StarFive 赛昉科技

VisionFive 2 FAQ

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Legal Statements

Important legal notice before reading this documentation.

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Preface

About this guide and technical support information.

About this document

This document mainly lists the *Frequently Asked Questions (FAQ)* on the VisionFive 2 *Single Board Computer (SBC)* from existing users and their corresponding solution from StarFive technical support.

Revision History

Table 0-1 Revision History

Version	Released	Revision
1.2	2024/03/15	Added a new section How to use JTAG to debug VisionFive 2? *(on page 14)*.
1.11	2023/10/07	Updated the purchase link and other page links.
1.1	2023/09/25	Updated the FAQ list and added the link of JH-7110 AVL.
1.0	2023/03/17	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.

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1. Introduction

VisionFive 2 Introduction

VisionFive 2 is the world's first high-performance RISC-V single board computer (SBC) with an integrated GPU. Compared with its last generation, VisionFive 2 has been fully upgraded with significant improvements in the processor work frequency, multimedia processing capabilities, scalability, etc. Its superior performance and reasonable price make VisionFive 2 the best affordable RISC-V development board ever.

VisionFive 2 boasts a quad-core 64-bit SoC with RV64GC ISA, running up to 1.5 GHz, and integrated with IMG BXE-4-32 MC1, supporting OpenCL 3.0, OpenGL ES 3.2, and Vulkan 1.2. VisionFive 2 available with 2/4/8 GB LPDDR4 RAM options, provides rich I/O peripherals such as M.2 connector, eMMC socket, USB 3.0 ports, a 40-pin GPIO header, Gigabit Ethernet ports, a TF card slot, and many more. It has onboard audio and video processing capabilities and has MIPI-CSI and MIPI-DSI connectors as multimedia peripherals. The open source SBC also provides wide software compatibility including support for Debian, Ubuntu, OpenSUSE, OpenKylin, OpenEuler, Deepin and other software running on theses operating systems.

This document mainly lists the *Frequently Asked Questions (FAQ)* on the VisionFive 2 single board computer (SBC) from existing users and their corresponding solution from StarFive technical support.

2. FAQ List

2.1. How to purchase VisionFive 2

Description

How to purchase VisionFive 2?

Solution

RVspace has a dedicated page where users can find all the purchase links. For the latest links, you can click the following link.

How to purchase VisionFive 2

2.2. Where can I find the VisionFive 2 documentation

Description

Where can I find the VisionFive 2 documentation?

Solution

StarFive has two documentation centers where users can find all the open source documents for all products.

- https://doc-en.rvspace.org/

  Contains English documentation.

- https://doc.rvspace.org/

  Contains Chinese documentation.

2.3. How to power VisionFive 2?

Description

How to power my VisionFive 2?

Solution

VisionFive 2 does not use a battery to power the board. It has a USB Type-C port and uses a 5V / 3A power adapter. For more information, please refer to the Required Hardware section in the VisionFive 2 Single Board Computer Quick Start Guide .

2.4. How to buy a case for VisionFive 2?

Description

How to buy a case for VisionFive 2?

Solution

StarFive provides a whole page for users to buy VisionFive 2 and its' accessories, you can click this link to buy what you want.

2.5. How to buy a fan for VisionFive 2?

Description

How to buy a fan for VisionFive 2?

Solution

StarFive provides a whole page for users to buy VisionFive 2 and its' accessories, you can click this link to buy what you want.

2.6. Where to get the supported software tools?

Description

Where to get the supported software tool for VisionFive 2?

Solution

StarFive provides an official GitHub repository for the supported software tool. For more information, click this link.

2.7. What is the supported OS on VisionFive 2?

Description

What is the supported OS on VisionFive 2?

Solution

VisionFive 2 supports Debian, Ubuntu, OpenSUSE, OpenKylin, OpenEuler, Deepin and other software running on theses operating systems. You can run those supported OS according to the application note on this page.

2.8. Where to post my thoughts on Debian?

Description

I would like to contribute to Debian. Where to post my thoughts?

Solution

You can do the following:

- find and participate in the latest discussion about Debian Release in VisionFive 2 Debian Image (December) Release.
- poll on Debian Demanded Improvement: Improvements for the next Image release.

2.9. When will JH-7110 be upstreamed?

Description

When will JH-7110 be upstreamed?

Solution

StarFive and our partners are working hard on upstreaming JH-7110. You can find the latest status on this page.

2.10. Where to get the design resources of VisionFive 2?

Description

Where to get the design resources of VisionFive 2?

Solution

StarFive documentation center has a dedicated page that provides the VisionFive 2 design resources, including:

- Bottom Silk Screen
- Top Silk Screen
- Design Schematics

2.11. What kind of SSD can be used for VisionFive 2?

Description

What kind of SSD can be used for VisionFive 2?

Solution

You can find the compatible SSDs in JH-7110 AVL.

2.12. Why error occurs and the cursor is freezing on Debian with my 4K monitor?

Description

My monitor supports both 4K and 1080 modes. When the screen starts with Debian, it shows cursor and the cursor becomes unresponsive, or the screen just cannot display. How can I fix this issue?

Cause

Currently some resolution cannot be supported via HDMI, such as 4K.

Solution

StarFive software team is working hard on solving this issue and this issue will be fixed in a future software release. Follow our progress on this page.

Currently, we have a workaround which is to set the resolution to a supported resolution, for example, 1920×1080:

- When the screen starts with Debian, it shows cursor and the cursor is freezing:
  1. Execute the following to check the supported resolution of the monitor:

