# ZXPicoMD

For the SD image and other resources including the latest version of this document please go to this URL

<https://retrotech.world/?sdm_downloads=zx-pico-md-resources>

## Usage

The device is very simple to use, upon booting the Spectrum you will see a Splash Screen which will disappear after a couple of seconds. The screen will then stay blank (OLED is off to prevent burn-in) and the LED (or whatever colour you picked) will light up on the side to indicate the device is ready for input, either from the IF1 or by the user pressing a button. You can now use all the normal commands on the Spectrum to control the drive such as RUN, LOAD \*"m";1;"aaa" or FORMAT "m";5;"blank".

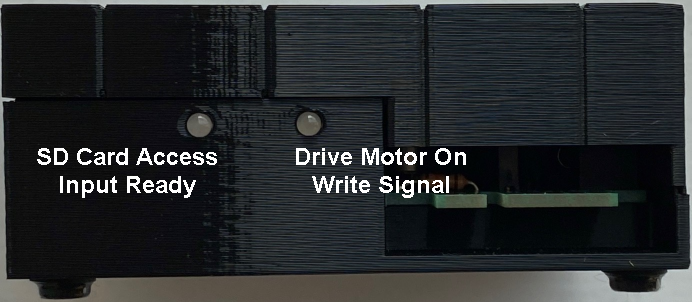
When the LED is on the unit is input ready, you can enter the Menu to select new cartridges etc... for full list of menu items see the chart below. To enter the menu press the enter key which is 3rd from left. You should now see the Cartridge 1 icon. Pressing enter again takes you to the cartridge sub-menu, showing a folder icon. Pressing again and you will enter the file explorer where you can navigate the listings to pick a new cartridge or snapshot to convert.

The buttons are (from the left): Previous; Next; Enter; Back; Reset

Previous & Next are used to go left/right or up/down in the menu or file explorer. Enter is used to select an option or file (also to enter the menu in the first place). Back goes up one level in the menu or when using the file explorer moves up one directory. Reset reboots the Pico if all else fails (also useful when flashing the Pico). If you hold down the buttons it also behaves differently in certain scenarios, for example holding down Next in the file explorer goes down one page of file entries rather than just one file entry.

The LEDs show certain activity:

1. The top LED (furthest from the buttons) is Drive and Write for when the Microdrive is being accessed. Drive will come on when the simulated motor is on (if you installed a buzzer you will also hear it). Write will come on (replacing Drive) when the ZXPicoMD is receiving a WRITE signal.
2. The other LED is for SD Card access and Input ready. SD Card is simply to show when the SD card is being accessed (don't turn off). Input ready is to show when the drive is idling and therefore ready for a command or input.



