StarFive 赛昉科技

VisionFive 2 Single Board Computer Quick Start Guide

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Preface

About this guide and technical support information.

About this document

This document mainly provides the users with the necessary information about the StarFive VisionFive 2 development board, including features, specifications, board appearance, and pinout, as well as the guidelines to get started with the Debian operating system.

Revision History

Table 0-1 Revision History

Version	Released	Revision
1.0	2022/12/21	The first official release.

Notes and notices

The following notes and notices might appear in this guide:

- **Tip:**
  Suggests how to apply the information in a topic or step.
- **Note:**
  Explains a special case or expands on an important point.
- **Important:**
  Points out critical information concerning a topic or step.
- **CAUTION:**
  Indicates that an action or step can cause loss of data, security problems, or performance issues.
- **Warning:**
  Indicates that an action or step can result in physical harm or cause damage to hardware.

Contents

List of Tables

List of Figures

1. Features and Specifications

This chapter describes the features and specifications of VisionFive 2.

1.1. Features

VisionFive 2 provides the following features.

1.1.1. Hardware

This section describes the following VisionFive 2 hardware functions.

Processor

- StarFive JH7110 with RISC-V quad-core CPU with 2 MB L2 cache and a monitor core, supporting RV64GC ISA, working up to 1.5 GHz
- IMG BXE-4-32 MC1 with work frequency up to 600 MHz

Memory

VisionFive 2 provides the system memory of 2 GB, 4 GB, or 8 GB LPDDR4 SDRAM up to 2,800 Mbps.

Storage

- Onboard TF card slot: The VisionFive 2 can boot from the TF card.
- Flash: The firmware to store U-Boot and bootloader.

Video Processing

The video processing of VisionFive 2 has the following features.

- Video decoder support up to 4K@60fps and multi-stream for H264/H265
- Video encoder support up to 1080p@30fps and multi-stream for H265
- JPEG encoder/decoder

1.1.2. Interfaces

- 1 × 2-lane MIPI DSI
- 1 × 4-lane MIPI DSI
- 1 × 2-lane MIPI CSI
- 1 × 3.5 mm Audio Jack
- 1 × USB-C port for charging
- 1 × USB device port (by reusing the USB-C port)
- 4 × USB 3.0 ports (multiplexed with a PCIe 2.0 1x lane)

- 1 × HDMI 2.0
- 2 × RJ45 Ethernet ports
- 1 × 4-pin PoE header
- 1 × 2-pin fan header
- 1 × Reset button
- 1 × 40-pin GPIO header, supporting various interface options:
  - 3.3 V (on 2 pins)
  - 5 V (on 2 pins)
  - Ground (on 8 pins)
  - GPIO
  - CAN bus
  - DMIC
  - I2C
  - I2S
  - PWM
  - SPI
  - UART
  - and so on

1.1.3. Software

Operating System

VisionFive 2 supports Debian operating system.

For more software resources, please follow the StarFive GitHub repository.

1.2. Specifications

VisionFive 2 has the following specifications.

Type	Item	Description
Processor:	StarFive JH7110	StarFive JH7110 with RISC-V quad-core CPU with 2 MB L2 cache and a monitor core, supporting RV64GC ISA, working up to 1.5 GHz
	Imagination GPU	IMG BXE-4-32 MC1 with work frequency up to 600 MHz
Memory:	2 GB/4 GB/8 GB	LPDDR4 SDRAM, up to 2,800 Mbps
Storage:	Onboard TF card slot	The VisionFive 2 can boot from a TF card.
	Flash	The firmware to store U-Boot and bootloader.

Type	Item	Description
Multimedia:	Video Output	• 1 × 2-lane MIPI DSI display port, supporting up to 1080p@30fps • 1 × 4-lane MIPI DSI display port, supporting up to 2K@30fps in both single display and dual display modes. • 1 × HDMI 2.0, supporting up to 4K@30fps or 2K@60fps **Note:** Only one MIPI DSI port can be used for display at a time.
	Camera	1 × 2-lane MIPI CSI camera port, supporting up to 1080p@30fps
	Encoder/Decoder	• Video decoder supports up to 4K@60fps and multi-stream for H264/H265; • Video encoder supports up to 1080p@30fps and multi-stream for H265; • JPEG encoder/decoder
	Audio	4-pole stereo audio jack
Connectivity:	Ethernet	2 × RJ45 Gigabit Ethernet ports
	USB Host	4 × USB 3.0 ports (multiplexed with a PCIe 2.0 1x lane).
	USB Device	1 × USB device port (by reusing the USB-C port)
	M.2 Connector	M.2 M-Key
	eMMC Socket	For eMMC modules as OS and data storage
	2-Pin Fan Header	-
Power:	USB-C port	5 V DC via USB-C with PD, up to 30 W (minimum 3 A)
	GPIO Power In	5 V DC via GPIO header (minimum 3 A)
	PoE (Power over Ethernet)	PoE function is enabled and requires separate PoE HAT
GPIO:	40-Pin GPIO Header	1 × 40-pin GPIO header, supporting various interface options: • 3.3 V (on 2 pins) • 5 V (on 2 pins) • Ground (on 8 pins) • GPIO • CAN bus • DMIC • I2C • I2S • PWM

Type	Item	Description
		• SPI • UART • and so on
Boot Mode:	Boot mode setting pins	You can choose one of the following boot modes: • 1-bit QSPI Nor Flash • SDIO3.0 • eMMC • UART
Button:	Reset button	To reset VisionFive 2, press and hold the Reset button for more than 3 seconds to ensure the reset is successful.
Dimensions:	100 × 74 mm	-
Compliance:	RoHS, FCC, CE	-
Environment:	Recommended operating temperature	0-50 ℃
Other:	Debug function	UART TX and UART RX are available through the 40-pin GPIO header.

2. Hardware Overview

This chapter provides the hardware overview of VisionFive 2.

2.1. Board Appearance

Figure 2-1 Board Appearance (Top View)

