VZBUG – A useful program for memory related work on the VZ200 or VZ300

Have you ever wanted to look inside a VZ memory chip? There are two ways to do this. The first is to get a hacksaw and cut the chip in half. The second method is to use VZBUG. We think you'll find VZBUG much more informative than the hacksaw.

ONE OF THE DISADVANTAGES of the modern home computer is that the user never really gets the opportunity to get into the guts of the machine. Most of the time the small home micro is in BASIC mode, and the user doesn't have any idea why the computer does what it does. VZBUG remedies this by letting you get into the "nitty-gritty" of your VZ's insides.

VZBUG is ideal for fixing jammed programs, or for other memory related work. In addition, you can use VZBUG for loading and saving data onto cassettes, clearing the screen, typing text into memory and printing it – a mini word processor!

Once you have VZBUG installed you will wonder how you ever got on without it.

Functions

There are seven main functions in VZBUG. All numbers are entered from the keyboard in hexadecimal. The functions are called after the program is loaded with the following commands:

C – Clear screen
G – Goto memory location and execute program
I – Insert ASCII into memory
L – Load from cassette
D – Display memory location
O – Output memory
S – Save to cassette

To terminate the program and return to BASIC, simply enter **G1A19**, which translates to "goto HEX 1A19 and execute". 1A19 is the return-to-BASIC address contained in the VZ ROMs.

Clear screen – just type "C" and the screen clears, returning the prompt character to the top left hand corner of the screen.

Goto – type "G" and the computer will ask you for a memory location. Enter the location in HEX and the computer will jump to that location and execute what i there. If there is not a valid program at that address the computer might lock up, so be careful.

Insert ASCII into memory – type "I" and an asterisk will appear on the screen. Enter the start address (again in HEX), and start typing. This is in effect a mini word processor. To exit the command and return to the VZBUG command loop, simply type CTRL "E".

Load cassette – typing "L" will result in the word "WAITING" will appear on the screen. Press PLAY on the cassette player and the next program on the tape will be loaded, in the same manner as the BASIC CRUN command. CTRL BREAK will terminate the load and return you to BASIC.

Display and alter memory – this command allows you to display and alter any memory address in the VZ RAM area. Type "D" followed by the address you wish to access, e.g. **DCF00** will display the contents of memory location CF00. If you wish to change the contents, simply type in the new data, in HEX of course. If the data typed is O.K., press RETURN to proceed to the next memory byte. To return to the VZBUG command loop, simply type "N".

Output memory – there are four different ways of accessing the VZ's memory with this command. They are:

"Output to printer in ASCII" - This prints out the contents of the locations selections on your printer in ASCII format. This is used to print out text created with the "I" command. The output is terminated by the HEX byte "00", which is the terminating character of the "I" command.

```
10 CLS
20 PRINT @200,"VZ MEMORY LOADER"
30 PRINT @ 232,"================"
40 PRINT"THE PROGRAME WILL AUTO EXECUTE ON COMPLETION"
50 PRINT
60 FOR X=1 TO2000:NEXT X
70 CLS
80 N=1000
100 FOR A=-20480 TO -19386
110 READ A$
130 GOSUB 500
140 G=F*16
150 GOSUB 510
160 J=G+F
170 POKE A,J
175 M=M+1:IF M=16 PRINT"LINE";:M=0:N=N+10:PRINT N
180 NEXT A
200 POKE 30862,00:POKE 30863,176:M=USR(N)
210 STOP
500 Z$=LEFT$(A$,1)
505 GOTO 520
510 Z$=RIGHT$(A$,1)
520 E=ASC(Z$)
530 IF E>47 AND E<58 THEN F=E-48:RETURN
540 IF E>64 AND E<71 THEN F=E-55:RETURN
550 PRINT"ERROR"
560 PRINT"CHECK LISTING FOR INCORRECT     BYTE"
570 PRINT"CURRENT ADDRESS";A
580 PRINT"WRONG BYTE ";A$
590 STOP
1000 DATA 3E,0D,CD,3A,03,3E,2A,CD,3A,03,CD,F4,2E,FE,00,28
1010 DATA F9,FE,53,CA,A7,B1,FE,4C,CA,53,B2,FE,44,28,3A,FE
1020 DATA 49,CA,64,B2,FE,4F,CA,B2,B2,FE,47,28,1F,FE,43,28
```

"Output to printer in HEX" - This prints out the contents of selected locations on your printer in HEX code. Only 256 bytes are printed and then the program stops, displaying a "?" prompt on the screen. Press RETURN to print out the next 256 bytes or "E" to return to the VZBUG loop.