     ```
     modetest -M starfive -c
     ```

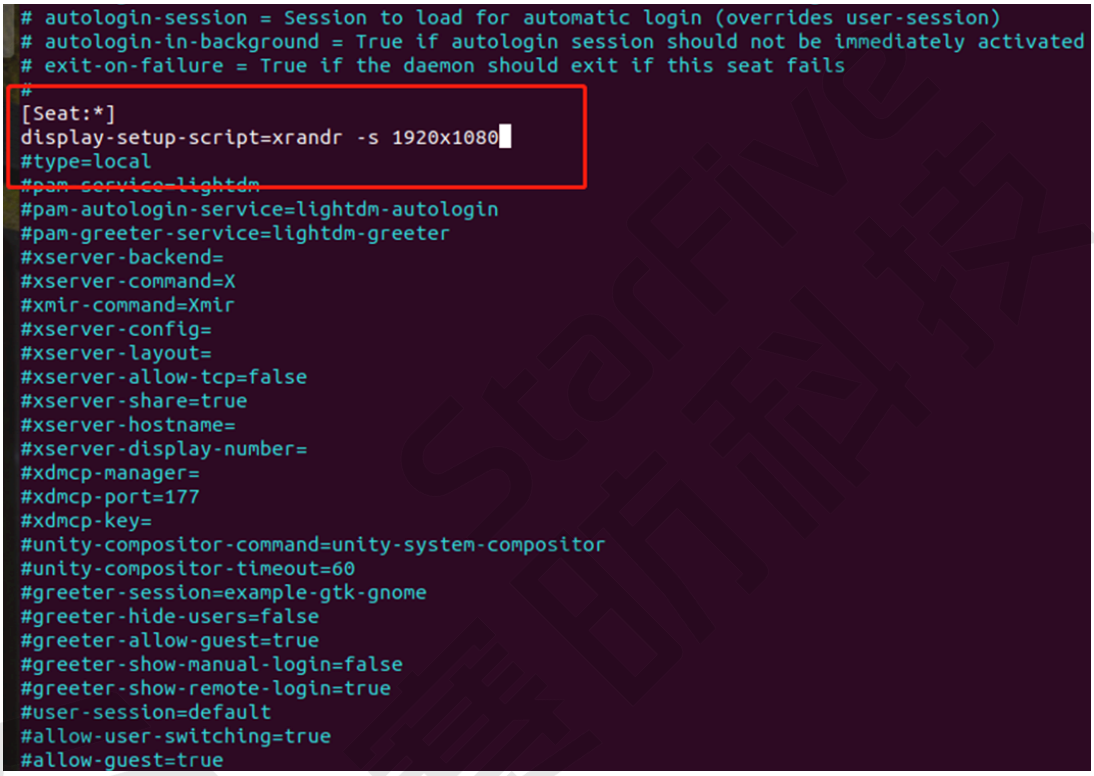
2. If the output shows it is a 4K monitor, execute the following to edit `/etc/lightdm/lightdm.conf` file:

```
vi /etc/lightdm/lightdm.conf
```

3. Add following line under **[Seat:*]** in `/etc/ligtdm/lightdm.conf`:

```
display-setup-script=xrandr -s 1920x1080
```

Figure 2-1 Example Settings



4. Restart the system to make the configuration take effect:

```
systemctl restart lightdm
```

- If the screen cannot display, VisionFive 2 may have not entered the Debian system. Perform the following steps:

1. Make sure you have used the correct power supply for VisionFive 2. VisionFive 2 has a USB Type-C port and uses a 5V / 3A power adapter. For more information, please refer to the Required Hardware section in the VisionFive 2 Single Board Computer Quick Start Guide .

2. Update to the SPL and U-Boot to the latest version. For instructions, refer to *Updating SPL and U-Boot* section in the quick start guide.

3. After updating the SPL and U-Boot, and entering the Debian, execute the following to make sure the monitor is connected and check the supported resolution of the monitor:

```
modetest -M starfive -c
```

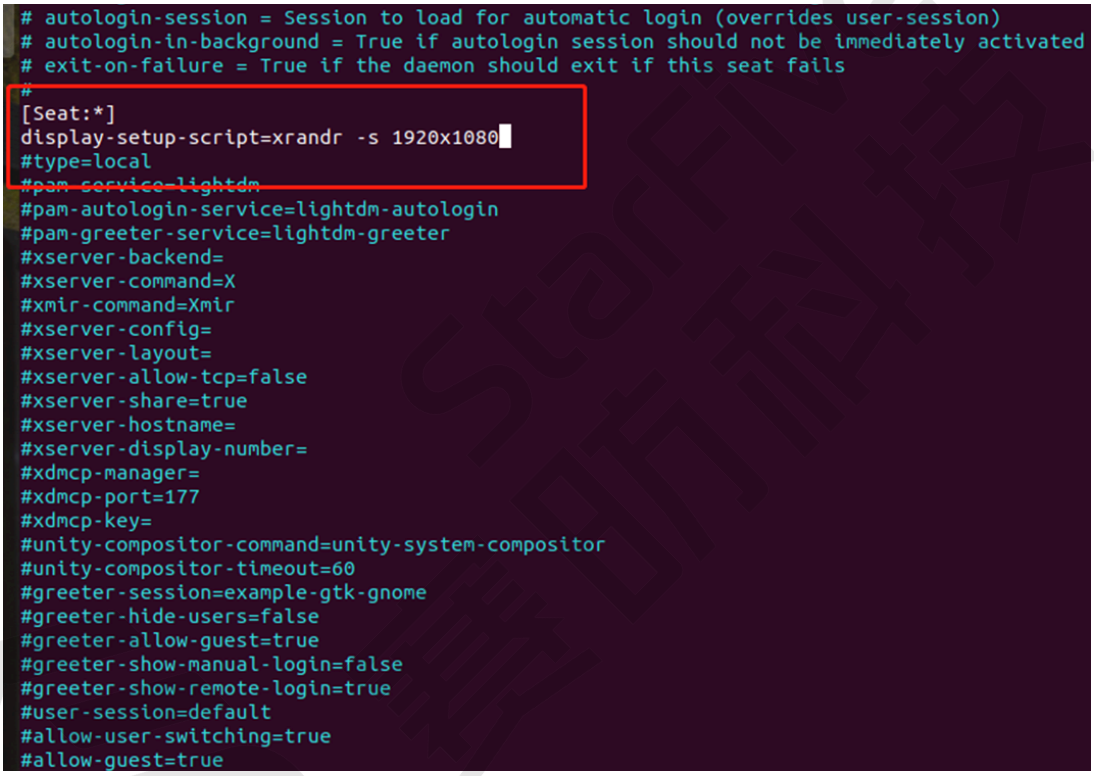
4. If the output shows it is a 4K monitor, execute the following to edit the `/etc/lightdm/lightdm.conf` file:

```
vi /etc/lightdm/lightdm.conf
```

5. Add following line under **[Seat:*]** in `/etc/ligtdm/lightdm.conf`:

```
display-setup-script=xrandr -s 1920x1080
```

Figure 2-2 Example Settings



6. Restart the system to make the configuration take effect:

```
systemctl restart lightdm
```

2.13. How to use JTAG to debug VisionFive 2?

Description

How can I use JTAG to debug VisionFive 2?

