

How to update the ODROID-H4's BIOS



ODROID-H4's BIOS is NOT compatible with the other BIOS also including the ODROID-H2 and ODROID-H3. However, ODROID-H4/H4+/H4-Ultra is using one together.



For the **impatient** who already flashed an ODROID-H4 BIOS before and who does not want to read the whole thing again: once the BIOS has been flashed, you **MUST cold reboot** your ODROID-H4. To do so, once the utility confirmed the successful flashing. **Pull the power cable off** your machine and plug in it back after a few seconds. Power on your ODROID-H4.

Introduction

The reasons you will want to flash the ODROID-H4 BIOS are:

- Hardkernel has released a new version that brings new or enhanced features and/or bug fixes.
- A Hardkernel support engineer told you on the forum to flash a specific BIOS version.
- You want to switch between the 1 X x4 lanes and 4 X x1 lanes PCIe bifurcation of the NVMe slot. The former is for using a PCIe Gen 3 x4 NVMe SSD. The latter is for using the ODROID H-series Net card.



It is a good idea to flash the BIOS while the ODROID-H4 **is powered via a UPS**. A power outage or an unstable power may interrupt the flashing operation and this will leave the BIOS in an unknown state and can make your ODROID-H4 inoperable afterwards. The UPS will prevent such incidents and will power the ODROID-H4 long enough for the flashing to complete.

Requirements

- A USB key drive
- [BIOS F/w and update tools](#)

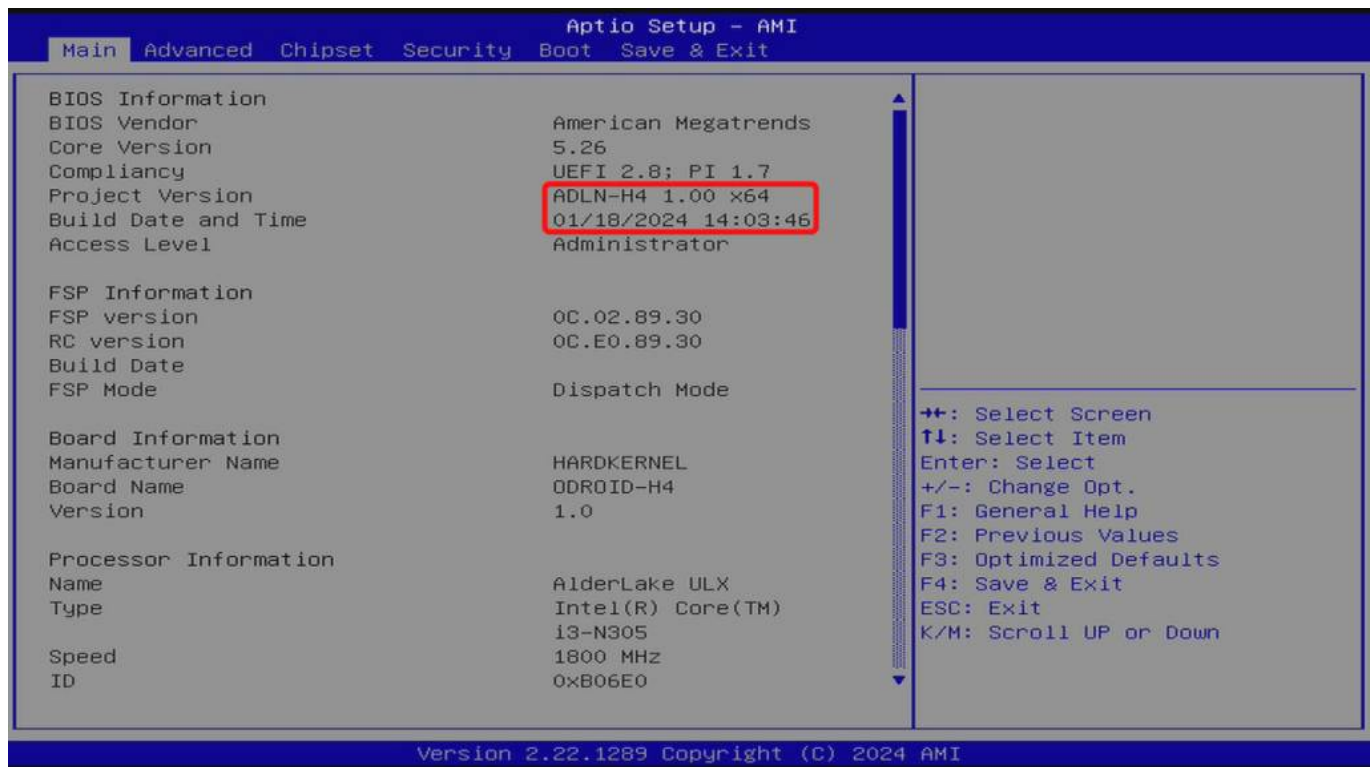


- You should know that ODROID-H4+/H4-Ultra has adapted a **Dual BIOS** feature. When the BIOS fails and is unable to boot, you can move the jumper to the other header pin manually to select a "Backup" BIOS. It will be booted without issue via the "Backup" BIOS and give you a chance to recover the failed BIOS.
- Check how to restore failed H4's BIOS on [this link](#).

Checking your current BIOS firmware version

Accessing the BIOS

1. Power off your **ODROID-H4**.
2. Press the Power button on your **ODROID-H4**, then Press “DEL” key while booting. You will get access to the BIOS screen shown below.
3. Check the Project Version and Build Date.