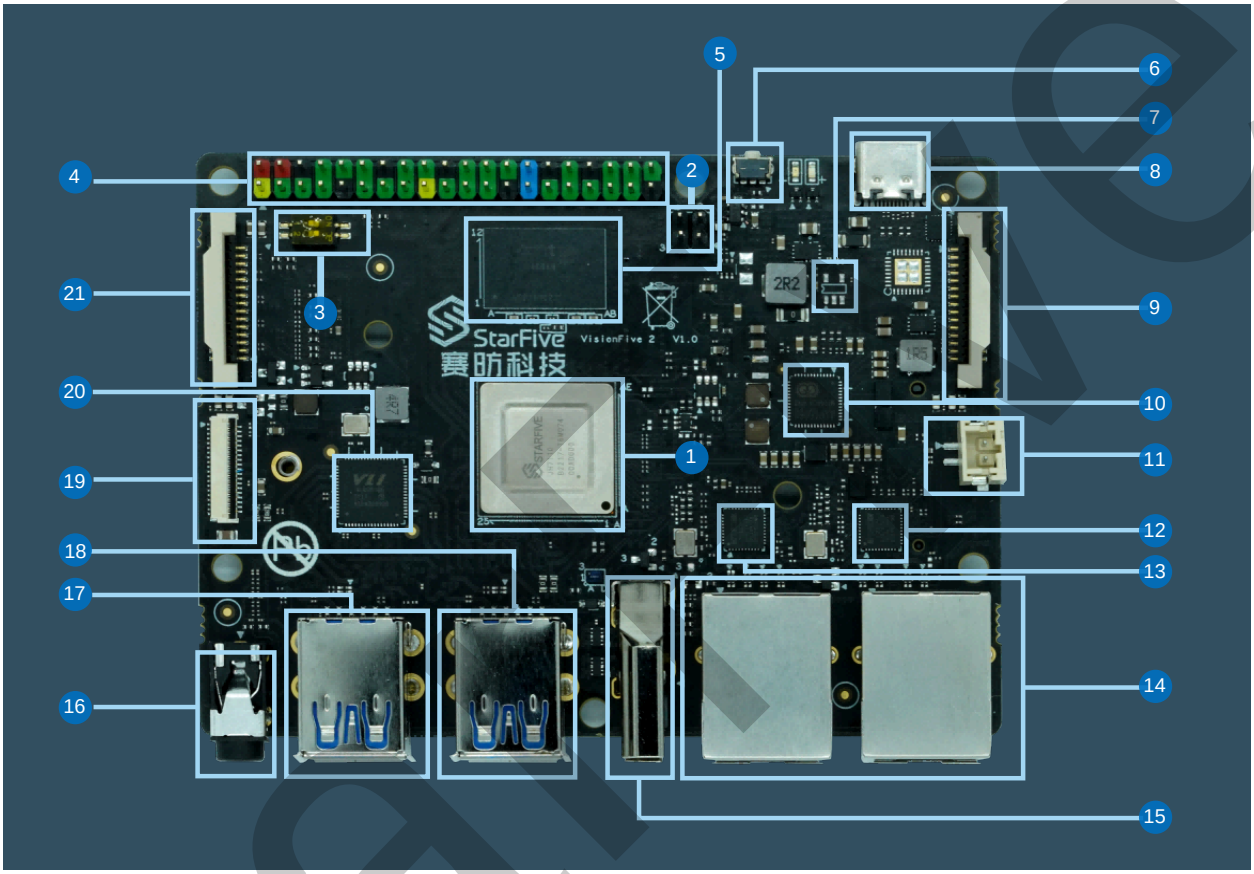
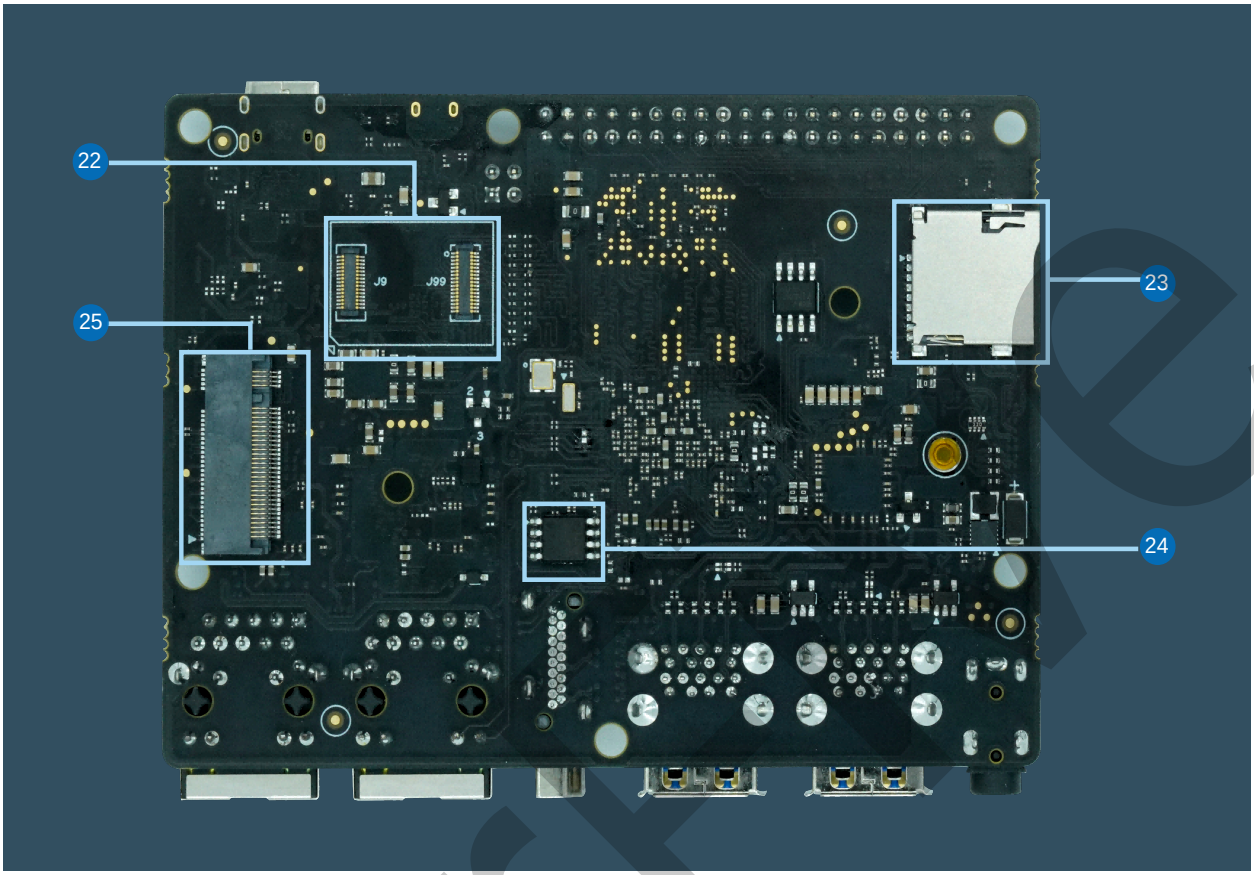


Figure 2-2 Board Appearance (Bottom View)



CAUTION:

During the use of VisionFive 2, avoid contact with hard objects that may cause damage.