## The GUI

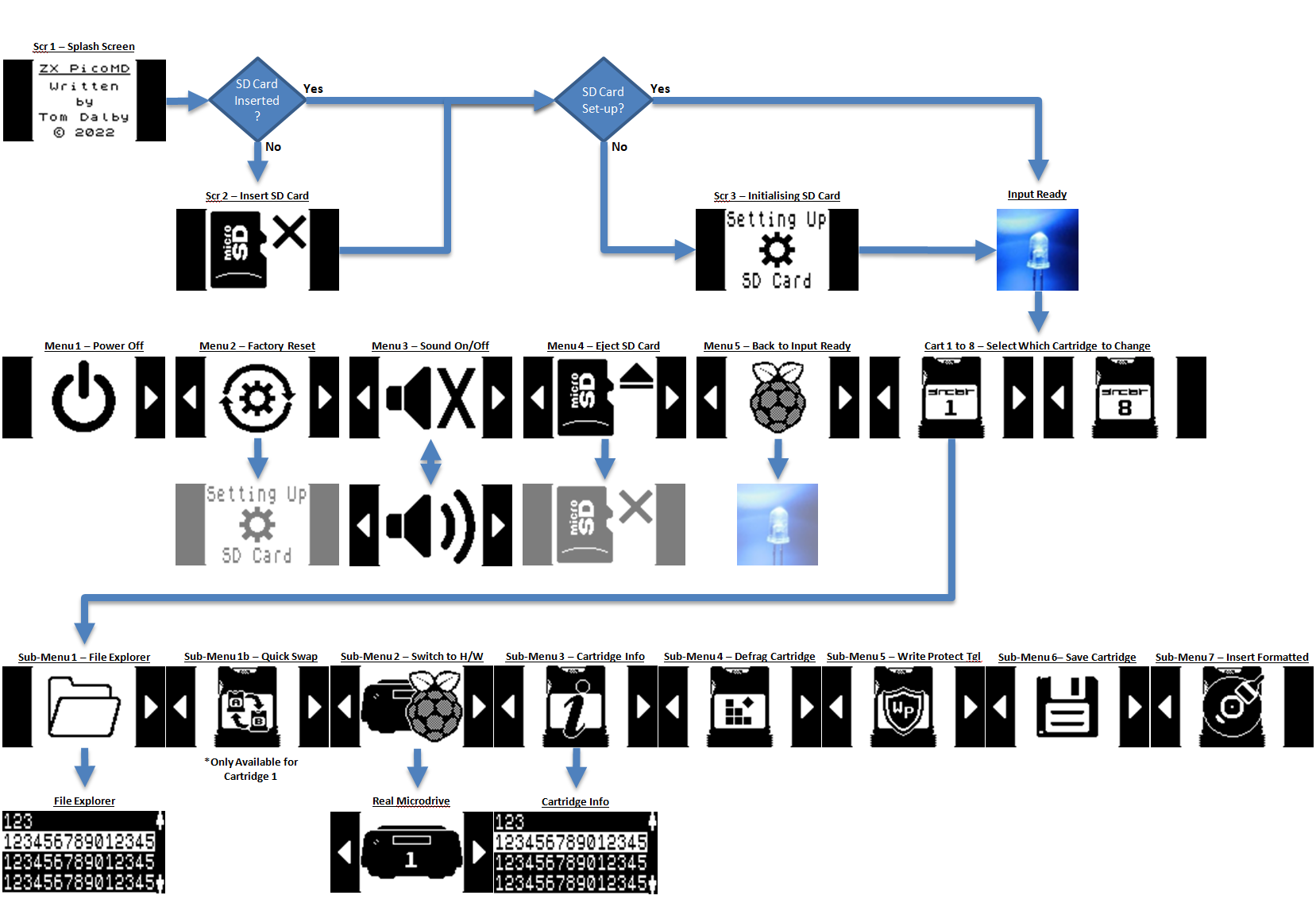
### Main Menu

* Power Off - not really required just don't switch off in the middle of a write as it could corrupt the files on the SD card
* Factory Reset - this creates 8 blank cartridges on the SD card root
* Sound Volume - Off, Low, Medium & High. The buzzer was always intended to be quiet as I didn't want it to be annoying. Some users responded it was too quiet to even hear with the case shut (I can still hear it ok) so I added the higher volumes. I also found that not all buzzers are created equal so adding the different volume levels helped with that.
* Eject SD Card - as it says, this safely unmounts the SD card so you can take it away and load up with more games
* Restart Emulation - Just resets the 2nd core, back button does the same at this level of the menu
* Cart 1 to 8 - Enter sub-menu for that specific Microdrive

### Microdrive Sub-Menu

* File Selector - enter the file explorer to navigate the folders on the SD card to select a file to load
* Quick Swap (Drive 1 only) - turns on/off Quick Swap functionality
* Switch to Real H/W - switches the drive number to a real H/W Microdrive. With this enabled the ZXPicoMD will emulate the shift register to activate the drive when called
* Cartridge Info - shows a basic CAT of the cartridge inserted
* Write Protect - toggles write protect on/off for the cartridge inserted
* Save Cartridge - creates a copy of the cartridge in the root directory of the SD card so all your work doesn't get lost if you load a new cartridge into the drive. See [Filename Selector](https://github.com/TomDDG/ZXPicoMD#using-the-filename-selector) section below.
* Insert Formatted - as it says load a blank formatted (to 127kB) cartridge into the drive

The file explorer will only show compatible files, those with extension MDR, TAP, Z80 & SNA and directories.



### Quick Swap

Firmware v1.3 added quick swap functionality to drive 1 allowing the user to quickly swap between 4 pre-loaded cartridges. This was only added to drive 1 as this drive number is often hardcoded into programs so being able to quickly flip between cartridges is an advantage.

To use Quick Swap on drive 1 you have to first turn it on. To do this go into the menu (enter button), select drive 1 and scroll one right of the folder icon. You should see an icon with a swap symbol. Click on this and you will get a message that it is setting up Quick Swap for Drive 1. This takes a few seconds as it is creating 4 new cartridges, copying the contents of the current drive 1 cartridge to A, and creating 3 blank cartridges B,C & D. Once done it goes back to idle (blue light) and is ready to use.