"Output to screen in ASCII" – Same as the first option, but the output is directed to the screen, not the printer.

"Output to screen in HEX" – Same as the second option, but output is directed to the screen and blocks of 16 bytes are displayed at a time. To return to command loop, press "N".

These options are selected with the following command line parameters:
Select **O** for output, then:

S/P	to select **S**creen or **P**rinter output, enter start address in HEX,
H/A	to select **H**EX or **A**SCII format.

e.g. to display address B000 on the screen in HEX,
type O,S,B000,H

Save on cassette – this command allows you to save a block of memory to cassette. Type "S" followed by the name you wish to allocate to the block (14 characters maximum). CTRL "E" finishes the entry of the file name. You must also enter the start and end addresses of the block and then select either "B" or "A", depending on whether you want the block saved as a load-only or auto-execute routine. The "B" parameter saves the program as load-only, whereas using the "A" parameter will create an auto-executing file. If you use the "A" parameter, be certain that the start address is a valid execute address, or the computer may lock up.

Getting VZBUG going

VZBUG is loaded as a BASIC program shown in the accompanying listing. I would strongly suggest that you enter the program in a number of stages, saving your work progressively. Take your time – maybe you should consider entering the data in two or three sittings, rather than a single eye-blurring, mind-boggling session.

Before you run the program initially, SAVE IT to cassette. As is always the case with machine-language-loading BASIC programs, a single error in entering the DATA statements can result in a computer lock-up, and the loss of all data in memory.

When the program is loaded it pokes into memory all the HEX code contained in the DATA statements at the end of the listing. It also checks to see if you have accidentally entered a non-HEX byte, and if so displays the address and contents of the incorrect byte. You can use this to locate and correct the error, by comparing the listings.

If you enter an incorrect but nevertheless valid HEX byte, the program will not trap it, and it may cause lock-up, so proceed slowly and carefully.

The program occupies addresses B000 to B447. It cannot be moved as it contains absolute addresses. I am prepared to supply reassembled programs at a different address, if you drop me a line at *my* address (see end of article), including a blank cassette and cheque/money order for $10.

Useful subroutines

Here are some additional useful subroutines I have implemented in VZBUG for users.

Executing hexadecimal address B151 instructs the computer to accept either two or four bytes from the keyboard, convert them to HEX and store them at HEX CFFA/B. The size of the input, two or four bytes, is determined by the check byte located at CFFF. If the check byte is HEX AB, then two characters will be accepted. Any other data will allow four bytes to be accepted.

Calling address B19F converts HEX to ASCII, and is used to display HEX data on the screen. The value to be converted is the one resident in the accumulator, after conversion is completed, the converted value is held in the accumulator.

Location B42F contains a routine to convert ASCII input from the keyboard into HEX. As with address B19F, the accumulator is used for both the original and converted values. The D and E registers are also used for this.

Besides these useful subroutines, there are many more contained in the VZ ROMs. Included with the assembler tape from Dick Smith Electronics is a full listing of the useful VZ subroutines.

Ready set go!