Table 2-1 Board Appearance Description

No.	Description	No.	Description
1	StarFive JH7110 with RISC-V quad-core CPU, supporting RV64GC ISA	14	2 × Ethernet Ports (RJ45)
2	PoE Header	15	HDMI 2.0 Port
3	Boot Mode Pins	16	3.5 mm Audio Jack
4	40-Pin GPIO Header	17	2 × USB 3.0 Port
5	2 GB/4 GB/8 GB LPDDR4 SDRAM	18	2 × USB 3.0 Port
6	Reset Button	19	4-Lane MIPI DSI
7	EEPROM	20	USB 3.0 Host Controller
8	USB-C Port, supporting both charging and data transmission	21	2-Lane MIPI DSI
9	2-Lane MIPI CSI	22	eMMC Socket
10	PMIC	23	TF Card Slot
11	2-Pin Fan Header	24	QSPI Flash
12	GMAC0 PHY	25	M.2 M-Key

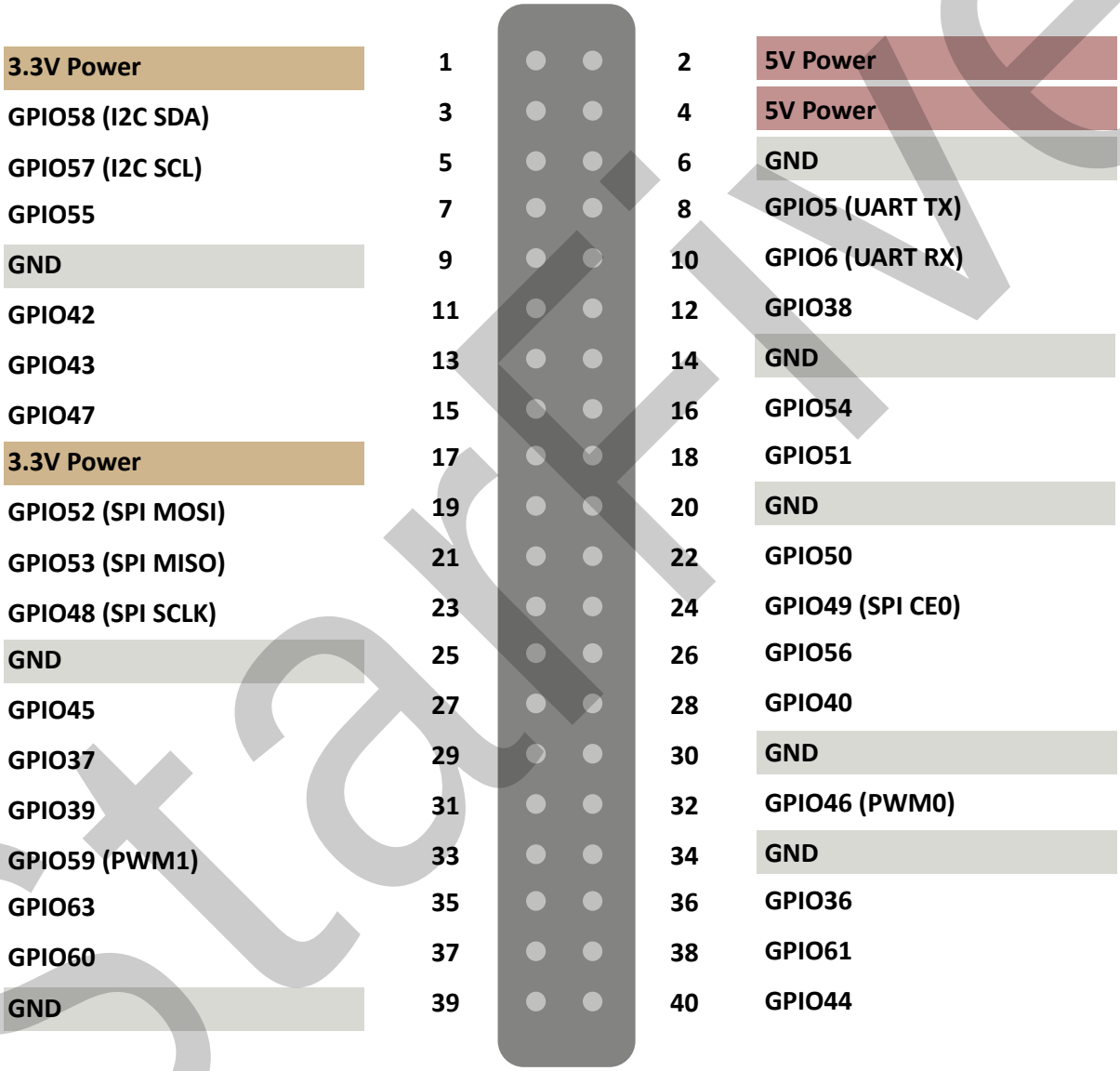
Table 2-1 Board Appearance Description (continued)

No.	Description	No.	Description
13	GMAC1 PHY	-	-

2.2. Pinout Diagram

The following is the pinout diagram:

Figure 2-3 Pinout Diagram



Note:

- Each GPIO pin can safely draw a maximum current of 32 mA, whereas the maximum current draw when all GPIOs are combined should be less than 100 mA. Please take this into account or otherwise, you will end up destroying the GPIO pins.
- All GPIOs can be configured to support different functions including but not limited to SDIO, Audio, SPI, I2C, UART, and PWM. For the instructions, refer to the *VisionFive 2 40-Pin GPIO Header User Guide*.

3. Getting Started

This chapter provides steps to get started with VisionFive 2.

3.1. Required Hardware

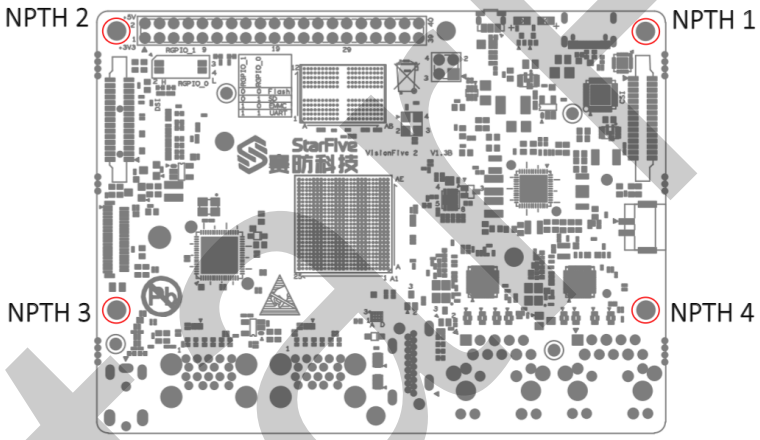
Make sure you have prepared the following hardware items:

- VisionFive 2
- Micro-SD card (32 GB or more)
- PC with Linux/ Windows/ MacOS
- USB to Serial Converter
- Ethernet cable
- Power adapter
- USB Type-C cable

Note:

During the use of VisionFive 2, avoid contact with hard objects that may cause damage. Thus, StarFive recommends that you use spacers for the following NPTHs (Non Plating Through Hole):

Figure 3-1 NPTHs on VisionFive 2



For spacers, StarFive strongly recommends that you use the copper columns or studs with the following specifications:

- Single head hexagonal copper columns (Size: M2.5*10+6mm)