To quickly swap the cartridges just press the PREV or NEXT buttons and a selector will pop up showing cartridges 1A to 1D. Just pick the one you want, press enter and it will complete the swap. Simple as that.

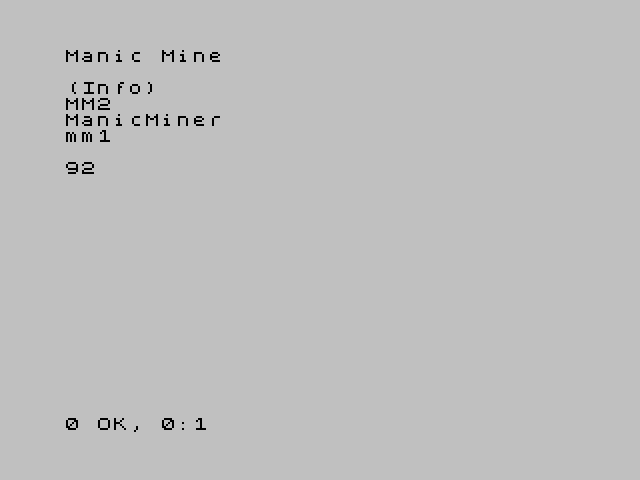
If you want to put a new image into a certain quick swap cartridge just first select the one you want, say 1D, and then just use the normal menu options to load a Z80 or format it etc... If you turn off quick swap (using the same icon), the cartridge currently selected remains in drive 1 and the others are lost, so recommend you save them first if needed.

### TAP copy

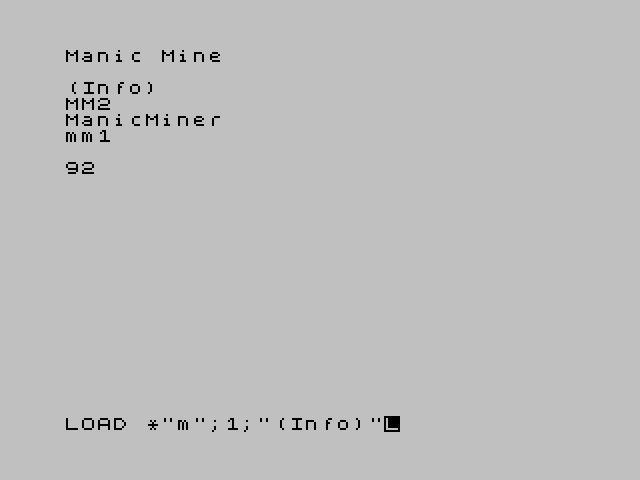
Selecting a TAP file from the file explorer will copy the contents to a blank cartridge. It works with headerless files as well as normal and also removes the autorun from basic files so they can be edited. As headerless files have no file type or start address these are simply set as a code block starting at memory end minus length.

Note this is a simple file copy so if you are wanting to run a loader, usually for a game, off the cartridge you will need to adjust said loader to use Microdrive commands. Unfortunately this isn't always possible as a lot of games use machine code loaders but some are and the following details how to do this for the classic Manic Miner.

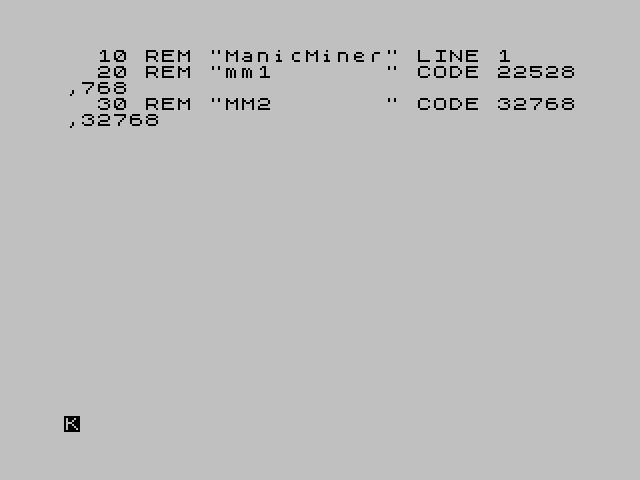
Once the copy has complete CAT the drive and you will see



