eZXCP/M F.A.Q.

eZXCP/M is an enhanced CP/M v2.2 for the **eLeMeNt ZX** computer and for the **MB03+ Ultimate** interface. Its main features are:

- 20 MHz Z80-CPU support in the eLeMeNt ZX
- esxDOS boot, from both SD slots
- 16 x 8 MB partitions = drives A: to P:
- ramdisk M: (4 MB on MB03+, 2 MB or 1 MB on eLeMeNt ZX)
- HGFX (Super)HiRes resolutions with 512*192 and 512*384 pixels
- ANSI terminal with 8 colours (with 2 levels, dim and bright)
- screens with 64*24, 80*24, 85*24 and 64*48, 80*48, 85*48 characters
- 6*8 and 8*8 fonts, bold, italics and bold+italics
- VT52 and VT100 emulation
- UART and other eleMeNt HW support, incl. FastDMA acceleration
- file transfers to and from a PC with a USB cable
- esx/FAT to CP/M transfer utilities
- autostart commands and autocopy (to CP/M drive)
- startup menu and configuration
- NZCOM and ZSDOS

eZXCP/M with CBIOS v1.7 by **Johny X**
pre-release version, 05/2025

Download:
https://drive.google.com/drive/folders/1_rgkvQ9BMe4F6Iw2ir5msgRwUpavVLZT

eZXCP/M information sources:
https://element.zxfiles.net/DOCS/INFO.HTM#ezxcpm

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General Tips

CTRL, ESC, DEL keys on ZX keyboard

CTRL is the EXTEND key (Caps+Symb Shifts)
ESC is the BREAK key (CapsShift + Space)
see the section **Keyboard**

change characters per line

choose 48, 64, 80 or 85 characters per line

```
A> crtcols
```

boot eZXCP/M from 2nd SD slot

change line 21 in the boot file RUNCPM.BAS
0 ... 1st SD slot, 1 ... 2nd SD slot

```
21 LET MMC=1
```

what commands are in the CCP

ERA, DIR, REN, SAVE, TYPE, USER
see the section **Built-in commands**

Drives and Archives

what is stored on disks A: to H:

Drive A:	basic commands
Drive B:	working files
Drive C:	NZCOM
Drive D:	Hisoft Devpac
Drive E:	text editors
Drive F:	Hi-Tech C
Drive G:	games
Drive H:	archives (ARC, ARK, LBR files)

import files from PC FAT and esxDOS

FAT DIR lists files, **FAT 2 CP/M** transfers from 1st partition on 1st SD slot to CP/M drive

```
A> fd
A> f2c
```

unarchivers

ARK/ARC
```
A> unarc ARCHIVE b:*.*
```
LBR
```
A> lu -o ARCHIVE -e d:*.*
A> lbrext ARCHIVE d:*.*
```

Serial Transfers

kermit - PC server configuration

```
line /dev/ttyUSB1
speed 115200
carrier-watch off
flow-control none
robust
```

kermit - escape character

```
CTRL+P (EXTend+P)
```

UART transfer with XMODEM

tty settings on PC side

```
stty -F /dev/ttyUSB1 ispeed 115200
                     ospeed 115200
```

send file from PC

```
sx file > /dev/ttyUSB1 < /dev/ttyUSB1
```

CP/M will receive

```
A> xmodem filename /R
```

send file from CP/M

```
A> xmodem filename /S
```

PC will receive

```
rx file < /dev/ttyUSB1 > devttyUSB1
```

Disk Images & Partitions

put eZXCP/M image to SD card

use PC tools, e.g. etcher.balena.io or rufus.ie or type this command:

```
dd if ezxcpm.img of=/dev/mmcblk0 bs=4M status=progress
```

cpmtools - PC files transfers

copy to	`cpmcp -f ezxcpm8k partition file 0:`
copy from	`cpmcp -f ezxcpm8k partition 0:file file`
copy all from partition/image	`cpmcp -f ezxcpm8k partition 0:* .`

ie sd card /dev/sdX5 is `A`

cpmtools - disk format used

```
diskdef ezxcpm8k

        seclen 512
        tracks 64
        sectrk 256
        blocksize 8192
        maxdir 1024
        skew 0
        boottrk 1
        os 2.2
```

CP/M partitions on SD image

```
mmcX:  5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20
       A:  B:  C:  D:  E:  F:  G:  H:  I:  J:  K:  L:  M:  N:  O:  P:
```

