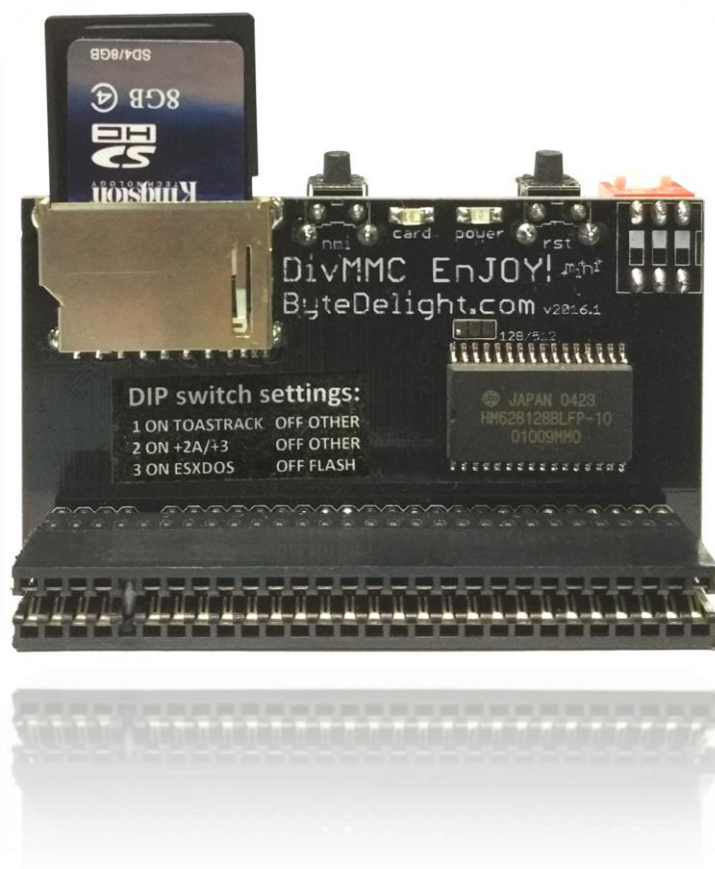


The  
**DivMMC EnJOY! <sub>mini</sub>**



with

*SD card interface for the Sinclair ZX Spectrum*



## Manual

***Read this manual before using  
the DivMMC EnJOY! <sub>mini</sub> interface!***

Manufactured by Ben Versteeg

**BYTEDELIGHT**

# Overview

With the DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> you can load software from SD card into your ZX Spectrum easily!

The DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> is the little brother of the highly successful DivMMC EnJOY! interface, which nowadays is the most widely used storage interface for the ZX Spectrum. But the DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> is the affordable alternative without case or joystick port.

There is an NMI button for an easy break-in menu with lots of functions, and a reset button. The DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> has 128KB ram by default (4x the memory compared to the DivIDE).

The DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> comes with ESXDOS, which is FAT and FAT32 compatible, and hence no additional pc software is needed.

The most used file type on ESXDOS is .TAP, which can contain a complete ZX Spectrum game in one file. Other supported formats are SNA and Z80 snapshot files and TRD files.

Check out [www.worldofspectrum.org](http://www.worldofspectrum.org) for many ZX Spectrum titles.

You can also load and save separate files directly from and to the SD card!

## Compatibility

The DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> is fully compatible with all Sinclair ZX Spectrum models: 16K, 48K, 48K+, 128K, +2, +2A, +2B, +3 and some clones.

The DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> is not compatible with the Spanish Investronica ZX Spectrum 128K.

## In the box

Your DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> interface is delivered with an SD card and this manual.

The card is formatted and contains some ZX Spectrum games en demos for you to try instantly when you install your DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> for the first time, without having to download software first.

## Notification Leds

The DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> has two notification leds.

The 'POWER' led indicates the ZX Spectrum with DivMMC EnJOY!  $\mu$ 1n<sup>+</sup> is powered on.

And the 'CARD' led shows the SD card activity.

**Please read these instructions carefully  
before powering on your system with the DivMMC EnJOY! mini**

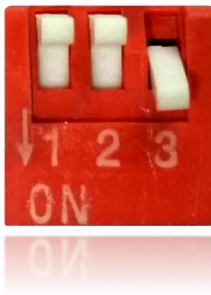
**Make sure the ZX Spectrum's edge connector is clean!**

It's important that your ZX Spectrum has a clean edge connector when connecting any add-on to it – many problems and even defects have been caused by dirty edge connectors in the past. Advised is to use cotton swabs with pure alcohol.

