" " ]%[DOWN]":PRINTT
AB(15)"SPIRIT &[DOWN]":PRINTTAB(15)"SNAK
E '[DOWN]" JM
.100 B=49152:E=53151:V=53248:S=1024:X=10:
Y=5:MX=.:MY=.:R=80:SR=40:M=32 KC
.110 L=.:EX=239:JY=56321:SO=54272:DEF FNA
(B)=Y*SR+X+S:DEF FNB(B)=PEEK(TY*SR+TX+S) JD
.120 DEF FNX(B)=(X-3)*8+28+((X>31)*255):D
EFFNE(B)=(X>31)*-1:DEFFNY(X)=Y*8+35 KD
.130 DEF FNJ(X)=15-(PEEK(JY)AND15):DEF FN

```



•520 GOSUB610:PRINT"[RVSON] KEY ":K=1:G=G+100:GOSUB620:RETURN	NH	K(1)OR4:POKE56334,PEEK(56334)OR1	JE
•530 GOSUB610:POKEV+33,2:GOSUB620:POKEV+33,,:G=G-(G>49)*-50:RETURN	CM	•860 READA:IFA=-1THEN890	MP
•540 POKEV+21,,:L=L+1:IFL=10THEN450	NE	•870 FORX=.TO7:READD:POKE14336+A*8+X,D:NEXT:GOTO860	BC
•550 K=.:PRINT"[CLEAR][6"[DOWN]]"TAB(4)"[RVSON] PREPARE FOR THE NEXT LEVEL !! "	JG	•880 REM ML SCROLL ROUTINE	BE
•560 PRINT"[3"[DOWN]]"TAB(4)"[RVSON] DESCENDING DOWN TO LEVEL";L+1;"[LEFT][3"[DOWN]]"	FP	•890 DIMX(10),Y(10),CX(2),CY(2),M(9),L(9):FORA=.TO10:READX(A),Y(A):NEXT	AP
•570 POKESO+4,17:FORD=100TO.STEP-1::FORX=.TO50:NEXT:POKESO+1,D:NEXT:POKESO+1,27	GD	•900 FORA=828TO914:READB:POKEA,B:NEXT:FORA=.TO63:POKE15*64+A,255:NEXT	BL
•580 POKESO+4,,:G=G+25:PRINTTAB(14)"[RVSON] GOLD = ";G;	GI	•910 FORA=.TO9:READL(A):NEXT:FORA=.TO9:READM(A):NEXT:FORX=916TO951:READA:POKEA,A	GA
•590 GOSUB640:MX=.:MY=.:X=10:Y=5:D=.:POKEV,FNX(.):POKEV+1,FNY(.)	IG	•920 NEXT:RETURN	EJ
•600 POKEV+16,FNE(.):POKEV+21,1:GOTO280	HO	•930 DATA 169,,133,251,133,253,169,208,133,252,169,56,133,254,162,8	GN
•610 POKEFNC(.),M:POKEV+21,,:POKE781,Y:POKE782,X-1:POKE783,,:SYS65520:RETURN	IH	•940 DATA 160,,177,251,145,253,136,208,249,230,252,230,254,202,208,240,96	IC
•620 POKESO+4,17:FORQ=.TO500:NEXT:POKEV+21,1:POKESO+4,,:RETURN	BM	•950 DATA000,152,152,190,217,024,060,036,195	FG
•630 REM DUNJON GENERATOR	AF	•960 DATA035,126,153,153,153,126,066,090,126	OJ
•640 SYS916:POKEV+33,(L<5)*-15:FORQ=192TO204STEP4:POKE648,Q:PRINT"[BLACK][CLEAR]":FORD=1TO3	OL	•970 DATA036,024,126,024,126,153,060,126,126	NE
•650 FORX=.TO7:IF(2[UPARROW]XANDL(L))THENPRINT"[RVSON][11"+"[RVSOFF][13" "];SPC(40);	IM	•980 DATA037,000,036,126,219,129,066,000,000	JA
•660 PRINT" [RVSON][3"+"[RVSOFF][8" "][RVSON][3"+"[RVSOFF]";	HF	•990 DATA038,031,021,021,014,028,156,248,112	OK
•670 NEXT:NEXT:NEXT:POKE648,4:POKE53283,L+2:FORA=BTOB+R:POKEA,42+64*3:NEXT	NC	•1000 DATA039,060,066,002,028,032,024,004,008	MJ
•680 FORA=E-RTOE+1:POKEA,42+64*3:NEXT:FORA=BTOESTEP:POKEA,42+64*3:NEXT	PC	•1010 DATA040,000,000,255,129,255,153,129,255	AP
•690 POKEB+3+R*3,47+64	EC	•1020 DATA041,062,034,062,008,008,056,008,056	LO
•700 A=RND(1)*60+8:Q=RND(1)*40+5:IFPEEK(B+A+Q*R)<>MTHEN700	HA	•1030 DATA042,255,129,189,165,165,189,129,255	BA
•710 POKEB+Q*R+A,EX	IH	•1040 DATA043,249,249,000,159,159,000,249,249	OB
•720 FORD=1TOL*2	IP	•1050 DATA045,000,000,000,000,016,000,000,000	JA
•730 A=RND(1)*70+5:Q=RND(1)*40+5:IFPEEK(B+Q*R+A)<>MTHEN730	LF	•1060 DATA047,129,066,036,024,024,036,066,129,-1	BF
•740 POKEB+Q*R+A,M+8:NEXT	NO	•1070 DATA0,0,0,-1,0,1,0,0,-1,0,-1,-1,-1,1,0,0,1,0,1,-1,1,1	GJ
•750 FORD=1TOL*2	IP	•1080 DATA 32,155,183,138,24,105,0,133,4,169,192,105,0,133,5,32,155,183,224	PE
•760 A=RND(1)*70+5:Q=RND(1)*40+5:IFPEEK(B+Q*R+A)<>MTHEN760	LE	•1090 DATA 0,240,16,165,4,24,105,80,133,4,165,5,105,0,133,5,202,208,240	JC
•770 POKEB+Q*R+A,M+13:NEXT	AF	•1100 DATA 169,0,133,2,169,4,133,3,162,24,160,39,177,4,145,2,136,16,249	LL
•780 A=RND(1)*70+5:Q=RND(1)*40+5:IFPEEK(B+Q*R+A)<>MTHEN780	LG	•1110 DATA 165,2,24,105,40,133,2,165,3,105,0,133,3,165,4,24,105,80,133	DP
•790 POKEB+Q*R+A,M+9	BK	•1120 DATA 4,165,5,105,0,133,5,202,16,218,96	HF
•800 FORD=.TO2	HP	•1130 DATA 201,223,178,245,251,199,143,124,211,255	MJ
•810 A=RND(1)*70+5:Q=RND(1)*40+5:IFPEEK(B+Q*R+A)<>MTHEN810	LA	•1140 DATA 35,36,37,38,39,35,36,37,38,39	KN
•820 CX(D)=INT(A):CY(D)=INT(Q):NEXT:RETURN	HD	•1150 DATA 169,0,133,251,169,192,133,252,162,20,160,0,169,32,145,251,200	FH
•830 REM REDEFINED CHARACTERS	AO	•1160 DATA 192,201,208,247,24,169,200,101	
•840 FORX=1TO33:READA:POKE680+X,A:NEXT:POKE56334,PEEK(56334)AND254	CE		
•850 POKE1,PEEK(1)AND251:SYS681:POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1			



JE ,251,133,251,144,2,230,252,202  
MP 1170 DATA 208,231,96

HH  
JF

## BASIC AHoy! FROM PAGE 58

Starting address in hex: 9000

Ending address in hex: 9FF0

SYS to start: 36864

Flankspeed required for entry! See page 111.

9000: AD 02 DD 09 03 8D 02 DD 07  
9008: AD 00 DD 29 FD 8D 00 DD 26  
9010: A9 04 8D 18 D0 A9 80 8D EB  
9018: 88 02 A9 04 85 2C A9 00 AB  
9020: 8D 00 04 A9 80 85 38 A9 43  
9028: 91 8D 18 03 8D 16 03 A9 B2  
9030: 9F 8D 19 03 8D 17 03 A9 CA  
9038: 01 8D 20 D0 8D 21 D0 A9 E0  
9040: 0E 8D 86 02 4C 93 90 93 68  
9048: 0D 42 41 53 49 43 20 41 1A  
9050: 48 4F 59 21 20 20 20 20 E2  
9058: 20 20 20 20 20 20 20 20 59  
9060: 33 31 37 34 31 20 42 59 1D  
9068: 54 45 53 20 46 52 45 45 98  
9070: 2E 0D 20 20 20 20 20 20 6C  
9078: 20 20 42 59 20 43 41 52 4B  
9080: 4C 4F 53 20 44 45 20 4C 85  
9088: 41 20 47 55 41 52 44 49 A7  
9090: 41 0D 00 A2 00 BD 47 90 17  
9098: C9 00 F0 07 20 D2 FF E8 36  
90A0: 4C 95 90 A9 00 8D 86 02 D2  
90A8: A2 07 BD 04 03 9D A7 02 5E  
90B0: BD C7 91 9D 04 03 CA 10 47  
90B8: F1 60 20 7C A5 A2 00 A0 90  
90C0: 04 84 0F BD 00 02 85 08 A5  
90C8: C9 22 F0 4F 24 0F 70 26 BE  
90D0: C9 41 90 22 C9 5B B0 1E 82  
90D8: 84 71 A0 4C 84 0B A0 FF EB  
90E0: 86 7A CA C8 E8 BD 00 02 1E  
90E8: 38 F9 CF 91 F0 F5 C9 80 AD  
90F0: D0 30 05 0B A4 71 E8 C8 C9  
90F8: 99 FB 01 B9 FB 01 F0 36 6D  
9100: 38 E9 3A F0 04 C9 49 D0 35  
9108: 02 85 0F 38 E9 55 D0 B3 9A  
9110: 85 08 BD 00 02 F0 DF C5 F3  
9118: 08 F0 DB C8 99 FB 01 E8 35  
9120: D0 F0 A6 7A E6 0B C8 B9 77  
9128: CE 91 10 FA B9 CF 91 D0 7F  
9130: B4 BD 00 02 10 BE 99 FD 0B  
9138: 01 A9 FF 85 7A 60 10 2A 7D  
9140: C9 FF F0 26 24 0F 30 22 A6  
9148: C9 CC 90 24 38 E9 CB AA 2C  
9150: 84 49 A0 FF CA F0 08 C8 4B  
9158: B9 CF 91 10 FA 30 F5 C8 6D  
9160: B9 CF 91 30 08 20 47 AB C6  
9168: D0 F5 4C F3 A6 4C EF A6 F8  
9170: 4C 1A A7 20 73 00 C9 CC A8

9178: 90 15 20 80 91 4C AE A7 F2  
9180: E9 CC 0A A8 B9 5E 92 48 DC  
9188: B9 5D 92 48 4C 73 00 20 5A  
9190: 79 00 4C E7 A7 A9 00 85 15  
9198: 0D 20 73 00 C9 FF F0 21 15  
91A0: C9 E8 90 1D 38 E9 E8 0A 16  
91A8: 48 20 73 00 20 F1 AE 68 AD  
91B0: A8 B9 95 92 85 55 B9 96 66  
91B8: 92 85 56 20 54 00 4C 8D 75  
91C0: AD 20 79 00 4C 8D AE BA 4B  
91C8: 90 3E 91 73 91 95 91 50 A5  
91D0: 41 55 53 C5 43 4F 4C 4F AE  
91D8: 55 D2 43 55 52 53 D2 50 62  
91E0: 4C 41 D9 45 4E 56 45 4C C3  
91E8: 4F 50 C5 54 45 4D 50 CF 55  
91F0: 56 4F CC 57 49 4E 44 4F E5  
91F8: D7 50 52 54 D9 43 4C D3 05  
9200: 48 4F 4D C5 46 49 4C CC 53  
9208: 46 43 4F CC 53 43 52 4F E5  
9210: 4C CC 51 55 49 D4 43 53 84  
9218: 45 D4 46 4C 49 D0 43 48 6A  
9220: 41 D2 4F 46 C6 50 4C 41 6E  
9228: 43 C5 53 50 52 49 54 C5 8A  
9230: 42 43 4F CC 4D 4F 44 C5 78  
9238: 52 41 53 54 45 D2 44 4F 1F  
9240: 57 4E 4C C4 57 49 50 C5 AD  
9248: 50 4C 4F D4 52 45 50 45 36  
9250: 41 D4 4A 4F D9 42 55 4D BE  
9258: D0 42 49 CE 00 9A 92 CD 7E  
9260: 92 FB 92 FE 94 1F 93 5A 22  
9268: 96 8B 96 EC 96 AC 9F 8A 7B  
9270: 97 B9 97 2D 97 55 97 D7 E2  
9278: 97 49 99 4C 99 6B 99 96 74  
9280: 99 F7 99 20 9A 87 9A 2B B3  
9288: 9C 4A 9C B2 9D 0F 9E 6C 76  
9290: 9E 8E 9E DD 9F 7E 9B C5 B9  
9298: 9B F0 9C 20 8A AD 20 F7 32  
92A0: B7 A6 15 A4 14 E0 00 D0 7E  
92A8: 08 C0 00 D0 04 20 C7 92 C0  
92B0: 60 C0 00 F0 09 88 A5 A2 9C  
92B8: C5 A2 F0 FC D0 F3 E0 00 B4  
92C0: F0 04 CA 4C B5 92 60 20 95  
92C8: E4 FF F0 FB 60 EA 20 8A 90  
92D0: AD 20 F7 B7 A5 14 29 0F 40  
92D8: 8D 20 D0 20 FD AE 20 8A CE  
92E0: AD 20 F7 B7 A5 14 29 0F 50  
92E8: 8D 21 D0 20 FD AE 20 8A DF  
92F0: AD 20 F7 B7 A5 14 29 0F 60  
92F8: 8D 86 02 60 20 9E B7 86 6C  
9300: FB 20 00 E2 A5 FB A8 C0 0A  
9308: 28 10 12 E0 19 10 0E 18 82  
9310: 20 F0 FF 20 06 E2 20 0E 58  
9318: E2 20 A0 AA 60 4C 48 B2 0E  
9320: 20 9E B7 E0 0A B0 5F 8E 20  
9328: 34 03 AD 34 03 0A 0A 0A 62  
9330: 8D 34 03 4C 89 93 02 00 60  
9338: 06 06 41 00 02 00 00 09 90  
9340: 00 00 41 00 06 00 00 09 90



9348:	00	00	11	00	00	00	00	08	61	9518:	94	D0	03	4C	9D	95	E8	E0	C9
9350:	00	00	81	00	00	00	08	09	E2	9520:	0E	D0	F3	A2	00	DD	EC	94	F4
9358:	04	01	41	00	02	00	00	09	A9	9528:	D0	03	4C	94	95	E8	E0	0A	46
9360:	09	00	41	00	08	00	08	04	BE	9530:	D0	F3	C9	52	D0	03	4C	B5	E6
9368:	08	00	11	00	00	00	00	09	8A	9538:	95	C9	4F	D0	03	4C	7C	95	19
9370:	02	01	21	00	00	00	09	04	A1	9540:	C9	20	F0	15	C9	56	D0	03	24
9378:	04	00	11	00	00	00	03	03	93	9548:	4C	A6	96	C9	40	F0	13	C9	A9
9380:	05	03	21	00	00	00	4C	48	3E	9550:	54	D0	03	4C	65	95	4C	08	14
9388:	B2	A9	00	8D	35	03	20	06	D0	9558:	AF	C8	CC	3B	03	F0	03	4C	1C
9390:	E2	20	00	E2	8A	AC	34	03	E4	9560:	12	95	A9	00	60	C8	B1	B0	3D
9398:	99	36	93	C8	84	B0	20	06	20	9568:	20	74	95	0A	0A	0A	8D	34	72
93A0:	E2	20	00	E2	A4	B0	8A	99	FF	9570:	03	4C	59	95	38	E9	30	C9	CA
93A8:	36	93	C8	84	B0	20	06	E2	79	9578:	0A	B0	DB	60	C8	B1	B0	20	BA
93B0:	20	00	E2	A4	B0	8A	99	36	63	9580:	74	95	85	C2	0A	18	65	C2	1D
93B8:	93	C8	84	B0	20	06	E2	20	73	9588:	0A	18	65	C2	0A	0A	8D	35	A9
93C0:	00	E2	A4	B0	8A	99	36	93	E6	9590:	03	4C	59	95	BD	D4	94	8D	83
93C8:	C8	84	B0	20	06	E2	20	00	EF	9598:	36	03	4C	59	95	86	02	A5	3B
93D0:	E2	A4	B0	8A	99	36	93	C8	BF	95A0:	02	0A	18	6D	35	03	AA	BD	D2
93D8:	84	B0	20	06	E2	20	FD	AE	E3	95A8:	F4	93	85	BB	E8	BD	F4	93	A1
93E0:	20	8A	AD	20	F7	B7	A4	B0	5E	95B0:	85	BC	4C	BB	95	A9	00	85	BF
93E8:	A5	14	99	36	93	C8	A5	15	89	95B8:	BB	85	BC	AE	34	03	BD	36	90
93F0:	99	36	93	60	01	C3	01	FA	75	95C0:	93	0A	0A	0A	0A	85	24	E8	0F
93F8:	01	0C	01	2D	01	51	01	66	ED	95C8:	BD	36	93	18	65	24	85	02	79
9400:	01	91	01	DD	01	FA	01	1C	8A	95D0:	8A	48	A5	02	AE	FC	94	9D	29
9408:	01	3E	01	51	01	7B	01	A9	C0	95D8:	00	D4	68	AA	E8	BD	36	93	31
9410:	03	86	03	F4	02	18	02	5A	08	95E0:	0A	0A	0A	0A	85	24	E8	BD	59
9418:	02	A3	02	CC	03	23	03	BB	71	95E8:	36	93	18	65	24	85	02	8A	66
9420:	03	F4	02	38	02	7D	02	A3	77	95F0:	48	A5	02	AE	FD	94	9D	00	BF
9428:	02	F6	03	53	07	0C	07	E9	7B	95F8:	D4	68	AA	E8	BD	36	93	85	D6
9430:	04	30	04	B4	05	47	05	98	07	9600:	02	8A	48	A5	02	AE	FB	94	BB
9438:	06	47	07	77	07	E9	04	70	69	9608:	9D	00	D4	68	AA	E8	BD	36	6A
9440:	04	FB	05	47	05	ED	06	A7	2D	9610:	93	85	02	8A	48	A5	02	AE	54
9448:	0E	18	0F	D2	08	61	09	68	2B	9618:	F9	94	9D	00	D4	68	AA	E8	15
9450:	0A	8F	0B	30	0C	8F	0E	EF	BE	9620:	BD	36	93	85	02	8A	48	A5	A7
9458:	0F	D2	08	E1	09	F7	0A	8F	BE	9628:	02	AE	FA	94	9D	00	D4	68	43
9460:	0B	DA	0D	4E	1C	31	1F	A5	B3	9630:	AA	A5	BC	AE	F7	94	9D	00	16
9468:	10	C3	12	D1	15	1F	16	60	CA	9638:	D4	A5	BB	AE	F8	94	9D	00	48
9470:	19	1E	1D	DF	1F	A5	11	C3	3E	9640:	D4	AD	36	03	AA	E0	00	F0	78
9478:	13	EF	15	1F	17	B5	1A	9C	33	9648:	09	CA	A5	A2	C5	A2	F0	FC	BA
9480:	38	63	3F	4B	21	87	25	A2	17	9650:	D0	F3	AE	FB	94	DE	00	D4	08
9488:	2A	3E	2C	C1	32	3C	3B	BE	47	9658:	4C	59	95	20	9E	B7	E0	1E	09
9490:	3F	4B	23	86	27	DF	2A	3E	34	9660:	B0	03	4C	48	B2	86	02	A2	86
9498:	2F	6B	35	39	70	C7	7E	97	EF	9668:	09	A5	02	9D	D4	94	4A	CA	35
94A0:	43	0F	4B	45	54	7D	59	83	32	9670:	CA	9D	D4	94	18	65	02	E8	AA
94A8:	64	79	77	7C	7E	97	47	0C	E3	9678:	9D	D4	94	4A	CA	CA	9D	D4	D1
94B0:	4F	BF	54	7D	5E	D6	6A	73	A4	9680:	94	E8	A5	02	4A	85	02	E0	58
94B8:	E1	8F	FD	2E	86	1E	96	8B	1D	9688:	01	D0	DE	60	20	8A	AD	20	12
94C0:	A8	FA	B3	06	C8	F3	EE	F8	C2	9690:	F7	B7	A5	15	F0	03	4C	48	83
94C8:	FD	2E	8E	18	9F	7E	A8	FA	5D	9698:	B2	A5	14	C9	10	90	03	4C	BE
94D0:	BD	AC	D4	E6	06	04	0B	08	14	96A0:	48	B2	8D	18	D4	60	C8	B1	F0
94D8:	17	0F	2D	1E	5A	3C	41	42	64	96A8:	B0	20	74	95	C9	04	B0	0A	0C
94E0:	43	44	45	46	47	C1	C2	C3	83	96B0:	C9	00	F0	06	20	BD	96	4C	32
94E8:	C4	C5	C6	C7	D3	53	C9	49	3C	96B8:	59	95	4C	48	B2	C9	03	F0	AC
94F0:	D1	51	C8	48	D7	57	EA	0E	4D	96C0:	27	C9	02	F0	1E	A2	00	8E	F3
94F8:	0F	10	11	12	13	14	EA	20	6D	96C8:	F7	94	E8	8E	F8	94	E8	8E	D1
9500:	9E	AD	20	A3	B6	A6	22	A4	34	96D0:	F9	94	E8	8E	FA	94	E8	8E	DD
9508:	23	86	B0	84	B1	8D	3B	03	64	96D8:	FB	94	E8	8E	FC	94	E8	8E	E9
9510:	A0	00	B1	B0	A2	00	DD	DE	72	96E0:	FD	94	60	A2	07	4C	C7	96	28



96E8:	A2 0E 4C C7 96 20 9E B7 BA	98B8:	AD 28 97 8D 11 98 AD 29 34
96F0:	E0 28 10 37 8E 26 97 20 AD	98C0:	97 8D 12 98 4C E7 98 A9 07
96F8:	00 E2 E0 19 10 2D 8E 28 C9	98C8:	CA 8D 0D 98 AD 26 97 8D BF
9700:	97 20 00 E2 E0 28 10 23 D6	98D0:	0F 98 AD 27 97 8D 10 98 1B
9708:	8E 27 97 20 00 E2 E0 19 52	98D8:	AD 28 97 8D 12 98 AD 29 5
9710:	10 19 8E 29 97 AE 27 97 F5	98E0:	97 8D 11 98 4C E7 98 AC 29
9718:	EC 26 97 90 0E AE 29 97 D0	98E8:	10 98 20 F4 98 88 CC 0F A3
9720:	EC 28 97 90 06 60 00 27 EA	98F0:	98 10 F7 60 AE 11 98 20 6A
9728:	0A 14 00 4C 48 B2 20 9E 4C	98F8:	F0 E9 20 24 EA B1 D1 48 CE
9730:	B7 8E 7E 97 AE 29 97 20 1C	9900:	B1 F3 48 A9 20 91 D1 AD C8
9738:	41 97 CA EC 28 97 10 F7 90	9908:	21 D0 91 F3 20 0D 98 20 65
9740:	60 AC 27 97 20 F0 E9 20 27	9910:	F0 E9 20 24 EA B1 D1 8D 2B
9748:	24 EA AD 7E 97 91 D1 88 07	9918:	7E 97 B1 F3 8D 7F 97 68 E0
9750:	CC 26 97 10 F5 60 20 9E FF	9920:	91 F3 68 91 D1 AD 7E 97 35
9758:	B7 8E 7F 97 AE 29 97 20 45	9928:	48 AD 7F 97 48 EC 12 98 15
9760:	69 97 CA EC 28 97 10 F7 E0	9930:	D0 DA AD E8 97 D0 03 68 46
9768:	60 AC 27 97 20 F0 E9 20 4F	9938:	68 60 AE 11 98 20 F0 E9 54
9770:	24 EA AD 7F 97 91 F3 88 52	9940:	20 24 EA 68 91 F3 68 91 57
9778:	CC 26 97 10 F5 60 20 0E 97	9948:	D1 60 4C E2 FC 20 9E B7 1D
9780:	A2 00 20 06 E2 20 9E B7 A2	9950:	E0 08 10 08 8A 0A 8D 5F D2
9788:	4C 8E 97 20 80 97 E0 00 14	9958:	99 4C 60 99 4C 48 B2 00 7F
9790:	D0 05 A9 93 4C D2 FF A2 65	9960:	AD 18 D0 29 F0 0D 5F 99 17
9798:	20 20 31 97 AE 21 D0 20 62	9968:	8D 18 D0 60 20 9E B7 E0 96
97A0:	59 97 AD 26 97 8D D6 97 F8	9970:	04 10 E9 8A 0A 0A 0A 0A 21
97A8:	AD 28 97 8D D7 97 60 A2 16	9978:	8D 5F 99 AD 18 D0 29 0F CD
97B0:	00 20 06 E2 20 9E B7 4C 7C	9980:	0D 5F 99 8D 18 D0 A9 80 27
97B8:	BD 97 20 AF 97 E0 00 D0 27	9988:	E0 00 F0 07 CA 18 69 04 B1
97C0:	05 A9 13 4C D2 FF AE 28 78	9990:	4C 88 99 8D 88 02 60 20 97
97C8:	97 8E D7 97 AC 26 97 8C 55	9998:	9E B7 8A 20 BA 99 0A 26 1E
97D0:	D6 97 18 4C F0 FF 00 00 94	99A0:	C2 0A 26 C2 0A 26 C2 85 CE
97D8:	20 9E B7 8E E7 97 20 00 7D	99A8:	C1 A5 C3 18 65 C1 85 C1 5A
97E0:	E2 8E E8 97 4C E9 97 04 A4	99B0:	A5 C4 18 65 C2 85 C2 4C EF
97E8:	00 AD E7 97 F0 1C C9 01 ED	99B8:	E1 99 48 A9 00 85 C1 85 F2
97F0:	D0 03 4C 13 98 C9 02 D0 59	99C0:	C2 AD 18 D0 29 0E 4A AA 46
97F8:	03 4C 33 98 C9 03 D0 03 B4	99C8:	A9 80 85 C4 A9 00 85 C3 30
9800:	4C A7 98 C9 04 D0 03 4C 7A	99D0:	E0 00 F0 0B A5 C4 18 69 99
9808:	C7 98 4C 48 B2 CA 60 00 DA	99D8:	08 85 C4 CA 4C D0 99 68 15
9810:	27 14 0A A9 C8 8D 0D 98 FA	99E0:	60 20 00 E2 8A A8 84 02 FD
9818:	AD 26 97 8D 0F 98 AD 27 8D	99E8:	C0 08 30 03 4C 48 B2 20 4C
9820:	97 8D 10 98 AD 28 97 8D E8	99F0:	00 E2 8A A4 02 91 C1 60 B8
9828:	11 98 AD 29 97 8D 12 98 78	99F8:	20 9E B7 E0 08 30 0B 4C DF
9830:	4C 50 98 A9 88 8D 0D 98 CA	9A00:	48 B2 01 02 04 08 10 20 3A
9838:	AD 26 97 8D 10 98 AD 27 AE	9A08:	40 80 BD 02 9A 85 C1 AD 18
9840:	97 8D 0F 98 AD 28 97 8D 08	9A10:	15 D0 48 A9 FF 38 E5 C1 C7
9848:	11 98 AD 29 97 8D 12 98 98	9A18:	85 C1 68 25 C1 8D 15 D0 22
9850:	AE 12 98 20 5D 98 CA EC 77	9A20:	60 20 9E B7 E0 08 30 03 13
9858:	11 98 10 F7 60 AC 0F 98 BE	9A28:	4C 48 B2 BD 02 9A 85 C1 11
9860:	20 F0 E9 20 24 EA B1 D1 0E	9A30:	86 C2 85 C4 20 FD AE 20 B0
9868:	48 B1 F3 48 A9 20 91 D1 CB	9A38:	8A AD 20 F7 B7 A5 15 C9 C4
9870:	AD 21 D0 91 F3 20 0D 98 5B	9A40:	02 30 03 4C 48 B2 A5 14 76
9878:	B1 D1 8D 7E 97 B1 F3 8D D2	9A48:	48 A5 C2 0A AA 68 9D 00 B3
9880:	7F 97 68 91 F3 68 91 D1 51	9A50:	D0 A5 15 F0 0B AD 10 D0 66
9888:	AD 7E 97 48 AD 7F 97 48 A1	9A58:	05 C1 8D 10 D0 4C 71 9A E5
9890:	CC 10 98 D0 E0 AD E8 97 E5	9A60:	AD 10 D0 48 A9 FF 38 E5 FE
9898:	D0 03 68 68 60 AC 0F 98 F1	9A68:	C1 85 C1 68 25 C1 8D 10 5E
98A0:	68 91 F3 68 91 D1 60 A9 64	9A70:	D0 20 00 E2 86 C3 A5 C2 F6
98A8:	E8 8D 0D 98 AD 26 97 8D BD	9A78:	0A AA A5 C3 9D 01 D0 AD B3
98B0:	0F 98 AD 27 97 8D 10 98 FA	9A80:	15 D0 05 C4 8D 15 D0 60 04



9A88:	20	9E	B7	E0	08	30	03	4C	67	9C58:	18	AD	16	D0	29	0F	8D	16	E0
9A90:	48	B2	86	C1	AD	18	D0	4A	B4	9C60:	D0	AD	11	D0	29	9F	8D	11	28
9A98:	4A	4A	4A	0A	0A	85	C4	A5	7B	9C68:	D0	A9	04	8D	5F	99	4C	60	1A
9AA0:	C4	18	69	83	85	C4	A9	F8	57	9C70:	99	E0	01	D0	18	AD	11	D0	64
9AA8:	85	C3	20	00	E2	8A	A4	C1	E5	9C78:	29	9F	8D	11	D0	AD	16	D0	45
9AB0:	91	C3	20	00	E2	8A	29	0F	CB	9C80:	09	10	8D	16	D0	A9	04	8D	49
9AB8:	A6	C1	9D	27	D0	A6	C1	BD	DC	9C88:	5F	99	4C	60	99	E0	02	D0	7B
9AC0:	02	9A	85	C3	20	00	E2	E0	8A	9C90:	1A	AD	16	D0	29	0F	8D	16	1B
9AC8:	04	30	03	4C	48	B2	E0	00	28	9C98:	D0	AD	11	D0	29	9F	09	40	0B
9AD0:	D0	1A	A9	FF	38	E5	C3	85	CC	9CA0:	8D	11	D0	A9	04	8D	5F	99	44
9AD8:	C3	AD	1D	D0	25	C3	8D	1D	CB	9CA8:	4C	60	99	E0	03	D0	20	AD	71
9AE0:	D0	AD	17	D0	25	C3	8D	17	D4	9CB0:	16	D0	29	0F	8D	16	D0	AD	F1
9AE8:	D0	4C	38	9B	E0	01	D0	1A	A6	9CB8:	11	D0	29	9F	09	20	8D	11	2B
9AF0:	AD	1D	D0	05	C3	8D	1D	D0	D0	9CC0:	D0	AD	18	D0	09	08	8D	18	DE
9AF8:	A9	FF	38	E5	C3	85	C3	AD	7B	9CC8:	D0	A9	00	8D	22	C0	60	AD	C1
9B00:	17	D0	25	C3	8D	17	D0	4C	92	9CD0:	16	D0	09	10	8D	16	D0	AD	F2
9B08:	38	9B	E0	02	D0	1A	AD	17	6E	9CD8:	11	D0	29	9F	09	20	8D	11	4B
9B10:	D0	05	C3	8D	17	D0	A9	FF	C8	9CE0:	D0	AD	18	D0	09	08	8D	18	FE
9B18:	38	E5	C3	85	C3	AD	1D	D0	DE	9CE8:	D0	A9	FF	8D	22	C0	60	00	34
9B20:	25	C3	8D	1D	D0	4C	38	9B	A4	9CF0:	A9	00	8D	EF	9C	20	82	B7	0F
9B28:	AD	17	D0	05	C3	8D	17	D0	FB	9CF8:	C0	08	F0	03	4C	98	B7	A0	F2
9B30:	AD	1D	D0	05	C3	8D	1D	D0	10	9D00:	00	B1	22	AA	B9	2E	9D	E0	E4
9B38:	20	00	E2	E0	00	D0	17	A6	AA	9D08:	30	F0	0E	E0	31	F0	03	4C	89
9B40:	C1	BD	02	9A	85	C3	A9	FF	4F	9D10:	98	B7	18	6D	EF	9C	8D	EF	EF
9B48:	38	E5	C3	85	C3	AD	1C	D0	0E	9D18:	9C	C8	C0	08	D0	E3	AD	EF	98
9B50:	25	C3	8D	1C	D0	60	A6	C1	7C	9D20:	9C	85	63	A9	00	85	62	A2	D9
9B58:	BD	02	9A	85	C3	AD	1C	D0	96	9D28:	90	38	20	49	BC	60	80	40	38
9B60:	05	C3	8D	1C	D0	20	06	E2	AC	9D30:	20	10	08	04	02	01	78	A9	91
9B68:	20	00	E2	8A	29	0F	8D	25	E0	9D38:	7F	8D	0D	DC	A9	01	8D	1A	81
9B70:	D0	20	06	E2	20	00	E2	8A	D7	9D40:	D0	A9	03	85	FB	AD	A4	9D	2F
9B78:	29	0F	8D	26	D0	60	A5	15	50	9D48:	8D	12	D0	A9	18	8D	11	D0	E9
9B80:	48	A5	14	48	20	F7	B7	A5	40	9D50:	A9	31	8D	A2	9D	A9	EA	8D	1B
9B88:	15	F0	03	4C	48	B2	A5	14	92	9D58:	A3	9D	A9	66	8D	14	03	A9	F7
9B90:	C9	01	F0	07	C9	02	F0	13	23	9D60:	9D	8D	15	03	58	60	AD	19	23
9B98:	4C	48	B2	AD	01	DC	29	1F	B3	9D68:	D0	8D	19	D0	29	01	F0	2B	F6
9BA0:	49	1F	85	63	A9	00	85	62	83	9D70:	C6	FB	10	04	A9	02	85	FB	74
9BA8:	4C	B8	9B	AD	00	DC	29	1F	1C	9D78:	A6	FB	BD	A7	9D	8D	21	D0	9D
9BB0:	49	1F	85	63	A9	00	85	62	93	9D80:	BD	AA	9D	8D	11	D0	BD	AD	61
9BB8:	68	85	14	68	85	15	A2	90	F0	9D88:	9D	8D	16	D0	BD	B0	9D	8D	34
9BC0:	38	20	49	BC	60	A5	15	48	82	9D90:	18	D0	BD	A4	9D	8D	12	D0	E9
9BC8:	A5	14	48	20	F7	B7	A5	15	55	9D98:	8A	F0	06	68	A8	68	AA	68	A6
9BD0:	F0	03	4C	48	B2	A5	14	C9	8F	9DA0:	40	4C	31	EA	31	B1	71	02	9F
9BD8:	08	30	03	4C	48	B2	AA	BD	C3	9DA8:	07	06	5B	1B	1B	08	08	18	6F
9BE0:	02	9A	85	C1	AD	1E	D0	25	86	9DB0:	14	16	14	20	9E	B7	8E	A6	9A
9BE8:	C1	D0	07	A9	00	85	63	4C	61	9DB8:	9D	20	00	E2	8E	A5	9D	20	4B
9BF0:	F6	9B	A9	01	85	63	AD	1F	E3	9DC0:	00	E2	8E	A4	9D	20	00	E2	77
9BF8:	D0	25	C1	F0	07	A9	02	18	6C	9DC8:	8E	A9	9D	20	00	E2	8E	A8	D8
9C00:	65	63	85	63	A9	00	85	62	43	9DD0:	9D	20	00	E2	8E	A7	9D	20	65
9C08:	68	85	14	68	85	15	A9	FF	B6	9DD8:	00	E2	8E	AC	9D	20	00	E2	97
9C10:	38	E5	C1	85	C1	AD	1E	D0	D3	9DE0:	8E	AB	9D	20	00	E2	8E	AA	F4
9C18:	25	C1	8D	1E	D0	AD	1F	D0	19	9DE8:	9D	20	00	E2	8E	AF	9D	20	85
9C20:	25	C1	8D	1F	D0	A2	90	38	EF	9DF0:	00	E2	8E	AE	9D	20	00	E2	B1
9C28:	20	49	BC	60	20	9E	B7	8A	AF	9DF8:	8E	AD	9D	20	00	E2	8E	B2	17
9C30:	29	0F	AA	8E	22	D0	20	00	B4	9E00:	9D	20	00	E2	8E	B1	9D	20	9E
9C38:	E2	8A	29	0F	AA	8E	23	D0	0B	9E08:	00	E2	8E	B0	9D	4C	36	9D	E7
9C40:	20	00	E2	8A	29	0F	AA	8E	3F	9E10:	20	9E	B7	E0	08	30	03	4C	EE
9C48:	24	D0	60	20	9E	B7	E0	05	F9	9E18:	48	B2	E0	02	30	07	E0	04	12
9C50:	30	03	4C	48	B2	E0	00	D0	7C	9E20:	10	03	4C	48	B2	8A	0A	0A	19