Keyboard Shortcuts

KEYBOARD

BREAK	CS+SPACE	ESC	
EDIT	CS+1	TAB (?)	
CAPSL	CS+2	CAPS LOCK	
EXT	CS+SS	CTRL	
	SS+SPACE	TAB	
EXT+I	CS+SS+I	TAB	
DELETE	CS+0	BACKSPACE KEY	Moves cursor LEFT. In most software also delete char on position before moving)
GRAPH	CS+9	RUBOUT / DELETE	(for compatibility). Erase char at current position AND moves cursor LEFT one char)

NZCOM / WordStarDiamond

UP	CS+7	CTRL+E	
DOWN	CS+6	CTRL+X	
LEFT	CS+5	CTRL+S	
RIGHT	CS+8	CTRL+D	
T.VID	CS+3	CTRL+R	(PgUP WordStarDiamond)
I.VID	CS+4	CTRL+C	(PgDown WordStarDiamond)

Control shortcuts

CTRL+C	Restarts eZXCP/M by initiating a warm start
CTRL+E	Forces the cursor to the next line of the screen for continued command line input.
CTRL+H	Moves the cursor one space to the left in the same manner as the BS key.
CTRL+I	Inputs a tab code (same as the TAB key)
CTRL+P	Turns on or off the echo function. Works with a printer or any other device assigned to LST. The eZXCP/M uses **LST:=TTY:** When the echo function is turned on, data displayed on the LCD screen is output to the UART each time the RETURN key is pressed. The echo function is turned on by pressing CTRL+P once, and is turned off when CTRL+P is pressed a second time.
CTRL+R	Redisplays the contents of the current command line.
CTRL+S	Momentarily stops processing currently being performed (same as the PAUSE key). Processing can be resumed by inputting this command again.

`CTRL+U` Cancels the current command line and moves the cursor to the next line on the screen for input of a different command.

`CTRL+X` Erases the current command line and moves the cursor back to the beginning of the line.

`CTRL+Z` Terminates input from the keyboard (used in combination with certain eZXCP/M transient commands).

Built-in Commands

`d:` - a drive letter
`filename` - *an exact filename, or a wildcard match for files.*
Items such as `[item]` *are optional, ones such as* `<item>` *are compulsory.*

DIR [d:][filename]
Display a list of files in the specified, or current drive.

ERA [d:]<filename>
Erase specified files. filematch *.* can be used to match all files in the current drive.

REN [d:]newname.ext = oldname.ext
Change the name of a disk file from oldname.ext to newname.ext

SAVE n [d:]filename.ext
Save the specified n number of pages of the transient program area to disk under the specified file name.

TYPE [d:]filename.ext
Display the contents of the specified file on the display screen. Display is only meaningful if the file contents was ASCII text.

USER n
Switches to the specified user area in a disk drive.
A user area is a physical area on a disk which has its own directory and which is managed seperately from the rest of the disk. Data cannot be read from or written to any user area other than that in which CP/M is currently operating. A disk can be divided up into a maximum of 16 user areas.

PIP syntax

`PIP [d:][newfile.ext]=[d:][filespec][<t>]`

Copy files between peripherals whilst performing optional conversion **<*t*>**.
Copy file from drive to drive: **`C> PIP H:=A:INFO.DAT`**
Copy file to new name: **`C> PIP A:NEW.DAT=A:INFO.DAT`**
Copy file to printer: **`C> PIP LST:=A:LETTER.TXT`**

In addition, a range of parameters can be specified in square brackets **[ ]** immediately after the command to perform various translations during the copy.

[B]	Block Mode Transfer - Copy data in blocks, used with devices such as paper tape readers.
[E]	Echo to screen - copy to screen as well as destination.
[Pn]	Form Feed - Insert a form feed (ASCII code 12, 0x0C) every n lines.
[F]	Suppress form feeds.
[H]	Hex format - only allow copying of intel HEX format files, terminate if match fails.
[I]	Ignore NULL records - An alternative/extension to [H], ignores NULL (hex 00) records and ensures content is in Intel HEX format.
[L]	Lower case conversion - converts all upper case characters to lower case.
[N]	Number lines - Move text to start at column 9, and insert right justified line numbering in the space.
[N2]	As [N] but zero pad the number to 6 digits.
[O]	Object file transfer - would otherwise break on non ascii/hex files.
[R]	Read System Files - read and copy system, sets [W].
[Qstring^Z]	Stop copying at specified string, ^Z refers to CTRL-Z.
[Sstring^Z]	Start copying at specified string.
[Tn]	TAB setting - move tab settings of file to columns, n, 1n, 2n, 3n, etc.
[Gn]	Transfer from user area n to current area.
[Dn]	Truncate file at column n.
[U]	Uppercase conversion - the opposite of [L].
[V]	Verify the copy.
[W]	Write to a readonly file.
[Z]	Zero parity setting - Set highest (parity) bit of every byte to 0, thus converting 8-bit ASCII to 7-bit.