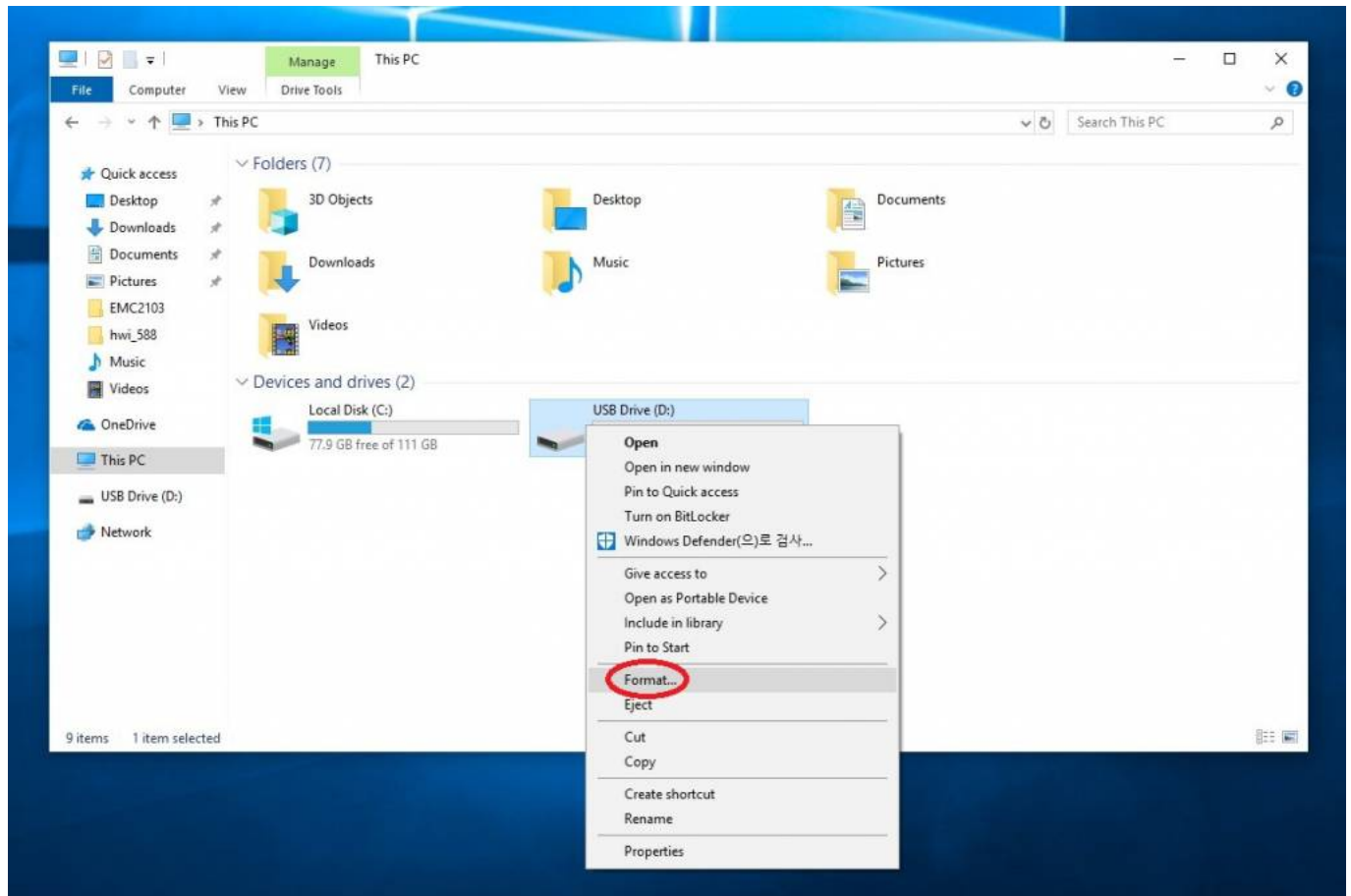


Preparing the USB key drive for updating BIOS

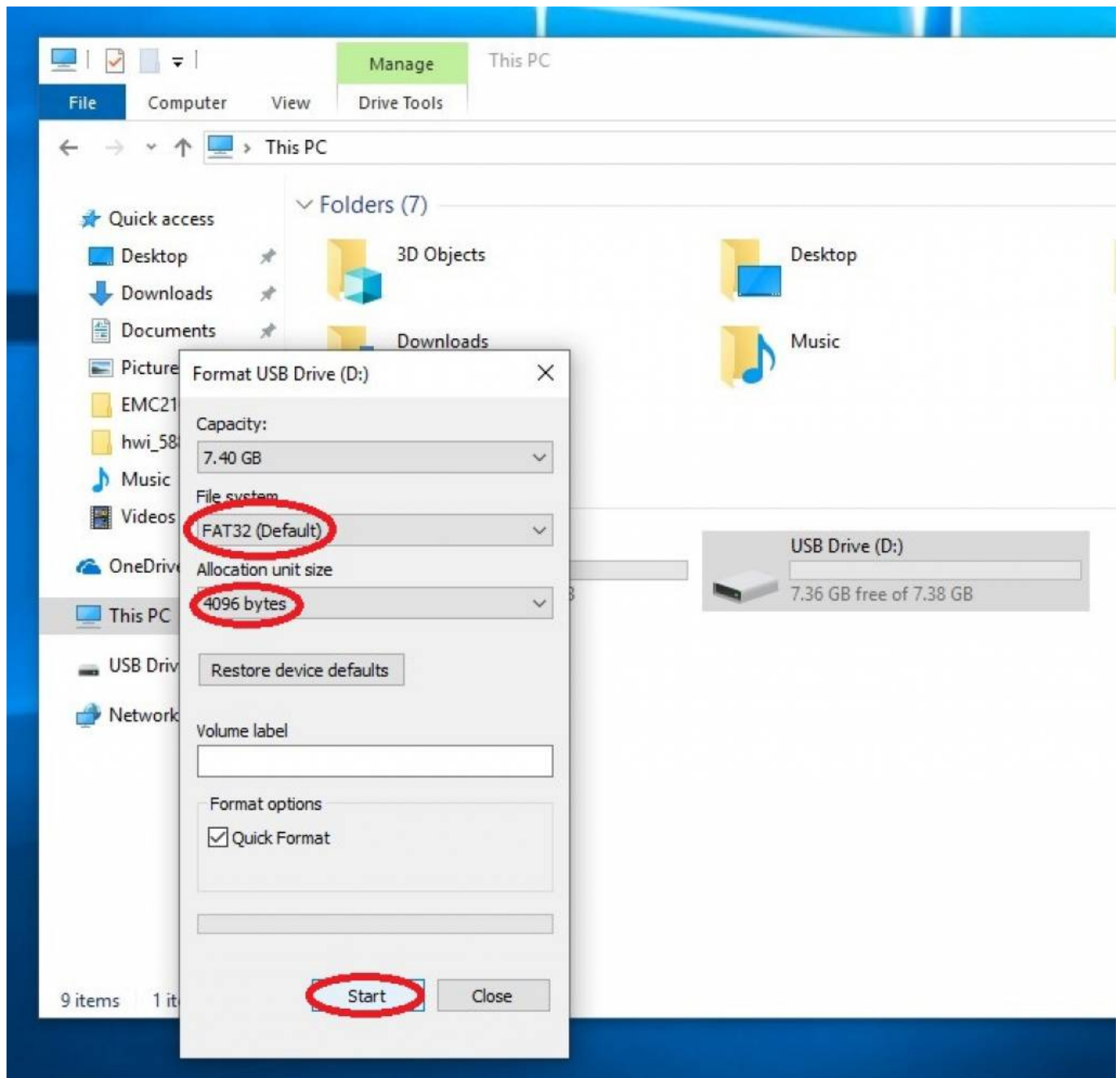
Formatting the USB key drive using the FAT32 filesystem

On Windows

1. Plug the USB key drive into your PC.
2. Right click on the USB key drive icon and then select **Format...** from the contextual menu.