Solution

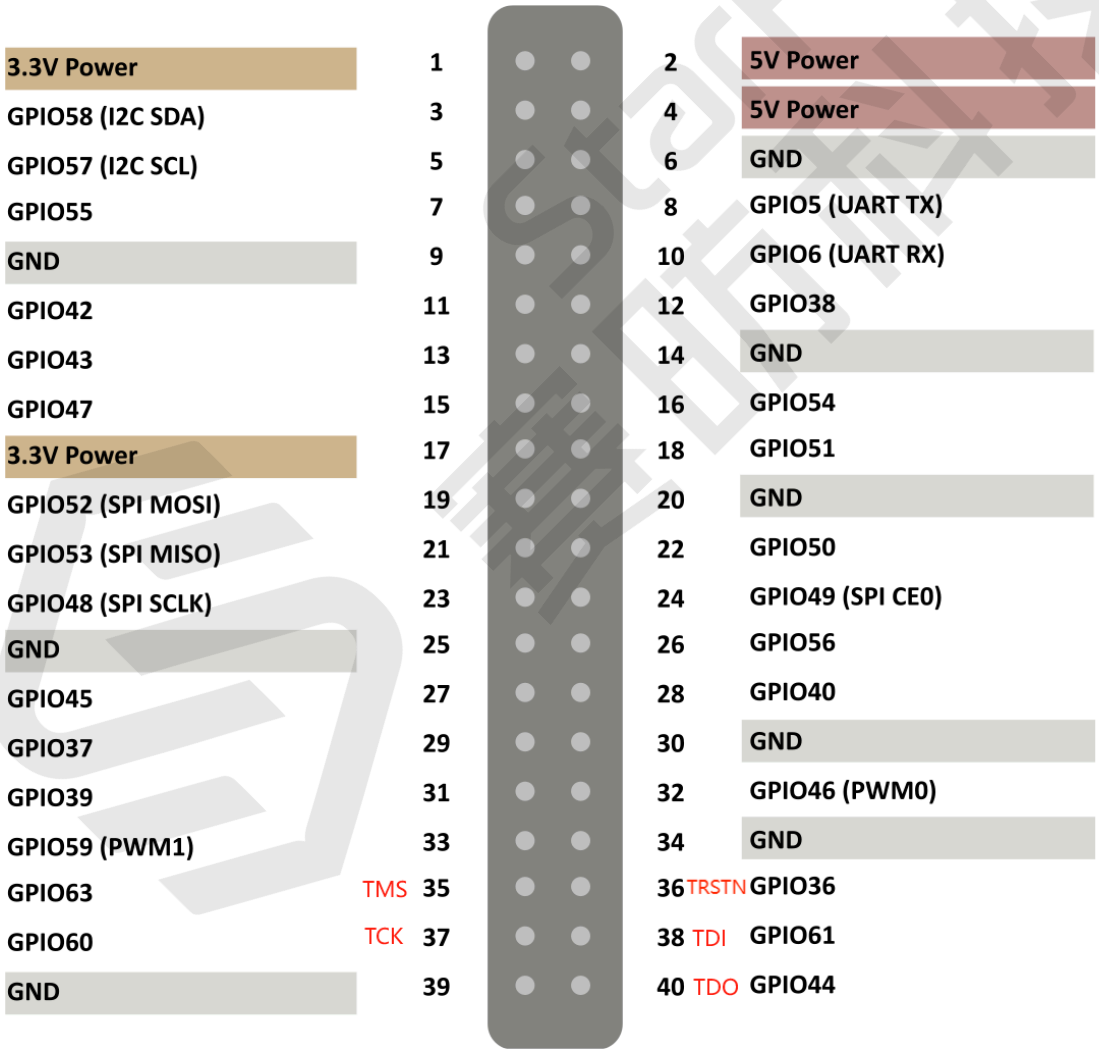
StarFive has provide the following two ways to connect JTAG with VisionFive 2:

2.13.1. Using FreedomStudio

Follow the steps below to use FreedomStudio:

1. The 40-pin GPIO on VisionFive 2 can be multiplexed into JTAG port.
2. The official U-Boot file of StarFive has already configured the JTAG port, click this link to get the information.
3. The following is a diagram of the 40-pin GPIO corresponding to TDI, TDO, TMS, TCK, and TRSTN:

Figure 2-3 Corresponding 40-pin GPIO



Tip:

Below is a brief introduction for TDI, TDO, TMS, TCK, and TRSTN:

- **Test Clock (TCK):** Test Clock is used to synchronize operations on the JTAG port. By sampling and updating the data on the rising or falling edge of the TCK, the data on the JTAG port can be transmitted synchronously.
- **Test Data Input (TDI):** Test Data Input is a channel that sends data to the device under test. By inputting data for TDI on each clock cycle of TCK, the test data, instructions, or configuration information can be sent to the device under test.
- **Test Data Output (TDO):** Test Data Output is a channel that receives data from the device under test. By reading data from TDO on each clock cycle of the TCK, the test response, status information, or output data of the device under test can be obtained.
- **Test Mode Select (TMS):** Test Mode Select is to control the state machine transition of the JTAG. By entering different values for the TMS on each TCK clock cycle, the state of the JTAG can be changed, allowing different test or operation modes to be selected.
- **Test Reset (TRSTN):** The RSTN can be used to reset the TAPController.

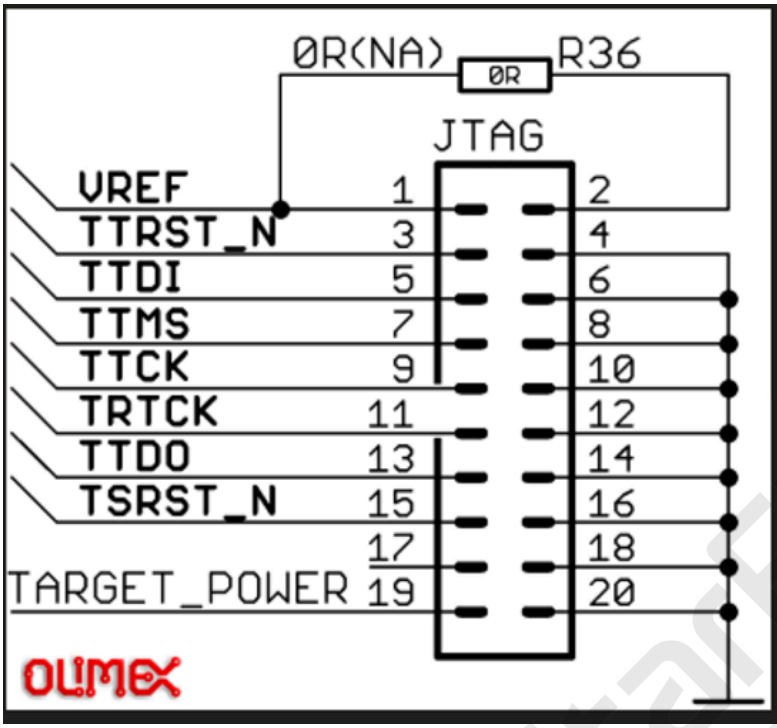
4. Install FreedomStudio.
    - For Windows *(on page 16)*
    - For Linux *(on page 18)*

2.13.1.1. For Windows

Follow the steps below to install FreedomStudio in Windows system:

1. Click to download the installation package and unzip it into a directory with no Chinese characters and no spaces.
2. Open the unzipped file and enter the `\SiFi\Drivers` path, then install the driver files `HiFive1_Driver.exe` and `sifive-winusb-utility.exe`.
3. Connect the Olimex connecter into the following corresponding pins. The following figures show the JTAG port schematics and connection diagram.