Now is the time to roll up your sleeves, polish your glasses, take the phone off the hook, and enter in the VZBUG listing. REMEMBER – take it easy, be careful, double and triple check, and **save before you run.** *HAPPY COMPUTING!*

Reg Batger
13 Hillview Rd,
Kellyville 2153 NSW

```
1130 DATA CB,3F,CB,3F,CB,3F,CD,2F,B4,CD,3A,03,4F,3A,F2,CF
1140 DATA E6,0F,CD,2F,B4,CD,3A,03,C9,3E,20,CD,3A,03,3E,00
1150 DATA 32,FF,CF,CD,F4,2E,FE,00,28,F9,FE,0D,28,28,FE,4E
1160 DATA CA,00,B0,3E,AB,32,FF,CF,CD,51,B1,3A,F6,CF,CD,9F
1170 DATA B1,CB,27,CB,27,CB,27,CB,27,47,3A,F7,CF,CD,9F,B1
1180 DATA B0,ED,5B,F0,CF,12,2A,F0,CF,23,22,F0,CF,CD,38,B1
1190 DATA 3E,0D,CD,3A,03,C3,B2,B0,CD,50,34,CD,50,34,CD,50
1200 DATA 34,CD,50,34,CD,50,34,CD,50,34,CD,50,34,CD,50,34
1210 DATA C9,DD,21,F4,CF,DD,22,F4,CF,CD,F4,2E,FE,00,CA,59
1220 DATA B1,11,36,B4,47,1A,B8,CA,72,B1,FE,FF,CA,59,B1,13
1230 DATA 18,F3,CD,3A,03,DD,2A,F4,CF,DD,77,02,DD,23,DD,22
1240 DATA F4,CF,CD,38,B1,3A,FF,CF,FE,AB,CA,96,B1,3A,F4,CF
1250 DATA FE,F8,C8,C3,59,B1,3A,F4,CF,FE,F6,C8,C3,59,B1,DE
1260 DATA 30,FE,0A,F8,DE,07,C9,CD,38,B1,3E,0D,CD,3A,03,3E
1270 DATA 4E,CD,3A,03,3E,41,CD,3A,03,3E,4D,CD,3A,03,3E,45
1280 DATA CD,3A,03,3E,2D,CD,3A,03,DD,21,D0,CF,3E,22,DD,77
1290 DATA 00,DD,23,DD,22,E0,CF,CD,87,B2,3E,22,DD,77,00,3E
1300 DATA 0D,CD,3A,03,CD,ED,B1,CD,FC,B1,C3,0B,B2,3E,53,CD
1310 DATA 3A,03,CD,6B,B0,2A,FA,CF,22,A4,78,C9,3E,45,CD,3A
1320 DATA 03,CD,6B,B0,2A,FA,CF,22,F9,78,C9,3E,42,CD,3A,03
1330 DATA 3E,20,CD,3A,03,3E,41,CD,3A,03,3E,20,CD,3A,03,3E
1340 DATA 3F,CD,3A,03,CD,F4,2E,FE,00,28,F9,FE,42,CA,45,B2
1350 DATA FE,41,20,F0,3E,0D,CD,3A,03,21,D0,CF,0E,F1,F3,CD
1030 DATA 16,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
1040 DATA 00,00,00,00,00,18,C3,CD,C9,01,18,B4,CD,3A,03,CD
1050 DATA 3B,B1,CD,6B,B0,2A,FA,CF,E9,CD,3A,03,CD,3B,B1,CD
1060 DATA 6B,B0,2A,FA,CF,22,F0,CF,C3,B2,B0,CD,51,B1,3E,0D
1070 DATA CD,3A,03,3A,F8,CF,CD,9F,B1,CB,27,CB,27,CB,27,CB
1080 DATA 27,32,FA,CF,3A,F9,CF,CD,9F,B1,47,3A,FA,CF,80,32
1090 DATA FA,CF,3A,F6,CF,CD,9F,B1,CB,27,CB,27,CB,27,CB,27
1100 DATA 32,FD,CF,3A,F7,CF,CD,9F,B1,47,3A,FD,CF,80,32,FB