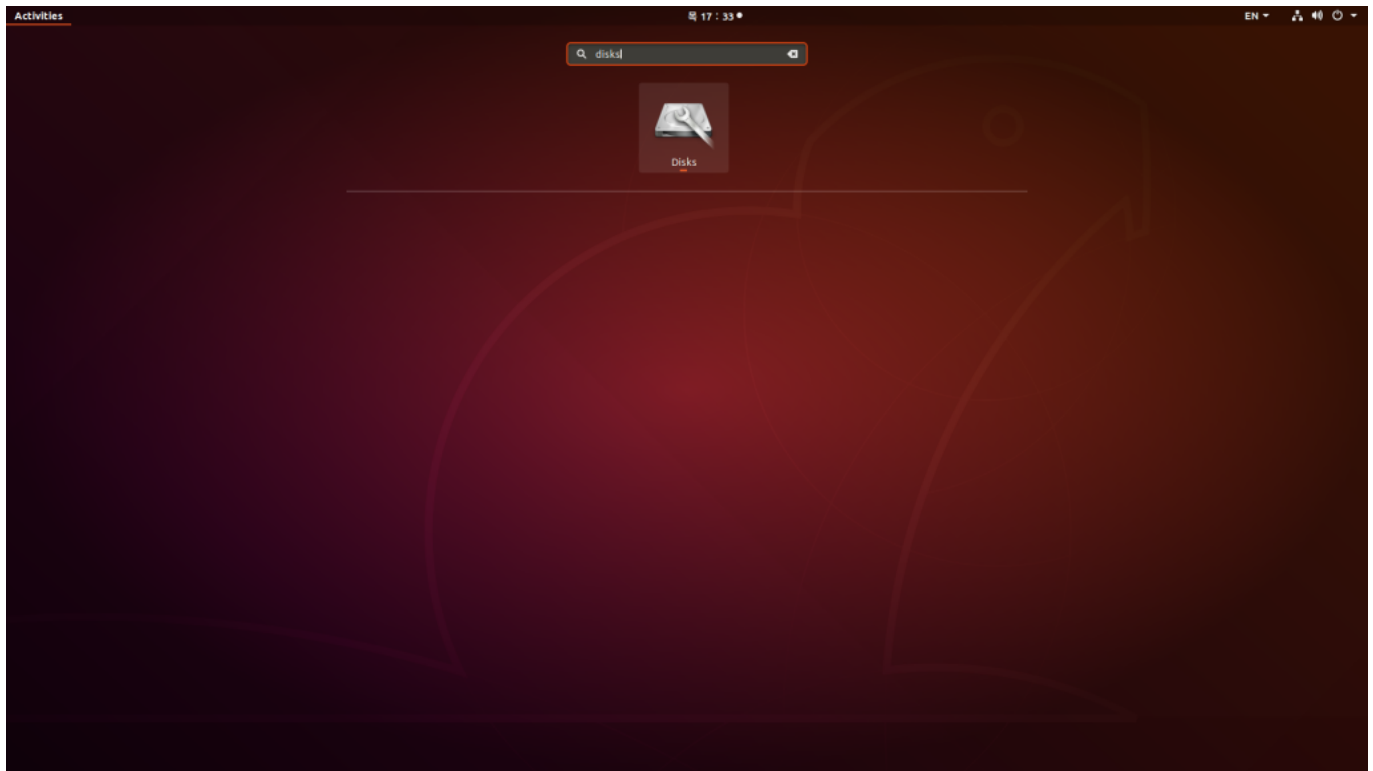


3. Set the parameters as they appear in screenshot shown below and then click on **Start**.

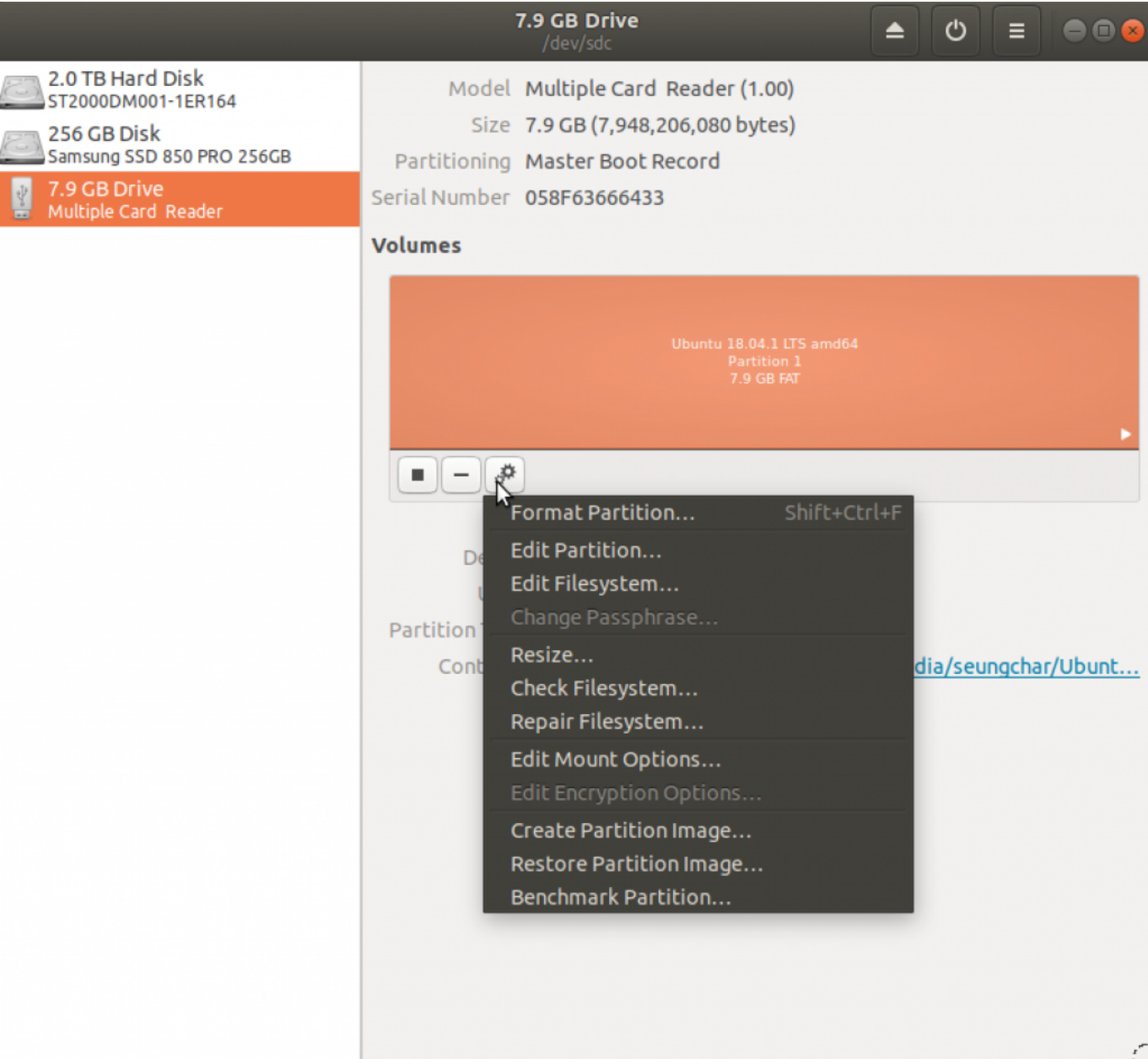


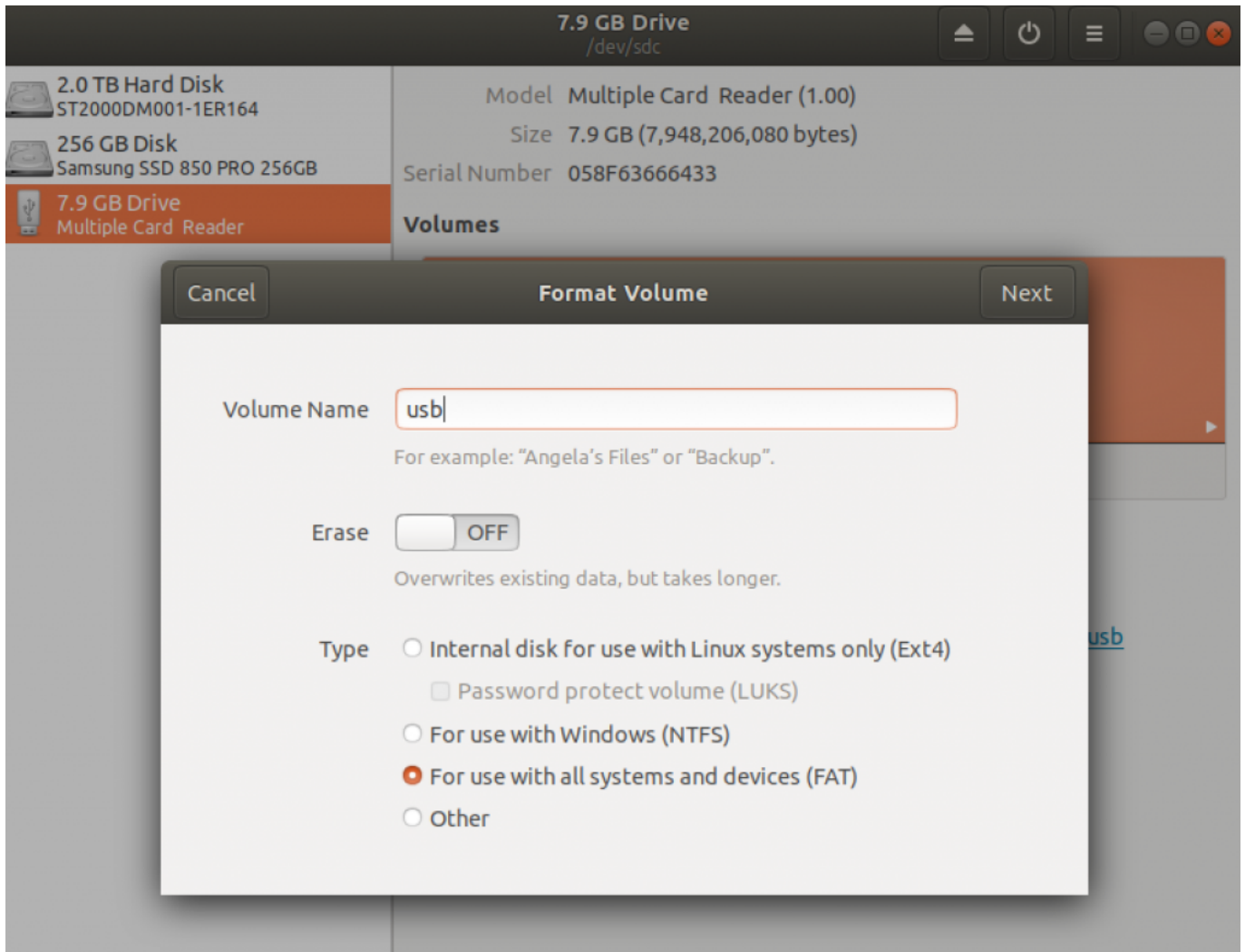
On Linux Ubuntu

1. Plug the USB key drive into your PC.
2. Run the Disks utility (see screenshot shown below).



3. Format the partition as FAT (see screenshots shown below).