```

9E28: 0A 85 02 A9 00 85 C1 85 30
9E30: C3 A9 D0 85 C2 A9 80 18 F8
9E38: 65 02 85 C4 AD 0E DC 29 AB
9E40: FE 8D 0E DC A5 01 29 FB 83
9E48: 85 01 A2 00 A0 00 B1 C1 85
9E50: 91 C3 C8 D0 F9 E6 C2 E6 C9
9E58: C4 E8 E0 08 D0 F0 A5 01 57
9E60: 09 04 85 01 AD 0E DC 09 95
9E68: 01 8D 0E DC 60 A9 00 A2 8E
9E70: C0 8D 7A 9E A0 A0 8C 7B 21
9E78: 9E 8D 00 A0 EE 7A 9E D0 1E
9E80: F8 EE 7B 9E EC 7B 9E D0 5A
9E88: F0 60 3F 01 00 00 A0 20 DA
9E90: 8A AD 20 F7 B7 A5 14 8D DF
9E98: 8A 9E A5 15 8D 8B 9E 20 54
9EA0: 00 E2 8E 8C 9E AD 8B 9E 15
9EA8: F0 13 A9 01 8D 8B 9E AD BC
9EB0: 8A 9E 30 04 C9 40 30 05 4D
9EB8: A9 3F 8D 8A 9E AD 8C 9E 31
9EC0: 10 0B 29 7F C9 48 30 05 CB
9EC8: A9 C7 8D 8C 9E AD 8C 9E CB
9ED0: 29 F8 85 C1 A9 00 85 C2 2C
9ED8: A5 C1 18 2A 26 C2 2A 26 BB
9EE0: C2 2A 26 C2 85 C3 A5 C2 68
9EE8: 85 C4 A5 C3 2A 26 C2 2A D9
9EF0: 26 C2 18 65 C3 85 C3 A5 0A
9EF8: C2 65 C4 85 C4 AD 8C 9E 09
9F00: 29 07 18 65 C3 85 C3 A5 60
9F08: C4 69 00 85 C4 AD 8A 9E 57
9F10: 29 F8 18 65 C3 85 C3 AD 6A
9F18: 8B 9E 65 C4 85 C4 AD 8D F1
9F20: 9E 18 65 C3 85 C3 AD 8E 85
9F28: 9E 65 C4 85 C4 AD 8A 9E 12
9F30: 29 07 85 C1 A9 07 38 E5 76
9F38: C1 AA A8 38 A9 00 2A CA 24
9F40: 10 FC 85 C2 A0 00 20 00 56
9F48: E2 E0 01 D0 13 A5 01 29 C0
9F50: FE 85 01 B1 C3 05 C2 91 A4
9F58: C3 A5 01 09 01 85 01 60 B3
9F60: E0 00 F0 13 A5 01 29 FE 14
9F68: 85 01 B1 C3 45 C2 91 C3 C1
9F70: A5 01 09 01 85 01 60 A9 B1
9F78: FF 38 E5 C2 85 C2 A5 01 48
9F80: 29 FE 85 01 B1 C3 25 C2 8C
9F88: 91 C3 A5 01 09 01 85 01 15
9F90: 60 20 15 FD 20 A3 FD 20 06
9F98: 18 E5 20 CC FF A9 00 85 B2
9FA0: 13 20 7A A6 20 00 90 58 FD
9FA8: A9 80 6C 00 03 20 9E B7 B8
9FB0: E0 08 30 03 4C 48 B2 BD D1
9FB8: 02 9A 85 C1 20 00 E2 E0 80
9FC0: 00 F0 0B AD 1B D0 05 C1 1D
9FC8: 8D 1B D0 4C DD 9F A9 FF B5
9FD0: 38 E5 C1 85 C1 AD 1B D0 91
9FD8: 25 C1 8D 1B D0 60 AD 8A D1
9FE0: 02 18 69 80 8D 8A 02 60 5F

```