Figure 3-2 Single Head Hexagonal Copper Columns

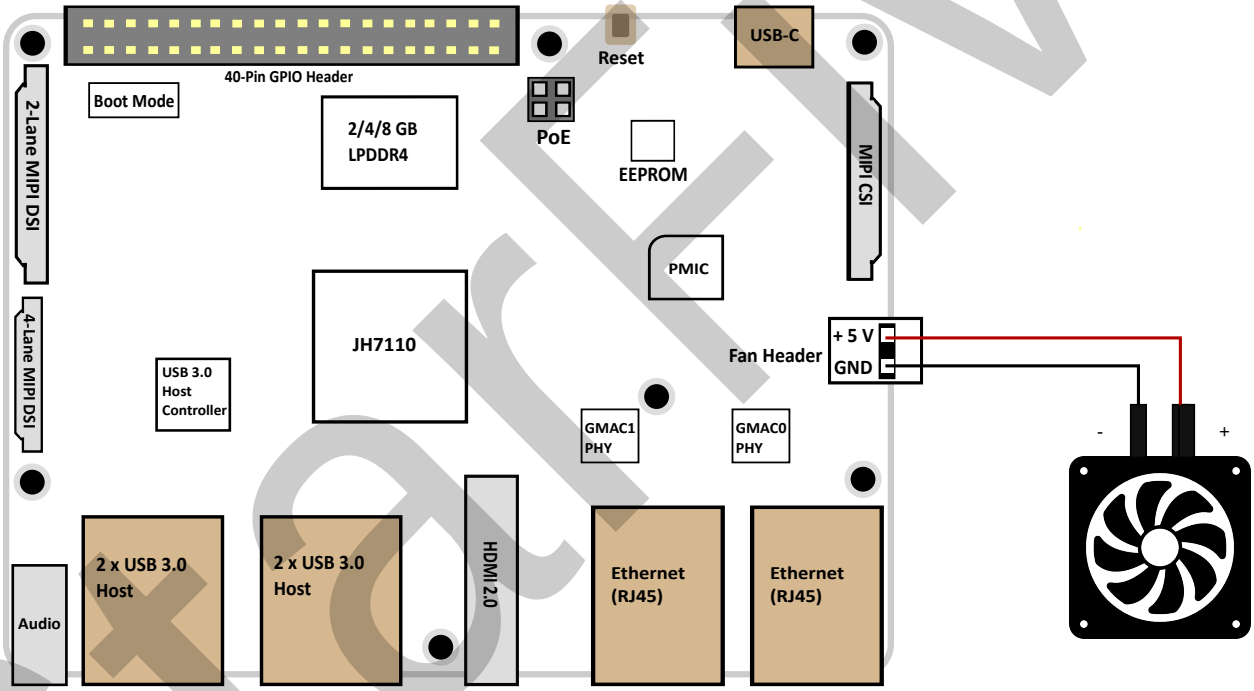
- Double way hexagon copper studs (Size: M2.5*4)

Figure 3-3 Double Way Hexagon Copper Studs

3.2. Connecting a Fan to VisionFive 2

You can connect a 2-pin 5 V fan to VisionFive 2 for further cooling as follows:

Figure 3-4 Connecting a Fan to VisionFive 2



3.3. Flashing OS to a Micro-SD Card

Now we need to burn Debian (which is a Linux distribution) to a micro-SD card so that it can run on the VisionFive 2. This chapter provides example steps to flash Debian to a Micro-SD card with Linux or Windows.

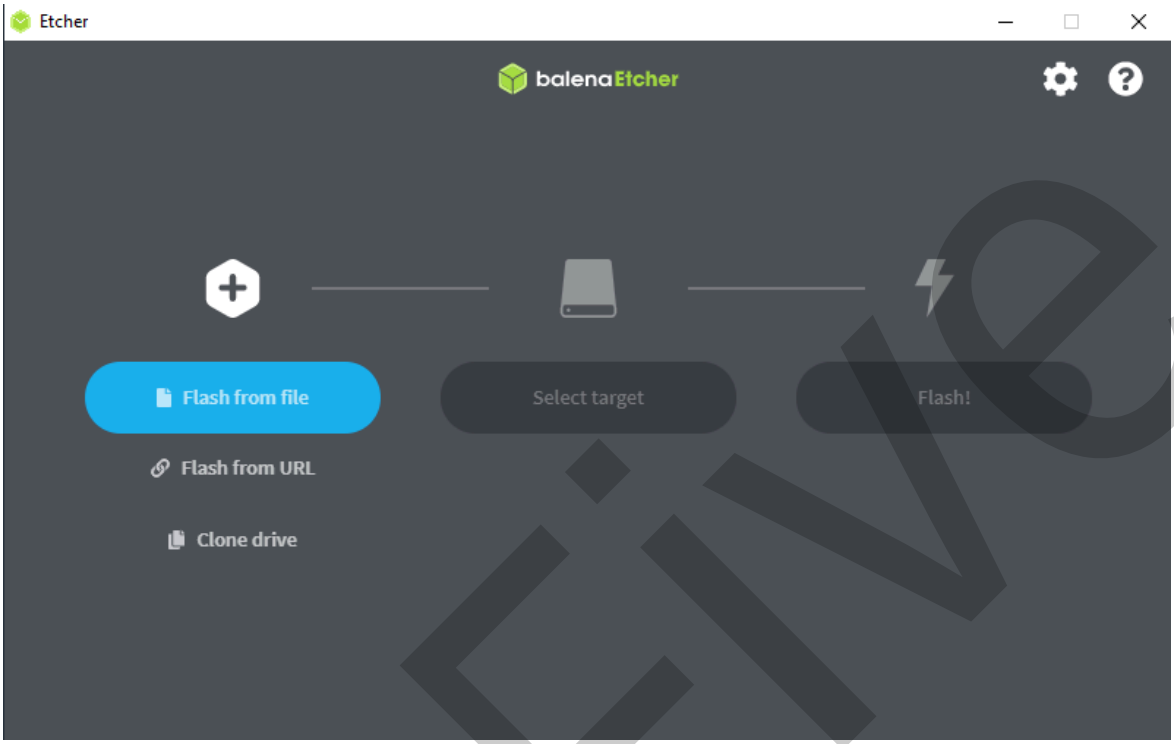
3.3.1. Flashing with Linux or Windows

To flash the image with Linux or Windows, perform the following steps:

1. Insert a micro-SD card into the computer through a micro-SD card reader, or by a built-in card reader on a laptop.
2. Download the latest Debian image from: this link.
3. Extract the `.bz2` file.
4. Visit this link to download BalenaEtcher. We will use BalenaEtcher software to flash the Debian image to a micro-SD card.

5. Install BalenaEtcher and open it.

Figure 3-5 Install BalenaEtcher



6. Click **Flash from file** and select the location of the image where we just unzipped the following file:

   `starfive-jh7110-VF2-<Version>.img`

   Tip:
   <Version> indicates the version number of the Debian image.

7. Click **Select target** and select the connected micro-SD card.
8. Click **Flash!** to start the flash task.

3.4. Logging into Debian

Perform the following steps to log into Debian:

1. Connect a display to VisionFive 2 via HDMI.
2. Insert the TF card with the Debian image into VisionFive 2 and power it on.
3. Start the system. Once enter the u-boot command line interface, enter the following command to boot into Debian:

```
ext4load mmc 1:3 a0000000 /boot/uEnv.txt
env import a0000000 17c
setenv fdtfile starfive/jh7110-visionfive-v2.dtb
sysboot mmc 1:3 ext2 b0000000 /boot/extlinux/extlinux.conf
```

   Result:

   The desktop login system is displayed and you can use the keyboard and mouse on VisionFive 2.

4. Enter the credentials as follows:
   - **Username**: root
   - **Password**: starfive
5. You can log into Debian OS by:

3.4.1. Using Xfce Desktop over HDMI

After installing Debian, you can log in to Debian OS on VisionFive 2 using Xfce Desktop over HDMI.