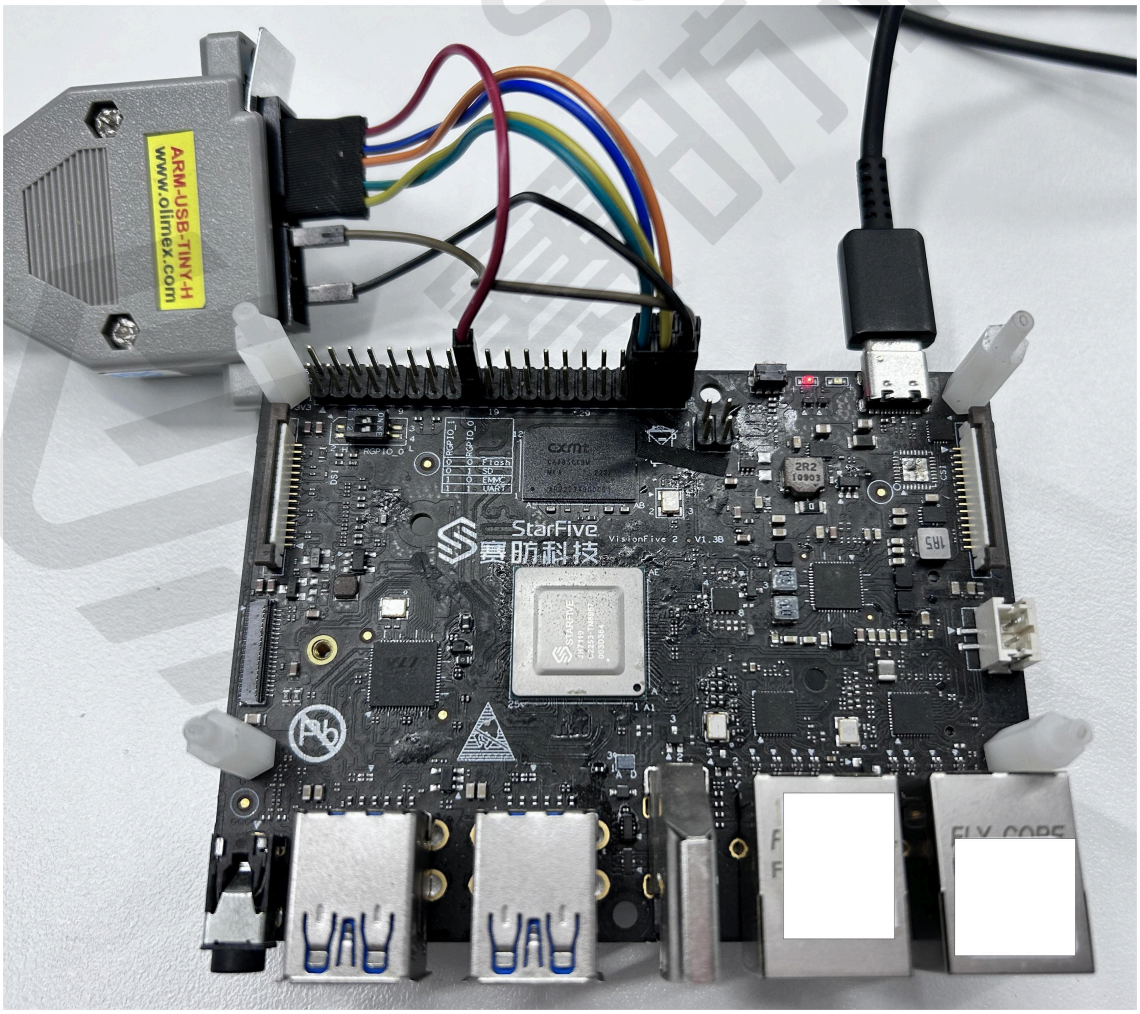
Figure 2-4 JTAG Schematics



JTAG:

signal	olimex	Beagle J7
VREF(3V3)	1	1/17
TTRST_N	3	36
TTDI	5	38
TTMS	7	35
TTCK	9	37
TTDO	13	40
GND	20	39

Figure 2-5 Connection Diagram



Note:
If your PC cannot recognize the Olimex connecter, please download and install the Zadig driver and connect again.

4. In the folder where you store the unzipped package, click to enter `\FreedomStudio-XXXX-XX-X\SiFive\riscv-openocd-0.10.0-XXXX.XX.X\bin` directory, and copy the openocd file there, then execute the `cmd` command.
5. Execute the following command:

```
openocd.exe -f openocd.cfg
```

Example Output:

```
F:\installer\FreedomStudio-2020-06-3-
win64\SiFive\riscv-openocd-0.10.0-2020.04.6\bin>openocd.exe -f
 openocd.cfg
Open On-Chip Debugger 0.10.0+dev (SiFive OpenOCD 0.10.0-2020.04.6)
Licensed under GNU GPL v2
For bug reports:
        https://github.com/sifive/freedom-tools/issues
Info : auto-selecting first available session transport "jtag". To
 override use 'transport select <transport>'.
Info : ftdi: if you experience problems at higher adapter clocks, try
 the command "ftdi_tdo_sample_edge falling"
Info : clock speed 10000 kHz
Info : JTAG tap: riscv.cpu0 tap/device found: 0x07110cfd (mfg: 0x67e
 (<unknown>), part: 0x7110, ver: 0x0)
Info : JTAG tap: riscv.cpu1 tap/device found: 0x07110cfd (mfg: 0x67e
 (<unknown>), part: 0x7110, ver: 0x0)
Info : datacount=2 progbufsize=16
Info : Disabling abstract command reads from CSRs.
Info : Examined RISC-V core; found 5 harts
Info :  hart 0: currently disabled
Info :  hart 1: XLEN=64, misa=0x800000000094112f
Info :  hart 2: currently disabled
Info :  hart 3: currently disabled
Info :  hart 4: currently disabled
Info : Listening on port 3333 for gdb connections
Ready for Remote Connections
Info : Listening on port 6666 for tcl connections
Info : Listening on port 4444 for telnet connections
```

The output above means the device is connected successfully.