```

9FE8: 00 FF 00 FF 00 FF 00 FF E8
9FF0: 00 F0

```

## PERMA-LINE FROM PAGE 78

```

•10 REM *** PERMA-LINE *** BUCK CHILDRESS
*** OF
•20 REM *** P.O. BOX 13575 SALEM, OR 9730
9 *** DC
•30 PRINTCHR$(147)"LOADING AND CHECKING D
ATA LINE:"J=52000:L=110:C=11 BD
•40 PRINTCHR$(19)TAB(31)L:PRINT:FORB=0TOC
:READA:IFA<0ORA>255THEN60 KG
•50 POKEJ+B,A:X=X+A:NEXTB:READA:IFA=XTHEN
70 BP
•60 PRINT"ERROR IN DATA LINE:"L:END HL
•70 X=0:J=J+12:L=L+10:IFL<390THEN40 AO
•80 IFL=390THENC=12:GOTO40 GC
•90 PRINT"THE DATA IS OK AND LOADED[3"."]
":PRINT GI
•100 PRINT"SYS 52[3"0"] TO ACTIVATE[3"."]
":NEW IK
•110 DATA32,33,204,169,0,162,160,133,251,
134,252,170,1700 ME
•120 DATA161,251,129,251,230,251,208,248,
230,252,165,252,2628 IJ
•130 DATA201,192,144,240,173,3,3,201,203,
208,9,169,1746 PO
•140 DATA131,162,56,160,164,76,136,203,14
2,126,169,169,1694 GB
•150 DATA76,162,156,160,203,141,108,164,1
42,109,164,140,1725 EK
•160 DATA110,164,162,187,160,203,141,156,
164,142,157,164,1910 JG
•170 DATA140,158,164,162,167,160,203,142,
123,168,140,124,1851 PN
•180 DATA168,162,175,160,203,141,197,168,
142,198,168,140,2022 NB
•190 DATA199,168,169,147,162,36,160,203,1
41,2,3,140,1530 IJ
•200 DATA3,3,104,104,76,15,204,32,30,204,
142,124,1041 AK
•210 DATA204,76,131,164,173,124,204,208,3
,76,113,164,1640 LP
•220 DATA76,116,164,169,0,141,124,204,76,
89,166,169,1494 CI
•230 DATA0,141,124,204,165,95,233,1,76,20
1,168,32,1440 LM
•240 DATA107,169,165,122,166,123,141,121,
204,142,122,204,1786 CD
•250 DATA169,255,162,1,133,122,134,123,20
2,134,251,160,1846 GK
•260 DATA6,32,115,0,176,20,201,48,144,16,

```



# IMPORTANT!

Letters on white background are **Bug Repellent** line codes. Do not enter them! Pages 109 and 110 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

```
166,251,1175
.270 DATA208,6,201,48,240,239,133,251,136
,240,32,76,1810
.280 DATA213,203,192,2,176,12,165,251,201
,54,144,6,1619
.290 DATA165,21,201,234,144,13,173,121,20
4,174,122,204,1776
.300 DATA133,122,134,123,76,159,164,104,1
04,162,0,189,1470
.310 DATA44,204,240,7,32,210,255,232,76,1
5,204,76,1595
.320 DATA116,164,162,54,44,162,55,120,134
,1,162,47,1221
.330 DATA134,0,88,96,17,84,72,69,32,77,65
,88,822
.340 DATA73,77,85,77,32,76,73,78,69,32,78
,85,835
.350 DATA77,66,69,82,32,73,83,32,54,53,53
,51,725
.360 DATA53,46,13,0,17,80,69,82,77,65,45,
76,623
.370 DATA73,78,69,32,73,83,32,79,78,46,13
,0,656
.380 DATA17,80,69,82,77,65,45,76,73,78,69
,32,763
.390 DATA73,83,32,79,70,70,46,13,0,66,85,
67,75,759
```

```
DF .140 B=1:N=18:TS=1:L(1)=.:L(2)=L(1):H(1)=
HM 10:H(2)=H(1):S(1)=128:S(2)=S(1):T(1)=.:T
CM (2)=T(1):G(1)=200:G(2)=G(1):P=.:P(1)=1:P
IP (2)=2:C(1)=21:C(2)=C(1):B(1)=.:B(2)=.
IL .150 CD$=CHR$(17):CU$=CHR$(145):HI$="[RVS
PH ON]":OF$="[RVSOFF]"
GM .160 FORX=1TO51:READA$(X):NEXT:FORX=0TO22
DL :READL$(X):NEXT:READA$:FORX=23TO29:L$(X)
JE =A$:NEXT:FORX=0TO29:FORJ=1TO6:READD(X,J)
AN :NEXTJ,X:FORX=0TO14:BO(X)=2[UPARROW]X:NE
PP XT
DJ .170 FORX=0TO29:READO(X):NEXT:FORX=0TO22:
HB READM(X):NEXT
KG .180 TR=BO(0)+BO(1)+BO(6)+BO(8)+BO(13):PS
=BO(8)-1
.190 PRINTCHR$(147)CHR$(14)CHR$(27)CHR$(8
8)CHR$(147)CHR$(14)CHR$(11)
.200 REM MAINLOOP
.210 FORZ=1TO2
.220 PRINT"[HOME][HOME]"CHR$(7):CHAR1,6,2
4:PRINT"[RVSON] [s P]LEASE WAIT [s P]LAY
ER #";3-Z;
.230 PRINTCHR$(27)CHR$(88)CHR$(14)CHR$(11
):CHAR1,6,24:PRINT"[RVSON] [s Y]OUR [s
T]URN [s P]LAYER #";Z;
.240 CL=C(Z):L=L(Z):S=S(Z):G=G(Z):H=H(Z):
P=P(Z):T=T(Z):TH=T(Z):H=H+.2
.250 GOSUB660
.260 B=1:N=18:TS=1:GOSUB480
.270 IFI<7THENGOSUB640:GOTO290
.280 ONI-6GOSUB810,840,890,960,1080,1150,
1280,1390,1520,1670,1730,1860
.290 IF(M(CL)AND(BO(9)-1))THENBEGIN:ELSE3
80
.300 Y=0:FORX=0TO8:IFM(CL)ANDBO(X)THENY=X
+1:NEXT:ELSENEXT
.310 I=M(CL)ANDBO(9)-1:IFYAND(TH>IOR(TH+T
(3-P)>IANDCL=(3-P)))THENBEGIN:M(CL)=M(CL)
AND(BO(12)+BO(13)+BO(14)):PRINTA$(42+Y)
;" KILLED!":TH=0:H=H+Y:SLEEP6:GOSUB670
.320 I=INT(RND(1)*(Y*50)):G=G+I:PRINT"[s
Y]OU FOUND";I:PRINT"[s G]OLD PIECES!"
.330 IFY=7THENO(CL)=O(CL)ORB(3-P):L=LORB(
Z):GOSUB780:PRINT"[s T]HE BAGWOMAN DROPP
ED ALL HER CONTRABAND.":SLEEP5
.340 Y=0
.350 BEND
.360 IFYANDY<8ANDRND(1)<.2+Y/10+((LANDBO(
1))*-.1)THENGOSUB780:PRINT"[s C][s R][s
U][s N][s C][s H]!![s S]TRUCK BY ";A$(42
+Y);"!":H=H-Y:IFY=7ANDLANDB(Z)=.THENB(Z)
=B(Z)ORL:L=0
.370 BEND
.380 IFH<=0ANDCLTHENBEGIN:PRINT"[s Y]OU H
AVE [s D][s I][s E][s D][3"."]":IF(M(CL)
AND(BO(7)-1))THENPRINT"[s S][s L][s A][s
```

## DARK FORTRESS FROM PAGE 99

```
.10 COLOR0,1:COLOR4,1:FORX=0TO1:PRINTCHR$(
27)CHR$(88)CHR$(147)CHR$(142)CHR$(11):C
OLOR5,15:CHAR1,0,5
.20 PRINTTAB(4)" [c A][27"[s C]"] [c S]
.30 PRINTTAB(4)" [s B] D A R K F O R T
R E S S [s B]
.40 PRINTTAB(4)" [s B][4" "]BY CLEVE BLA
KEMORE[5" "][s B]
.50 PRINTTAB(4)" [s B][27" "][s B]
.60 PRINTTAB(4)" [s B] [RVSON](C)1986 C
.M.BLAKEMORE [RVSOFF] [SS][SS][s B]
.70 PRINTTAB(4)" [s B][27" "][s B]
.80 PRINTTAB(4)" [s B] DOUBLE SCREEN GA
ME FOR[3" "][s B]
.90 PRINTTAB(4)" [s B] C128 REQUIRES 40
& 80 COL [s B]
.100 PRINTTAB(4)" [s B]MONITORS AND TWO
JOYSTICKS [s B]
.110 PRINTTAB(4)" [c Z][27"[s C]"] [c X]
.120 PRINT"[6"[DOWN]]"TAB(10)" PLEASE ST
AND BY [4"."]":NEXT
.130 DIM A$(69),L$(29),O(29),D(29,6),BO(1
5),M(29),W(18)
```

```
BE .140 B=1:N=18:TS=1:GOSUB480
OD .150 IFI<7THENGOSUB640:GOTO290
MK .160 ONI-6GOSUB810,840,890,960,1080,1150,
1280,1390,1520,1670,1730,1860
DH .170 IF(M(CL)AND(BO(9)-1))THENBEGIN:ELSE3
80
EA .180 Y=0:FORX=0TO8:IFM(CL)ANDBO(X)THENY=X
+1:NEXT:ELSENEXT
AL .190 I=M(CL)ANDBO(9)-1:IFYAND(TH>IOR(TH+T
(3-P)>IANDCL=(3-P)))THENBEGIN:M(CL)=M(CL)
EA AND(BO(12)+BO(13)+BO(14)):PRINTA$(42+Y)
;" KILLED!":TH=0:H=H+Y:SLEEP6:GOSUB670
GI .320 I=INT(RND(1)*(Y*50)):G=G+I:PRINT"[s
Y]OU FOUND";I:PRINT"[s G]OLD PIECES!"
IG .330 IFY=7THENO(CL)=O(CL)ORB(3-P):L=LORB(
Z):GOSUB780:PRINT"[s T]HE BAGWOMAN DROPP
ED ALL HER CONTRABAND.":SLEEP5
HD .340 Y=0
KG .350 BEND
OJ .360 IFYANDY<8ANDRND(1)<.2+Y/10+((LANDBO(
1))*-.1)THENGOSUB780:PRINT"[s C][s R][s
U][s N][s C][s H]!![s S]TRUCK BY ";A$(42
+Y);"!":H=H-Y:IFY=7ANDLANDB(Z)=.THENB(Z)
=BN(Z)ORL:L=0
FN .370 BEND
.380 IFH<=0ANDCLTHENBEGIN:PRINT"[s Y]OU H
AVE [s D][s I][s E][s D][3"."]":IF(M(CL)
AND(BO(7)-1))THENPRINT"[s S][s L][s A][s
```



```
I][s N] BY THE ";A$(42+Y);"!"  
390 CL=0:Y=0:SLEEP7:GOSUB670:BEND  
400 IFC(Z)<>CLTHENTH=0  
410 C(Z)=CL:L(Z)=L:S(Z)=S:G(Z)=G:H(Z)=H:  
T(Z)=T:T(Z)=TH  
420 Y=0  
430 NEXT  
440 TH=0:GOTO210  
450 REM ** MENU SUBROUTINE **  
460 REM RETURNS VALUE CHOSEN IN "I"  
470 REM FIRE BUTTON TO CHOOSE  
480 WINDOW0,5,16,23,1  
490 PRINTCHR$(19);  
500 FORI=BT0N:PRINTTAB(TS);OF$;A$(I):NEX  
T  
510 PRINTCHR$(19);:I=B  
520 PRINTTAB(TS);HI$;A$(I)  
530 A$=""  
540 J=JOY(P):REM JOYSTICK PORT  
550 IFJAND128THENRETURN  
560 IFJ=5THENA$=CD$  
570 IFJ=1THENA$=CU$  
580 IFA$<>CD$ANDA$<>CU$THEN530  
590 PRINTCU$;TAB(TS);OF$;A$(I)  
600 IFA$=CD$THENI=I+1:IFI>NTHEN510  
610 IFA$=CU$THENPRINTCU$CU$;:I=I-1:IFI<B  
THEN510  
620 GOTO520  
630 REM MOVE  
640 IFD(CL,I)THENCL=D(CL,I):GOSUB670:TH=  
0:RETURN  
650 GOSUB780:PRINT"[s Y]OU CAN'T GO THAT  
WAY!":RETURN  
660 REM LOCATION  
670 IF(LANDBO(7))=.ANDCL>5ANDCL<20AND(CL  
<>C(3-P)ORCL=C(3-P)AND(L(3-P)ANDBO(7)=0)  
)THENGOSUB760:PRINT"[s Y]OU CAN'T SEE A  
THING IN THIS DARKNESS!":RETURN  
680 GOSUB760:PRINTHI$;L$(CL):PRINT"[s E]  
[s X][s I][s T][s S]";:FORX=1TO6:IFD(CL  
,X)THENPRINTA$(0+X);"[LEFT]";  
690 NEXT:PRINT"[LEFT]";  
700 GOSUB800:PRINTHI$;"[s Y]OU CAN NOW S  
EE [3"."]":FORX=0TO14:IF(O(CL)ANDBO(X))T  
HENPRINTA$(19+X)  
710 NEXT  
720 FORX=0TO8:IF(M(CL)ANDBO(X))THENPRINT  
"[RVSON][3"*"] [s T]HERE IS A [3"*"] ";C  
HR$(13);HI$;A$(43+X);" HERE!"  
730 NEXT:IFCL=C(3-P)THENPRINT:PRINTHI$;A  
$(40+(3-P));" IS HERE!"  
740 IFO(CL)=.AND(M(CL)AND(BO(9)-1))=0THE  
NPRINT"[s N]OTHING[4"."]":RETURN:ELSE RE  
TURN  
750 REM WINDOW ONE  
760 WINDOW0,0,39,4,1:RETURN  
770 REM WINDOW ONE W/O CLEAR  
780 WINDOW0,0,39,4,0:CHAR1,0,4:PRINTCHR$
```

```
IO (27);CHR$(81);:RETURN  
DC 790 REM WINDOW TWO W/CLEAR  
PB 800 WINDOW 17,5,39,23,1:RETURN  
810 REM INVENTORY  
DD 820 GOSUB800:PRINT"[RVSON][s I][s N][s V  
][s E][s N][s T][s O][s R][s Y]":FORX=0T  
O14:IF(BO(X)ANDL)THENPRINTA$(19+X)  
ED 830 NEXT:PRINTCHR$(13)" [RVSON][s G][s O  
][s L][s D][RVSOFF]";G:RETURN  
BN 840 REM ATTACK  
FE 850 GOSUB780:IF(M(CL)AND(BO(9)-1))=.THEN  
PRINT"[s N]OTHING HERE TO ATTACK!":RETUR  
N  
BB 860 IF(LANDBO(3)-1)=.THENPRINT"[s Y]OUR  
BARE FISTS ARE INEFFECTIVE[3"."]":RETURN  
PA 870 PRINT"[s S]LASH!":IFRND(1)<.2+H/10TH  
ENTH=TH+(LAND(BO(0)+BO(2)))+H/5:PRINT"[s  
Y]OU HIT[3"!"]"  
OF 880 RETURN  
IM 890 REM TAKE  
LI 900 GOSUB780:IFO(CL)=.THENPRINT"[s N]OTH  
ING HERE!":RETURN  
BN 910 I=.:FORX=0TO14:IF(LANDBO(X))THENI=I+  
1  
DL 920 NEXT:IFI=>4THENPRINT"[s Y]OUR [s L]O  
AD IS TOO HEAVY!":RETURN  
CI 930 B=52:N=B:FORX=0TO14:IF(O(CL)ANDBO(X)  
)THENA$(N)=A$(19+X):W(N-52)=BO(X):N=N+1  
LF 940 NEXT:A$(N)="[s N]OTHING":W(N-52)=.:G  
OSUB480:I=I-52  
GL 950 IFLANDW(I)THENGOSUB780:PRINT"[s Y]OU  
ALREADY HAVE ONE,GREEDY!":RETURN:ELSEL=  
(LORW(I)):O(CL)=O(CL)-W(I):GOSUB820:RETU  
RN  
GJ 960 REM DROP  
MC 970 IFL=.THENGOSUB780:PRINT"[s Y]OU ARE'  
NT CARRYING ANYTHING TO DROP!":RETURN  
JC 980 B=52:N=B:GOSUB820:FORX=0TO14:IF(LAND  
BO(X))THENA$(N)=A$(19+X):W(N-52)=BO(X):N  
=N+1  
BK 990 NEXT:A$(N)="[s N]OTHING":W(N-52)=.:G  
OSUB480:I=I-52:IFO(CL)ANDW(I)THENGOSUB78  
0:PRINT"[s Y]OU CAN'T DROP THAT HERE.":R  
ETURN:ELSEL=L-W(I):O(CL)=(O(CL)ORW(I)):G  
OSUB820  
MK 1000 GOSUB780  
CP 1010 IFCL=20AND(M(CL)ANDBO(14))=.AND(O(C  
L)AND(BO(3)+BO(4)+BO(5)))=BO(3)+BO(4)+BO  
(5)THENPRINT"[s A]DVENTURER, YOU HAVE CON  
QUERED THE [s D][s A][s R][s K][SS] [s F  
][s O][s R][s T][s R][s E][s S][s S]!!":  
ELSE RETURN  
PA 1020 SLEEP6:FORX=1TO2:PRINTCHR$(27);CHR$  
(88);CHR$(19);CHR$(19);:WINDOW0,0,39,24,  
1:CHAR1,0,5  
HI 1030 PRINT"[RVSON][3"[RIGHT]]"[8" "][s P  
]LAYER #";Z;"[LEFT] [s W]INS [3"!"]"[8" "  
]"  
CF
```