Copying the BIOS update tool and the latest BIOS firmware to the USB key drive

You can download the BIOS update tool and firmware via this link:

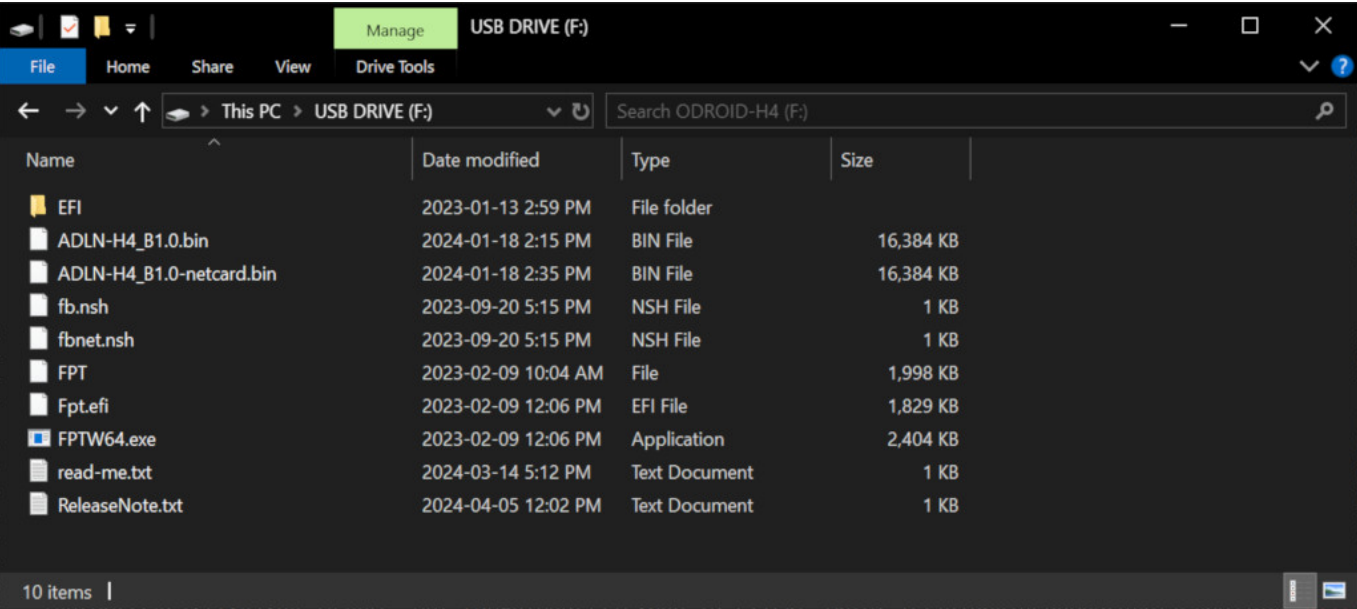
<https://dn.odroid.com/ODROID-H4/bios/>

1. Download bios zip and related sha256sum hash file.
2. Verify the bios zip file with SHA256sum hash value whether is **OK** or not.