2.13.1.2. For Linux

Follow the steps below to install FreedomStudio in Linux system:

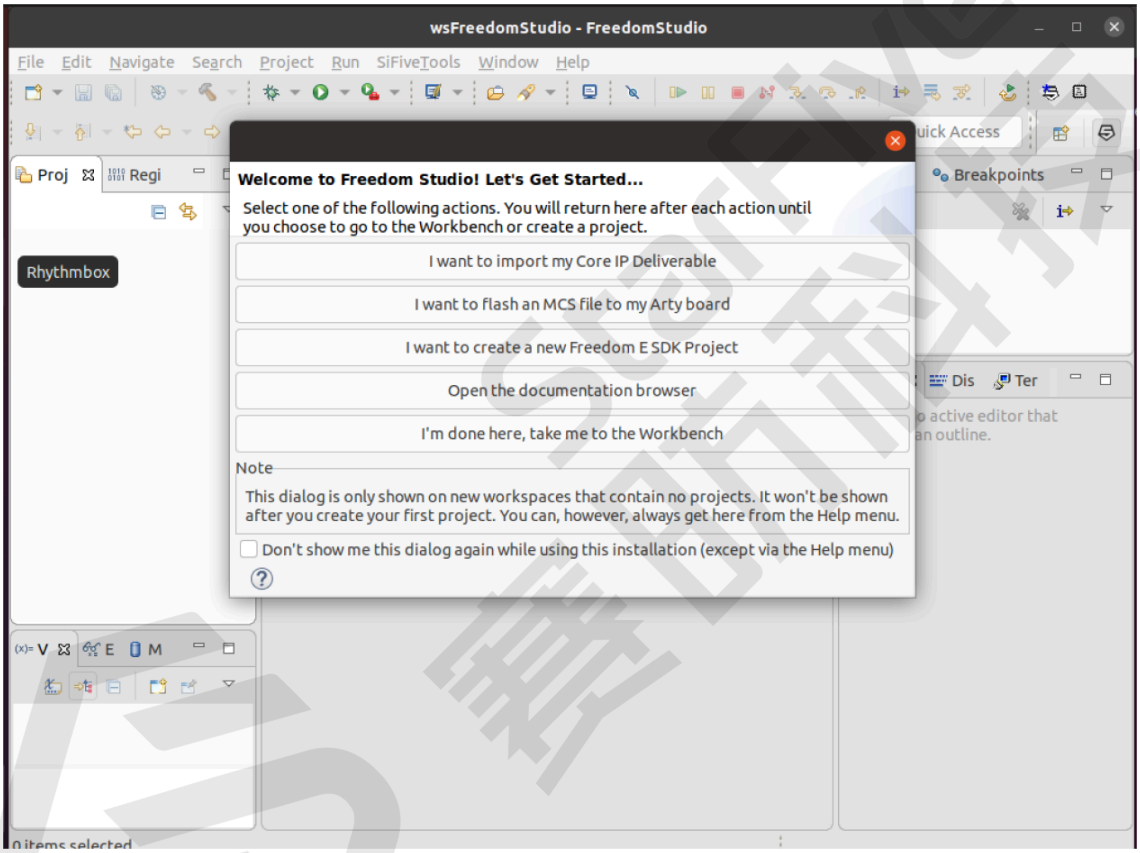
1. Click to download the installation package and unzip it into `\opt\FreedomStudio` directory.

2. Execute the following command to start FreedomStudio:

```
cd /opt/FreedomStudio
./FreedomStudio
```

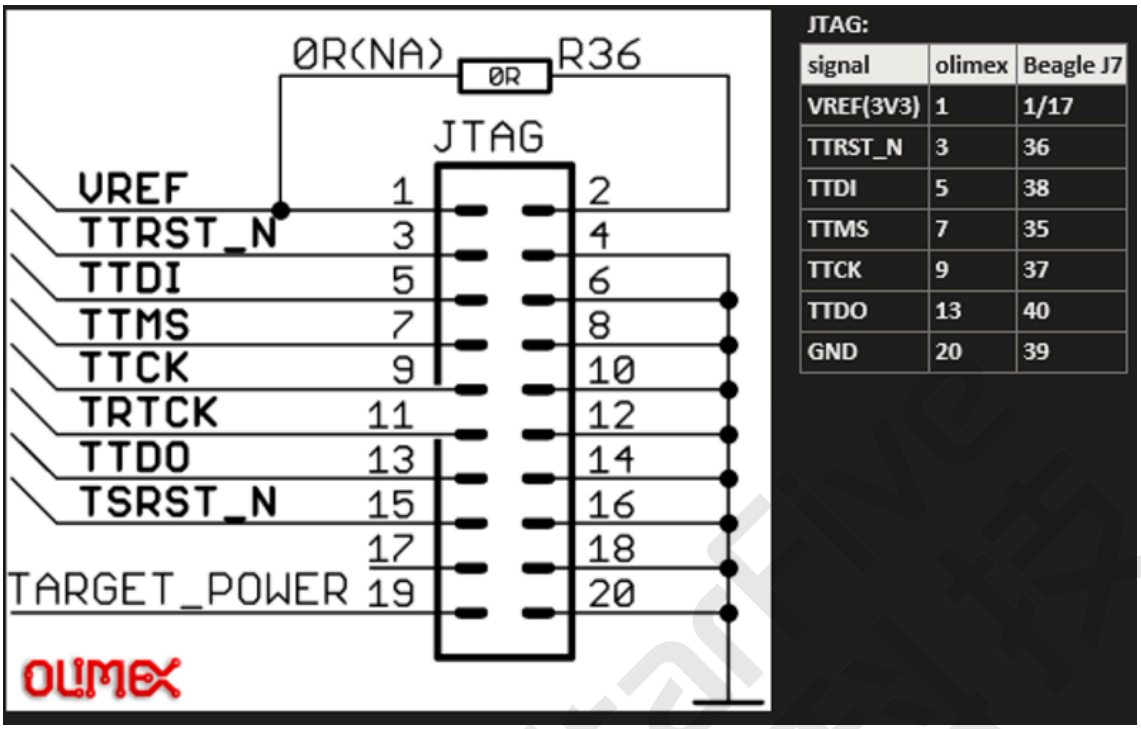
   The following figure shows that FreedomStudio has been installed successfully:

Figure 2-6 Installed Successfully



3. Connect the Olimex connecter into the following corresponding pins. The following figures show the JTAG port schematics and connection diagram.