```

•1040 PRINT"[RVSON][3"[DOWN]]"[3"[RIGHT]]
  ][8" "][s C][s O][s N][s G][s R][s A][s
  T][s U][s L][s A][s T][s I][s O][s N][s
  S][SS][4"!"]][7" "]:PRINT"[3"[DOWN]]"[RI
  GHT][RIGHT][s T]HE THREE GEMS ARE IN THE
  TROPHY CASE." DO
•1050 PRINT"[DOWN][DOWN][RIGHT][RIGHT][s
  I] HOPE YOU HAVE ENJOYED YOUR QUEST [3".
  "]" EN
•1060 PRINTTAB(15)"[s G][s O][s O][s D][s
  B][s Y][s E]." OD
•1070 NEXT:FORX=0TO50:PRINTCHR$(7);:FORI=
  1TO75:NEXTI,X:END KC
•1080 REM INCANT EJ
•1090 GOSUB780:IFCLANDCL<>15THENPRINT"[s
  Y]YOU'RE NOT IN THE RIGHT PLACE FOR AN[4"
  "]"INCANTATION[3"."]:RETURN PP
•1100 IFCL=.ANDRND(1)<.05THENPRINT"[s Y]O
  UR [s D]EITY HAS INTERCEDED FOR YOU.":SL
  EEP6:CL=21:H=10:GOSUB670:RETURN LJ
•1110 IF(LANDBO(12))=.THENPRINT"[s S]PELL
  FIZZLED.":RETURN PH
•1120 IFCL=15THENH=H+25:L=L-BO(12):X=(23+
  (RND(0)*7)):O(X)=O(X)+BO(12):IFC(3-P)=0T
  HENC(3-P)=15 GL
•1130 IFCL=0THENL=L-BO(12):X=(23+(RND(0)*
  7)):O(X)=O(X)+BO(12):CL=15:H=10:D(0,5)=1
  5 NO
•1140 PRINT"[s T]HE RING GLOWS BRIGHTLY A
  ND VANISHES[3"."]:SLEEP5:GOSUB670:RETUR
  N PJ
•1150 REM CAST SPELL DM
•1160 IFS=.THENGOSUB780:PRINT"[s S]ORRY[3
  "."][s Y]OUR [s M]AGIC IS ALL GONE.":RET
  URN PN
•1170 B=52:N=B:FORX=0TO7:IF(BO(X)ANDS)THE
  NA$(N)=A$(33+X):W(N-52)=X+1:N=N+1 IB
•1180 NEXT:A$(N)="[s N]O [s S]PELL":W(N-5
  2)=.:GOSUB480:GOSUB780:IFW(I-52)THENS=S-
  BO(W(I-52)-1):ONW(I-52)GOSUB1200,1210,12
  20,1230,1240,1250,1260,1270 BB
•1190 RETURN IM
•1200 IFM(CL)ANDRND(1)>.9THENM(CL)=(M(CL)
  -(BO(9)-1)):PRINT"[s F]EAR [s S]PELL CAS
  T[3"."][s B][s O][s O][3"!"]":RETURN:ELS
  EPRINT"[s S]PELL FIZZLED[4"."]:RETURN AP
•1210 PRINT"[s H]EALING SPELL CAST[3"."]"
  :H=H+10:RETURN KD
•1220 TH=TH+100:PRINT"[s Z][s Z][s E][s E
  ][s O][3"[s W]]!![s M]AGIC [s M]ISSILE
  FIRED!":RETURN MF
•1230 TH=TH+500:PRINT"[s Z][s A][s H][s O
  ][s R][4"[s F]]"[3"!"]][s F][s I][s R][s
  E][s B][s A][s L][s L][SS]FIRED!":RETURN PD
•1240 X=INT(RND(1)*22+1):IFX=10ORX=14ORX=
  19THEN1240:ELSEIFCL<>C(3-P)THENPRINT"[s
  N]O PLAYER HERE!":RETURN:ELSEC(3-P)=X:PR
  INT"[s W]HISSH![s T]RANSPORTED.":SLEEP5:
  GOSUB670:RETURN BH
•1250 CL=C(3-P):GOSUB760:GOSUB670:GOSUB78
  0:PRINT"[s T]HE VISION WAVERS FOR A MOME
  NT.":CL=C(P):SLEEP5:GOSUB760:RETURN FM
•1260 IFCL=12THENPRINT"[s A] LUMP OF COPP
  ER TRANSMUTES INTO GOLD!":G=G+1000:GOSUB
  820:RETURN IJ
•1270 IFCL=.THENCL=21:H=10:GOSUB670:GOSUB
  780:PRINT"[RVSON] [s Y]OU HAVE BEEN [s R
  ][s E][s S][s U][s R][s R][s E][s C][s T
  ][s E][s D]! [RVSOFF]":RETURN:ELSE PRIN
  T"[s S]PELL [s F]IZZLED!":RETURN DF
•1280 REM SPEAK AP
•1290 GOSUB780:IFCL>5ANDCL<19AND(LANDBO(7
  )=.)THENPRINT"[s H] [s E] [s L] [s P] [
  3"!"]":GOTO1330 MN
•1300 IFCL=13THENPRINT"[s H][s E][s L][s
  L][s O][3"."][s H]ELLO[3"."]HELLO[3"."]
  "":GOTO1330 JK
•1310 IFCL=.THENPRINT"[s I]T'S HOPELESS'
  SAYS ONE OF THE SPIRITS.":GOTO1330 JD
•1320 PRINT"[s H]ELLO.'" GI
•1330 IFM(CL)ANDBO(1)THENPRINT"[s M][s E]
  [s G][s U][s A][s R][s D][SS][s B][s R]
  [s I][s D][s G][s E][3"!"]" FB
•1340 IFM(CL)ANDBO(5)THENPRINT"[s D][s I]
  [s E],[s K][s N][s A][s V][s E][4"!"]" ML
•1350 IFM(CL)ANDBO(6)THENPRINT"[s W]ELL,I
  T'S GOOD TO SEE A YOUNG PERSON WITH MANN
  ERS!" CD
•1360 IFM(CL)ANDBO(7)THENPRINT"[s G]OD BL
  ESS,YOUNG FRIEND.[s H]AVE YOU SEEN MY ST
  AFF AROUND?[s I] AM SO SHORT,AND [s I] O
  FTEN USE IT TO EXTEND MY REACH[3"."]" DM
•1370 IFM(CL)ANDBO(8)THENPRINT"[s Y]OU'RE
  WELCOME TO WHATEVER [s I] HAVE.[s B]UT[
  3" "]YOU MUST FIND IT,MY GOOD FELLOW." GP
•1380 RETURN IM
•1390 REM LOCK/UNLOCK LM
•1400 GOSUB780 CP
•1410 IFCL=9AND(LANDBO(9))THEND(CL,1)=XOR
  (D(CL,1),10):PRINT"[s C]LICK[4"."]";A$(2
  8):SLEEP3:GOSUB670:RETURN CK
•1420 IFCL=18AND(LANDBO(10))THEND(CL,3)=X
  OR(D(CL,3),19):PRINT"[s C]LICK[4"."]";A$
  (29):SLEEP3:GOSUB670:RETURN AB
•1430 IFCL=2AND(LANDBO(10))THEND(CL,6)=XO
  R(D(CL,6),14):PRINT"[s C]LICK[4"."]";A$(
  29):SLEEP3:GOSUB670:RETURN JC
•1440 IFCL=3AND(LANDBO(10))THEND(CL,2)=XO
  R(D(CL,2),6):PRINT"[s C]LICK[4"."]";A$(2
  9):SLEEP3:GOSUB670:RETURN KA
•1450 IFCL=21AND(M(CL)ANDBO(13))=.THENPRI
  NT"[s T]HE MACHINE DOOR IS OPEN.":SLEEP5
  :GOSUB670:RETURN BH
•1460 IFCL=21AND(LANDBO(11))THENO(CL)=O(C
  L)ORBO(4):M(CL)=M(CL)ANDBO(9)-1:PRINT"[s
  C]LICK[3"."][s C]AHCHUNK![s L]OOK WHAT
  URN

```



BH	THE SOFTDRINK MAN LEFT BEHIND!":SLEEP5:G	GE	•1660 PRINT"[s N]O USE FOR";A\$(18+I);"HER	BP
8	OSUB670:RETURN		E!":RETURN	
IE	•1470 IFCL=20AND(LANDBO(11))THENBEGIN:M(C		•1670 REM DRINK	AJ
FM	L)=XOR(M(CL),BO(14)):PRINT"[s C]LICK[4".		•1680 GOSUB780	CP
PP	"]";A\$(30):SLEEP3	HP	•1690 IFCL=21THENPRINT"[s P]OP[3"."]][s F]	
IB	•1480 IF(M(CL)ANDBO(14))THENPRINT"[s T]RO		IZZ[3"."]][s A][s A]AAH[3"."]][s W]HATTA R	
IJ	PHY CASE CLOSED[3"."]":ELSE PRINT"[s T]R		EFRESHING BREAK FROM ALL THIS ADVENTURI	
B	OPHY CASE OPEN[3"."]"	EM	NG!":H=H+0.2:RETURN	FA
R	•1490 RETURN	IM	•1700 IFCL=7THENPRINT"[s A][s A]AAH[3"."]	
T	•1500 BEND	BG	[s W]HATTA REFRESHING BREAK FROM[3" "]A	
N	•1510 IFCL=9ORCL=18ORCL=20ORCL=30ORCL=20ORC		LL THIS ADVENTURING!":H=H+0.5:RETURN	KH
DF	L=21THENPRINT"[s Y]OU DON'T HAVE THE RIG		•1710 IFCL=17THENPRINT"[s Y]UUCCH..[s T]H	
AP	HT KEY.";CHR\$(13);"[s K]EEP [s L]OOKING!		AT STUFF MADE YOU SICK[3"!"]":H=H-5:RETU	
7	":RETURN:ELSE PRINT"[s U]NLOCK WHAT?!?":		RN	MM
[	RETURN	KK	•1720 PRINT"[s D]RINK WHAT?":RETURN	CO
MN	•1520 REM USE	IB	•1730 REM TRADE	PJ
s	•1530 IFL=.THENGOSUB780:PRINT"[s Y]OU ARE		•1740 IFCL<>22THENGOSUB780:PRINT"[s Y]OU'	
[	'NT CARRYING ANYTHING TO USE!":RETURN	CM	RE NOT AT THE [s T][s R][s A][s D][s I][	
JK	•1540 B=52:N=B:GOSUB820:FORX=0TO14:IF(LAN		s N][s G][SS][s P][s O][s S][s T].":RETU	OD
'	DBO(X))THENA\$(N)=A\$(19+X):W(N-52)=X+1:N=		RN	
JD	N+1	JI	•1750 A\$(52)="[s B][s U][s Y] [s E][s Q][	
GI	•1550 NEXT:A\$(N)="[s N]OTHING":W(N-52)=.	GJ	s U][s I][s P][s M][s E][s N][s T]:A\$(5	
[	GOSUB480:I=I-52:I=W(I):IFI=.THENRETURN		3)="[s B][s U][s Y][SS][s M][s A][s G][s	
[	•1560 GOSUB780:IFCL=13ANDI=3AND(M(CL)ANDB		I][s C]:A\$(54)="[s N][s O][SS][s P][s	
FB	O(12))THENPRINT"[s Y]OU HOOKED A BAG OF		U][s R][s C][s H][s A][s S][s E]":B=52:N	
[	GOLD IN THE GRATE !":G=G+1500:M(CL)=M(CL)	CM	=54:GOSUB480:ONI-51GOSUB1760,1810:RETURN	KC
ML	-BO(12):RETURN		•1760 I=.:FORX=0TO14:IF(LANDBO(X))THENI=I	
I	•1570 IFCL=13ANDI=3AND(M(CL)ANDBO(12))=.T	LO	+1	DL
N	HENPRINT"[s T]HE GRATE IS EMPTY[3"."]":R		•1770 NEXT:IFI=>4THENGOSUB780:PRINT"[s Y]	
CD	ETURN		OUR [s L]OAD IS TOO HEAVY!":RETURN	AJ
T	•1580 IFCL=12ANDI=14AND(M(CL)ANDBO(13))TH		•1780 B=52:N=B:FORX=0TO14:IF(TRANDBO(X))T	
0	ENM(CL)=M(CL)-(BO(12)+BO(13)):O(CL)=O(CL)		HENA\$(N)=A\$(19+X):W(N-52)=BO(X):N=N+1	KH
[	+BO(9):PRINT"[s Y]OU DUG UP A BAG OF GO		•1790 NEXT:A\$(N)="[s N]OTHING":W(N-52)=.	
DM	LD!":G=G+500:RETURN	NO	GOSUB480:I=I-52	GL
E	•1590 IFCL=11ANDI=7THENC=12:PRINT"[s Y]O		•1800 IFG<(I+1)*200THENGOSUB780:PRINT"[s	
[	U CLIMBED DOWN THE ROPE TO THE BOTTOM OF		Y]OU DON'T HAVE ENOUGH GOLD.[s S]ORRY!":	
GP	THE SHAFT,AND PULLED IT DOWN AFTER[3" "	BH	RETURN:ELSEL=(LORW(I)):G=G-((I+1)*200):G	JC
IM	]YOU[3"."]":RETURN		OSUB820:RETURN	
LM	•1600 IFCL=14ANDI=4AND(M(CL)ANDBO(13))THE		•1810 B=52:N=B:FORX=0TO7:IF(PSANDBO(X))TH	
CP	NBEGIN:PRINT"[s T]HE";A\$(22);"CUT A NEAT		ENA\$(N)=A\$(33+X):W(N-52)=BO(X):N=N+1	KD
R	HOLE IN THE[6" "]MIRROR.[s Y]OU FOUND A	KE	•1820 NEXT:A\$(N)="[s N]OTHING":W(N-52)=.	
2	BAG OF GOLD.":G=G+1500	LB	GOSUB480:I=I-52	GL
CK	•1610 O(CL)=O(CL)ORBO(11):M(CL)=M(CL)-BO(		•1830 IFG<(I+1)*100THENGOSUB780:PRINT"[s	
[	12)-BO(13):RETURN:BEND		Y]OU DON'T HAVE ENOUGH GOLD.[s S]ORRY!":	
S	•1620 IFCL=14ANDI=4AND(M(CL)ANDBO(13))=.T	GC	RETURN:ELSEL=(SORW(I)):G=G-((I+1)*100):G	GM
AB	HENPRINT"[s T]HE MIRROR ALREADY HAS A HO		OSUB820:RETURN	
0	LE CUT IN IT.[s S]OMEBODY WAS HERE BEFOR		•1840 :	DI
[	E YOU[3"."]":RETURN		•1850 REM READ	LJ
JC	•1630 IFCL=17ANDI=9AND(M(CL)ANDBO(12))THE		•1860 IFCL=21THENBEGIN:WINDOW0,0,39,24,1	BM
0	NPRINT"[s Y]OU FOUND A CACHE OF GOLD IN		•1870 PRINTTAB(10)"[RVSON] [s D][s A][s R	
E	THE OYSTER!":M(CL)=M(CL)-BO(12)-BO(13):O	NI	][s K][SS][s F][s O][s R][s T][s R][s E]	AP
KA	(CL)=O(CL)+BO(5):G=G+1500:RETURN		[s S][s S][SS]"	
[	•1640 IFCL=17ANDI=9AND(M(CL)ANDBO(12))=.T	NI	•1880 PRINT" [s H]ELLO![s W]ELCOME TO [s	
BH	HENPRINT"[s T]HE [s O]YSTER SHELL HAS AL		D]ARK [s F]ORTRESS![s T]HIS IS AN EXCITI	
[	READY BEEN PRIED OPEN[4"."]":RETURN		NG TWO PLAYER,DOUBLE SCREEN[4" "][s A][s	
[	•1650 IFCL=17ANDI=1THENPRINT"[s T]HE [s O	DC	D][s V][s E][s N][s T][s U][s R][s E] G	
[	]YSTER SQUIRTED WATER IN YOUR FACE!":RET		AME,BY [s C]LEVE [s B]LAKEMORE,[6" "]ESP	GB
[	URN		ECIALLY FOR [s A][s H][s O][s Y]!	



1890 PRINT"[s T]HE OBJECT OF THE GAME IS TO ACQUIRE THE THREE PRECIOUS GEMS HIDDEN INSIDE THE [s F]ORTRESS AND RETURN THEM TO THE TROPHY CASE DOWNSTAIRS BEFORE YOUR"		[SS][s S][s T][s A][s S][s H]![RVSOFF]": RETURN	AJ
1900 PRINT"OPPONENT.[s Y]OU WILL ENCOUNTER FRIENDS AND FOES, SECRET CAVERNS AND A WESOME MAGIC[3" "]INSIDE THE [s D][s A][s R][s K][SS][s F][s O][s R][s T][s R][s E][s S][s S].[s R]EMEMBER YOUR OPPONENT IS ALSO STRUGGLING"	BG	2050 IFCL=15THENPRINT"[s Y]OU CAN'T UNDERSTAND THE HIEROGLYPHS,BUT IF [s I] TOOK A WILD GUESS [s I] WOULD SAY[5" "]THERE WAS SOME REFERENCE TO A RING OF[3" "]POWER[3".]":RETURN	LP
1910 PRINT"AGAINST YOU,BUT YOU MAY HAVE TO[9" "]COOPERATE OR EVEN TEAM UP IN ORDER TO[3" "]OVERCOME CERTAIN OBSTACLES."	AN	2060 PRINT"[s R]EAD [s W]HAT?!?":RETURN	LF
1920 PRINT"[s B]E COURAGEOUS,USE YOUR HEAD,AND NEVER[3" "]GIVE UP.[s G]OOD LUCK TO BOTH OF YOU,AND MAY THE BEST MAN WIN! [s I] OPERATE THE TRADING BOOTH NEXT DOOR,AND [s I]"	FF	2070 DATA " [s N]ORTH "," [s S]OUTH "," [s E]AST "," [s W]EST "," [s U]P "," [s D]OWN "," [s I]NVENTORY "	LA
1930 PRINT"SELL [s A]DVENTURER'S SUPPLIES,AS WELL AS AN OCCASIONAL BIT OF MAGIC. [s D]ROP IN WHEN[3" "]YOU GET SOME GOLD."	CL	2080 DATA " [s A]TTACK "," [s T]AKE "," [s D]ROP "," [s I]NCANT "," [s C]AST [s S]PELL "," [s S]PEAK "	JI
1940 PRINTTAB(10)"[RVSON] [s C]LEVE [s B]LAKEMORE ":SLEEP15	GI	2090 DATA " [s L]OCK/[s U]NLOCK "," [s U]SE "," [s D]RINK "," [s T]RADE "," [s R]EAD "	DE
1950 RETURN	NJ	2100 DATA " [s S]WORD "," [s S]HIELD "," [s S]TAFF "," [s D]IAMOND "," [s E]MERALD "," [s P]EARL "," [s R]OPE "," [s L]ANTERN "	NB
1960 BEND	IM	2110 DATA " [s C]ROWBAR "," [s C]OPPER [s K]EY "," [s I]RON [s K]EY "," [s S]ILVER [s K]EY "," [s G]OMAR'S [s R]ING "," [SS][s S]HOVEL "	OG
1970 GOSUB780:IFCL=9THENPRINT"[RVSON] [s R][s E][s Q][s U][s I][s E][s S][s C][s A][s T][SS][s I][s N][SS][s P][s A][s C][s E] ":RETURN	BG	2120 DATA"[s S]PELL OF [s F]EAR","[s H]EALING [s S]PELL","[s M]AGIC [s M]ISSILE","[s F][s I][s R][s E][s B][s A][s L][s L]","[s T]RANSPORTATION","[s C]LAIRVOYANCE","[s T]RANSMUTATION","[s R]ESURRECTION"	JO
1980 IFCL=.THENPRINT"[RVSON]--[s A][s B][s A][s N][s D][s O][s N][SS][s A][s L][s L][s H][s O][s P][s E],[s Y][s E][SS][s W][s H][s O][SS][s E][s N][s T][s E][s R][SS][s H][s E][s R][s E]--":RETURN	DP	2130 DATA "[s P]LAYER #1","[s P]LAYER #2"," [s G]IANT [s S]PIDER"," [s H]ORRID [s T]ROLL"," [s S]NARLING [s R]AT","[s E]VIL [s S]ORCERER"	EF
1990 IFCL=19THENPRINT"[s T]HERE IS SOME GRAFFITI HERE ON THE WALL--[s C][s H][s E][s C][s K][SS][s T][s H][s E][SS][s S][s O][s D][s A][s M][s A][s C][s H][s I][s N][s E]":RETURN	GN	2140 DATA "[s G]RIMACING[SS][s O]RC"," [s B]LACK [s K]NIGHT"," [s O]LD [s B]AGWOMAN"," [s H]OODED [s M]ONK "," [s W]HITE [s R]ABBIT"	CC
2000 IFCL=14THENPRINT"[s M]IRROR,MIRROR ON THE WALL[3".]":RETURN	KB	2150 REM LOCATIONS	IH
2010 IFCL=3THENPRINT"[RVSON] * [s N][s O][s T][s R][s E][s S][s P][s A][s S][s S][s I][s N][s G]! * ":RETURN	ID	2160 DATA"[s Y]OU ARE IN THE [s L]AND OF [s H]ADES.[s T]HERE IS NO WAY OUT.[s L]OST [s A]DVENTURERS' SPIRITS ROAM ENDLESSLY AROUND YOU,MOANING THEIR FATE."	LO
2020 IFCL=8THENPRINT"HETAY RISONERSAY AVEHAY AAY ECRETSAY[4" "]ASSAGWAYPAY[3".]"	FC	2170 DATA"[s Y]OU'RE IN [s S]HADOW[s T]HORNS [s W]OODS.[s T]HE BRUSH IS THICK AND TANGLED,WITH PATHS GOING OFF IN VARIOUS DIRECTIONS."	DI
2030 IFCL=20THENPRINT"[RVSON] [s U][s N][s L][s O][s C][s K][SS][s C][s A][s S][s E][SS][s W][s I][s T][s H][SS][s S][s I][s L][s V][s E][s R][SS][s K][s E][s Y] ":RETURN	BL	2180 DATA"[s Y]OU'RE BY THE [s R]ABBIT'S [s H]OME.[s A] GNARLED[3" "]HICKORY-STUMP DOOR IS SEALED IN THE SIDE OF A GRAVELLY BURROW NESTLED IN SOME[3" "]BRAMBLES."	JP
2040 IFCL=22THENPRINT"[RVSON][s I][s F][SS][s Y][s O][s U][s G][s O][s T][SS][s T][s H][s E][SS][s C][s A][s S][s H],[s W][s E][s G][s O][s T][s T][s H][s E]	BA	2190 DATA"[s Y]OU'RE ON THE BRIDGE ACROSS THE [s C]HASM. [s T]HE [s D]ARK [s F]ORTRESS TOWERS OVERHEAD,IT'S MASSIVE STEEL PLATED DOORS SET WITH A[3" "]SOLID LOCKING LOCK."	OJ



AJ	•2200 DATA"[s Y]OU'RE AT THE LOWER PLATEAU OF THE [s C]HASM BEYOND THE WOODS.[s A] SHEER CANYON WALL[3" "]IS ON THE OTHER SIDE OF THE RIVER."	OK	•2330 DATA"[s Y]OU'RE AT THE [s S]UBTERRANEAN [s C]REEK,A COLD AND SLUGGISH POOL EMERGING FROM A CRACK IN THE SOUTH WALL.[s A] LARGE OYSTER IS HALF SUBMERGED IN THE WATER."	KP
LP	•2210 DATA"[s Y]OU'RE UPSTREAM OF [s S]HADOW[s T]HORN [s C]HASM,THE DEEP AND MISTY GORGE THAT SURROUNDS THE [s D]ARK [s F]ORTRESS[3""]"	PF	•2340 DATA"[s Y]OU'RE IN THE [s T]ORTURER'S [s S]DUNGEON.[s T]HERE IS AN EMPTY CELL HERE FILLED WITH RATS AND RUBBISH."	DI
LA	•2220 DATA"[s Y]OU'RE IN THE [s H]ALL OF [s R]ULERS,A LONG[5" "]MUSTY PASSAGE RUNNING [s E]-[s W],WITH EXITS IN MANY DIRECTIONS."	PN	•2350 DATA"[s Y]OU'RE IN THE [s P]RISONER'S [s S]ESCAPE [s T]UNNEL, A VAST ANTECHAMBER CONNECTING TO A[5" "]NORTHERN TUNNEL."	JM
JI	•2230 DATA"[s Y]OU'RE AT [s S]TATUE INTERSECTION,BY AN OLD BLUE GRANITE FOUNTAIN.[s C]LEAR WATER POURS FROM AN ORNATE STONE ANGEL'S UPHELD JAR INTO A MOTTLED BASIN."	OL	•2360 DATA"[s Y]OU'RE IN THE [s T]ROPHY [s R]OOM.[s A] LARGE[7" "]GLASS CASE,ILLUMINATED WITH FLOURESCENT LIGHTS,SITS AGAINST THE NORTH WALL."	FM
DE	•2240 DATA"[s Y]OU'RE IN [s L]IBRARY.[s A] MASSIVE,ANCIENT TOME RESTS OPEN ON A PEDESTAL NEARBY,[7" "]INSCRIBED WITH STRANGE SCRIPT IN AN[5" "]UNKNOWN TONGUE[3""]"	PH	•2370 DATA"[s Y]OU'RE IN THE [s A]DVENTURER'S LOUNGE.[s T]HERE IS A [s C]OKE [s M]ACHINE HERE,AND A SET OF[5" "]LAMINATED INSTRUCTIONS TAPED TO THE EAST WALL."	KK
OG	•2250 DATA"[s Y]OU'RE IN [s M]ONK'S [s R]ETREAT,A SECRET [s N]-[s S][3" "]TUNNEL SLANTING UPWARD,ENDING AT A LARGE GRANITE SLAB.[s T]HE SLAB HAS A MITRED[5" "]CRUSTY COPPER PLATE ON IT."	HL	•2380 DATA"[s Y]OU'RE AT THE [s A]DVENTURER'S [s T]RADING [s P]OST.[s A] VERY SERIOUS LOOKING YOUNG MAN SITS[3" "]BEHIND A GLASS WINDOW IN A BOOTH HERE, WEARING A NAMETAG-[s C].[s M].[s B].'"	FI
JO	•2260 DATA"[s Y]OU'RE IN THE [s C]RYPT OF [s K]INGS,A COBWEBBY TOMB LITTERED WITH SKELETAL REMAINS,THE FINAL RESTING PLACE OF THE GREAT WARRIOR [s K]ING [s G]OMARR."	JH	•2390 DATA"[s Y]OU'RE DEEP IN THE [s S]HADOW[s T]HORN [s H]EDGE[4" "] [s M]AZE.[s H]IGH WALLS OF THICK,THORNY BUSHES PARALLEL YOUR PATH.[s T]URNS AND TWISTS LEAD IN EVERY DIRECTION[3""]"	MB
EF	•2270 DATA"[s Y]OU'RE ABOVE THE [s S]HIFTING [s S]HAFT,A DEEP PIT THAT TWISTS ODLY AS IT GOES DOWN. [s I]T IS PERHAPS 50-60 FEET TO THE MOSSY[3" "]FLOOR BELOW."	HP	•2400 REM DIRECTIONS	KH
CC	•2280 DATA"[s Y]OU'RE IN THE [s C]OPPER [s M]INES BENEATH THE [s F]ORTRESS.[s M]OUNDS OF COPPER ORE PILINGS[3" "]SURROUND YOU,AND A DARK TRESTLED SHAFT LEADS EAST[3""]"	AH	•2410 REM N,S,E,W,U,D	IM
LO	•2290 DATA"[s Y]OU'RE IN A [s L]IMESTONE [s C]AVERN FILLED WITH ELEGANT STALACTITE SCULPTURE.[s T]HERE IS AN IRON GRATE SET INTO THE FLOOR OVER A PIT FILLED WITH RUBBISH."	FN	•2420 DATA0,0,0,0,0,0	JC
DI	•2300 DATA"[s Y]OU'RE IN THE [s R]ABBIT'S [s B]URROW.[s T]HERE IS AN OAK TABLE AND A[SS]LARGE GLASS MIRROR ON THE SOUTH WALL.[s T]HERE IS SOMETHING[5" "]CARVED ON THE WOOD TABLE."	BP	•2430 DATA28,3,2,5,0,0	KH
JP	•2310 DATA"[s Y]OU'RE IN THE [s S]ORCERER'S [s S]DEN,A LARGE[4" "]CAVE STREWN WITH HIEROGLYPHICS AND MAGIC PAINTINGS."	MI	•2440 DATA0,4,0,1,0,0	IN
OJ	•2320 DATA"[s Y]OU'RE IN A SLOPING [s E]-[s W] PASSAGE THAT[4" "]WINDS BENEATH A SHAFT IN THE CEILING."	MB	•2450 DATA1,0,4,5,5,0	KD
			•2460 DATA2,0,0,3,3,0	IA
			•2470 DATA1,0,3,1,0,3	LC
			•2480 DATA3,7,8,6,0,0	LA
			•2490 DATA6,11,0,6,0,0	MN
			•2500 DATA6,0,9,6,0,0	LL
			•2510 DATA0,0,0,8,0,0	JK
			•2520 DATA0,9,17,0,0,0	NG
			•2530 DATA7,0,6,0,6,0	LF
			•2540 DATA0,0,13,0,0,0	MP
			•2550 DATA0,0,15,12,0,0	AE
			•2560 DATA0,0,11,0,2,0	KH
			•2570 DATA16,0,0,13,0,0	PK
			•2580 DATA0,15,18,11,0,18	FE
			•2590 DATA0,0,0,10,0,0	NG
			•2600 DATA0,0,0,0,16,0	NC
			•2610 DATA1,0,0,18,0,0	KH
			•2620 DATA0,0,0,0,21,0	MC
			•2630 DATA0,0,0,22,0,20	PF
			•2640 DATA0,23,21,0,0,0	NH
			•2650 DATA 22,23,24,26,0,0	KF
			•2660 DATA 0,0,24,25,24,0	EA
			•2670 DATA 26,25,27,0,0,0	DF



•2680 DATA 0,25,0,26,26,0  
 •2690 DATA 24,29,24,0,0,23  
 •2700 DATA 26,28,29,1,0,0  
 •2710 DATA 25,27,0,29,0,28  
 •2720 REM OBJECTS  
 •2730 DATA 512,0,0,0,64,0,0,0,0,4100,0,  
 0,0,0,0,0,0,8,0,0,0,128,0,1024,0,128,0,  
 1024  
 •2740 REM MONSTERS & FLAGS  
 •2750 DATA 0,1,0,2,0,0,32,0,64,128,32,0,1  
 2288,12288,12544,8,128,12288,4,16,16384,  
 12288,0

GM  
 HM  
 GN  
 LL  
 LK  
 AP  
 PO  
 IB

C128: 85 AF A9 00 85 02 85 B2 C6  
 C130: 85 B3 20 77 C1 B9 AA C0 E7  
 C138: 85 B0 B9 AB C0 85 B1 8A 56  
 C140: 18 65 B1 29 1F 85 B1 E6 D5  
 C148: 02 20 77 C1 C8 C8 C8 C8 C6  
 C150: D0 BE 18 A5 FC 69 40 85 C9  
 C158: FC 90 02 E6 FD 84 8B A4 81  
 C160: FE E8 E0 20 D0 AA A5 8B F5  
 C168: 18 69 04 A8 E6 FF A5 FF 23  
 C170: A2 00 C9 04 D0 98 60 84 2F  
 C178: 8E 86 8F A4 B1 A6 B0 B9 84  
 C180: 10 C8 10 0E 18 B9 D0 C7 E1  
 C188: 65 B3 85 B3 90 10 E6 AF 12  
 C190: D0 0C 38 A5 B3 F9 D0 C7 91  
 C198: 85 B3 B0 02 C6 AF B9 30 E4  
 C1A0: C8 30 0E 18 B9 F0 C7 65 97  
 C1A8: B2 85 B2 90 10 E6 AE D0 9A  
 C1B0: 0C 38 A5 B2 F9 F0 C7 85 85  
 C1B8: B2 B0 02 C6 AE A5 02 F0 2C  
 C1C0: 25 8A 48 98 48 A5 AF 0A F8  
 C1C8: 18 65 AF 85 8B A5 AE 29 84  
 C1D0: 07 AA A5 AE 4A 4A 4A 18 CD  
 C1D8: 65 8B A8 BD 32 C0 11 FC 31  
 C1E0: 91 FC 68 A8 68 AA CA E0 3F  
 C1E8: FF D0 94 A6 8F A4 8E 60 18  
 C1F0: A2 00 A0 01 BD 00 10 C9 CC  
 C1F8: B8 90 01 C8 C9 07 B0 01 8E  
 C200: C8 AD 09 10 C9 08 B0 06 18  
 C208: A9 00 8D 41 10 EA C0 01 3D  
 C210: F0 06 A0 00 98 9D 40 10 2E  
 C218: E0 02 B0 07 A9 02 8D 40 2C  
 C220: 10 D0 26 BD 40 10 F0 21 47  
 C228: BD 30 10 C9 0A 90 1A A5 4A  
 C230: A2 BC F8 07 29 03 F0 01 AD  
 C238: 88 A9 00 9D 30 10 98 29 0A  
 C240: 9F 09 80 9D F8 07 20 CE F5  
 C248: C2 86 FF BC 38 10 98 FE 2E  
 C250: 30 10 20 A9 C2 8A 18 69 29  
 C258: 08 AA 20 A9 C2 A6 FF 88 C6  
 C260: C0 FF D0 EB E8 E0 08 D0 80  
 C268: 89 A9 00 85 FE 85 FF AA 50  
 C270: A8 A9 01 85 FC BD 40 10 54  
 C278: F0 06 A5 FC 05 FE 85 FE 9A  
 C280: BD 00 10 0A 99 00 D0 90 53  
 C288: 06 A5 FC 05 FF 85 FF BD 79  
 C290: 08 10 99 01 D0 06 FC E8 FF  
 C298: C8 C8 E0 08 90 D7 A5 FE 20  
 C2A0: 8D 15 D0 A5 FF 8D 10 D0 28  
 C2A8: 60 BD 50 10 30 10 18 BD 3D  
 C2B0: 10 10 7D 20 10 9D 20 10 4C  
 C2B8: 90 03 FE 00 10 60 38 BD B1  
 C2C0: 20 10 FD 10 10 9D 20 10 DC  
 C2C8: B0 03 DE 00 10 60 BD F8 82  
 C2D0: 07 29 1F A8 B9 D0 C7 9D B8  
 C2D8: 18 10 B9 10 C8 49 80 9D FA  
 C2E0: 58 10 B9 F0 C7 4A 9D 10 B3  
 C2E8: 10 B9 30 C8 9D 50 10 60 0A  
 C2F0: A2 00 8A 9D 00 D4 9D 80 AE

## VORTEX FROM PAGE 20

Starting address in hex: C000

Ending address in hex: C7E0

SYS to start: 49152

Flankspeed required for entry! See page 111.

C000: 4C DA C6 20 CC C3 A2 F2 34  
 C008: A0 00 C8 D0 FD E8 D0 F8 F2  
 C010: A9 00 8D 08 D4 A9 51 8D AC  
 C018: 0B D4 20 F0 C1 20 59 C4 09  
 C020: 4C 56 C5 AD 8D 02 F0 DB 92  
 C028: D0 F9 09 42 24 32 5A 62 51  
 C030: 12 3A 80 40 20 10 08 04 79  
 C038: 02 01 02 03 29 05 50 07 C5  
 C040: 78 07 A0 07 C9 05 F2 03 2C  
 C048: 9F 11 11 11 11 20 20 20 8C  
 C050: 20 20 20 20 20 20 20 20 51  
 C058: 20 20 3E 3E 20 55 4F 52 2C  
 C060: 54 45 58 20 3C 3C 0D 11 09  
 C068: 9E 20 20 20 20 20 20 46 0E  
 C070: 31 20 3D 20 4E 4F 56 49 5C  
 C078: 43 45 20 20 20 46 33 20 FA  
 C080: 3D 20 45 58 50 45 52 54 B7  
 C088: 20 20 20 20 20 20 20 53 BC  
 C090: 43 4F 52 45 3A 20 30 30 75  
 C098: 30 30 30 30 30 20 20 4C 16  
 C0A0: 45 56 45 4C 3A 20 30 31 89  
 C0A8: 05 1E 0D 0E 05 02 0D 12 0D  
 C0B0: 00 00 09 09 09 09 0A 1C FA  
 C0B8: 00 00 09 17 09 17 0A 04 07  
 C0C0: FF FF FF FF 07 0C 0E 1E FF  
 C0C8: 07 14 0E 02 04 0A 07 18 21  
 C0D0: FF FF FF FF 06 10 0C 00 F2  
 C0D8: FF FF FF FF 09 10 11 00 03  
 C0E0: 09 15 11 05 09 19 0F 09 4F  
 C0E8: 09 1C 11 0C FF FF FF FF 2B  
 C0F0: A9 20 85 FD A9 00 85 FC 6A  
 C0F8: A8 AA 91 FC C8 D0 FB E8 59  
 C100: E6 FD E0 20 D0 F4 86 FD 30  
 C108: A2 00 8A 86 FF A8 84 FE E7  
 C110: B9 A8 C0 85 B0 B9 A9 C0 8D  
 C118: 85 B1 30 36 18 8A 65 B1 6F  
 C120: 29 1F 85 B1 A9 0B 85 AE 88



C2F8:	03	9D	00	10	E8	E0	80	D0	C4	C4C8:	F0	AD	01	10	E9	07	4A	4A	FD
C300:	F2	AA	E9	08	9D	60	10	E8	86	C4D0:	A8	B1	AE	C9	40	90	2A	A5	44
C308:	E0	08	90	F6	A9	93	20	D2	A8	C4D8:	AF	C9	07	B0	24	A9	00	8D	65
C310:	FF	A9	00	8D	21	D0	A9	0B	ED	C4E0:	81	03	8D	41	10	84	B0	20	99
C318:	8D	20	D0	A2	00	BD	3A	C0	F1	C4E8:	97	E0	A4	B0	A5	8E	25	AB	BB
C320:	85	FE	A8	18	BD	3B	C0	65	84	C4F0:	D0	0F	A9	20	91	AE	A9	FC	81
C328:	FE	85	FF	A9	A0	99	50	05	E5	C4F8:	85	17	A5	AA	85	15	EE	74	E3
C330:	AD	40	03	99	50	D9	C8	C4	72	C500:	03	AD	41	10	F0	30	A2	02	C7
C338:	FF	D0	F0	E8	E8	E0	0E	D0	8B	C508:	BD	40	10	F0	24	BD	00	10	F8
C340:	DC	A9	51	8D	CB	05	A9	3E	5E	C510:	85	FC	BD	08	10	85	FD	AD	99
C348:	8D	00	10	A9	D8	8D	08	10	0E	C518:	01	10	85	FE	AD	09	10	85	F9
C350:	A9	B0	8D	F8	07	A9	1B	8D	8A	C520:	FF	20	37	C5	90	0B	EE	75	3D
C358:	11	D0	A9	7F	8D	0D	DC	A9	84	C528:	03	A9	00	8D	41	10	DE	40	D2
C360:	C6	8D	15	03	A9	5D	8D	14	75	C530:	10	E8	E0	08	D0	D2	60	A5	BB
C368:	03	A9	81	8D	1A	D0	AD	41	FD	C538:	FC	69	04	C5	FE	90	15	E9	F6
C370:	03	A0	07	C9	07	90	02	A0	1F	C540:	08	C5	FE	B0	0F	A5	FD	E9	5A
C378:	0F	8C	42	03	A9	0F	8D	18	B7	C548:	0D	C5	FF	B0	07	69	16	C5	18
C380:	D4	A9	F0	8D	06	D4	A9	B0	B2	C550:	FF	90	01	60	18	60	A9	13	77
C388:	8D	0D	D4	A9	51	8D	0B	D4	60	C558:	20	D2	FF	A2	06	BD	6F	03	24
C390:	8D	04	D4	AD	41	03	0A	0A	FC	C560:	C9	0A	90	0A	E9	0A	9D	6F	CF
C398:	0A	8D	07	D4	A9	01	8D	27	6B	C568:	03	FE	6E	03	D0	EF	69	30	36
C3A0:	D0	A9	0E	8D	28	D0	A9	98	F1	C570:	9D	96	C0	CA	D0	E7	AD	CB	62
C3A8:	20	D2	FF	AD	41	03	A2	30	60	C578:	05	C9	21	B0	51	A9	02	8D	A3
C3B0:	C9	0A	90	03	E8	E9	0A	8E	83	C580:	17	D0	8D	1D	D0	A9	51	85	64
C3B8:	A6	C0	18	69	30	8D	A7	C0	C7	C588:	FE	A9	76	85	FF	A9	00	85	5C
C3C0:	29	07	AA	BD	2A	C0	85	AA	74	C590:	14	85	AD	20	7B	C6	A9	00	E3
C3C8:	AD	1F	D0	60	A2	00	8E	02	F9	C598:	8D	17	D0	8D	1D	D0	AD	41	78
C3D0:	DC	AC	F8	07	AD	00	DC	29	0E	C5A0:	03	A6	AB	F0	01	0A	18	6D	77
C3D8:	10	D0	3E	AD	41	10	D0	36	FD	C5A8:	73	03	8D	73	03	AE	41	03	16
C3E0:	EE	41	10	AD	00	10	8D	01	6D	C5B0:	E8	E0	13	90	02	A2	01	8E	52
C3E8:	10	AD	08	10	8D	09	10	EE	54	C5B8:	41	03	AE	40	03	E8	8A	29	8B
C3F0:	80	03	A2	01	AD	F8	07	18	DD	C5C0:	0F	D0	02	A9	01	8D	40	03	1E
C3F8:	69	20	8D	F9	07	20	CE	C2	C2	C5C8:	20	F0	C2	4C	03	C0	A5	AD	FF
C400:	EE	41	10	A9	07	8D	39	10	C7	C5D0:	29	01	F0	07	AD	08	10	C9	82
C408:	A5	17	C9	20	B0	0B	A9	20	34	C5D8:	48	B0	23	AD	CB	D9	45	A1	2F
C410:	85	17	A9	02	85	15	EE	81	63	C5E0:	8D	CB	D9	A2	02	AD	00	10	76
C418:	03	AD	00	DC	29	04	D0	02	A5	C5E8:	85	FC	AD	08	10	85	FD	BD	72
C420:	EA	C8	AD	00	DC	29	08	D0	60	C5F0:	00	10	85	FE	BD	08	10	85	E0
C428:	02	EA	88	CA	8E	02	DC	98	6E	C5F8:	FF	20	37	C5	90	23	AD	00	77
C430:	29	1F	09	A0	8D	F8	07	E8	98	C600:	10	85	FE	AD	08	10	85	FF	DF
C438:	20	CE	C2	AD	81	03	F0	06	13	C608:	20	7B	C6	EE	43	03	AD	1F	6C
C440:	8E	10	10	8E	18	10	8E	81	B5	C610:	D0	AD	43	03	C9	03	D0	03	75
C448:	03	E8	E8	8E	38	10	A9	02	9F	C618:	4C	E0	C6	20	F0	C2	4C	03	2F
C450:	8D	40	10	AD	1F	D0	85	AD	FE	C620:	C0	E8	E0	08	D0	BF	A2	00	E5
C458:	60	A2	02	BD	40	10	D0	3A	76	C628:	BD	00	0D	2A	90	02	09	01	B9
C460:	FE	40	10	A9	55	9D	00	10	5C	C630:	9D	00	0D	E8	E0	08	D0	F0	6E
C468:	A9	85	9D	08	10	A9	09	9D	9D	C638:	A2	00	BD	88	C0	20	D2	FF	D4
C470:	30	10	86	AF	20	97	E0	A6	26	C640:	E8	E0	20	D0	F5	AD	00	10	AE
C478:	AF	A5	8E	29	1F	09	80	9D	CB	C648:	C9	02	B0	02	A9	B4	8D	00	B2
C480:	F8	07	A5	8F	2D	42	03	4A	72	C650:	10	C9	B6	90	02	A9	02	8D	AC
C488:	CD	41	03	B0	E5	9D	38	10	17	C658:	00	10	4C	23	C0	A9	01	8D	D0
C490:	A5	8E	29	07	18	69	03	9D	17	C660:	19	D0	A5	17	F0	03	38	E5	19
C498:	27	D0	E8	E0	08	D0	BC	F0	E0	C668:	15	8D	01	D4	85	17	AD	0D	38
C4A0:	01	60	AD	41	10	F0	FA	AD	9A	C670:	DC	29	01	F0	03	4C	31	EA	D3
C4A8:	09	10	38	E9	18	4A	4A	4A	DA	C678:	4C	BC	FE	A9	00	8D	07	D4	93
C4B0:	A8	A9	03	85	AF	A9	D8	85	43	C680:	A9	81	8D	04	D4	A9	00	85	41
C4B8:	AE	18	A5	AE	69	28	85	AE	99	C688:	15	8D	10	D0	20	97	E0	A5	4A
C4C0:	90	02	E6	AF	88	C0	01	D0	05	C690:	8E	8D	28	D0	29	0F	F0	F4	C3



# IMPORTANT!

Letters on white background are Bug Repellent line codes. Do not enter them! Pages 109 and 110 explain these codes and provide other essential information on entering Ahoy! programs. Refer to these pages before entering any programs!