host

```
C:\Users\neal.DESKTOP-NEAL\Downloads>ls ADLN-H4_B1.0.zip*
ADLN-H4_B1.0.zip  ADLN-H4_B1.0.zip.sha256
C:\Users\neal.DESKTOP-NEAL\Downloads>sha256sum -c ADLN-
H4_B1.0.zip.sha256
ADLN-H4_B1.0.zip: OK
```

3. unzip the .zip archive file you just downloaded.
4. Copy the extracted files to the USB key drive.
5. Make sure the USB key drive now contains the files as they appear in the screenshot shown below.



Update to the latest BIOS



You **MUST** cold reboot your ODROID-H4.

Flashing the BIOS reset all settings to their default If you changed something, e.g. the PL4 value, reboot into the BIOS and change the values back to your preferences.

Enter the BIOS

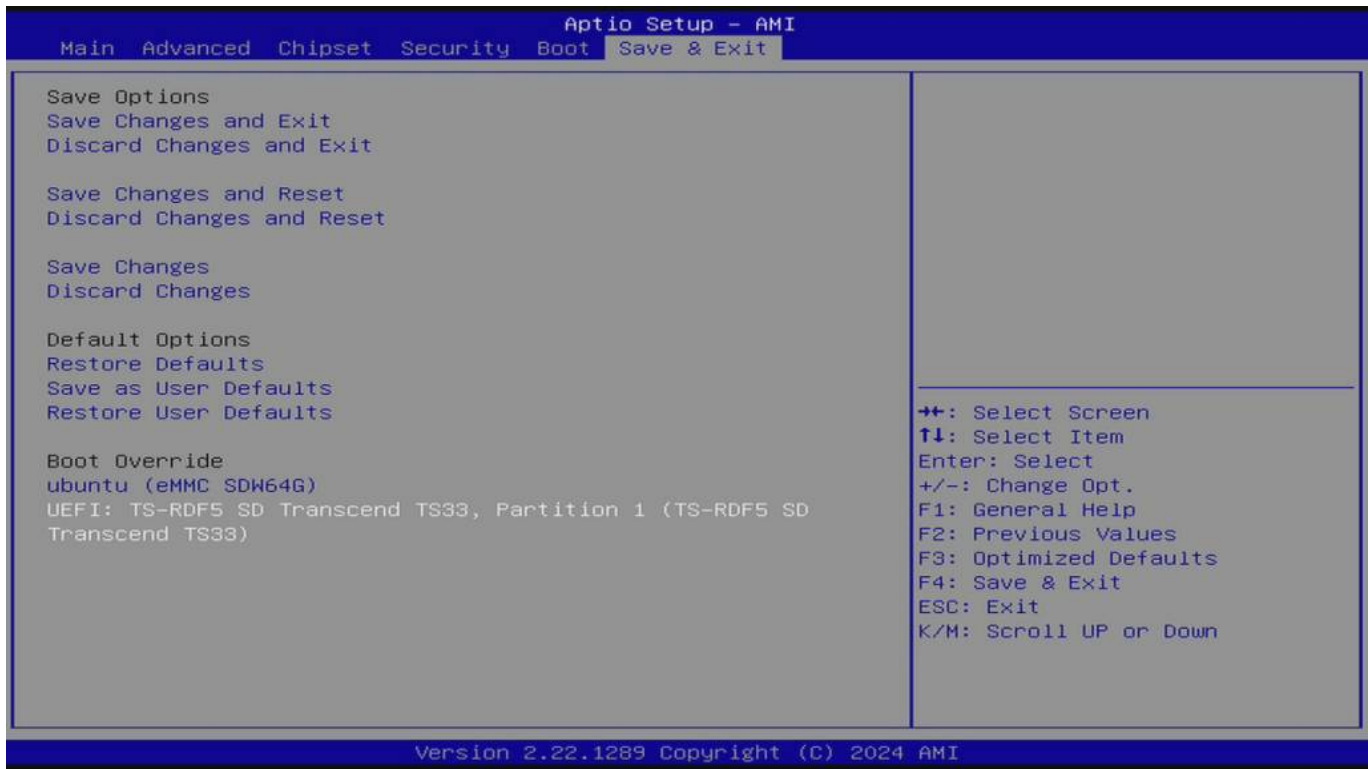
1. Power off your **ODROID-H4**.
2. Press the Power button on your **ODROID-H4**, then Press “DEL” key while booting.
3. Move to “**Save & Exit**” tab.

Enter an EFI shell and Run a fb.nsh

Go to the **Save & Exit** page. In the **Boot Override** section, select the USB key + Enter.
You will boot directly from the USB Key.

OR

Go to the Boot page. In the **Boot Priorities** section, change Boot option #1 to a USB key.
From the next booting, you will boot directly from the USB key.



Find the fs node of your memory stick

Enter **fs0:** or **fs1:** etc... which is marked as **Removable HardDisk**.

```
Device mapping table
fs0      :HardDisk - Alias hd20b blk0
          PciRoot(0x0)/Pci(0x1A,0x0)/eMMC(0x0)/HD(1,GPT,0063B4D3-F3EE-49F4-BAA8
          -BE9466F0BFE4,0x800,0x1E8000)
fs1      :Removable HardDisk - Alias hd15e0b blk1
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x4,0x0)/HD(1,GPT,6D0262B5-243C-5041-B
          4EA-3710F6102EB7,0x800,0xECD7C1)
blk0     :HardDisk - Alias hd20b fs0
          PciRoot(0x0)/Pci(0x1A,0x0)/eMMC(0x0)/HD(1,GPT,0063B4D3-F3EE-49F4-BAA8
          -BE9466F0BFE4,0x800,0x1E8000)
blk1     :Removable HardDisk - Alias hd15e0b fs1
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x4,0x0)/HD(1,GPT,6D0262B5-243C-5041-B
          4EA-3710F6102EB7,0x800,0xECD7C1)
blk2     :HardDisk - Alias (null)
          PciRoot(0x0)/Pci(0x1A,0x0)/eMMC(0x0)/HD(2,GPT,5239844C-6F05-4C26-BBCD
          -464B1DBBF5AC,0x1E800,0x7293351)
blk3     :BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x1A,0x0)/eMMC(0x0)
blk4     :Removable BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x4,0x0)

Press ESC in 4 seconds to skip startup.nsh, any other key to continue.
Shell> fs1:
fs1:\> _
```

To ensure that you select a proper disk, enter **ls** and see the files on the root directory of the disk.