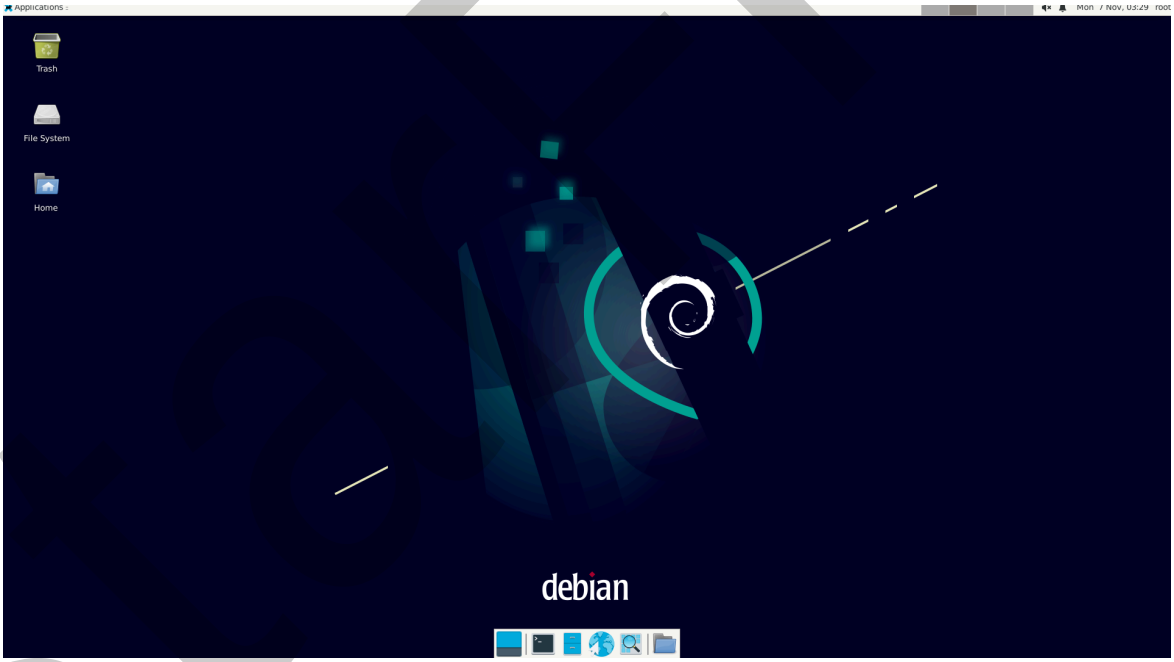
Steps:

1. After the HDMI of the display screen is connected, insert the micro-SD card with the Fedora image into the VisionFive and power on.
2. After the desktop login system is displayed, you can use the keyboard and mouse on VisionFive 2.
3. Enter the credentials as follows:
   - **Username**: root
   - **Password**: starfive

   Result:

   You will see the following interface:

Figure 3-6 Debian Interface



3.4.2. Using SSH over Ethernet

After installing Debian, you can log in to Debian OS on VisionFive 2 through an SSH connection over the local network.

1. Insert the micro-SD card with the Debian image into the VisionFive 2 and power on.
2. Connect one end of an Ethernet cable to the RJ45 connector on the VisionFive 2 and the other end of the cable to a router.
3. After a successful Ethernet connection, your router will assign an IP address to the VisionFive 2 and it will be connected to the Internet.
4. Continue the steps according to your OS:

- For Windows *(on page 18)*
- For Mac/Linux *(on page 18)*

3.4.2.1. For Windows

1. Log in to your router (usually you need to enter `192.168.1.1` on the web browser to enter the router).
2. Go to DHCP configuration and find the IP address of the VisionFive 2.

   Tip:
   You can easily find the IP address of the VisionFive 2 by referring to its host name, `starfive`.

3. Download and install Putty by visiting this link.

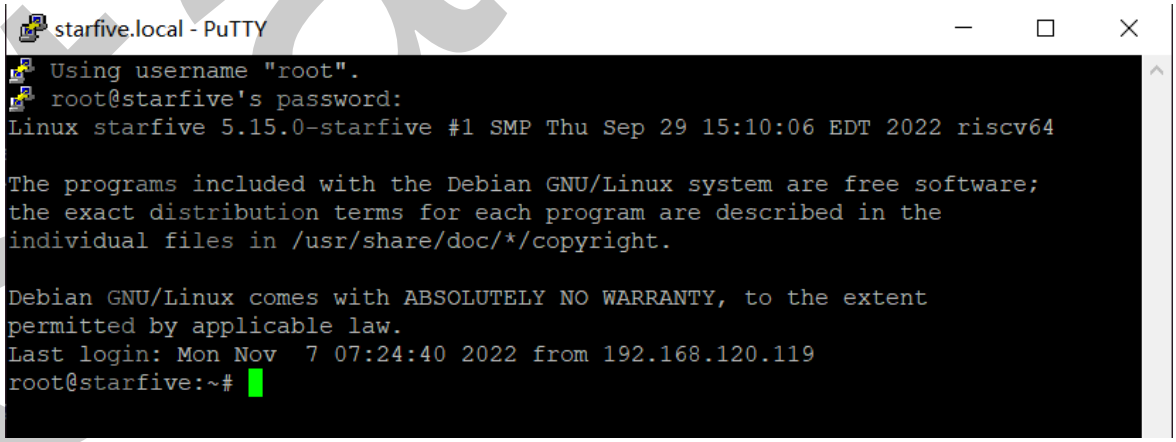
   Tip:
   Putty is an SSH and telnet client through which you can connect to the Carrier Board. You can skip this step if you already have Putty installed.

4. Open Putty to log in to Debian.
5. Select **SSH** under the **Connection Type**.
6. Configure the settings as follows:
   - **Host Name**: IP address of your VisionFive 2
   - **Port**: 22
7. Click **Open**.
8. Enter the credentials as follows:
   - **Username**: root
   - **Password**: starfive

Result:

Now you have connected with the VisionFive 2 via SSH using windows!

Figure 3-7 Example Output



3.4.2.2. For Mac/Linux

1. Log in to your router (usually you need to enter **192.168.1.1** on the web browser to enter the router).
2. Go to DHCP configuration and find the IP address of the VisionFive 2.

Tip:
You can easily find the IP address of the VisionFive 2 by referring to its host name, **starfive**.

3. Open a terminal window and type the following:

```
ssh root@192.168.1.xxx
```

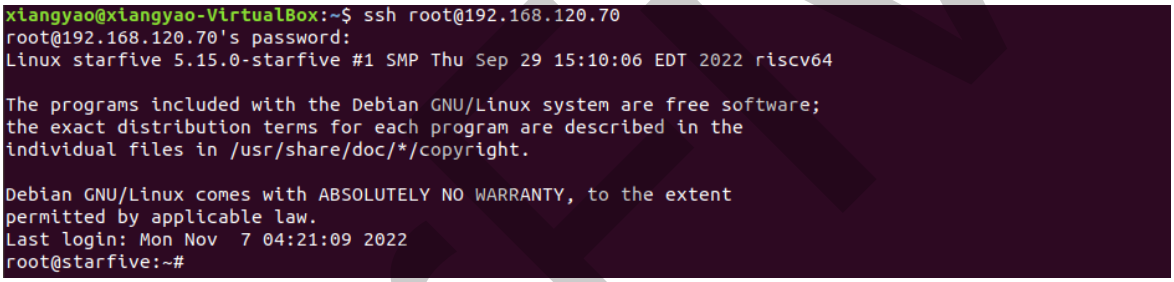
Tip:
`192.168.1.xxx` is the IP address of VisionFive 2.

