

ZEN FOR THE MZ-80A WITH CP/M

This version of ZEN runs on the MZ-80A using the CP/M operating system. Several new commands have been added to ZEN and facilities for text editing and program testing have been improved. These notes should be read in conjunction with the ZEN manual.

TEXT ENTRY

The following line editing commands using CP/M control sequences have been added:

- ctrl B Moves the cursor to the Beginning of the current line (HOME key)
- ctrl C At the start of a line in response to the ZEN> prompt this will reboot the CP/M system; otherwise at the start of a line it acts like BREAK; if not at the start of a line it is ignored
- ctrl D This Deletes the character to the left of the cursor position (DEL key)
- ctrl E This allows the insertion of a character in a line (cursor up key)
- ctrl F Moves the cursor Forward to the next character (cursor right key)
- ctrl H Cursor left one position (cursor left key)
- ctrl I This acts as a line terminator since the CP/M tabulate function is not operative
- ctrl J Line feed - acts as a line terminator (cursor down key)
- ctrl M Carriage return (CR key)
- ctrl P Turns the Printer echo on/off
- ctrl Q Exits to command level (BREAK key)
- ctrl S Holds Screen output for inspection
- ctrl T Moves the cursor to the Top of the current line
- ctrl X Erases the current line
- ctrl Z Erases the remainder of the line above the cursor position (CLR key)

As indicated, a number of these facilities are implemented on the MZ-80A keys. Note that the insert function is available on the cursor down key; this is necessary because CP/M uses INST as the shift lock key.

During text entry ZEN will accept command lines and assembler text in either upper or lower case; however since the ZEN assembler requires mnemonics and symbols in upper case, all lower case characters on input lines before a ";" are converted to upper case (this facility allows lower case to be used in comments). This version of ZEN generates text in standard CP/M format with a carriage return and line feed character at the end of each line in memory. Standard ZEN text with only CR characters terminating each line will however be accepted for assembly.

CHANGES AND ADDITIONS TO ZEN COMMANDS

In order to improve the facilities offered by ZEN a number of changes have been made to the commands which are available. The old ZEN commands R, W, F, L, V, S and carriage return have been replaced by:

- L Load an assembler text file from disc. You will be asked for a name which must be in CP/M format (i.e up to 8 characters) and ZEN will assume a secondary name of ASM which need not be input. A disc reference (e.g. A:) can be given in front of the name if a specific disc drive is to be used. Note that this version of ZEN will not load object files.
 - S Save a file to disc. In this case the complete CP/M name must be specified. If the secondary name ASM is given then ZEN will save the current assembler text file; otherwise you will be prompted for the memory area you wish to be saved (e.g for a COM file). Note that the file name for this command cannot be ambiguous.
 - B Delete (Banish) a specified file from disc. For safety the CP/M name with this command cannot be ambiguous.
 - W Write data to a memory area (the old ZEN "F" command).
 - V Clear the screen (the old ZEN carriage return command).
 - Y List the symbol table to screen or printer (the old ZEN "S" command).
 - F Finds the string following the F, stopping at each occurrence - press CR to continue search, BREAK to abort. FPRNBR for example will search for the string "PRNBR". To search for strings containing lower case characters the search string must be enclosed in quotes (" or '), for example F'print number'.
 - R Replace the string following R - you will be prompted for the new string. As each occurrence is found, it will be printed and ZEN will wait for a user input. If "Y" or "y" is pressed the replacement will take place, otherwise it will
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not. The BREAK key terminates the command. Again any search or replacement strings containing lower case characters must be enclosed in quotes.

The ZEN copy command "C" has also been extended to allow assembler text to be copied or moved. The command "CP" will copy a specified group of lines to a new position leaving the original text unchanged (the lines are inserted before the destination line). The command "CD" does the same but deletes the original lines giving a move function.

NUMBERS IN ZEN

The program counter which was accessed with "\$" is now accessed with "#" (this is the only change needed to assemble old ZEN texts). Octal and hexadecimal numbers can be input using "O" and "H" as normal but in addition the prefixes "%" and "\$" respectively can also be used (for example \$A1C3 and 0A1C3H are equivalent hexadecimal numbers).

PROGRAM TESTING

The register display using X has been extended to show the first operand on the stack and to show the next six bytes to be executed.

Single step operation has been added to the ZEN "G" command - if an S is input in response to the breakpoint prompt ZEN enters single shot mode. Each time a key other than break is pressed a single instruction is executed and the new values of the registers are displayed. Pressing break terminates single shot mode. There are certain limitations with the single shot mode which you should be aware of:

- (a) Code which manipulates the MZ-80A interrupt facilities cannot be debugged.
- (b) Since CP/M is not re-entrant, single stepping while in CP/M code may not give correct results (ZEN output will destroy the user context in CP/M).
- (c) Any instruction which modifies the location immediately below it cannot be debugged by single stepping.

If at any time the single step function fails to operate, it can be recovered by saving all files and performing a cold start using the reset button.

ZEN COMMAND SUMMARY

E	Enter text	N	New version of line
Un	move Up n lines	Dn	move Down n lines
Tn	move (Target) to line n	Pn	Print n lines
Zn	delete (Zap) n lines	H	text size (Howbig)
K	Kill current text	V	clear screen (Video)
Fst	Find string "ST"	F"st"	Find string "st"
Rst	Replace string "ST"	R"st"	Replace string "st"
Qn	Query memory area	Mn	Modify memory
W	Write to memory area	C	Copy memory area
X	eXamine registers	CP	Copy text lines
In	Input from port n	On	Output to port n
A	Assemble text	Y	list sYmbol table
G	Go to program	ctrl-C	exit to CP/M
L	Load disc file	S	Save disc file
B	Banish disc file		