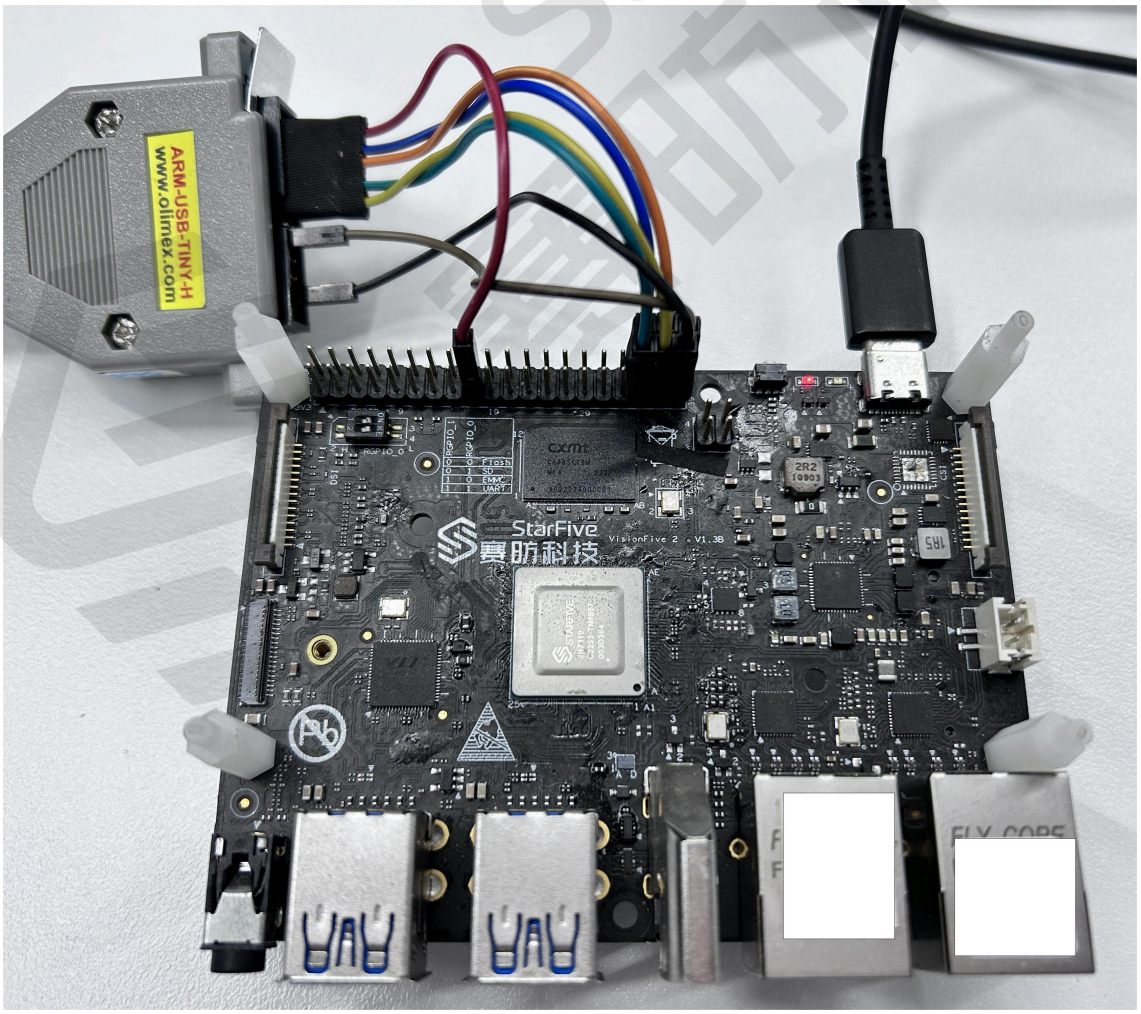
Figure 2-7 JTAG Schematics



JTAG:

signal	olimex	Beagle J7
VREF(3V3)	1	1/17
TTRST_N	3	36
TTDI	5	38
TTMS	7	35
TTCK	9	37
TTDO	13	40
GND	20	39

Figure 2-8 Connection Diagram



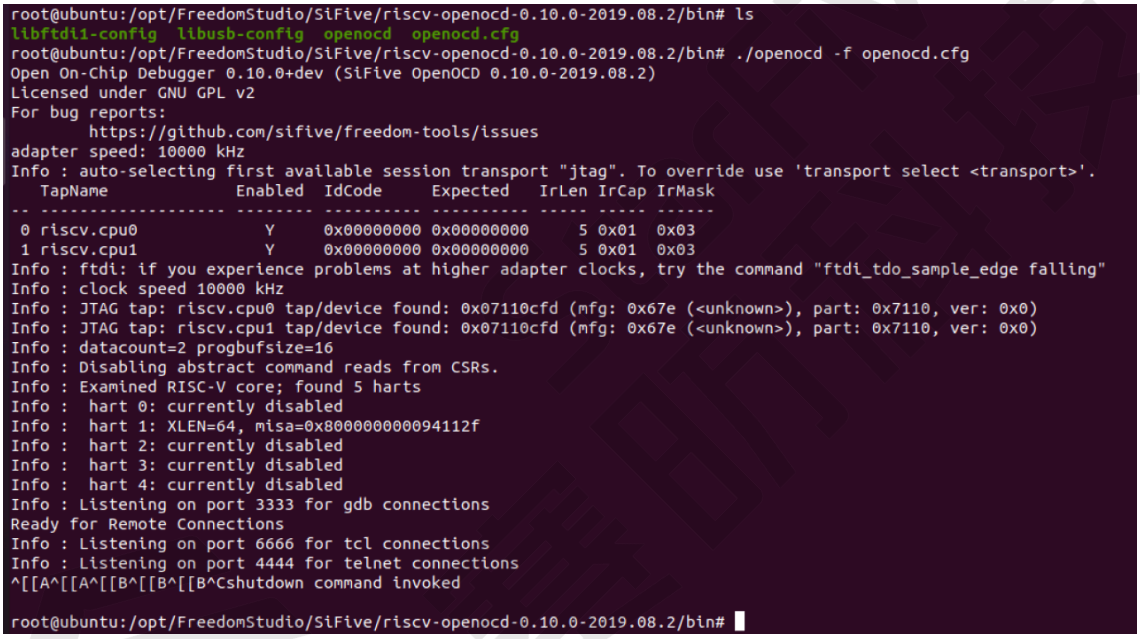
Tip:
You can execute `lsusb` command to judge whether the system has recognized the device.