4. Type the password as `starfive` in the prompt.
Result:

Now you have connected with the VisionFive 2 via SSH using Mac/Linux!

Tip:
`192.168.1.xxx` is the IP address of VisionFive 2.

Figure 3-8 Example Output



3.4.3. Using a USB to Serial Converter

You can log in to Debian OS on VisionFive 2 using a USB-to-Serial converter. Please follow the following steps according to your OS:

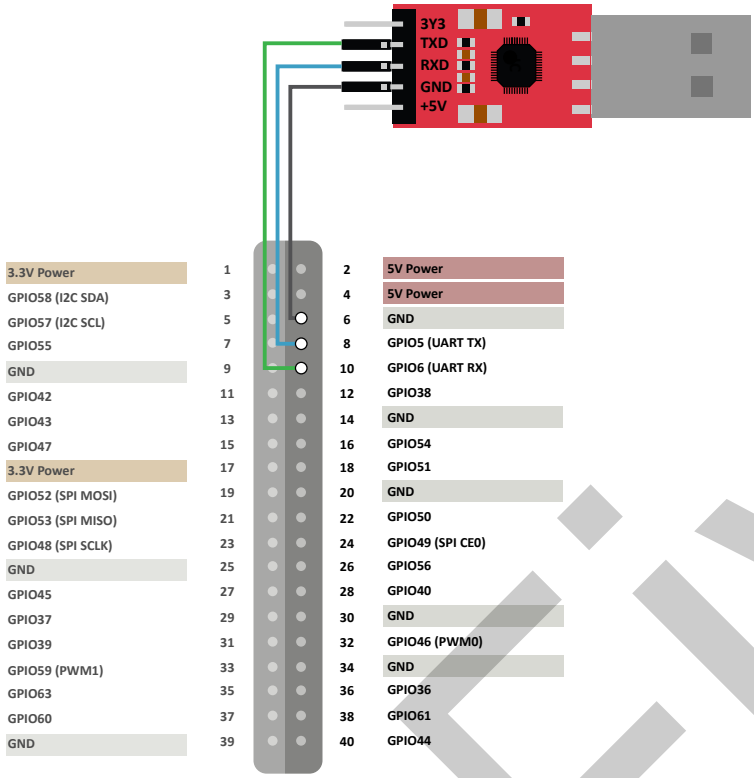
- For Windows *(on page 19)*
- For Mac/Linux *(on page 22)*

3.4.3.1. For Windows

Steps:

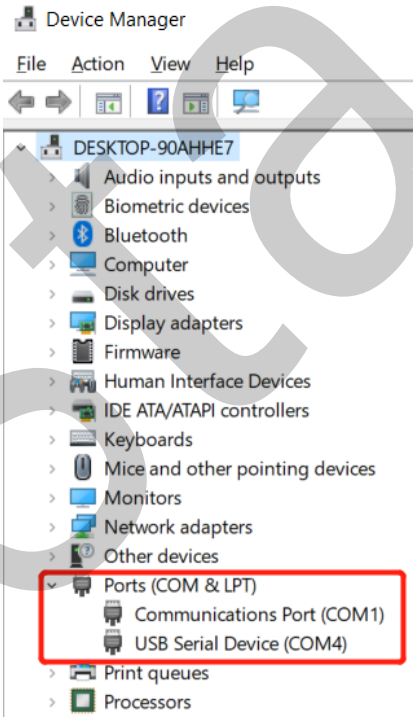
1. Insert the micro-SD card with the Debian image burnt into VisionFive 2.
2. Connect one end of the USB Type-C cable to the USB Type-C port on the VisionFive 2, and connect the other end of the cable to the power adapter.
3. Connect the jumper wires from the USB to Serial Converter to the 40-Pin GPIO header of the VisionFive 2 as follows.

Figure 3-9 Connecting Jumper Wire



4. Connect the USB-to-Serial converter to the PC.
5. Open Device Manager by typing **Device Manager** in the windows search box.
6. Click the drop-down arrow from **Ports (COM & LPT)** and find the name of the connected serial port (e.g.: **COM4**).

Figure 3-10 Example

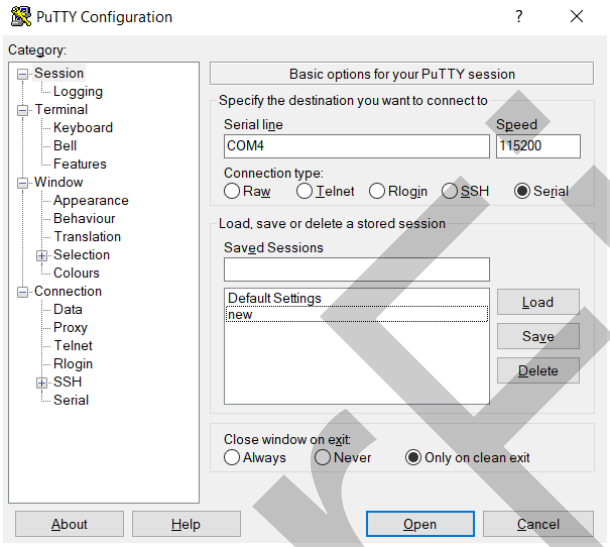


7. Download and install Putty by visiting this link.

Tip:
Putty is an SSH and telnet client through which you can connect to the Carrier Board via SSH. You can skip this step if you already have Putty installed.

8. Open Putty to connect the PC to the Carrier Board.
   a. Select **Serial** under the **Connection Type**.
   b. Configure the settings as follows:
      - **Serial line**: COM4 (choose your COM port)
      - **Speed**: 115200

Figure 3-11 Example Configuration



   c. Click **Open**.
9. Power on the VisionFive 2.
10. Type username and password in the prompt as follows:
    - **Username**: root
    - **Password**: starfive

Result:

Now you have connected with the VisionFive 2 via serial communication using windows!