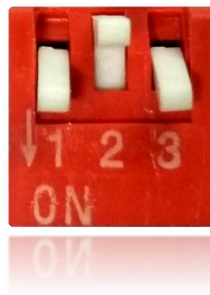
**DIP switch configuration**

1	OFF ON	Other models ZX Spectrum 128K+ (toastrack)
2	OFF ON	Other models ZX Spectrum +2A/+2B/+3
3	OFF ON	Flash (programming) mode Normal operation

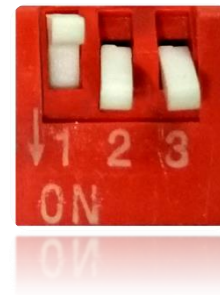
ZX Spectrum  
16K, 48K, 48K+ or (grey) +2:



ZX Spectrum  
128K 'toastrack' model\*:



ZX Spectrum  
+2A, +2B or +3:



\* Some ZX Spectrum 128K 'toastrack' models seem not to need switch 4 enabled. If you are using a ZX Spectrum 128K 'toastrack' and you are getting 'tape loading errors', disable switch 4.

**Firmware upgrade mode – DIP switch 3**

The firmware upgrade mode is enabled when setting DIP switch 3 to 'OFF'. When upgrading to a newer version of the ESXDOS firmware, download and run the programming files and read the on screen instructions carefully - the programming software will indicate when to put DIP switch 3 to the 'ON' position and when to place it back to the 'ON' position again.

Please note that the EEPROM on the DivMMC EnJOY! mini is write protected by default, to avoid unintentional programming. When an firmware update fails and shows that the ROM is protected, download and run the unprotect utility first.

## Connecting the DivMMC EnJOY! mini

***Always disconnect the power from your ZX Spectrum before connecting any interface!***

Connect the DivMMC EnJOY! mini to your ZX Spectrum carefully and insert the SD card. Now you can power up your ZX Spectrum.

## Using the DivMMC EnJOY! mini

This DivMMC EnJOY! mini\* interface comes with ESXDOS. When you power up your ZX Spectrum, you will see the ESXDOS boot screen, like shown here on the right. Read more about ESXDOS on the next page and further.

After the ZX Spectrum with DivMMC EnJOY! mini had finished the boot sequence, you will enter 48K BASIC in USR 0 mode.

### USR 0 Mode

For ZX Spectrum 128K / +2 / +2A / +2B or +3 users: the DivMMC EnJOY! mini Starts the ZX Spectrum in USR 0 mode. This mode supports 128K software and using the 3-channel audio chip in 128K models.

ESXDOS currently does no support 128K BASIC (keep an eye on future upgrades). 128K programs will however run fine.

### Loading a game with the NMI menu

This is the simplest way of loading a game or program. Press the NMI button at any time and the NMI menu will appear. Press H for a help screen. Use the cursor keys or CAPS SHIFT+6, CAPS SHIFT+7 to select a file. Press ENTER to load and run it. More info about the NMI menu is found in the separate 'NMI Menu' paragraph.

### Getting software on the memory card

Disconnect the power from your ZX Spectrum, pull the SD card from the DivMMC EnJOY! mini, put the SD card into a card reader on your PC or laptop and copy your files to the SD card. Please note that a maximum of 704 files per folder is supported. When having more files than that, split the file-set in subfolders.

Visit [www.worldofspectrum.org](http://www.worldofspectrum.org) to download lots of games and other software!

### Supported emulator file formats

The DivMMC EnJOY! mini with ESXDOS supports .TAP, .SNA, .Z80 and .SCR files. There is a limitation in snapshot files (.Z80 and .SNA): 128K snapshot files will often only work on the ZX Spectrum 128K ('toastrack') but not on the ZX Spectrum +2A, +2B and +3 because of ROM incompatibility.

The .TZX file format is not supported; this file format contains exotic loading systems (speed loaders, loaders with copy protections, etc.) which need a lot of CPU power to decode.

# ESXDOS 0.8.5

Welcome to ESXDOS, the most advanced firmware for mass storage interfaces for the ZX Spectrum. ESXDOS is still continuously in development, thus being a future-safe choice for your ZX Spectrum interface.

## Main ESXDOS features

- Full FAT16/FAT32 read and write support
- New BASIC commands
- Additional commands in BIN folder: see "DOT" commands
- Betadisk/TR-DOS emulation using .TRD files
- TAPE emulation: reading and writing .TAP files
- NMI menu: pressing H in the NMI menu brings up onscreen help

## Advanced

- Device and file system abstraction layer; uses drivers to access file systems
- BASIC command integration using +3DOS headers for FAT file systems
- Provides RST 8 hooks for user applications
- POSIX-based API usable by .commands and external programs; functions available on rst \$08: open, read, write, close, opendir, readdir, seek, sync, fstat, getcwd, chdir, unlink...
- Support for seamless IM2 loading/saving, from BASIC and machine code
- Possibility of getting absolute LBA sector and device on an opened file for direct I/O access
- Can attach and auto-LOAD .TRD files (check help screen)
- New/Updated Commands: .DivIDEo, .vdisk, .playwav, .dskprobe, .snapload, .gramon, .speakcz