- Do not use **blk0**, **blk1**, It showed like aliased with corresponding **fs** locations,



but the update binary won't work under the **blk** location.

```
blk4      PciRoot(0x0)/Pci(0x1A,0x0)/eMMC(0x0)
          :Removable BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x6,0x0)

Press ESC in 5 seconds to skip startup.nsh, any other key to continue.
Shell> fs1:

fs1:\> ls
Directory of: fs1:\

01/13/23  02:59p <DIR>          16,384  EFI
01/18/24  02:15p                16,777,216  ADLN-H4_B1.0.bin
01/18/24  02:35p                16,777,216  ADLN-H4_B1.0-netcard.bin
09/20/23  05:15p                 29  fb.nsh
09/20/23  05:15p                 37  fbnet.nsh
02/09/23  10:04a                2,045,256  FPT
02/09/23  12:06p                1,872,832  Fpt.efi
02/09/23  12:06p                2,460,720  FPTW64.exe
03/14/24  05:12p                 842  read-me.txt
04/05/24  12:02p                 171  ReleaseNote.txt
          9 File(s)  39,934,319 bytes
          1 Dir(s)

fs1:\> _
```

Run the nsh batch file

- **fb.nsh** : H4/H4+/H4-Ultra regular bios update
- **fbnet.nsh** : H4/H4+/H4-Ultra for Net-Card or M.2 4×1 Card
- **fb2.nsh** : H4/H4+/H4-Ultra for M.2 2×2 Card



fb.nsh file is just execute this command **Fpt.efi -f ADLN-H4_B1.0.bin**.

If you want to update the specific bios version - In this example shows the bios for Net card (ADLN-H4_B1.0-netcard.bin), write down and execute like this **Fpt.efi -f ADLN-H4_B1.0-netcard.bin**



Do not turn off your **ODROID-H4** while the BIOS is updating.

Just type **fb** and enter for updating regular bios in this case.
For the Net Card updating, just type **fbnet** and enter.

```
fs1:\> fb
fb> Fpt.efi -f ADLN-H4_B1.0.bin
Intel (R) Flash Programming Tool Version: 16.50.0.1292
Copyright (C) 2005 - 2023, Intel Corporation. All rights reserved.

Reading HSFSTS register... Flash Descriptor: Valid

--- Flash Devices Found ---
ID:0xEF7018    Size: 16384KB (131072Kb)

GbE Region does not exist.

Processing Flash memory block 459 from 4095.
- Erasing Flash Block [0x1CC000] - 100 percent complete.
- Programming Flash [0x01CC000] 44KB of 44KB - 100 percent complete.
Processing Flash memory block 469 from 4095.
- Erasing Flash Block [0x1D6000] - 100 percent complete.
- Programming Flash [0x01D6000] 36KB of 36KB - 100 percent complete.
Processing Flash memory block 543 from 4095.
- Erasing Flash Block [0x220000] - 100 percent complete.
- Programming Flash [0x021FC52] 3KB of 4KB - 77 percent complete.
```

You can see the results like the screenshot below when the update is finished.

```
- Erasing Flash Block [0x23F000] - 100 percent complete.
- Programming Flash [0x023F000] 16KB of 16KB - 100 percent complete.
Processing Flash memory block 1536 from 4095.
- Erasing Flash Block [0x601000] - 100 percent complete.
- Programming Flash [0x0601000] 4KB of 4KB - 100 percent complete.
Processing Flash memory block 1564 from 4095.
- Erasing Flash Block [0x61D000] - 100 percent complete.
- Programming Flash [0x061D000] 108KB of 108KB - 100 percent complete.
Processing Flash memory block 1621 from 4095.
- Erasing Flash Block [0x656000] - 100 percent complete.
- Programming Flash [0x0656000] 156KB of 156KB - 100 percent complete.
Processing Flash memory block 1631 from 4095.
- Erasing Flash Block [0x660000] - 100 percent complete.
- Programming Flash [0x0660000] 4KB of 4KB - 100 percent complete.
- Processed memory blocks 4095 from 4095.
- Verifying Flash [0x1000000] 16388KB of 16384KB - 100 percent complete.
RESULT: The data is identical.
```

Flash device was programmed. It is recommended to perform G3 power cycle to complete the flashing process.

FPT Operation Successful.