4. In the folder where you store the unzipped package, click to enter `\FreedomStudio-XXXX-XX-X\SiFive\riscv-openocd-0.10.0-XXXX.XX.X\bin` directory, and copy the openocd file there. Execute the following command under root account:

```
openocd -f openocd.cfg
```

The following is an example output:

Figure 2-9 Example Output



The output above means the devices is connected successfully.

2.13.2. Using J-Link

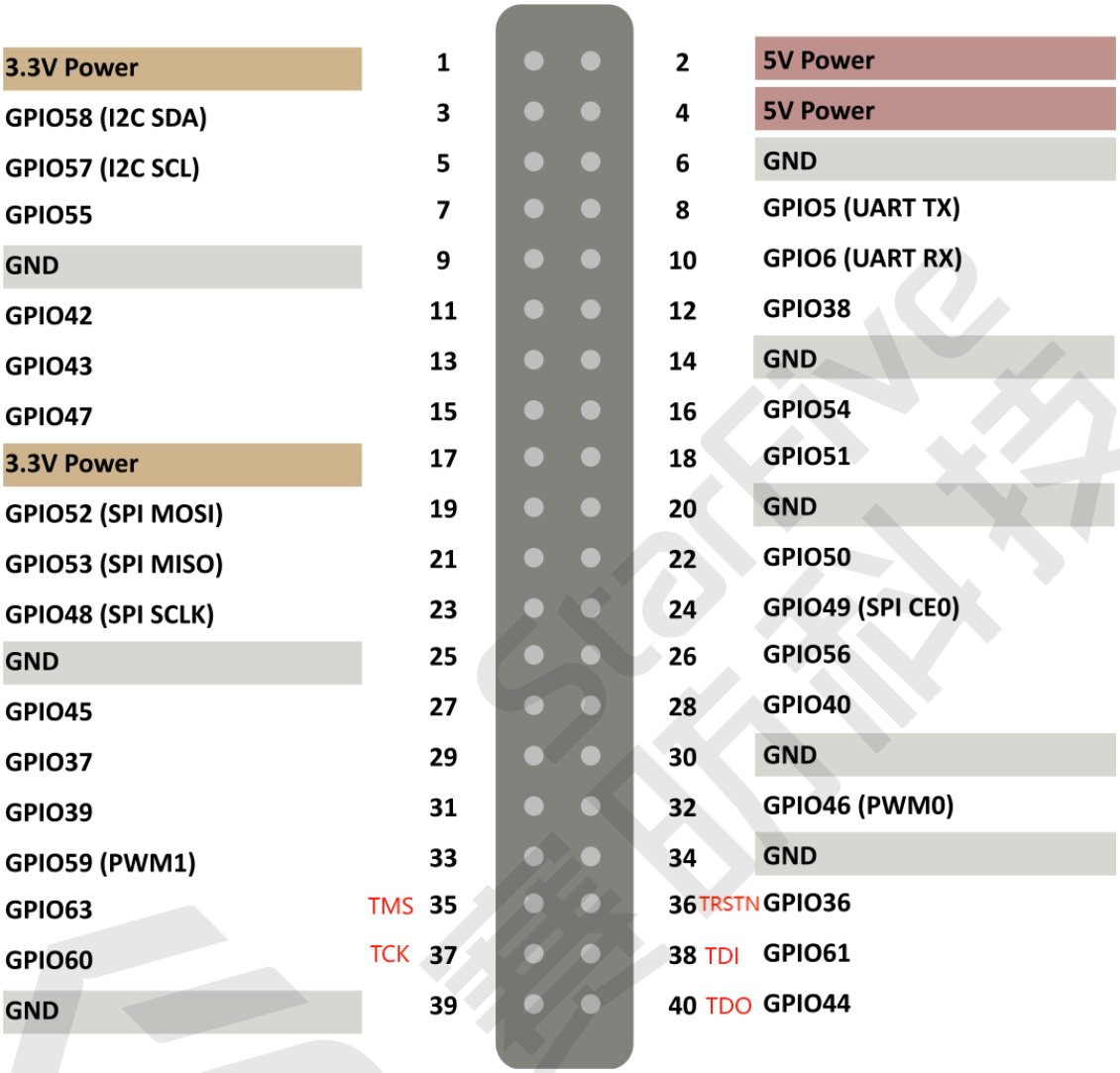
Note:
The solution is referenced from the RVspace Community, StarFive does not assume any responsibility in it. If you encounter any issues after following the practices, please contact the writer of the solution by replying to the thread for more information.

Follow the steps below to use J-Link:

1. The 40-pin GPIO on VisionFive 2 can be multiplexed into JTAG port.
2. The official U-Boot file of StarFive has already configured the JTAG port, click this link to get the information.

3. The following is a diagram of the 40-pin GPIO corresponding to TDI, TDO, TMS, TCK, and TRSTN:

Figure 2-10 Corresponding 40-pin GPIO



Tip:

Below is a brief introduction for TDI, TDO, TMS, TCK, and TRSTN:

- **Test Clock (TCK):** Test Clock is used to synchronize operations on the JTAG port. By sampling and updating the data on the rising or falling edge of the TCK, the data on the JTAG port can be transmitted synchronously.
- **Test Data Input (TDI):** Test Data Input is a channel that sends data to the device under test. By inputting data for TDI on each clock cycle of TCK, the test data, instructions, or configuration information can be sent to the device under test.
- **Test Data Output (TDO):** Test Data Output is a channel that receives data from the device under test. By reading data from TDO on each clock cycle of the

TCK, the test response, status information, or output data of the device under test can be obtained.

- **Test Mode Select (TMS):** Test Mode Select is to control the state machine transition of the JTAG. By entering different values for the TMS on each TCK clock cycle, the state of the JTAG can be changed, allowing different test or operation modes to be selected.
- **Test Reset (TRSTN):** The RSTN can be used to reset the TAPController.

4. Click to download the latest J-Link debugger software Ozone, you can reference to J-Link RISC-V.
5. Connect the Segger debugger into the following corresponding pins. The following figures show the J-Link port schematics and connection diagram.