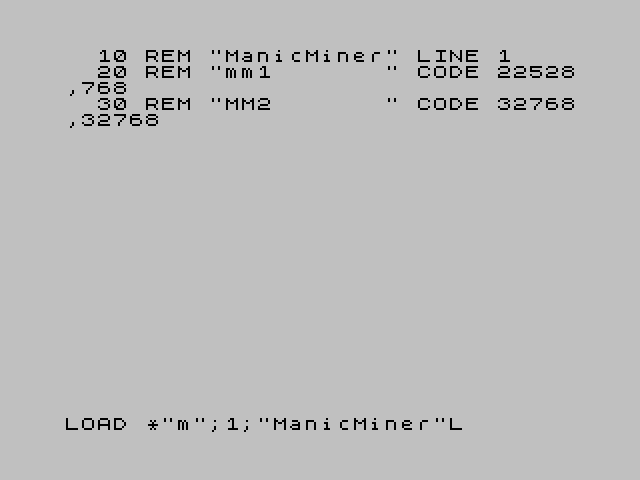
Now Load the (Info) file:



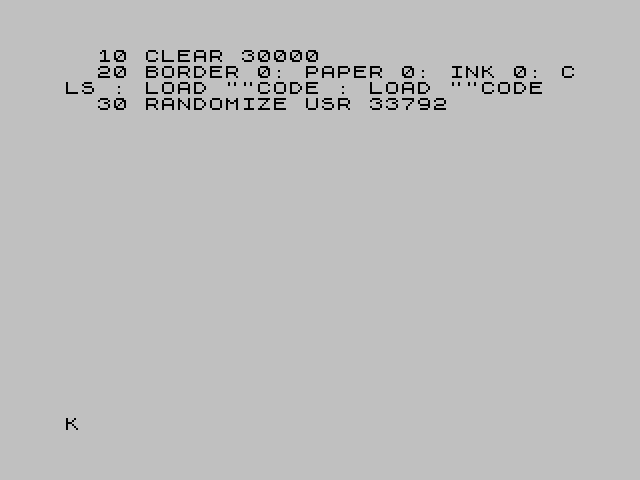
This will show details of the files copied from the TAP in REM statements. Write down the filenames mm1 (the loading screen) & MM2 (the main code) for later.



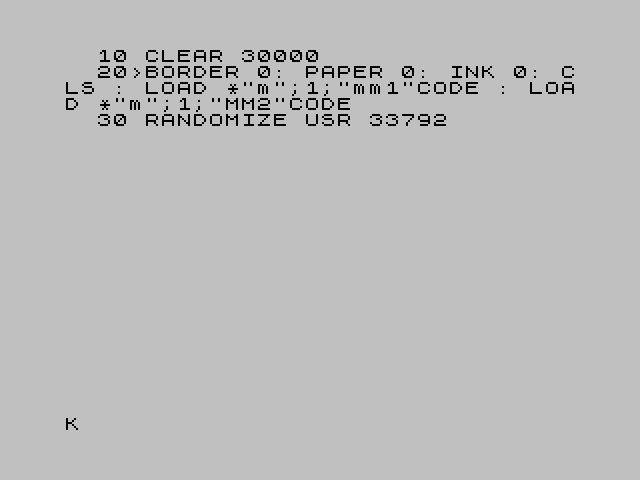
Now load the main basic loader ManicMiner:



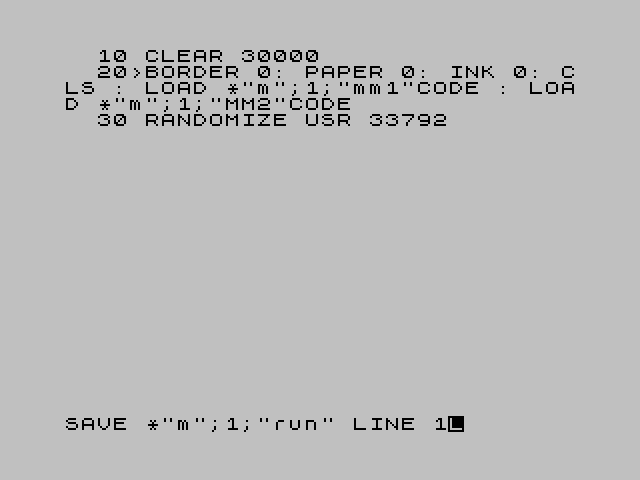
and LIST



Now edit the loader with the correct Microdrive syntax \*"m";1; and filenames you wrote down earlier:

[](https://github.com/TomDDG/ZXPicoMD/blob/main/Images/TAPtoMDR/mm8.png)

Save this as RUN with autorun LINE 1 added so you can use the shortcut on reboot:



The game will now load using RUN:

### image

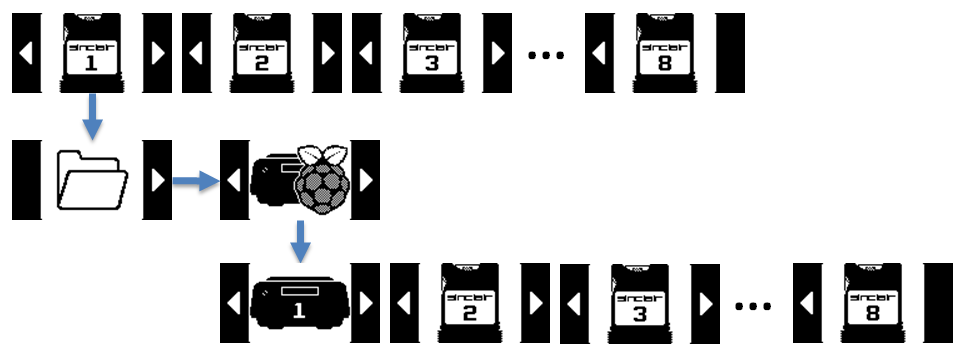
### **Working with Real H/W Microdrives**



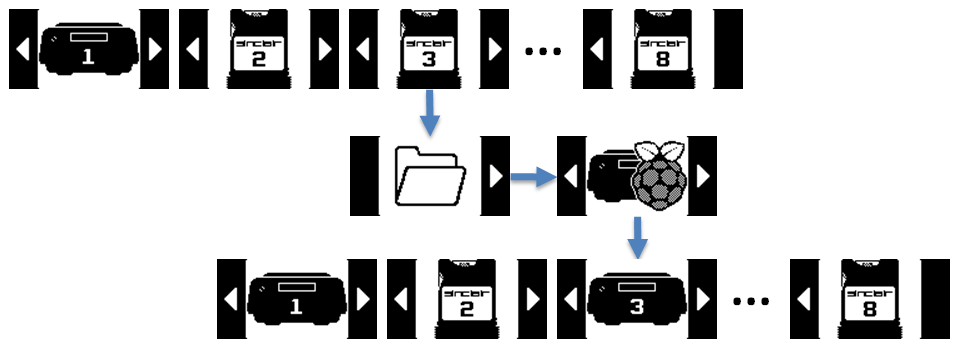
**Note** If using with a real h/w Microdrive you must use the correct Connection Block (shown below) between the ZX PicoMD and the Microdrive not the cable you use to connect to the IF1.

You can put real h/w Microdrives downstream of the ZXPicoMD. Please note these only work downstream (ZXPicoMD closest to the Spectrum) as the ZXPicoMD needs to control the COMMs shift register in order to mix virtual/emulated drives and real h/w drives. Any drive combination can be used with the only restriction being a lower numbered drive will be activated first, example, if you pick drive 2 & 4 as real h/w drives the lower number, 2, will be the one next to the ZXPicoMD and 4 the one after.

The following diagram shows how to select drive 1 as real h/w.



and how to add drive 3 as real h/w.

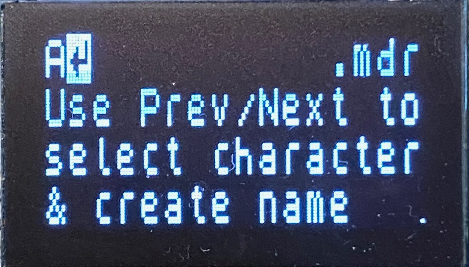


With drive 1 & 3 set to real h/w, CAT 1 will access the first real drive connected to the ZXPicoMD. CAT 3 will access the second real drive, the one connected to the first real drive. All other drive selections will access a virtual/emulated drive.

To flip back to virtual/emulated drive just select the drive in the menu.

**Using the Filename Selector**

When saving a cartridge to the SD card you can specify a filename by using a simple character selector as show below:



Use the previous and next buttons to pick the character you want and press enter to select the character, note unless you are on the last character the enter is used to select the character not to complete the name. To complete the name before the last character there is a complete name option towards the beginning of the selector (see list below). To delete an entered character you use a remove character option at the beginning of the selector. The selector only allows you to enter alphanumeric characters i.e. no specials and maximum length is 12. The order of the characters is:

* Remove character (delete)
* Complete name (looks like enter symbol on your keyboard)
* Space
* 0-9
* A-Z
* a-z

You can't pick anything before 0 (zero) for the first character. If you press back it will exit the selector and if you either pick the complete name option or enter 12 characters it will ask if you want to save or not. Pressing enter again saves the cartridge to the root of the SD Card.