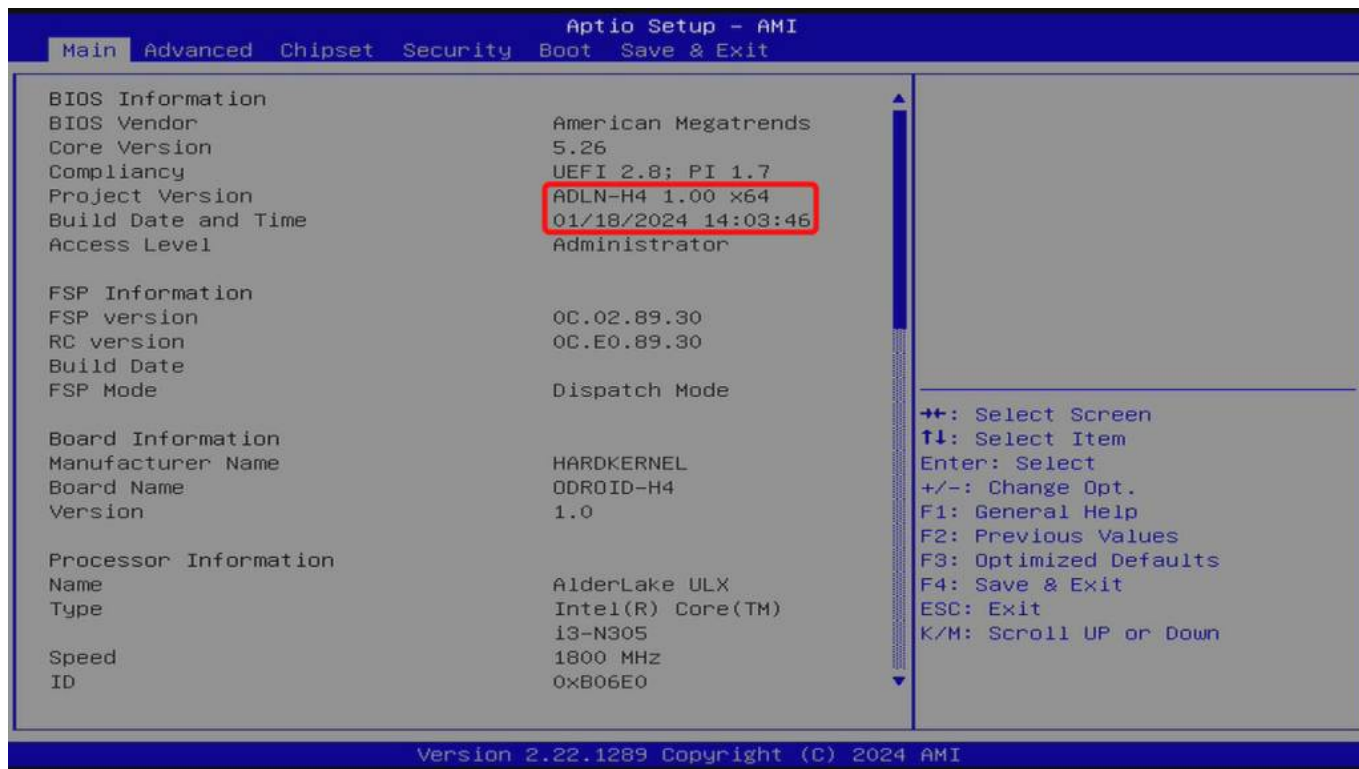
```
fs1:\> _
```

Reboot and Check the updated BIOS version

Then pull out the power code (UPS also pulls out, if it connected), and after a couple of seconds, plug the power code back into the ODROID-H4.

The BIOS will be loaded with the new settings on the ODROID-H4.

To check the version of bios, press "DEL" key while booting, and enter the BIOS Setup.



BIOS Release



- Please do **cold-boot** after updating BIOS. Pull the cord out from the board and reconnect that.
- GLK-**ESF** BIOS is designed for our **Net Card** product. You can see the detailed information of the ESF BIOSes here.
 - https://wiki.odroid.com/accessory/connectivity/h2_net_card#esf_bios

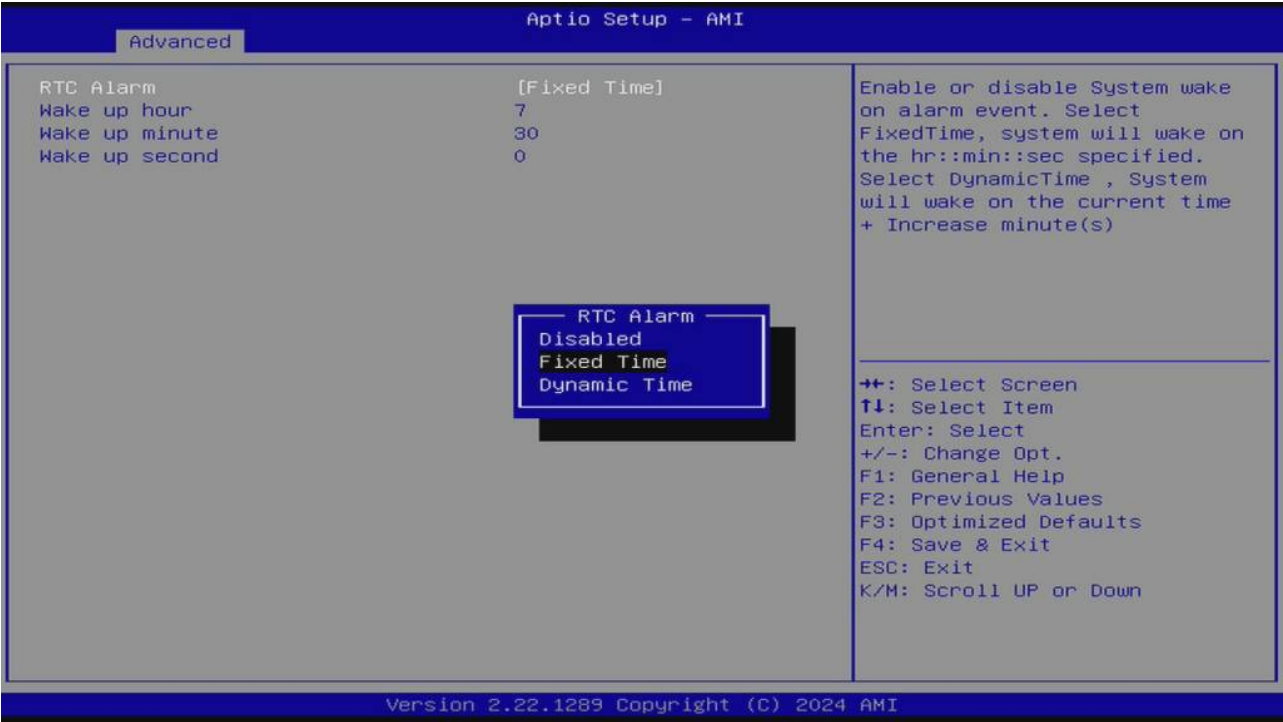
- Download [H4 BIOS files and update Tools](#)

ADLN-H4 1.06

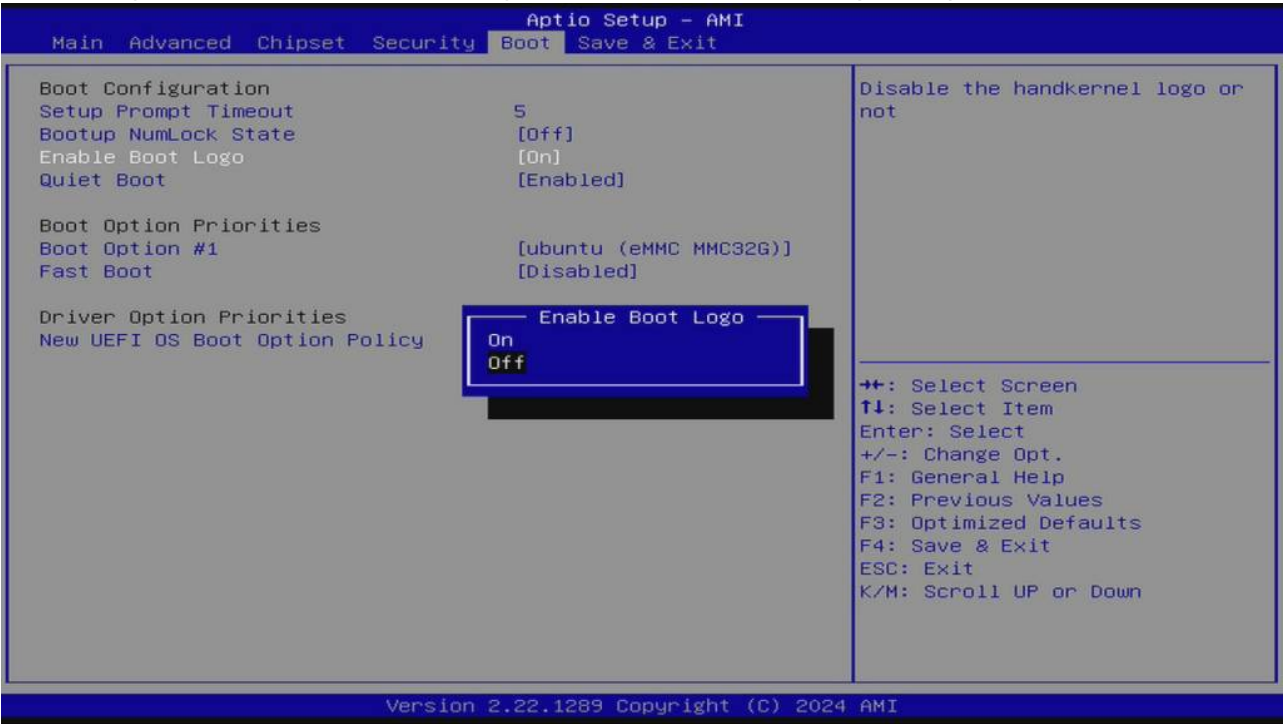
- Project Version: ADLN-H4 1.06 x64
- Build Date and Time: 11/27/2024 14:28:59

