Hermit Retro ZXZero

Diagnostics Software User Guide

Hermit Retro Products Ltd.



ABSTRACT

A guide on how to use the Hermit Retro ZXZero Diagnostics software

Version 1.0

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support@hermitretro.com

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2 Introduction

Welcome to the User Guide for the Hermit Retro ZXZero Diagnostics software.

If you find any issues with the instructions, or sections that aren't clear, drop us a line at support@hermitretro.com

3 PCB Version

These instructions refer to version 1.8.0 of the PCBs. This will be printed on the Main Board PCB.

4 Accessing the Diagnostics Software

The Diagnostics software is included in the Hermit Retro ZXZero firmware. It is accessed by holding down the Fuse menu button during boot.

To access the Diagnostics software:

- Make sure the latest firmware is flashed onto the internal MicroSD card and that the card is inserted into the Raspberry Pi Zero
- Make sure you have some programs/files present on the secondary SD card
- Disconnect power from either the SD/USB Testing PCB or the fully-assembled Hermit Retro ZXZero board
- Connect HDMI to the board
- Hold down the Fuse menu button on the ZXZero board (if assembled) or the tactile switch on the SD/USB Testing PCB
- Apply power

After a few seconds, your monitor should display the ZXZero Diagnostics screen:

```
ZXZero Diagnostics (v1.0.0) - (c)2021 Hermit Retro Products
https://hermitretro.com

> 0. No-operation
    1. Mount SD Card
    2. Unmount SD Card
    3. ls -laF SD Card
    4. Stress Test SD Card
    5. Test GPIO
    6. Test USB
    7. Test I2C

Press Fuse menu button to advance cursor
Menu selection will be activated in 3 seconds
```

Figure 1: ZXZero Diagnostics main menu

5 Using the Diagnostics Software

The Diagnostics software is simple to operate. The only "key" is the Fuse menu button. Menu selections are actioned by a 3 second time-out.

To advance through the menu, simply press the Fuse button and wait. If you don't want to run any menu selection, move the cursor to the first "no operation" option!

Once a menu option other that "no operation" is selected it will display that selection and say "Press a key to continue". You will then be taken to a screen showing the results of that operation.

```
ZXZero Diagnostics (v1.0.0) - (c)2021 Hermit Retro Products
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0. No-operation
1. Mount SD Card
2. Unmount SD Card
3. ls -laf SD Card
4. Stress Test SD Card
5. Test GPI0
> 6. Test USB
7. Test I2C

>>> Test USB
Press a key to continue

Press Fuse menu button to advance cursor
Menu selection will be activated in 0 seconds
```

Figure 2: After selecting an option to run

Figure 3: USB Results

In general, commands run other shell programs. The raw output of these shell commands is displayed between the left and right chevrons.

5.1 Mount SD Card

This option enables you to manually mount the SD card as a UNIX filesystem. By default, it will be already mounted on /mnt/sd.

If successful, this option will simply display:

```
>>>>>>>
Opened pipe ok
<<<<<<<
```

If you receive an error, for example, the following, it implies that your soldering of the secondary MicroSD card holder is not correct.

5.2 Unmount SD Card

This option enables you to manually unmount the SD card. By default, the card is already mounted on /mnt/sd.

!!! If you unmount the card, then execute the "Is -laF SD Card" and "Stress SD Card" options, they will run on the internal SD card which is not a useful test !!!

If you unmount the SD card, you should remount it via the "Mount SD Card" option before commencing any SD card tests.

If successful, this option will simply display:

```
>>>>>>>
Opened pipe ok
<<<<<<<
```

If the card isn't actually mounted, you will see the following error:

```
>>>>>>>
Opened pipe ok
fusermount3: entry for /mnt/sd not found in /etc/mtab
<<<<<<<<<<<<<<<<<<<><<<<<><<</>
```

5.3 ls -laF SD Card

This option lists the contents of the /mnt/sd directory. By default, the SD card will already be mounted on this location and it should show the contents of that SD card. Please ensure there are some files on the SD card in advance.

If the card is present and mounted OK, it will display the directory contents:

If the card is not mounted, it will display an empty directory, for example:

```
>>>>>>>>>
Opened pipe ok
total 8
drwxr-xr-x 2 root root 4096 Apr 2 12:13 ./
drwxr-xr-x 3 root root 4096 Apr 2 12:13 ../
<<<<<<<<
```

If you don't see any sort of directory listing, but an error, for example, the following, it implies that your soldering of the secondary MicroSD card holder is not correct.

5.4 Stress SD Card

This option runs a full stress test on your secondary Micro SD card.

It will:

- 1. Create 32x 48K test files containing random data on your MicroSD card in a new directory called "STRESSSD"
- 2. Check there are 32 files in the "STRESSSD" directory
- 3. Perform an integrity check on all 32 files
- 4. Remove the 32 files and the "STRESSSD" directory

The stress test takes a couple of minutes to run.

A successful run should look like the following:

```
>>>>>>>>>
Opened pipe ok
== bcm2835 init ok
== Removing test files...
!! failed to stat parent directory for removal: 4
!! ...but this is ok because it can't be found
== Removed test files ok...
== Creating test files...
== Created 32 test files. expected: 32
== Testing files. Iteration 1 of 1
== Scan Results: 1 iterations, 1 pass, 0 fail, 0 corruptions, 0
iterations
== Removing test files...
== Removed test files ok...
== Unmounted volume ok
<<<<<<<
```

An unsuccessful run will differ from the above and give more detail about the specific cause of failure. If the error indicates the SD card cannot be accessed, it implies your soldering of the MicroSD card holder is faulty. For example,

5.5 Test GPIO

This option can only be satisfactorially used if you have the GPIO LED Hat positioned on the SD/USB Testing Board.

If this board is present, this option will illuminate all the LEDs on the board. If the LEDs don't illuminate, it indicates a faulty GPIO pin on the Raspberry Pi Zero. You should replace the Raspberry Pi Zero at this point.

5.6 Test USB

This option is used to test the USB kernel functionality.

By default, with nothing else connected to the SD/USB Testing Board USB port or the assembled ZXZero USB port, it will report the following:

If you attach a USB device and re-run the menu option, it should report an additional device, for example,

5.7 Test I2C

This option will test the kernel I2C functionality.

By default, with nothing connected to the I2C connector, it should report an empty, but valid, I2C bus.

If an I2C device is connected, it should be displayed in the listing:

>>>>>>>>															
Opened pipe ok															
	0	1	2												
00:													 		
10:													 		
20:															
30:													 		
40:															
50:															
60:													 		
70:															
<<<<<<<															