```
C698: A9 02 8D 15 D0 A5 FE 18 74
C6A0: 0A 8D 02 D0 90 05 A9 02 4C
C6A8: 8D 10 D0 A5 FF 8D 03 D0 1E
C6B0: A9 06 85 17 A0 00 A2 00 40
C6B8: A5 A2 18 69 01 29 1F 49 15
C6C0: E0 8D F9 07 A5 14 D0 03 BD
C6C8: EE 20 D0 CA D0 EA 88 D0 88
C6D0: E5 A9 02 85 15 85 17 85 1F
C6D8: 14 60 20 96 C7 20 F0 C0 9D
C6E0: A2 00 86 17 8E 15 D0 8E 24
C6E8: 21 D0 8E 01 D4 CA 8E 02 9A
C6F0: DC A9 13 AE 3C 03 D0 05 4E
C6F8: A9 93 EE 3C 03 20 D2 FF 57
C700: A2 00 BD 48 C0 20 D2 FF 5C
C708: E8 E0 40 D0 F5 A5 CB A2 EC
C710: 00 C9 04 F0 08 A2 03 C9 46
C718: 05 F0 02 D0 F0 86 AB AD B1
C720: 8D 02 F0 10 AD 20 C4 49 8C
C728: 22 8D 20 C4 AD 29 C4 49 A1
C730: 62 8D 29 C4 A9 00 8D 0E 53
C738: DC A9 33 85 01 A0 00 B9 D2
C740: 00 D0 99 00 08 B9 00 D1 3E
C748: 99 00 09 B9 00 D2 99 00 11
C750: 0A B9 00 D3 99 00 0F C8 59
C758: D0 E5 A9 37 85 01 A9 01 21
C760: 8D 0E DC A2 00 A9 CF 9D 92
C768: 00 0D 2A 90 02 09 01 E8 25
C770: E0 08 D0 F3 A9 12 8D 18 7F
C778: D0 A2 00 86 AD 8A 9D 40 88
C780: 03 E8 E0 40 D0 F8 85 17 F3
C788: EE 41 03 A9 02 8D 40 03 38
C790: 20 F0 C2 4C 03 C0 A2 00 17
C798: 8A 9D E0 C7 E8 E0 80 D0 84
C7A0: F8 AA BD D0 C7 9D E0 C7 E0
C7A8: 9D F8 C7 9D 08 C8 BD D8 0C
C7B0: C7 9D E8 C7 9D F0 C7 9D BA
C7B8: 00 C8 A9 81 9D 20 C8 9D D0
C7C0: 28 C8 9D 38 C8 9D 40 C8 F6
C7C8: E8 E0 08 D0 D5 60 EA EA 77
C7D0: 00 31 61 8E B5 D4 EC FB 65
C7D8: FF FB EC D4 B4 8E 61 31 6C
C7E0: 00 E0
```