1110 DATA CF,C9,2A,F0,CF,7C,CD,C9,B0,7D,CD,C9,B0,3E,20,CD
1120 DATA 3A,03,7E,CD,C9,B0,C3,E9,B0,32,F2,CF,E6,F0,CB,3F
1360 DATA AC,34,C3,00,B0,3E,0D,CD,3A,03,21,D0,CF,CD,A9,34
1370 DATA C3,00,B0,3E,22,32,FA,CF,32,FB,CF,21,FA,CF,CD,5F
1380 DATA 36,C3,00,B0,3E,0D,CD,3A,03,CD,38,B1,CD,ED,B1,DD
1390 DATA 2A,A4,78,DD,22,E0,CF,CD,87,B2,3E,00,DD,77,00,3E
1400 DATA 0D,DD,77,01,C3,00,B0,3E,08,CD,3A,03,CD,F4,2E,FE
1410 DATA 00,CA,8C,B2,FE,87,C8,CD,3A,03,DD,2A,E0,CF,DD,77
1420 DATA 00,DD,23,DD,22,E0,CF,CD,38,B1,3E,A0,CD,3A,03,C3
1430 DATA 87,B2,CD,3A,03,3E,00,32,E2,CF,CD,38,B1,3E,0D,CD
1440 DATA 3A,03,3E,53,CD,3A,03,3E,2F,CD,3A,03,3E,50,CD,3A
1450 DATA 03,CD,F4,2E,FE,00,28,F9,FE,50,28,06,FE,53,28,05
1460 DATA 18,EF,32,E2,CF,3E,0D,CD,3A,03,CD,ED,B1,3E,48,CD
1470 DATA 3A,03,3E,2F,CD,3A,03,3E,41,CD,3A,03,CD,F4,2E,FE
1480 DATA 00,28,F9,FE,48,CA,25,B3,FE,41,CA,0F,B3,18,ED,3E
1490 DATA 0D,CD,3A,03,2A,A4,78,3A,E2,CF,FE,50,CA,0F,B4,CD
1500 DATA 75,2B,C3,00,B0,3E,0D,CD,3A,03,3A,E2,CF,FE,50,28
1510 DATA 51,3A,A5,78,CD,63,B3,3A,A4,78,CD,63,B3,3E,0D,CD
1520 DATA 3A,03,2A,A4,78,06,10,7E,CD,63,B3,23,10,F9,22,A4
1530 DATA 78,CD,F4,2E,FE,00,28,F9,FE,0D,28,D5,FE,4E,CA,00
1540 DATA B0,18,EE,32,F0,CF,E6,F0,CB,3F,CB,3F,CB,3F,CB,3F
1550 DATA CD,2F,B4,CD,3A,03,3A,F0,CF,E6,0F,CD,2F,B4,CD,3A
1560 DATA 03,C9,3E,10,32,E4,CF,3A,A5,78,4F,CD,C4,B3,3A,A4
1570 DATA 78,4F,CD,C4,B3,0E,20,CD,8D,05,3E,10,32,E8,CF,3A
1580 DATA E8,CF,FE,00,28,56,3D,32,E8,CF,2A,A4,78,7E,23,22
1590 DATA A4,78,CD,C4,B3,0E,20,CD,8D,05,18,E3,0E,0A,CD,8D
1600 DATA 05,C3,00,B0,32,F0,CF,E6,F0,CB,3F,CB,3F,CB,3F,CB
1610 DATA 3F,CD,2F,B4,4F,CD,8D,05,3A,F0,CF,E6,0F,CD,2F,B4
1620 DATA 4F,CD,8D,05,C9,3E,3F,CD,3A,03,CD,F4,2E,FE,00,28
1630 DATA F9,FE,0D,28,8D,FE,45,CA,00,B0,18,EE,0E,0A,CD,8D
1640 DATA 05,3A,E4,CF,3D,FE,00,28,DC,32,E4,CF,C3,87,B3,22
1650 DATA E6,CF,7E,FE,00,CA,00,B0,FE,0D,CA,27,B4,4F,CD,8D
1660 DATA 05,2A,E6,CF,23,18,E8,3E,0A,4F,CD,8D,05,18,F2,11
1670 DATA 36,B4,83,5F,1A,C9,30,31,32,33,34,35,36,37,38,39
1680 DATA 41,42,43,44,45,46,FF
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