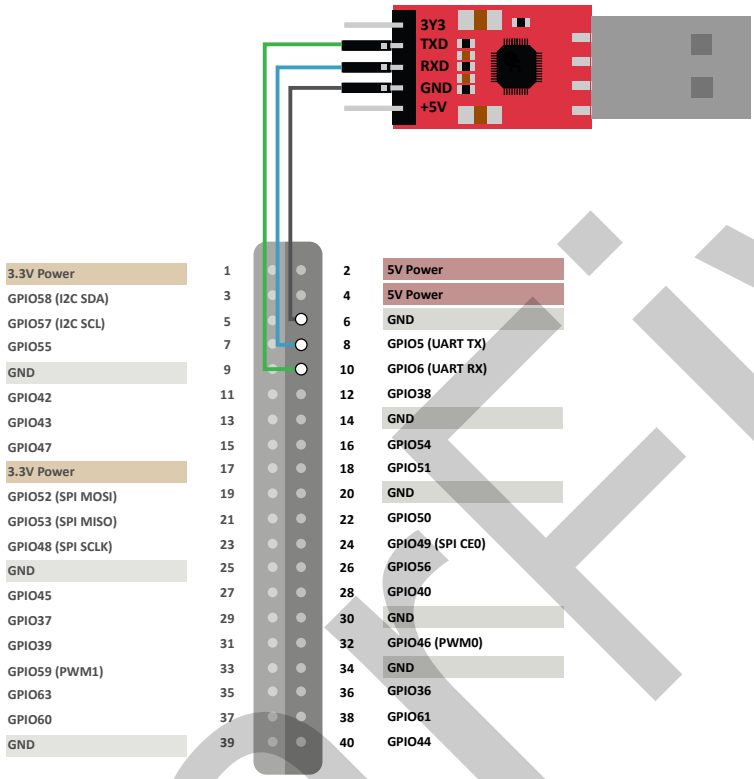
Figure 3-12 Example Output

```
Debian GNU/Linux bookworm/sid starfive ttyS0

starfive login: root
Password:
Linux starfive 5.15.0-starfive #1 SMP Thu Sep 29 15:10:06 EDT 2022 riscv64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Nov  7 05:58:28 UTC 2022 on ttyS0
root@starfive:~#
```

3.4.3.2. For Mac/Linux

1. Insert the micro-SD card with the Debian image burnt into VisionFive 2.
2. Connect one end of the USB Type-C cable to the USB Type-C port on the VisionFive 2, and connect the other end of the cable to the power adapter.
3. Connect the jumper wires between the USB-to-Serial converter and the 40-Pin GPIO header of the VisionFive 2 as follows.

Figure 3-13 Connecting Jumper Wires



4. Connect the USB-to-Serial converter to the PC.
5. Open a terminal window on Mac/Linux.
6. Update the packages list by typing the following command.

```
sudo apt-get update
```

7. Install minicom by typing the following command.

```
sudo apt-get install minicom
```

8. View the connected serial devices.

```
dmesg | grep tty
```

Figure 3-14 Example Output

```
xiangyao@xiangyao-VirtualBox:~$ dmesg | grep tty
[    0.134738] printk: console [tty0] enabled
[    3.382696] ttyS2: LSR safety check engaged!
[    3.383989] ttyS2: LSR safety check engaged!
[ 9599.503061] usb 2-2: pl2303 converter now attached to ttyUSB0
```

9. Connect to the serial device by typing the following command.

```
sudo minicom -D /dev/ttyUSB0 -b 115200
```

Note:
The baud rate is set to 115,200.

Figure 3-15 Example Output

```
ryan@ubuntu:~$ sudo minicom -D /dev/ttyUSB0 -b 115200
[sudo] password for ryan:


Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB0, 00:03:16

Press CTRL-A Z for help on special keys
```

10. Power on the VisionFive 2.
11. Type username and password in the prompt as follows:
    - **Username**: root
    - **Password**: starfive

Result:

Now you have connected with the VisionFive 2 via serial communication using MacOS/Linux!

Figure 3-16 Example Output

```
Debian GNU/Linux bookworm/sid starfive ttyS0

starfive login: root
Password:
Linux starfive 5.15.0-starfive #1 SMP Thu Sep 29 15:10:06 EDT 2022 riscv64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Nov  7 05:58:28 UTC 2022 on ttyS0
root@starfive:~#
```

4. Appendix

4.1. Extend Partition

To fully utilize the unused space on the SD card after logging into Debian, perform the following steps:

1. Use the following command to list available elements:

   ```
   df -h
   ```

   Example Output:

   ```
   root@starfive:~# df -h
   Filesystem     Size     Used Avail Use% Mounted on
   udev           1.7G        0  1.7G   0% /dev
   tmpfs          390M     1.7M  388M   1% /run
   /dev/mmcblk1p3 4.8G     3.2G  1.6G  68% /
   tmpfs          2.0G        0  2.0G   0% /dev/shm
   tmpfs          5.0M        0  5.0M   0% /run/lock
   tmpfs          390M      32K  390M   1% /run/user/111
   tmpfs          390M      24K  390M   1% /run/user/0
   ```

2. Run the `fdisk` command with disk name as an argument.

   Then type the following commands according to your needs:

   - Type `d` to delete this partition **/dev/mmcblk1p3**.
   - Type `n` to create a new one.
   - Type `w` to save these modifications.

   Example Command and Output:

   ```
   root@starfive:~# fdisk /dev/mmcblk1

   Welcome to fdisk (util-linux 2.38).
   Changes will remain in memory only, until you decide to write them.
   Be careful before using the write command.
   GPT PMBR size mismatch (10485759 != 249737215) will be corrected by write.
   The backup GPT table is not on the end of the device. This problem will be corrected by
   write.
   This disk is currently in use - repartitioning is probably a bad idea.
   It's recommended to umount all file systems, and swapoff all swap
   partitions on this disk.

   Command (m for help): d
   Partition number (1-3, default 3): 3

   Partition 3 has been deleted.

   Command (m for help): n
   Partition number (3-128, default 3): 3
   First sector (239616-249737182, default 239616):
   Last sector, +/-sectors or +/-size{K,M,G,T,P} (239616-249737182, default 249735167):

   Created a new partition 3 of type 'Linux filesystem' and of size 119 GiB.
   Partition #3 contains a ext4 signature.

   Do you want to remove the signature? [Y]es/[N]o: N

   Command (m for help): w

   The partition table has been altered.
   Syncing disks.

   root@starfive:~#
   ```

3. Resize the **/dev/mmcblk1p3** partition by running the `resize2fs` command to fully utilize the unused block.

   Example Command and Output:

```
root@starfive:~# resize2fs /dev/mmcblk1p3
resize2fs 1.46.5 (30-Dec-2021)
Filesystem at /d[ 192.744328] EXT4-fs (mmcblk1p3): resizing filesystem from 1280507 to
31186944 blocks
ev/mmcblk1p3 is mounted on /; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 15
[ 196.934822] EXT4-fs (mmcblk1p3): resized filesystem to 31186944
The filesystem on /dev/mmcblk1p3 is now 31186944 (4k) blocks long.
```

   Verification:

   Run `df -h` to verify the new size of partition, and to verify that our steps to extend partition (**/dev/mmcblk1p3**) are successful.