Changes

- Add new feature RTC Alarm that enable or disable system wake on alarm event (Advanced -> RTC Alarm)
Below screenshot made wake up the H4 at seven thirty zero seconds everyday.



- Add new option Hardkernel logo On or Off (Boot -> Enable Boot Logo)
 - Change default Setup Prompt Timeout to 5 sec from 1 sec to display Hardkernel logo when Enable Boot Logo is On.
- This change could be affected the longer POST times when the system power ON.



ADLN-H4 1.05

- Project Version: ADLN-H4 1.05 x64
- Build Date and Time: 09/21/2024 10:33:28

Changes

- Fixed PKfail security issue
- Modified ACPI table to improve OpenBSD compatibility. [Forum Thread Link](#)
- The Secure Boot menu is hidden by default. To show the menu, you need to change an option, SETUP > Security > Secure Boot > Disable to Enable.

ADLN-H4 1.04

- Project Version: ADLN-H4 1.04 x64
- Build Date and Time: 07/16/2024 09:19:38

Changes

- Fixed the wrong WoL Enabled / Disabled settings.
- Add a new setting menu to “Chipset -> PCH-IO configuration -> USB port power under S5” Enabled(turn on) / Disabled(turn off) to control the USB power in the S5 (power-off) state.

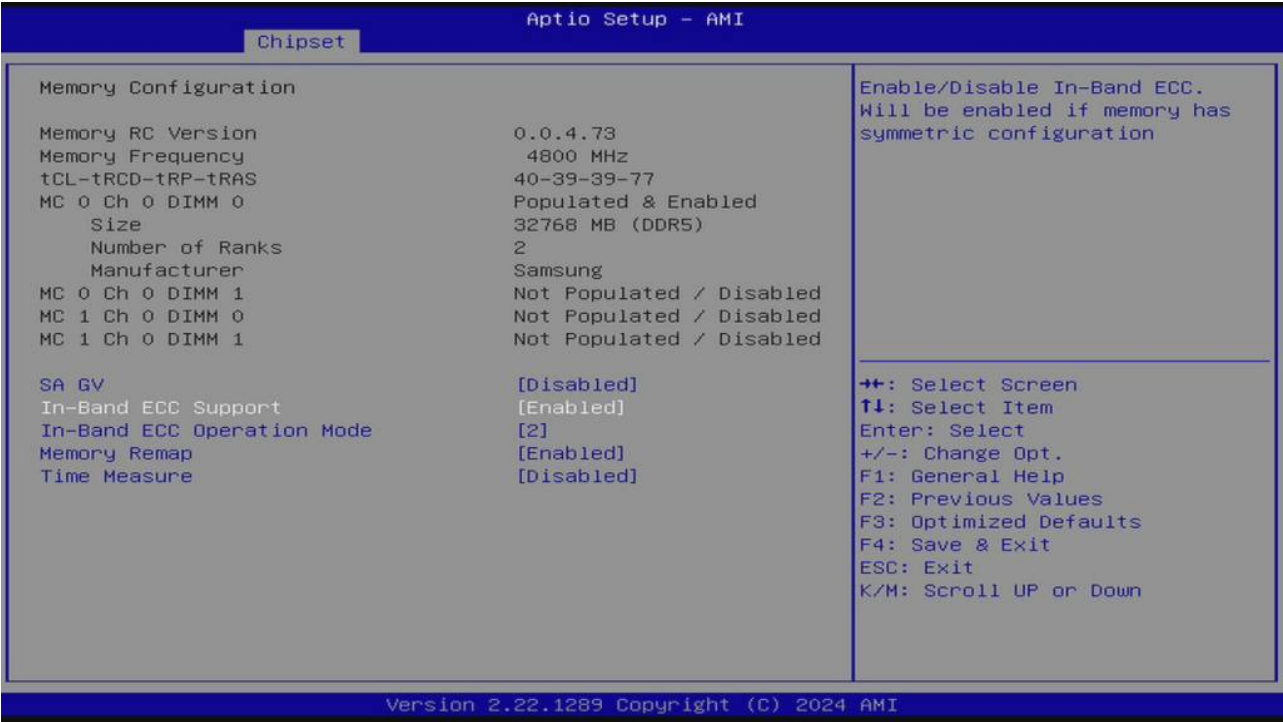


ADLN-H4 1.02

- Project Version: ADLN-H4 1.02 x64
- Build Date and Time: 04/29/2024 18:09:39

Changes

- Support M.2 Cards [M.2 2x2 Card](#) [M.2 4x1 Card](#)
- Support IBECC (Chipset -> System Agent (SA) Configuration -> Memory Configuration -> In-Band ECC Support).



What is IBECC

The In-Band Error Correction Code (IBECC) improves reliability by providing error detection and correction.

IBECC can work for all or for specific regions of physical memory space. The IBECC is useful for memory technologies that do not support the out-of-band ECC.

IBECC adds memory overhead of 1/32 of the memory. This memory is not accessible and used to store ECC syndrome data.

IBECC converts read / write transactions to two separate transactions: one for actual data and another for cache line containing ECC value.

IBECC Configuration

There are three IBECC operation modes which can be selected. They are listed below:

OPERATION_MODE = 0 sets functional mode to protect requests based on address range.

OPERATION_MODE = 1 sets functional mode to all requests not be protected and to ignore range checks.

OPERATION_MODE = 2 sets functional mode to protect all requests and ignore range checks.

(Default)

You can find some useful IBECC information in the [forum thread](#).

ADLN-H4 1.00

- Project Version: ADLN-H4 1.00 x64
- Build Date and Time: 01/18/2024 14:03:46

Changes

- The first production BIOS.

Troubleshooting

From:

<https://wiki.odroid.com/> - **ODROID Wiki**

Permanent link:

https://wiki.odroid.com/odroid-h4/hardware/h4_bios_update

Last update: **2024/12/04 15:29**