Terminal Control Codes

Implemented VT52 control codes .

ESC A	cursor UP
ESC B	cursor DOWN
ESC C	cursor RIGHT
ESC D	cursor LEFT
ESC E	CLEAR SCREEN, move cursor position to HOME (1,1), same as ESC H ESC J
ESC H	cursor HOME - goto top left of screen
ESC I	cursor roll up - REVERSE LINE FEED - move cursor UP one line, if on start of screen, scrolls up screen
ESC J	erase screen from cursor to end of screen
ESC K	erase from cursor to end of line
ESC Yrc	set cursor position , row number+30, col number+30 , starts on 1,1
ESC e	cursor enable
ESC f	cursor disable
ESC j	save cursor position
ESC k	restore cursor position
ESC p	REVERSE video
ESC q	NORMAL video
ESC v	CURSOR WRAP ON end of line - on line end, next cursor position is moved to start of new line, scroll up if end of screen
ESC w	CURSOR WRAP OFF on end of line - cursor will not move to next line

Implemented ANSI/VT100 control codes

n,r,c=dec number in ascii
(NI) - not implemented YET
(T) needs testing (and propably (re)implement)

ESC [A	Cursor UP
ESC [nA	(NI) Cursor UP by n
ESC [B	Cursor DOWN
ESC [nB	(NI) Cursor DOWN by n
ESC [C	Cursor RIGHT
ESC [nC	(NI) Cursor RIGHT by n
ESC [D	Cursor LEFT
ESC [nD	(NI) Cursor LEFT by n

ESC [r;cH	Cursor MOVE to rOW,cOLUMN, begining on 1,1. (T) `ESC[;cH` is same as `ESC[1;cH` also `ESC[rH` is same as `ESC[1;rH`
ESC [J	Erase from cursor to end of scr
ESC [0J	Erase from cursor to end of scr
ESC [1J	Erase from cursor to start of scr
ESC [2J	Erase whole screen, not changing cursor position
ESC [K	Erase from cursor to end of line
ESC [0K	Erase from cursor to end of line
ESC [1K	Erase from cursor to start of line
ESC [2K	(NI) Erase line, place cursor on start of line
ESC [L	(T) Insert line, move rest DOWN
ESC [M	(T) Remove line, move rest up
ESC [e	Cursor enable
ESC [f	Cursor disable
ESC [s	Cursor pos SAVE
ESC [u	Cursor pos RESTORE
ESC [l	Clear line to end
ESC [o	Clear line to start
ESC [p	Reverse video
ESC [q	Normal video
ESC [v	Cursor wrap ON (default)
ESC [w	Cursor wrap OFF

SPECIAL ANSI (non standard) codes

ESC [z	CRT RAW ON - turn off all control codes, can output all 256 chars
ESC [nz	CRT RAW OFF - default

NON STANDAR ANSI, taken from older XTERM specification

ESC [8r;ct	SET CRT ROWS COLS. Can be used as `ESC[;ct` to set only number of COLS and `ESC[r;t` to set only number of ROWS
ESC [9t	(NI) output current terminal size in form `ESC[8<ROWS>;<COLS>t` into CRT OUT (=keybuffer)

ANSI video attributes

ESC [nm	sets VIDEO attributes, can be stacked, for example ESC[0;1;2;3m
ESC [0m	NORMAL VIDEO
ESC [1m	BOLD VIDEO
ESC [2m	DIM VIDEO (Color bright off)
ESC [3m	CURSIVE

ESC [4m UNDERLINE
ESC [7m REVERSE VIDEO
ESC [9m CROSSED OUT

ANSI COLOURS (with default palette same as ZX colors)

ESC [30m BLACK INK / FOREGROUND
ESC [31m BLUE INK / FOREGROUND
ESC [32m RED INK / FOREGROUND
ESC [33m MAGENTA INK / FOREGROUND
ESC [34m GREEN INK / FOREGROUND
ESC [35m CYAN INK / FOREGROUND
ESC [36m YELLOW INK / FOREGROUND
ESC [38m WHITE INK / FOREGROUND
ESC [39m DEFAULT INK (WHITE) / FOREGROUND
ESC [40m BLACK PAPER / BACKGROUND
ESC [41m BLUE PAPER / BACKGROUND
ESC [42m RED PAPER / BACKGROUND
ESC [43m MAGENTA PAPER / BACKGROUND
ESC [44m GREEN PAPER / BACKGROUND
ESC [45m CYAN PAPER / BACKGROUND
ESC [46m YELLOW PAPER / BACKGROUND
ESC [48m WHITE PAPER / BACKGROUND
ESC [49m DEFAULT PAPER (BLACK) / BACKGROUND