   The following output indicates the modification is successful:

```
root@starfive:~# df -h
Filesystem     Size Used  Avail Use% Mounted on
udev           1.7G 0     1.7G  0%   /dev
tmpfs          390M 1.8M  388M  1%   /run
/dev/mmcblk1p3 118G 3.3G  114G  3%   /
tmpfs          2.0G 0     2.0G  0%   /dev/shm
tmpfs          5.0M 0     5.0M  0%   /run/lock
tmpfs          390M 32K   390M  1%   /run/user/0
```

4.2. Enable SSH Root Login

After fresh system installation, the root login on Debian Linux is disabled by default. When you attempt to log in as the root user to your Debian Linux server, your access will be denied. The following is an example message:

```
$ ssh root@192.168.1.172
root@192.168.1.172's
password: Permission denied, please try again.
root@192.168.1.172's password:
```

To enable SSH root login, perform the following steps:

1. Run the following command to configure the SSH server:

```
echo "PermitRootLogin=yes" >> /etc/ssh/sshd_config
```

2. Restart the SSH server:

   Example Command and Output:

```
# /etc/init.d/ssh restart
[ ok ] Restarting ssh (via systemctl): ssh.service.
```

   Result:

   You will be able to use SSH login as a root user. The following output indicates the login is successful:

```
$ ssh root@192.168.1.172 root@192.168.1.172's password:
Linux starfive 5.15.0-starfive #1 SMP Wed Aug 31 08:29:37 EDT 2022 riscv64The programs included with
 the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to
 the extent
permitted by applicable law.
Last login: Sat Sep 3 11:48:06 2022 root@starfive:~#
```

4.3. Updating SPL and U-Boot

To update SPL and U-Boot for VisionFive 2, perform the following steps:

1. Prepare the TFTP server. The following is an example command for Ubuntu distribution.

```
sudo apt install tftpd-hpa
```

2. Power on VisionFive 2 and wait until it enters the U-Boot command line interface.
3. Configure the environment variables by executing:

```
setenv ipaddr 192.168.120.222;setenv serverip 192.168.120.99
```

4. Check the connectivity by pinging the host PC from VisionFive 2.
5. Initialize SPI flash:

```
sf probe
```

6. Update SPL binary:

```
tftpboot 0xa0000000 ${serverip}:u-boot-spl.bin.normal.out
sf update 0xa0000000 0x0 $filesize
```

7. Update U-Boot binary:

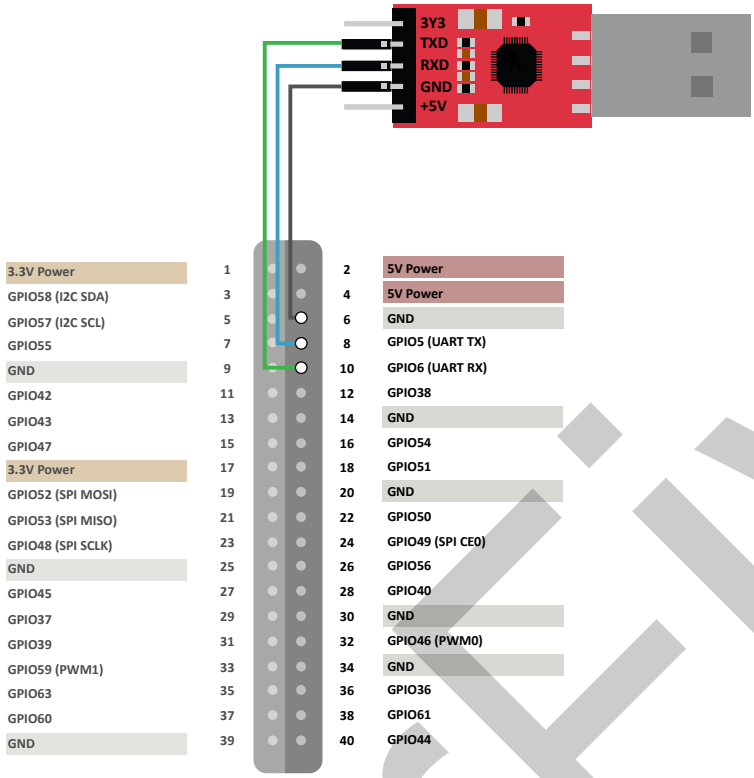
```
tftpboot 0xa0000000 ${serverip}:visionfive2_fw_payload.img
sf update 0xa0000000 0x100000 $filesize
```

4.4. Recovering the Bootloader

The SPL and U-Boot are stored inside the SPI flash of your board. There may be situations where you accidentally empty the flash or if the flash is damaged on your board. In these situations, it's better to recover the bootloader.

1. Connect the jumper wires between the USB-to-Serial converter and the Debug pins of VisionFive 2 40-pin GPIO header. The following figure is an example:

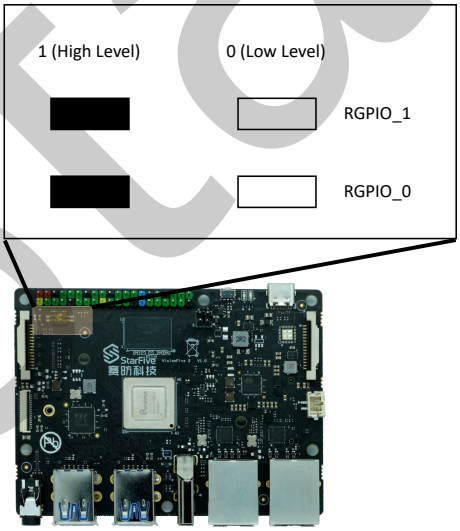
Figure 4-1 Connecting to the Debug Pins of VisionFive 2 40-pin GPIO Header



2. Before you recover the bootloader, double check the boot mode jumpers (Switch_2) on your board has already been switched to UART mode (RGPIO_1,RGPIO_0: 1,1).

Tip:
The following figure shows the boot mode settings. For more information, refer to Boot Mode Settings *(on page 28)*.

Figure 4-2 Boot Mode Setting (UART)



3. Configure the serial port baud rate settings to `115200` bps.

4. Power up, you will see an output like this:

```
ccccccccccccccccccccc
```

5. Transfer the recovery binary (`jh7110-recovery-20221205.bin`) by XMODEM. The recovery binary is located at: https://github.com/starfive-tech/Tools/tree/master/recovery.
6. Type `0` and press **Enter** on your keyboard to update SPL binary <`u-boot-spl.bin.normal.out`>.
7. Type `2` and press **Enter** on your keyboard to update U-Boot binary <`visionfive2_fw_payload.img`>.
8. Power off and switch jumpers back to Flash mode (RGPIO_1,RGPIO_0: 0,0).

4.5. GitHub Repository

The following table describes the GitHub Repository addresses:

Note:
Make sure you have switched to the corresponding branch.

Table 4-1 GitHub Repository Addresses

Type	Repository	Branch
Linux	Linux	JH7110_VisionFive2_devel
dts File under Linux Repo	• jh7110-common.dtsi • jh7110.dtsi	-
Uboot	Uboot	JH7110_VisionFive2_devel
OpenSBI	OpenSBI	master
Debian	Debian	-

4.6. Boot Mode Settings

VisionFive 2 provides pins to determine the boot mode before it is powered up. The following are the available boot modes and details.

Table 4-2 Boot Mode Settings

Boot Mode	RGPIO_0	RGPIO_1
1-bit QSPI Nor Flash	0	0
SDIO3.0	1	0
eMMC	0	1
UART	1	1

The following figure displays the location and the pin definitions of the boot mode settings.

Figure 4-3 Boot Mode Settings