```
NEXT
140 FORX=128TO202:READKW$(X):NEXT
150 FORX=0TO160:READCD$(X):NEXT:GOSUB 44
20
160 FORX=32TO95:KW$(X)=CD$(X):NEXT:KW$(2
55)="[PI]"
180 OF$=F$:PRINT"[CLEAR][c 8][15" "[s L
]XTER[CNTRL N]":PRINT:PRINT
190 INPUT"[s E]NTER [s F]ILENAME--";F$
200 IFF$=""ORF$=""THENPRINT"[s O].[s K]
[s R]EADY.":END
209 IFF$=""THEN300
210 IFOF$=F$THEN 240
220 PRINT"[3"[DOWN]"] [s W]HAT IS ITS FIL
ETYPE ([s S]/[s P])";
230 GETT$:IFT$< "[s P]"ANDT$< "[s S]"AND
T$< "S"ANDT$< "P"THEN 230
240 IFT$=""[s P]"ORT$=""[s S]"THENT$=CHR$(
ASC(T$)-128)
250 PRINT"[CLEAR][5"[DOWN]"] [s N]OW OPE
NING FILE->[GREEN]";CHR$(34);F$;";";T$;C
HR$(34);"[c 8]"
260 BL=8
270 PRINT"[5"[DOWN]"] [s I]S THIS ALL COR
RECT? ([s Y]/[s N])";
280 GETA$:IFA$< "[s Y]"AND$< "Y"AND$<
"[s N]"AND$< "N"THEN 280
290 IFA$=""[s N]"ORA$=""N"THENF$="":GOTO 1
80
300 PRINT"[CLEAR] [s S]END OUTPUT TO THE
[RVSON][s S][RVSOFF]CREEN OR [RVSON][s
P][RVSOFF]RINTER"
310 GETA$:IFA$< "[s S]"AND$< "S"AND$<
"[s P]"AND$< "P"THEN 310
320 IFA$=""S"ORA$=""[s S]"THENDV=3:WD=40:G
OTO 340
330 DV=4:BL=16
340 OPEN15,8,15
341 IFF$=""THENOPEN8,8,0,"$0":GOTO360
350 OPEN8,8,8,F$+",""+T$+","R"
360 OPEN1,DV,7
370 GET#8,LO$,HI$:HI=ASC(HI$+CHR$(0)):LO
=ASC(LO$+CHR$(0))
380 SA=LO+256*HI
390 GOSUB 4490
400 PRINT#1,:PRINT#1,"[s F]ILENAME:=">";F
$:PRINT#1,
410 PRINT#1," [s S]TARTING [s A]DDRESS=
#"SA" = $"HX$(HI)HX$(LO)
420 PRINT:PRINT:PRINT
430 PRINT"[s S]ELECT [s D]UMP TYPE":PRIN
T"1> [s H]EX [s D]UMP":PRINT"2> [s A][s
S][s C][s I][s I] [s D]UMP":PRINT"3> [s
D]ISASSEMBLY"
440 PRINT"4> [s B]ASIC [s L][s I][s S][s
```

## LIXTER FROM PAGE 98

```
100 DIM KW$(255),HX$(255),CD$(255),OP$(2
55),AR(255)
110 BL=8:BK=0:POKE53281,BK:POKE53280,PEE
K(BK)
120 PRINT"[CLEAR][CNTRL N][6"[DOWN]"] [6"
[RIGHT]"] [s P]LEASE WAIT ONE MOMENT[3"
"]"
130 FORX=0TO255:READHX$(X),OP$(X),AR(X):
```



```

T]"
.450 GETA$:IFVAL(A$)>4ORVAL(A$)<1THEN 450
.460 PC=0
.470 PRINT"[CLEAR]"
.480 IFA$="2"THEN 780
.500 IFA$="3"THEN 880
.510 IFA$="4"THEN 1441
.570 TM=BL*(INT((SA+PC)/BL)):IFTM=SA+PCTH
EN 610
.580 PRINT#1,CHR$(13);:H=INT((TM)/256):L=
TM-(256*H)
.590 PRINT#1,HX$(H)HX$(L)"->";
.600 FORM=1TO(SA+PC)-TM:PRINT#1,"-- ";:N
EXT
.610 GET#8,A$:VL=ASC(A$+CHR$(0))
.620 IFST<>0THEN4450
.630 IF(SA+PC)/BL<>INT((SA+PC)/BL)THEN 69
0
.640 GETK$:IFK$<>" "THEN 670
.650 GETK$:IFK$<>CHR$(13)ANDK$<>"+ANDK$<
>"Q"THEN 650
.660 IFK$="Q"THEN 4450
.661 IFK$="+THENGOSUB7000
.670 PRINT#1,CHR$(13);:H=INT((SA+PC)/256)
:L=SA+PC-(256*H)
.680 PRINT#1,HX$(H)HX$(L)"->";
.690 PRINT#1,HX$(VL)" ";:PC=PC+1
.700 GOTO 610
.710 PC=PC-1:PRINT#1,CHR$(13);:H=INT((SA+
PC)/256):L=SA+PC-(256*H)
.720 PRINT#1,"[s E]NDING ADDRESS = #SA+
PC"=$HX$(H)HX$(L):GOTO 4450
.780 GET#8,A$:VL=ASC(A$+CHR$(0))
.790 IFST<>0THEN4450
.830 PRINT#1,CD$(VL);:PC=PC+1
.840 GETK$:IFK$<>" "THEN 870
.850 GETK$:IFK$<>CHR$(13)ANDK$<>"+ANDK$<
>"Q"THEN 850
.860 IFK$="Q"THEN 4450
.861 IFK$="+THENGOSUB7000
.870 GOTO 780
.880 PRINT:PRINT:PRINT"[s D]O YOU WISH TO
CHANGE [s S]TARTING:PRINT"ADDRESS ([s
Y]/[s N])?"
.890 GETA$:IFA$<>"[s Y]"ANDAS$<>"Y"ANDAS$<
>"[s N]"ANDAS$<>"N"THEN 890
.900 IFA$="N"ORAS$="[s N]"THEN1000
.910 PRINT:PRINT:PRINT:PRINT"[s E]NTER TH
E [s N][s E][s W] STARTING ADDRESS IN"
.920 PRINT"DECIMAL."
.930 INPUT"#=";S$
.940 IFS$=""THEN1000
.950 SA=VAL(S$)
.1000 REM*****
.1010 PRINT#1,CHR$(13);CHR$(13);"[s S]TAR
TING [s A]DDRESS =#";
.1020 PRINT#1,SA;" = $HX$(INT(SA/256));H
X$(SA-(INT(SA/256)*256))

```

```

KC .1030 PRINT#1,CHR$(13)
MP .1040 PC=0
HK .1050 GET#8,A$
HH .1060 IFST<>0THEN4450
FP .1080 PRINT#1,CHR$(13);:H=INT((SA+PC)/256
):L=SA+PC-(256*H)
KA .1090 PRINT#1,HX$(H)HX$(L)"- ";
GB .1100 VL=ASC(A$+CHR$(0))
LE .1110 IFAR(VL)=1THENGET#8,A$:B1=ASC(A$+CH
R$(0)):IFST<>0THEN4450
LF .1120 IFAR(VL)<>2THEN 1150
LE .1130 GET#8,A$:B1=ASC(A$+CHR$(0)):IFST<>0
THEN4450
MJ .1140 GET#8,A$:B2=ASC(A$+CHR$(0)):IFST<>0
THEN4450
JI .1150 PRINT#1,HX$(VL);" ";:IFAR(VL)=0THEN
PRINT#1,"[10""]";
FL .1160 IFAR(VL)=1THENPRINT#1,HX$(B1);"[8"
"]";
OB .1170 IFAR(VL)=2THENPRINT#1,HX$(B1);" ";H
X$(B2);"[5""]";
FG .1180 OS=OP$(VL):IFMID$(O$,1,1)="[s B]"AN
DMID$(O$,1,3)<>"[s B][s I][s T]"THEN 125
0
KA .1190 FORX=1TOLEN(O$)
MK .1200 IFMID$(O$,X,1)<>"1"ANDMID$(O$,X,1)<
>"2"THENPRINT#1,MID$(O$,X,1);
CO .1210 IFMID$(O$,X,1)="1"THENPRINT#1,HX$(B
1);
BO .1220 IFMID$(O$,X,1)="2"THENPRINT#1,HX$(B
2);
LE .1230 NEXT
HP .1240 GOTO 1310
CD .1250 IFB1>127THENB1=-(256-B1)
FK .1260 FORX=1TOLEN(O$)
CI .1270 IFMID$(O$,X,1)<>"0"THENPRINT#1,MID$
(O$,X,1);:GOTO 1300
JI .1280 PP=PC+SA+B1+2
FL .1290 PRINT#1,HX$(INT(PP/256));HX$(PP-(IN
T(PP/256)*256));
MA .1300 NEXT
HI .1310 PC=PC+AR(VL)+1:B1=0:B2=0
KC .1320 GETK$:IFK$<>" "THEN 1350
MK .1330 GETK$:IFK$<>CHR$(13)ANDK$<>"+ANDK$
<>"Q"THEN 1330
CO .1340 IFK$="Q"THEN 4450
CL .1341 IFK$="+THENGOSUB7000
IJ .1350 GOTO 1050
PH .1370 PRINT#1,CHR$(13)"[s E]NDING [s A]DD
RESS =#"PC+SA"=$HX$(INT(SA+PC)/256);
DI .1380 PRINT#1,HX$((SA+PC)-256*(INT((SA+PC
)/256)))CHR$(13)
CH .1390 GOTO 4450
AN .1441 CD$(0)=""
NE .1480 PRINT:PRINT
NC .1490 GET#8,P1$,P2$,L1$,L2$:IFST<>0THEN44
50
CE .1500 LI=256*(ASC(L2$+CHR$(0)))+ASC(L1$+C

```

HO  
HK  
JL  
FL  
BO  
JB  
MG  
KD  
DI  
CD  
CK  
IN  
IH  
NK  
HG  
NL  
AK  
GG  
HM  
IA  
FE  
OD  
NL  
JG  
AG  
PO  
IA  
GN  
HN  
OJ  
MK  
CO  
FN  
EN  
AL  
FM  
CG  
GJ  
KF



```

HR$(0)):QM=0
.1510 PRINT#1,MID$(STR$(LI),2,LEN(STR$(LI
))-1)";
.1520 GET#8,A$:IFST<>0THEN4450
.1530 VL=ASC(A$+CHR$(0)):IFVL=0THENPRINT#
1,CHR$(13);:QM=0:GOTO 1490
.1550 IFVL=34THENQM=ABS(QM=0)
.1580 PRINT#1,CD$(VL*ABS(QM=1));KW$(VL*AB
S(QM=0));
.1590 GETG$:IFG$<>" "THEN 1630
.1600 GETG$:IFG$<>CHR$(13)ANDG$<>"Q"THEN
1600
.1610 IFG$<>"Q"THEN 1630
.1620 GOTO 4450
.1630 GOTO 1520
.1640 GOTO 4450
.1650 GOSUB 4490:CLOSE1:CLOSE8:CLOSE15:EN
D
.1660 DATA"00","[s B][s R][s K]",0
.1670 DATA"01","[s O][s R][s A] ($1,[s X]
)",1
.1680 DATA"02","[3"?""]",0
.1690 DATA"03","[3"?""]",0
.1700 DATA"04","[3"?""]",0
.1710 DATA"05","[s O][s R][s A] $1",1
.1720 DATA"06","[s A][s S][s L] $1",1
.1730 DATA"07","[3"?""]",0
.1740 DATA"08","[s P][s H][s P]",0
.1750 DATA"09","[s O][s R][s A] #1",1
.1760 DATA"0[s A]", "[s A][s S][s L]",0
.1770 DATA"0[s B]", "[3"?""]",0
.1780 DATA"0[s C]", "[3"?""]",0
.1790 DATA"0[s D]", "[s O][s R][s A] $21",
2
.1800 DATA"0[s E]", "[s A][s S][s L] $21",
2
.1810 DATA"0[s F]", "[3"?""]",0
.1820 DATA"10", "[s B][s P][s L] $0",1
.1830 DATA"11", "[s O][s R][s A] ($1),[s Y]
]",1
.1840 DATA"12", "[3"?""]",0
.1850 DATA"13", "[3"?""]",0
.1860 DATA"14", "[3"?""]",0
.1870 DATA"15", "[s O][s R][s A] $1,[s X]"
,1
.1880 DATA"16", "[s A][s S][s L] $1,[s X]"
,1
.1890 DATA"17", "[3"?""]",0
.1900 DATA"18", "[s C][s L][s C]",0
.1910 DATA"19", "[s O][s R][s A] $21,[s Y]
",2
.1920 DATA"1[s A]", "[3"?""]",0
.1930 DATA"1[s B]", "[3"?""]",0
.1940 DATA"1[s C]", "[3"?""]",0
.1950 DATA"1[s D]", "[s O][s R][s A] $21,[
s X]",2
.1960 DATA"1[s E]", "[s A][s S][s L] $21,[
s X]",2

```

```

AG .1970 DATA"1[s F]", "[3"?""]",0
JD .1980 DATA"20", "[s J][s S][s R] $21",2
CP .1990 DATA"21", "[s A][s N][s D] ($1,[s X]
)",1
OK .2000 DATA"22", "[3"?""]",0
LC .2010 DATA"23", "[3"?""]",0
NC .2020 DATA"24", "[s B][s I][s T] $1",1
KC .2030 DATA"25", "[s A][s N][s D] $1",1
OE .2040 DATA"26", "[s R][s O][s L] $1",1
FI .2050 DATA"27", "[3"?""]",0
FM .2060 DATA"28", "[s P][s L][s P]",0
FM .2070 DATA"29", "[s A][s N][s D] #1",1
.2080 DATA"2[s A]", "[s R][s O][s L]",0
.2090 DATA"2[s B]", "[3"?""]",0
.2100 DATA"2[s C]", "[s B][s I][s T] $21",
2
.2110 DATA"2[s D]", "[s A][s N][s D] $21",
2
.2120 DATA"2[s E]", "[s R][s O][s L] $21",
2
.2130 DATA"2[s F]", "[3"?""]",0
.2140 DATA"30", "[s B][s M][s I] $0",1
.2150 DATA"31", "[s A][s N][s D] ($1),[s Y]
]",1
.2160 DATA"32", "[3"?""]",0
.2170 DATA"33", "[3"?""]",0
.2180 DATA"34", "[3"?""]",0
.2190 DATA"35", "[s A][s N][s D] $1,[s X]"
,1
.2200 DATA"36", "[s R][s O][s L] $1,[s X]"
,1
.2210 DATA"37", "[3"?""]",0
.2220 DATA"38", "[s S][s E][s C]",0
.2230 DATA"39", "[s A][s N][s D] $21,[s Y]
",2
.2240 DATA"3[s A]", "[3"?""]",0
.2250 DATA"3[s B]", "[3"?""]",0
.2260 DATA"3[s C]", "[3"?""]",0
.2270 DATA"3[s D]", "[s A][s N][s D] $21,[
s X]",2
.2280 DATA"3[s E]", "[s R][s O][s L] $21,[
s X]",2
.2290 DATA"3[s F]", "[3"?""]",0
.2300 DATA"40", "[s R][s T][s I]",0
.2310 DATA"41", "[s E][s O][s R] ($1,[s X]
)",1
.2320 DATA"42", "[3"?""]",0
.2330 DATA"43", "[3"?""]",0
.2340 DATA"44", "[3"?""]",0
.2350 DATA"45", "[s E][s O][s R] $1",1
.2360 DATA"46", "[s L][s S][s R] $1",1
.2370 DATA"47", "[3"?""]",0
.2380 DATA"48", "[s P][s H][s A]",0
.2390 DATA"49", "[s E][s O][s R] #1",1
.2400 DATA"4[s A]", "[s L][s S][s R]",0
.2410 DATA"4[s B]", "[3"?""]",0
.2420 DATA"4[s C]", "[s J][s M][s P] $21",
2

```