## Currently unsupported features / known bugs

- No long file names
- No wildcards yet in BASIC commands
- No 64K clusters
- No extended partitions
- BASIC/Tape Emulator: You can overwrite ESXDOS system using LOAD CODE that crosses \$2000
- Commands: Proper argument/syntax checking is not done yet on most commands
- FAT Driver: +3DOS header is set on file creation and never updated when file size changes
- FAT Driver: rename() isn't even remotely posix compliant
- FAT Driver: Directories read-only attribute isn't always respected
- BIOS: version of system file isn't checked against the ROM version (beware of a mismatch)
- TR-DOS: FORMAT and MOVE commands don't work yet + too many to list ;)

## Cold start

To perform a cold start without powering off your ZX Spectrum, press the reset-button and hold the SPACE key while resetting.

This way ESXDOS reinitializes.

## Drive Naming Convention

Drives are named according to their type and partition number.

For the first hard drive and partition, it would be named hd0 (or sd0 if using DivMMC).

You can see a list of drive names when ESXDOS runs it's initial BIOS drive detection (on a cold start).

## BASIC commands

On all BASIC commands that use a drive parameter, you can use \* for the current drive. [...] means it's an optional parameters.

GOTO [drive] ["path"]

Example:

GOTO hd0"demos"

This will change the current drive and directory to hd0:/demos.

You can use it to change the current drive, dir, or both.

CAT [drive]

Example:

CAT, CAT \*, CAT hd1

Without specifying a drive a fast CAT is done (no speccy header info is displayed).

LOAD drive "path/filename" [CODE][SCREEN\$]

MERGE drive "path/filename"

Example:

LOAD \*/test/blabla", etc

SAVE drive "path/filename" [LINE][CODE][SCREEN\$]

Example:

SAVE \*"filename" SCREEN\$, etc

ERASE [drive] "path/filename"

Example:

ERASE "filename", ERASE \*"filename", etc

## System commands

Files located in the /BIN directory are system commands.

These system commands can be executed from BASIC by typing: ".command <args>".

Each .command has 7.5K of RAM available and may call any ESXDOS syscall.

Commands can also exit to BASIC with a custom error message.

Most commands are self-explanatory or show onscreen help when run without arguments (or with the -h parameter).

An example of the onscreen help:

.tapeout

tapeOUT v0.1 (c) phoenix

Usage: tapeout [args] [tapfile]

-c: Close file

-o: Overwrite file

.ls  
Show directory listing

.cd somedir  
Change directory

.tapein somefile.tap  
Attach .tap file for reading

.tapeout somefile.tap  
Attach .tap file for writing

.chmod +h somefile.sys  
Set/unset attributes on file/dir

New commands in v0.8.5:

.divideo (currently unsupported for the DivMMC EnJOY! mind)

.vdisk

.playwav

.mkdir newdir  
Create a new directory

.mv oldname newname  
Rename/move file/dir

.cp source target  
Copy file

.more textfile  
Display the contents of a textfile

.dskprobe

.snapload

.gramon

.speakcz

### **TR-DOS emulator**

Either use the NMI browser to attach/auto-LOAD .TRDs, or use the .vdisk command:

`.vdisk unit <filename>`

Unit 0 = Drive A, Unit 1 = Drive B, etc.

If you specify just the unit, it will eject the virtual drive.

You can use .dskprobe to check the contents of the vdisk.

Instructions on how to use TR-DOS are out of the scope of this document.

Note: TR-DOS emulation is not available in MapRAM mode (BETADISK.SYS will not be loaded)

## **NMI menu**

Pressing the NMI button will bring up the NMI file selector menu.  
From that menu the following keyboard shortcuts can be used.

### Up, Down

Move cursor on page

### Left, Right

Change page

### Enter

RUN .sna, .z80, files with ZX header of type 'basic', view screen (same as 'v' except for .sna files), attach .tap file to input slot and soft reset with autoload

### r

Reset(Warm)

### s

Create snapshot (auto incrementing name starting with snap0000.sna on initialisation of ESXDOS).  
If you get ERROR 18 it's because file already exists, try again.

### 1

Go to parent directory (chdir to '..')

### v

Show screen from .scr and .sna files (or files with ZX header of type 'CODE')

### i

Attach tape file to input slot

### Space

Exit from NMI mode

### H

Onscreen help

ESXDOS (c) 2005-2013 by Papaya DeSIGN  
[www.esxdos.org](http://www.esxdos.org)

Document version: v1.0 January 2017  
Manual created by Ben Versteeg

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