```

EL
CG
PO
ME
OP
MO
OJ
NO
LL
HF
NB
OH
FE
KL
LO
KD
DA
MN
PM
LJ
ME
OP
AB
AI
KA
EN
BE
GG
EJ
FE
KG
MN
FF
IG
EJ
NG
LJ
ME
PI
AI
MF
EE
NM
ON
GG
MN

```



EL	•2430 DATA"4[s D]", "[s E][s O][s R] \$21",	JJ	•2860 DATA"78", "[s S][s E][s I]", 0	JD
CG	2		•2870 DATA"79", "[s A][s D][s C] \$21, [s Y]	CL
PO	•2440 DATA"4[s E]", "[s L][s S][s R] \$21",	NB	" , 2	FC
ME	2	FC	•2880 DATA"7[s A]", "[3"?"]", 0	FF
OP	•2450 DATA"4[s F]", "[3"?"]", 0	PI	•2890 DATA"7[s B]", "[3"?"]", 0	DA
MO	•2460 DATA"50", "[s B][s V][s C] \$0", 1	FP	•2900 DATA"7[s C]", "[3"?"]", 0	IB
OJ	•2470 DATA"51", "[s E][s O][s R] (\$1), [s Y	LL	•2910 DATA"7[s D]", "[s A][s D][s C] \$21, [	NH
NO	] ", 1	MO	s X]", 2	EB
LL	•2480 DATA"52", "[3"?"]", 0	LB	•2920 DATA"7[s E]", "[s R][s O][s R] \$21, [	ME
HF	•2490 DATA"53", "[3"?"]", 0	CK	s X]", 2	FB
NB	•2500 DATA"54", "[3"?"]", 0	FF	•2930 DATA"7[s F]", "[3"?"]", 0	MC
OH	•2510 DATA"55", "[s E][s O][s R] \$1, [s X]"	NK	•2940 DATA"80", "[3"?"]", 0	MF
FE	, 1	HK	•2950 DATA"81", "[s S][s T][s A] (\$1, [s X]	AB
KL	•2520 DATA"56", "[s L][s S][s R][SS]\$1, [s	BN	) ", 1	NA
LO	X]", 1	DA	•2960 DATA"82", "[3"?"]", 0	AC
KD	•2530 DATA"57", "[3"?"]", 0	EL	•2970 DATA"83", "[3"?"]", 0	LB
DA	•2540 DATA"58", "[s C][s L][s I]", 0	FO	•2980 DATA"84", "[s S][s T][s Y] \$1", 1	JP
MN	•2550 DATA"59", "[s E][s O][s R] \$21, [s Y]	JP	•2990 DATA"85", "[s S][s T][s A] \$1", 1	MH
PM	" , 2	KH	•3000 DATA"86", "[s S][s T][s X] \$1", 1	BP
LJ	•2560 DATA"5[s A]", "[3"?"]", 0	FH	•3010 DATA"87", "[3"?"]", 0	FC
ME	•2570 DATA"5[s B]", "[3"?"]", 0	IG	•3020 DATA"88", "[s D][s E][s Y]", 0	MC
OP	•2580 DATA"5[s C]", "[3"?"]", 0	ED	•3030 DATA"89", "[3"?"]", 0	MN
AB	•2590 DATA"5[s D]", "[s E][s O][s R] \$21, [	LJ	•3040 DATA"8[s A]", "[s T][s X][s A]", 0	MP
AI	s X]", 2	LL	•3050 DATA"8[s B]", "[3"?"]", 0	FO
KA	•2600 DATA"5[s E]", "[s L][s S][s R] \$21, [	MO	•3060 DATA"8[s C]", "[s S][s T][s Y] \$21",	PH
EN	s X]", 2	NC	2	ID
BE	•2610 DATA"5[s F]", "[3"?"]", 0	AA	•3070 DATA"8[s D]", "[s S][s T][s A] \$21",	MH
GG	•2620 DATA"60", "[s R][s T][s S]", 0	MH	2	NK
EJ	•2630 DATA"61", "[s A][s D][s C] (\$1, [s X]	HK	•3080 DATA"8[s E]", "[s S][s T][s X] \$21",	CN
FE	) ", 1	OC	2	NO
KG	•2640 DATA"62", "[s A][s D][s C] \$1", 1	BN	•3090 DATA"8[s F]", "[3"?"]", 0	PM
MN	•2650 DATA"63", "[3"?"]", 0	DA	•3100 DATA"90", "[s B][s C][s C] \$0", 1	OG
FF	•2660 DATA"64", "[3"?"]", 0	JC	•3110 DATA"91", "[s S][s T][s A] (\$1), [s Y	HA
IG	•2670 DATA"65", "[s A][s D][s C] \$1", 1	HL	] ", 1	PJ
EJ	•2680 DATA"66", "[s R][s O][s R] \$1", 1	KB	•3120 DATA"92", "[3"?"]", 0	DK
NG	•2690 DATA"67", "[3"?"]", 0	GM	•3130 DATA"93", "[3"?"]", 0	FH
LJ	•2700 DATA"68", "[s P][s L][s A]", 0	PO	•3140 DATA"94", "[s S][s T][s Y] \$1, [s X]"	GK
ME	•2710 DATA"69", "[s A][s D][s C] # \$1", 1	PN	, 1	KH
PI	•2720 DATA"6[s A]", "[s R][s O][s R]", 0	MF	•3150 DATA"95", "[s S][s T][s A] \$1, [s X]"	GI
AI	•2730 DATA"6[s B]", "[3"?"]", 0	KA	, 1	GD
MF	•2740 DATA"6[s C]", "[s J][s M][s P] (21)"	LL	•3160 DATA"96", "[s S][s T][s X] \$1, [s X]"	KN
EE	, 2	OA	, 1	ON
NM	•2750 DATA"6[s D]", "[s A][s D][s C] \$21",	CK	•3170 DATA"97", "[3"?"]", 0	
ON	2	NM	•3180 DATA"98", "[s T][s Y][s A]", 0	
GG	•2760 DATA"6[s E]", "[s R][s O][s R] \$21",		•3190 DATA"99", "[s S][s T][s A] \$21, [s Y]	
MN	2		" , 2	
	•2770 DATA"6[s F]", "[3"?"]", 0		•3200 DATA"9[s A]", "[s T][s X][s S]", 0	
	•2780 DATA"70", "[s B][s V][s S] \$0", 1		•3210 DATA"9[s B]", "[3"?"]", 0	
	•2790 DATA"71", "[s A][s D][s C] (\$1), [s Y		•3220 DATA"9[s C]", "[3"?"]", 0	
	] ", 1		•3230 DATA"9[s D]", "[s S][s T][s A] \$21, [	
	•2800 DATA"72", "[3"?"]", 0		s X]", 2	
	•2810 DATA"73", "[3"?"]", 0		•3240 DATA"9[s E]", "[3"?"]", 0	
	•2820 DATA"74", "[3"?"]", 0		•3250 DATA"9[s F]", "[3"?"]", 0	
	•2830 DATA"75", "[s A][s D][s C] \$1, [s X]"		•3260 DATA"[s A]0", "[s L][s D][s Y] # \$1",	
	, 1		1	
	•2840 DATA"76", "[s R][s O][s R] \$1, [s X]"		•3270 DATA"[s A]1", "[s L][s D][s A] (\$1, [	
	, 1		s X]", 1	
	•2850 DATA"77", "[3"?"]", 0		•3280 DATA"[s A]2", "[s L][s D][s X] # \$1",	



1  
 •3290 DATA"[s A]3","[3"?"]",0  
 •3300 DATA"[s A]4","[s L][s D][s Y] \$1",1  
 •3310 DATA"[s A]5","[s L][s D][s A] \$1",1  
 •3320 DATA"[s A]6","[s L][s D][s X] \$1",1  
 •3330 DATA"[s A]7","[3"?"]",0  
 •3340 DATA"[s A]8","[s T][s A][s Y]",0  
 •3350 DATA"[s A]9","[s L][s D][s A] #1",1  
 •3360 DATA"[s A][s A]","[s T][s A][s X]",0  
 •3370 DATA"[s A][s B]","[3"?"]",0  
 •3380 DATA"[s A][s C]","[s L][s D][s Y] \$21",2  
 •3390 DATA"[s A][s D]","[s L][s D][s A] \$21",2  
 •3400 DATA"[s A][s E]","[s L][s D][s X] \$21",2  
 •3410 DATA"[s A][s F]","[3"?"]",0  
 •3420 DATA"[s B]0","[s B][s C][s S] \$0",1  
 •3430 DATA"[s B]1","[s L][s D][s A] (\$1),[s Y]",1  
 •3440 DATA"[s B]2","[3"?"]",0  
 •3450 DATA"[s B]3","[3"?"]",0  
 •3460 DATA"[s B]4","[s L][s D][s Y] \$1,[s X]",1  
 •3470 DATA"[s B]5","[s L][s D][s A] \$1,[s X]",1  
 •3480 DATA"[s B]6","[s L][s D][s X] \$1,[s Y]",1  
 •3490 DATA"[s B]7","[3"?"]",0  
 •3500 DATA"[s B]8","[s C][s L][s V]",0  
 •3510 DATA"[s B]9","[s L][s D][s A] \$21,[s Y]",2  
 •3520 DATA"[s B][s A]","[s T][s S][s X]",0  
 •3530 DATA"[s B][s B]","[3"?"]",0  
 •3540 DATA"[s B][s C]","[s L][s D][s Y] \$21,[s X]",2  
 •3550 DATA"[s B][s D]","[s L][s D][s A] \$21,[s X]",2  
 •3560 DATA"[s B][s E]","[s L][s D][s X] \$21,[s Y]",2  
 •3570 DATA"[s B][s F]","[3"?"]",0  
 •3580 DATA"[s C]0","[s C][s P][s Y] #1",1  
 •3590 DATA"[s C]1","[s C][s M][s P] (\$1,[s X])",1  
 •3600 DATA"[s C]2","[3"?"]",0  
 •3610 DATA"[s C]3","[3"?"]",0  
 •3620 DATA"[s C]4","[s C][s P][s Y] \$1",1  
 •3630 DATA"[s C]5","[s C][s M][s P] \$1",1  
 •3640 DATA"[s C]6","[s D][s E][s C] \$1",1  
 •3650 DATA"[s C]7","[3"?"]",0  
 •3660 DATA"[s C]8","[s I][s N][s Y]",0  
 •3670 DATA"[s C]9","[s C][s M][s P] #1",1  
 •3680 DATA"[s C][s A]","[s D][s E][s X]",

OO  
 FC  
 HN  
 FM  
 HG  
 FO  
 BI  
 IA  
 KG  
 AP  
 DG  
 CJ  
 BL  
 NL  
 GM  
 JH  
 FE  
 HP  
 HJ  
 DC  
 HP  
 EL  
 CI  
 JF  
 JF  
 OE  
 IC  
 GL  
 EK  
 MA  
 IM  
 MG  
 EJ  
 FE  
 JA  
 IB  
 HC  
 DA  
 OA  
 JJ

0  
 •3690 DATA"[s C][s B]","[3"?"]",0  
 •3700 DATA"[s C][s C]","[s C][s P][s Y] \$21",2  
 •3710 DATA"[s C][s D]","[s C][s M][s P] \$21",2  
 •3720 DATA"[s C][s E]","[s D][s E][s C] \$21",2  
 •3730 DATA"[s C][s F]","[3"?"]",0  
 •3740 DATA"[s D]0","[s B][s N][s E] \$0",1  
 •3750 DATA"[s D]1","[s C][s M][s P] (\$1),[s Y]",1  
 •3760 DATA"[s D]2","[3"?"]",0  
 •3770 DATA"[s D]3","[3"?"]",0  
 •3780 DATA"[s D]4","[3"?"]",0  
 •3790 DATA"[s D]5","[s C][s M][s P] \$1,[s X]",1  
 •3800 DATA"[s D]6","[s D][s E][s C] \$1,[s X]",1  
 •3810 DATA"[s D]7","[3"?"]",0  
 •3820 DATA"[s D]8","[s C][s L][s D]",0  
 •3830 DATA"[s D]9","[s C][s M][s P] \$21,[s Y]",2  
 •3840 DATA"[s D][s A]","[3"?"]",0  
 •3850 DATA"[s D][s B]","[3"?"]",0  
 •3860 DATA"[s D][s C]","[3"?"]",0  
 •3870 DATA"[s D][s D]","[s C][s M][s P] \$21,[s X]",2  
 •3880 DATA"[s D][s E]","[s D][s E][s C] \$21,[s X]",2  
 •3890 DATA"[s D][s F]","[3"?"]",0  
 •3900 DATA"[s E]0","[s C][s P][s X] #1",1  
 •3910 DATA"[s E]1","[s S][s B][s C] (\$1,[s X])",1  
 •3920 DATA"[s E]2","[3"?"]",0  
 •3930 DATA"[s E]3","[3"?"]",0  
 •3940 DATA"[s E]4","[s C][s P][s X] \$1",1  
 •3950 DATA"[s E]5","[s S][s B][s C] \$1",1  
 •3960 DATA"[s E]6","[s I][s N][s C] \$1",1  
 •3970 DATA"[s E]7","[3"?"]",0  
 •3980 DATA"[s E]8","[s I][s N][s X]",0  
 •3990 DATA"[s E]9","[s S][s B][s C] #1",1  
 •4000 DATA"[s E][s A]","[s N][s O][s P]",0  
 •4010 DATA"[s E][s B]","[3"?"]",0  
 •4020 DATA"[s E][s C]","[s C][s P][s X] \$21",2  
 •4030 DATA"[s E][s D]","[s S][s B][s C] \$21",2  
 •4040 DATA"[s E][s E]","[s I][s N][s C] \$21",2  
 •4050 DATA"[s E][s F]","[3"?"]",0  
 •4060 DATA"[s F]0","[s B][s E][s Q] \$0",1  
 •4070 DATA"[s F]1","[s S][s B][s C] (\$1),[s Y]",1  
 •4080 DATA"[s F]2","[3"?"]",0

HE  
 NJ  
 GN  
 BG  
 PL  
 OF  
 FN  
 HE  
 GG  
 EJ  
 FE  
 FJ  
 GA  
 FF  
 PM  
 KM  
 OD  
 PG  
 NJ  
 FG  
 BB  
 OC  
 MF  
 LC  
 EL  
 FO  
 HF  
 HN  
 HO  
 GK  
 BJ  
 KF  
 IC  
 NL  
 EK  
 FO  
 DP  
 OH  
 GA  
 OM  
 DA







## CADET'S DOS REVISITED FROM PAGE 85

### CADET'S DOS 1.2

```

•1 SCNCLR OK
•2 WINDOW 1,0,39,16:SCNCLR AF
•4 PRINT"[37"*"]" KG
•5 PRINT"*[35" "]"* IN
•6 PRINT"*[11" "]"CADET'S DOS 1.2[9" "]"* FK
•7 PRINT"*[35" "]"* IN
•8 PRINT"*[5" "]"MODIFIED BY ROBERT WEMPE[ PK
  6" "]"* HM
•9 PRINT"[37"*"]":PRINT EG
•10 PRINTTAB(3);"A",TAB(4)"ACCESS DIRECTO BJ
  RY" EG
•20 PRINTTAB(3);"B",TAB(4)"BACKUP FILES" LJ
•30 PRINTTAB(3);"C",TAB(4)"COLLECT FILES" AA
•40 PRINTTAB(3);"D",TAB(4)"DELETE FILES" DI
•50 PRINTTAB(3);"E",TAB(4)"EXIT TO BASIC" FA
•60 PRINTTAB(3);"F",TAB(4)"FORMAT DISK" ED
•70 PRINTTAB(3);"G",TAB(4)"GIVE FILE A NE AP
  W NAME" CP
•80 WINDOW 1,16,39,18 KO
•90 INPUT"ENTER YOUR CHOICE";X$ CG
•100 X=ASC(X$):X=X-64:ON X GOSUB 200,300, LP
  400,500,1000,700,800 BD
•195 GOSUB 600 OD
•199 GOTO 2 AK
•200 REM ACCESS DIRECTORY OM
•210 WINDOW 0,0,39,24:SCNCLR EP
•220 WINDOW 5,3,39,24 BG
•230 DIRECTORY DG
•240 PRINT:PRINT"HIT A KEY TO RETURN TO M HC
  ENU" FL
•250 GETKEY Q$ IN
•260 PRINT"[CLEAR]":RETURN HL
•300 REM BACKUP FILE EG
•310 GOSUB 2000 NK
•320 COPY""+SF$+""TO""+NF$+"":RETURN DG
•400 REM VALIDATE (COLLECT) DISK BG
•410 WINDOW 1,20,39,24:SCNCLR OA
•420 PRINT"WARNING:OPEN FILES WILL BE DEL CF
  ETED." EG
•430 PRINT "HIT Y TO VALIDATE - ANY OTHER CO
  KEY TO RETURN" JJ
•440 GETKEY Q$ EP
•450 IF Q$="Y" THEN COLLECT:SCNCLR:RETURN IA
  :ELSE SCNCLR:RETURN IM
•500 REM ERASE FILE
•510 WINDOW 1,20,39,24:SCNCLR
•520 INPUT "WHAT FILES TO DELETE";FI$
•530 INPUT"DO YOU WISH TO CONTINUE";X$
•540 IF X$<>"Y"THEN RETURN
•550 SCRATCH""+FI$
•560 RETURN

```

```

•600 REM DISPLAY DISK ERROR STATUS PL
•610 WINDOW 1,20,39,24:SCNCLR EG
•620 IF DS>0 THEN PRINT DS$:RETURN:ELSE R GC
  ETURN KC
•700 REM FORMAT DISK EG
•710 WINDOW 1,20,39,24:SCNCLR HL
•720 PRINT "INSERT DISK TO FORMAT" AJ
•730 PRINT "ENTER DISK NAME":INPUT DISK$ FM
•740 PRINT:PRINT "ENTER EXTENDER NAME":IN PUT ID$ KP
•750 PRINT"PUT DISK TO BE ERASED IN DRIVE .":PRINT"PRESS Y TO CONTINUE. ";
•760 INPUT"CONTINUE";Q$:IF Q$<>"Y" THEN R FK
  ETURN IE
•770 HEADER""+DISK$+",""+ID$:RETURN CA
•800 REM GIVE FILE NEW NAME FL
•810 GOSUB 2000 IO
•820 RENAME ""+SF$+""TO""+NF$+"":RETURN HO
•1000 REM RETURN TO BASIC FH
•1010 SCNCLR:PRINT"[CLEAR][HOME][HOME][CL EAR]" AO
•1020 PRINT "TO ERASE WEDGE FROM MEMORY T YPE NEW." AC
•1030 PRINT "TO RETURN TO PROGRAM TYPE RU N" IC
•1099 END EB
•2000 REM INPUT ROUTINE EG
•2010 WINDOW 1,20,39,24:SCNCLR EJ
•2020 INPUT"WHAT SOURCE FILE";SF$ CA
•2030 PRINT:INPUT "WHAT IS NEW FILE NAME" OK
  ;NF$ IM
•2040 SCNCLR
•2050 RETURN

```

## BUGOUT FROM PAGE 96

Starting address in hex: C000

Ending address in hex: C91D

SYS to start: 49152

Flankspeed required for entry! See page 111.

```

C000: A9 E6 A0 C4 20 1E AB 20 FF
C008: B8 C3 A0 00 B9 1E C6 99 5D
C010: 00 3C B9 1E C7 99 00 3D C2
C018: B9 1E C8 99 00 3E C8 D0 2A
C020: EB A0 18 B9 AD C5 99 00 8B
C028: D4 88 10 F7 A0 3F 98 99 9F
C030: 80 3F 88 10 F9 A0 3F AD 10
C038: 1B D4 29 3F AA B9 80 3F B4
C040: 48 BD 80 3F 99 80 3F 68 C7
C048: 9D 80 3F 88 10 E9 8C 1C D0
C050: D0 A9 05 8D 20 D0 A9 0F 07
C058: 8D 25 D0 A9 09 8D 26 D0 13
C060: A0 27 A9 68 99 00 04 99 71
C068: F8 06 A9 02 99 00 D8 99 1F

```



C070:	F8	DA	88	10	ED	A2	14	A0	22	C240:	9D	4A	C5	CA	30	03	4C	A2	DA
C078:	09	18	20	F0	FF	A9	F8	A0	ED	C248:	C1	A2	06	8A	0A	A8	BD	43	F0
C080:	C4	20	1E	AB	A9	00	8D	40	A6	C250:	C5	99	03	D0	BD	4A	C5	99	EA
C088:	C5	8D	10	D0	8D	17	D0	8D	BF	C258:	02	D0	AD	10	D0	3D	76	C5	33
C090:	1B	D0	8D	1D	D0	78	A9	7F	99	C260:	A8	BD	51	C5	29	01	F0	05	FD
C098:	8D	0D	DC	A9	01	8D	1A	D0	33	C268:	98	1D	6F	C5	A8	8C	10	D0	69
C0A0:	8D	12	D0	A9	1B	8D	11	D0	45	C270:	CA	10	D8	60	BD	F9	07	85	C8
C0A8:	A9	21	8D	14	03	A9	C4	8D	14	C278:	39	A9	00	85	3A	A0	06	06	C7
C0B0:	15	03	58	A9	30	8D	87	07	17	C280:	39	26	3A	88	D0	F9	A0	3F	4D
C0B8:	20	47	C3	A2	06	20	D2	C2	42	C288:	B1	39	99	C0	3F	88	10	F8	9E
C0C0:	CA	10	FA	20	49	C2	A9	7E	EA	C290:	A9	FF	9D	F9	07	A0	54	8C	5A
C0C8:	8D	01	D0	A9	19	8D	6E	C5	AC	C298:	0B	D4	C8	8C	0B	D4	86	04	38
C0D0:	A9	FF	8D	6D	C5	8D	3F	C5	CD	C2A0:	A0	3F	BE	80	3F	A9	00	9D	46
C0D8:	8D	15	D0	A9	00	8D	42	C5	8B	C2A8:	C0	3F	EE	3E	C5	D0	FB	EE	57
C0E0:	A2	0A	8E	27	D0	8E	00	D0	73	C2B0:	3E	C5	D0	FB	98	0A	0A	8D	BB
C0E8:	8A	29	08	4A	4A	4A	09	F0	7D	C2B8:	08	D4	88	10	E5	A5	04	0A	C7
C0F0:	8D	F8	07	18	A5	A2	69	02	4A	C2C0:	A8	A9	00	99	03	D0	38	A9	62
C0F8:	C5	A2	D0	FC	E8	E0	42	90	CB	C2C8:	1A	ED	6E	C5	AA	20	19	C3	AC
C100:	E4	AD	1F	D0	AD	8D	02	8D	4D	C2D0:	A6	04	BD	84	C5	9D	43	C5	2A
C108:	3F	C5	D0	F8	AD	40	C5	0D	97	C2D8:	BD	7D	C5	9D	4A	C5	A9	01	32
C110:	42	C5	D0	12	AD	00	DC	29	AE	C2E0:	9D	51	C5	A9	00	9D	66	C5	09
C118:	10	D0	0B	20	69	C1	A9	81	7A	C2E8:	AD	1B	D4	29	03	A8	B9	9D	B2
C120:	8D	04	D4	EE	40	C5	A5	03	24	C2F0:	C5	9D	58	C5	B9	A1	C5	9D	31
C128:	29	08	4A	4A	4A	09	F0	AC	DE	C2F8:	F9	07	A9	07	C0	03	F0	09	68
C130:	40	C5	F0	02	09	02	8D	F8	BA	C300:	AD	1B	D4	29	07	A8	B9	A5	D5
C138:	07	AD	1F	D0	29	FE	F0	16	0C	C308:	C5	9D	28	D0	AD	1B	D4	29	2B
C140:	85	02	A2	06	06	02	90	08	11	C310:	01	A8	B9	9A	C5	9D	5F	C5	96
C148:	BD	51	C5	D0	03	20	74	C2	48	C318:	60	A0	04	38	B9	78	07	69	F7
C150:	CA	10	F1	AD	1F	D0	20	A0	7B	C320:	00	C9	3A	90	02	A9	30	99	2A
C158:	C1	AE	6E	C5	A0	00	C8	D0	37	C328:	78	07	88	10	EF	CA	D0	E9	B5
C160:	FD	CA	D0	FA	C6	03	4C	04	0F	C330:	38	AD	6D	C5	E9	28	A8	AD	B1
C168:	C1	A9	07	85	FB	A9	04	85	8F	C338:	6E	C5	E9	00	C9	06	90	06	BC
C170:	FC	38	AD	01	D0	E9	2B	48	82	C340:	8D	6E	C5	8C	6D	C5	60	A0	C2
C178:	29	07	09	60	8D	41	C5	68	0F	C348:	00	B9	78	07	D9	90	07	F0	E3
C180:	4A	4A	4A	A8	18	A5	FB	69	2B	C350:	05	B0	0B	4C	69	C3	C8	C0	14
C188:	28	85	FB	A5	FC	69	00	85	C3	C358:	06	90	EE	4C	69	C3	A0	05	FC
C190:	FC	88	D0	F0	A5	FB	85	FD	FC	C360:	B9	78	07	99	90	07	88	10	63
C198:	18	A5	FC	69	D4	85	FE	60	76	C368:	F7	A0	05	A9	30	99	78	07	F8
C1A0:	A2	06	BD	66	C5	F0	0E	FE	31	C370:	88	10	FA	60	AD	40	C5	D0	E8
C1A8:	4A	C5	D0	03	FE	51	C5	DE	81	C378:	FB	A9	01	8D	3F	C5	18	A5	6F
C1B0:	66	C5	4C	43	C2	BD	51	C5	04	C380:	A2	69	78	C5	A2	D0	FC	A9	E4
C1B8:	D0	3B	38	BD	4A	C5	E9	3C	F0	C388:	00	8D	15	D0	85	C6	EE	86	BD
C1C0:	C9	17	B0	31	38	AD	01	D0	3B	C390:	02	A2	0A	A0	0E	18	20	F0	17
C1C8:	E9	0A	DD	43	C5	B0	26	18	92	C398:	FF	A9	EA	A0	C4	20	1E	AB	7C
C1D0:	69	1D	DD	43	C5	90	1E	BD	AA	C3A0:	18	A5	A2	69	0E	C5	A2	D0	B1
C1D8:	F9	07	C9	FA	B0	08	A9	C8	C9	C3A8:	FC	20	E4	FF	C9	00	F0	DE	44
C1E0:	9D	66	C5	4C	43	C2	AD	42	EC	C3B0:	A2	0A	20	FF	E9	4C	B3	C0	28
C1E8:	C5	D0	0A	A9	07	8D	27	D0	BF	C3B8:	AD	0E	DC	29	FE	8D	0E	DC	F1
C1F0:	A9	78	8D	42	C5	A5	03	29	7A	C3C0:	A5	01	29	FB	85	01	A9	D0	8D
C1F8:	07	D0	1A	18	BD	43	C5	7D	47	C3C8:	85	3A	A9	38	85	3C	A0	00	CC
C200:	5F	C5	DD	8B	C5	90	05	DD	C7	C3D0:	84	39	84	3B	A2	04	B1	39	DF
C208:	92	C5	90	06	20	0C	C3	4C	33	C3D8:	91	3B	C8	D0	F9	E6	3A	E6	41
C210:	15	C2	9D	43	C5	A5	03	3D	74	C3E0:	3C	CA	D0	F2	A5	01	09	04	5F
C218:	58	C5	D0	27	38	BD	4A	C5	34	C3E8:	85	01	AD	0E	DC	09	01	8D	9F
C220:	E9	02	A8	BD	51	C5	E9	00	73	C3F0:	0E	DC	AD	18	D0	29	F0	09	95
C228:	10	12	20	D2	C2	EE	87	07	7D	C3F8:	0E	8D	18	D0	A9	00	A0	3F	07
C230:	AD	87	07	C9	33	90	0C	68	6E	C400:	99	00	3B	88	10	FA	A8	A9	BA
C238:	68	4C	74	C3	9D	51	C5	98	72	C408:	18	99	00	3B	18	98	69	09	18



C410:	A8	C0	40	90	F2	A0	57	B9	EE	C5E0:	3C	3C	3C	3C	3C	0F	00	3E	5B
C418:	C6	C5	99	40	3B	88	10	F7	4A	C5E8:	3C	3C	3C	3C	3C	F0	00	0F	16
C420:	60	A2	01	8E	19	D0	A0	0F	4C	C5F0:	3C	3C	3C	3C	3C	0F	00	F0	1E
C428:	AD	12	D0	10	03	4C	C4	C4	A1	C5F8:	3C	00	FC	3C	3C	F0	00	0F	AA
C430:	AD	3F	C5	F0	03	4C	C0	C4	A8	C600:	3C	3C	3C	3C	3C	0F	00	F0	2D
C438:	E6	05	A2	06	BD	F9	07	C9	55	C608:	3C	3C	3C	3C	3C	F0	00	3F	65
C440:	FC	B0	20	A4	05	C9	F8	B0	2B	C610:	33	03	03	03	03	07	00	FC	53
C448:	0D	BD	66	C5	D0	08	98	29	D9	C618:	CC	C0	C0	C0	C0	E0	05	54	22
C450:	07	F0	08	4C	63	C4	98	29	86	C620:	00	0F	BF	C0	2B	88	00	2B	8E
C458:	03	D0	08	BD	F9	07	49	01	3D	C628:	AA	00	2A	AE	80	0E	E8	00	23
C460:	9D	F9	07	CA	10	D6	AD	40	9E	C630:	3E	BC	00	FF	AA	00	FF	EA	C0
C468:	C5	F0	2E	AE	41	C5	C9	15	E1	C638:	00	D5	FC	A0	DA	BC	90	3A	0E
C470:	90	08	38	A9	29	ED	40	C5	08	C640:	AA	A4	3E	AA	A4	15	AB	14	F1
C478:	A2	20	A8	8A	91	FB	AD	1B	C4	C648:	05	50	14	05	50	00	05	50	5C
C480:	D4	09	08	91	FD	EE	40	C5	EA	C650:	00	05	50	00	0F	50	00	0F	14
C488:	AD	40	C5	C9	29	90	31	A9	9A	C658:	FC	00	0F	FC	00	00	05	54	BA
C490:	80	8D	04	D4	A9	00	8D	40	EE	C660:	00	0F	BF	C0	2B	88	00	2B	CE
C498:	C5	AD	42	C5	F0	0A	CE	42	20	C668:	AA	00	2A	AE	80	0E	E8	00	63
C4A0:	C5	D0	1D	A9	0A	8D	27	D0	8D	C670:	3E	BC	00	FF	AA	00	FF	EA	01
C4A8:	AD	00	DC	29	03	A8	18	AD	CD	C678:	00	D5	FC	A0	DA	BC	90	3A	4E
C4B0:	01	D0	79	99	C5	C9	3C	90	F1	C680:	AA	A4	3E	AA	A4	15	AB	14	32
C4B8:	07	C9	B4	B0	03	8D	01	D0	51	C688:	05	50	14	15	54	00	35	14	A4
C4C0:	A2	D0	A0	00	8E	12	D0	8C	D2	C690:	00	FC	3F	C0	FF	3F	C0	3F	CC
C4C8:	21	D0	A5	03	29	07	C0	00	54	C698:	3F	00	00	00	00	00	05	54	31
C4D0:	F0	02	A9	00	09	C0	8D	16	DA	C6A0:	00	0F	BF	C0	2B	88	00	2B	0F
C4D8:	D0	AD	0D	DC	29	01	F0	03	5F	C6A8:	AA	00	2A	AE	80	0E	E8	00	A3
C4E0:	4C	31	EA	4C	BC	FE	8E	08	E7	C6B0:	3E	BC	00	FF	AA	00	FF	EA	41
C4E8:	93	00	50	52	45	53	53	20	2B	C6B8:	EA	F5	7F	A9	36	AA	A9	3E	8B
C4F0:	41	4E	59	20	4B	45	59	00	E3	C6C0:	AA	85	3F	AA	05	15	50	00	45
C4F8:	1F	A9	AA	20	20	AB	AC	20	25	C6C8:	05	50	00	05	50	00	05	50	C8
C500:	20	AD	AE	20	20	AF	B0	20	3D	C6D0:	00	05	50	00	0F	50	00	0F	94
C508:	20	AB	AC	20	20	B1	B2	0D	32	C6D8:	FC	00	0F	FC	00	00	05	54	3B
C510:	0D	20	20	1C	53	43	4F	52	B1	C6E0:	00	0F	BF	C0	2B	88	00	2B	4F
C518:	45	20	05	30	30	30	30	30	73	C6E8:	AA	00	2A	AE	80	0E	E8	00	E3
C520:	30	20	20	95	4D	49	53	53	63	C6F0:	3E	BC	00	FF	AA	00	FF	EA	81
C528:	45	44	20	05	30	20	20	20	67	C6F8:	EA	F5	7F	A9	36	AA	A9	3E	CB
C530:	9C	48	49	47	48	20	05	30	43	C700:	AA	85	3F	AA	05	15	50	00	84
C538:	30	30	30	30	30	00	00	00	29	C708:	05	50	00	15	54	00	35	14	10
C540:	00	00	00	00	00	00	00	00	40	C710:	00	FC	3F	C0	FF	3F	C0	3F	4C
C548:	00	00	00	00	00	00	00	00	48	C718:	3F	00	00	00	00	00	00	00	57
C550:	00	00	00	00	00	00	00	00	50	C720:	00	C0	C0	00	30	33	00	0C	11
C558:	00	00	00	00	00	00	00	00	58	C728:	CC	08	2A	BC	30	99	6D	30	4B
C560:	00	00	00	00	00	00	00	00	60	C730:	CF	3F	80	99	6D	30	2A	BC	DD
C568:	00	00	00	00	00	00	00	00	6A	C738:	30	0C	CF	08	3C	C0	00	00	49
C570:	04	08	10	20	40	80	FD	FB	67	C740:	C0	00	03	00	00	00	00	00	04
C578:	F7	EF	DF	BF	7F	8A	76	62	E2	C748:	00	00	00	00	00	00	00	00	48
C580:	58	6C	80	94	44	56	68	7A	D7	C750:	00	00	00	00	00	00	00	00	50
C588:	8C	9E	B0	41	53	65	77	89	5F	C758:	00	00	00	00	00	00	03	00	5B
C590:	9B	AD	47	59	6B	7D	8F	A1	94	C760:	00	00	C0	00	3C	C0	00	0C	2A
C598:	B3	00	01	FF	00	01	03	07	58	C768:	CF	08	2A	BC	30	99	6D	30	8E
C5A0:	00	F4	F6	F8	FA	03	04	05	8C	C770:	CF	3F	80	99	6D	30	2A	BC	1E
C5A8:	07	08	0A	0D	0E	2E	FD	00	09	C778:	30	0C	CC	08	30	33	00	C0	AD
C5B0:	00	00	00	F0	3E	01	80	00	61	C780:	C0	00	00	00	00	00	00	00	41
C5B8:	54	3A	06	FF	FF	00	00	80	CD	C788:	00	00	00	00	00	00	00	00	88
C5C0:	00	00	00	5A	F1	AF	FB	FB	B4	C790:	00	00	00	00	00	00	00	00	90
C5C8:	00	BF	BF	00	FF	FF	00	7F	C7	C798:	00	00	00	00	00	00	03	00	9B
C5D0:	3C	3C	3F	3C	3C	7F	00	F0	71	C7A0:	00	00	C0	00	3C	C0	00	0C	6A
C5D8:	3C	3C	F0	3C	3C	F0	00	7C	28	C7A8:	CF	00	2B	CC	3C	96	E8	40	6C



C7B0: 71 C7 A0 96 E8 40 2B CC 42 C868: 5C 00 03 1C C0 3B F7 4C 24  
 C7B8: 3C 0C CC 00 30 33 00 C0 F1 C870: EA EB B0 3B F7 4C 03 1C 96  
 C7C0: C0 00 00 00 00 00 00 00 81 C878: C0 0D 5C 00 35 43 00 15 30  
 C7C8: 00 00 00 00 00 00 00 00 C8 C880: 00 00 00 00 00 00 00 00 80  
 C7D0: 00 00 00 00 00 00 00 00 D0 C888: 00 00 00 00 00 00 00 00 88  
 C7D8: 00 00 00 00 00 00 00 00 D8 C890: 00 00 00 00 00 00 00 00 90  
 C7E0: 00 C0 C0 00 30 33 00 0C D1 C898: 00 00 00 00 00 00 00 00 98  
 C7E8: CC 0C 2B CC 30 96 E8 40 A9 C8A0: 00 00 00 00 03 0C 50 00 FF  
 C7F0: 71 C7 A0 96 E8 40 2B CC 82 C8A8: C5 54 33 95 F0 07 7F B8 BB  
 C7F8: 30 0C CF 0C 3C C0 00 00 0E C8B0: FF BB BB 07 7F B8 33 95 30  
 C800: C0 00 03 00 00 00 00 00 C3 C8B8: F0 00 C5 54 03 0C 50 00 23  
 C808: 00 00 00 00 00 00 00 00 08 C8C0: 00 00 00 00 00 00 00 00 C0  
 C810: 00 00 00 00 00 00 00 00 10 C8C8: 00 00 00 00 00 00 00 00 C8  
 C818: 00 00 00 00 00 00 00 00 18 C8D0: 00 00 00 00 00 00 00 00 D0  
 C820: 00 00 00 00 14 C3 00 55 4D C8D8: 00 00 00 00 00 00 00 00 D8  
 C828: 4C 00 0D 5C C0 3B F7 4C 1E C8E0: 00 00 01 50 03 05 70 00 AA  
 C830: EA EB B0 3B F7 4C 0D 5C A0 C8E8: D5 C0 33 93 F0 07 7F B8 76  
 C838: C0 55 4C 00 14 C3 00 00 72 C8F0: FF BB BB 07 7F B8 33 93 6E  
 C840: 00 00 00 00 00 00 00 00 40 C8F8: F0 00 D5 C0 03 05 70 00 F8  
 C848: 00 00 00 00 00 00 00 00 48 C900: 01 50 00 00 00 00 00 00 51  
 C850: 00 00 00 00 00 00 00 00 50 C908: 00 00 00 00 00 00 00 00 08  
 C858: 00 00 00 00 00 00 00 00 58 C910: 00 00 00 00 00 00 00 00 10  
 C860: 00 15 00 00 35 43 00 0D FA C918: 00 00 00 00 00 00 00 18

## SCUTTLEBUTT

Continued from page 14

list, page 14).

## SHOPPING PROGRAM

An aid in preparing a grocery list, *Shopping List* (\$29.95) enables C-64 users to "walk" down 21 different on-screen aisles, selecting the names and quantity of items they wish to purchase. When they're finished, a list



Create a computerized Shopping List.  
 READER SERVICE NO. 133

is printed. Over 800 different items are included.

Kledzik Company, 805-254-4720 (see address list, page 14).

## C-64 BIBLE STUDY

Suitable for individuals or Chris-

tian education settings, the *Bible Bytes* memory game presents scripture in three activity formats for students aged 8 to adult: Word Blanks, Word Scramble, and Word Pop, with animation and musical rewards offered as reinforcement. A 50-verse range of preprogrammed scriptures is provided for study and memorization, with an Advanced Option Mode allowing for insertion and deletion of any 50 additional verses at one time. An optional timer mode is included for team competition. The program is offered in both New Testament and Proverbs versions for the C-64. Price is \$29.95 plus \$2.00 shipping.

Scriptural Software Unlimited, 619-434-2121 (see address list, page 14).

*Bible Files On Disks* offers the entire New Testament in *Paper Clip* files on four disks. Each chapter of each book is a separate file, making it possible to search the entire New Testament for any word or combination of words. Price is \$39.95 plus \$3.00 shipping; CA residents add 6.5% tax. The Old Testament will be available in early 1987 for \$69.95.

John 1:1 Graphics, 213-422-5307—modem (see address list, page 14).

(See also *Bible Trivia* under the **Plus/4 Software** heading, page 11.)

## PAPER CLIP SHIPS

After one of the longer delays in software development history, the eagerly awaited *Paper Clip II* (advertised in these pages as long ago as July) has at last begun shipping. Price of the C-128 word processor is \$79.95. Included in the first shipment will be a free BI80 monochrome adaptor cable (for obtaining an 80-column mono display on a non-RGB monitor).

Batteries Included, 416-881-9941 (Canada) or 714-250-8723 (US) (see address list, page 14).

## SIGHT AND SOUND

Two user port devices for the C-64, C-128, or SX64:

*Eye-Scan* (\$89.95) takes in composite video via an RCA jack from a VCR or video camera. Conversion time is about 6 seconds per gray level, with 8 levels provided by the included disk software, along with pull-down windows for black and white imaging, image inversion, and disk and 1525 printer support. A utility package lets the programmer utilize the image in capturing algorithms in his own programs. *Eye-Scan* is compatible with the *Koala*, *DOODLE!*, and *Blazing Paddles* graphics programs. A 90-day limited warranty is



included.

The *Tardus-125* sound sampler (\$98.95) offers a sampling rate of 1KHz to 30KHz and a sample time of 1.4 to 41 seconds, waveform screen plotting and printing, live effects like phlanger, reverb, chorus, slapback, echo, and pitch conversion, and sound dubbing, sequencing, and editing. Included are a programmer's utility package and sound/voice recognition software.

Digital Engineering and Design, 503-245-1503 (see address list, page 14).

### BANNER ACHIEVEMENT

We hate devoting *Scuttlebutt* space to anything but new products of specific interest to Commodore users, but occasionally we get a press release we can't resist. Broderbund informs us that students at Thurston Middle School in Laguna Beach, California have printed a 1.7 mile long banner using *The Print Shop*. The banner, created to publicize a series of job education forums, took 420 students and 12 teachers two weeks to complete. The school has already shipped the banner to the Guinness Book of World Records—but we *know* some of our readers are going to want to beat it. So get printing! But please don't send your results here for verification.

### CHRISTMAS CHORALES

Two C-64 music disks from Free Spirit, each \$9.95:

The all-J.S. Bach *Music of the Masters IV* includes such works as English Suite No. 3 in G Minor, French Suite No. 5 in G, and selections from The Well-Tempered Clavier. All four disks in the series can

be had for \$31.95 (no shipping fee).

*Christmas Classics* includes 40 holiday favorites such as Jingle Bells, Joy to the World, and Twelve Days of Christmas.

Free Spirit Software, Inc., 312-352-7323 (see address list, page 14).

### ACCOUNTING PROGRAMS

*Accountant, Inc.* (\$99.95), an integrated accounting package for the C-128, utilizes the computer's extra memory, 80-column display, and greater disk storage. The three-module program consists of General Ledger (handles 140 accounts per disk, with no limit to the number of disks used), Accounts Receivable, and Accounts Payable (up to 960 customer and vendor accounts each).

The user enters data invoices and purchase orders as he would with a paper accounting system; the program generates those forms and automatically processes data. Financial reports generated include trial balance, income statement, balance sheet, and audit trails. Accounts receivable and payable balances are available, plus account histories, exception reports, and monthly statements. No knowledge of accounting is required.

Softsync, Inc., 212-685-2080 (see address list, page 14).

Modeled after the popular Dome Simplified Bookkeeping Records, *Dome Accounting by Computer* (\$39.95) boasts easy setup procedures, automatic updating, and a collection of pop-up desk accessories including a perpetual calendar, a memo pad, and a calculator that can transfer the results of calculations directly into onscreen forms. Assorted reports are available, including a list of

expense, income, and payroll items entered. An income statement that summarizes the activity of the business is also available.

Great American Software, 1-800-528-5015; in NH 603-889-5400 (see address list, page 14).

### NEWSROOM CLIP ART

For use with Springboard's *The Newsroom* newspaper-layout program for the C-64, *Clip Art Collection, Volume 3* (\$29.95) comprises more than 600 sports and recreation illustrations in such categories as baseball, football, tennis, skiing, aerobics, and fishing. The art can be used as drawn, modified with *The Newsroom's* editing tools, or combined with clip art from the two previous collections.

Springboard Software, Inc., 612-944-3915 (see address list, page 14).

### KYAN PASCAL FOR 128

*Kyan Pascal/128* (\$69.95), a fully validated implementation of ISO Pascal and the only native code compiler which runs in true C-128 mode, is designed to help both students and advanced programmers learn the Pascal language and develop programs that run more than 30 times faster than BASIC. Included is an 80-column editor, a native code compiler, a macro-assembler, and assorted programming utilities. Also featured are Pascal extensions like "include" files, object module chaining, string handling, random files, random numbers, and Commodore graphics. The built-in macro-assembler lets programmers add in-line assembly source code to Pascal programs.

Kyan Software, Inc., 415-626-2080 (see address list, page 14).

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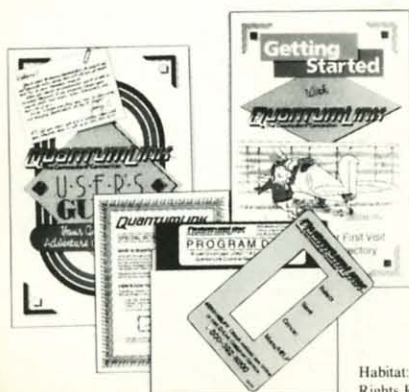
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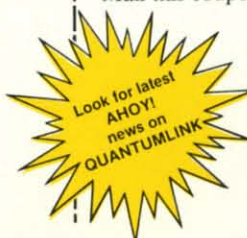
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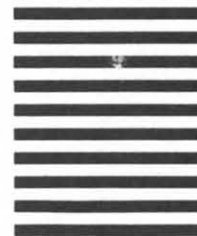
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