Figure 2-11 J-Link Schematics

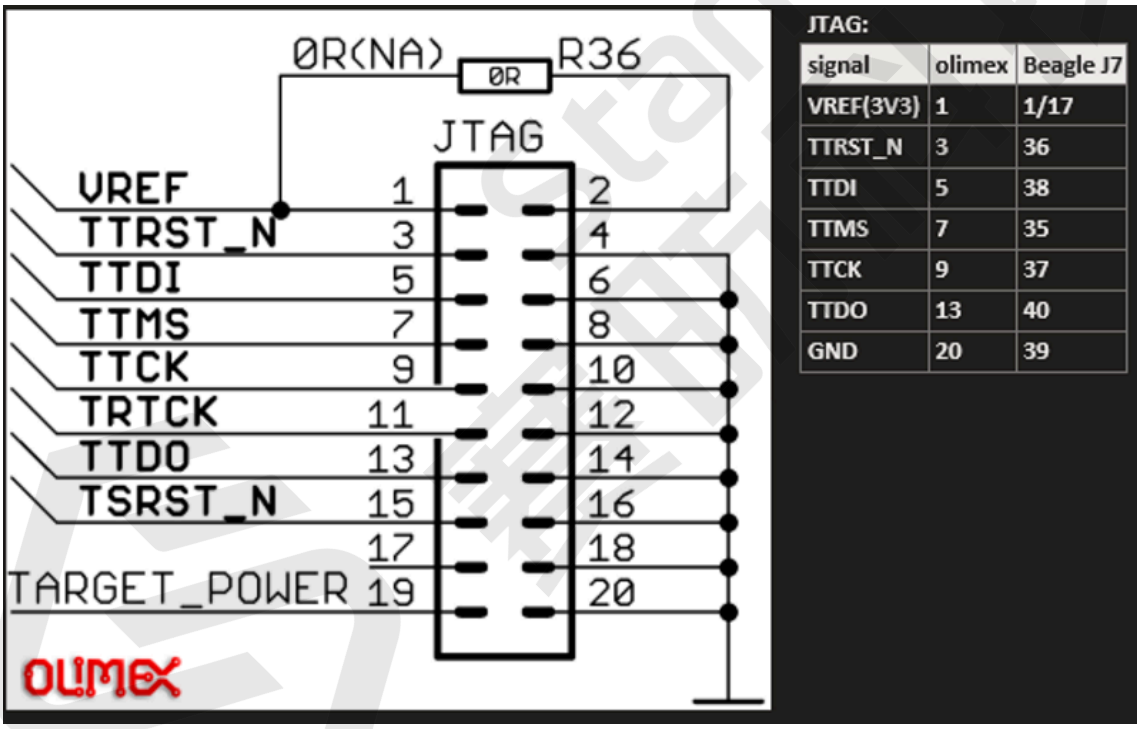
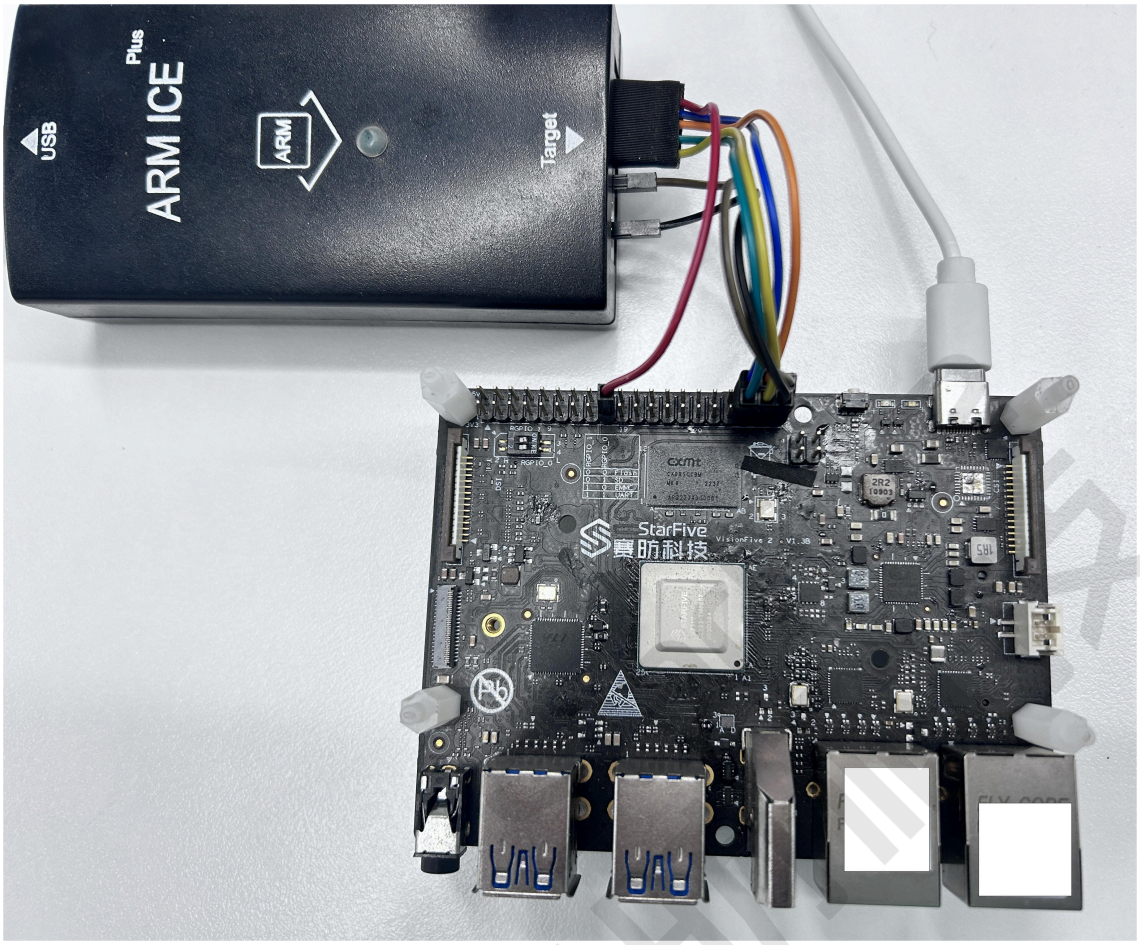


Figure 2-12 Connection Diagram



Note:

If your PC cannot recognize the Segger debuger, please download and install the J-Link driver after connecting again.

6. Open Ozone, and creat a **Project**, choosing U74 or S76 under **Device**, and then keep clicking **Next** until choose **J-Link Script File**.

Figure 2-13 U74

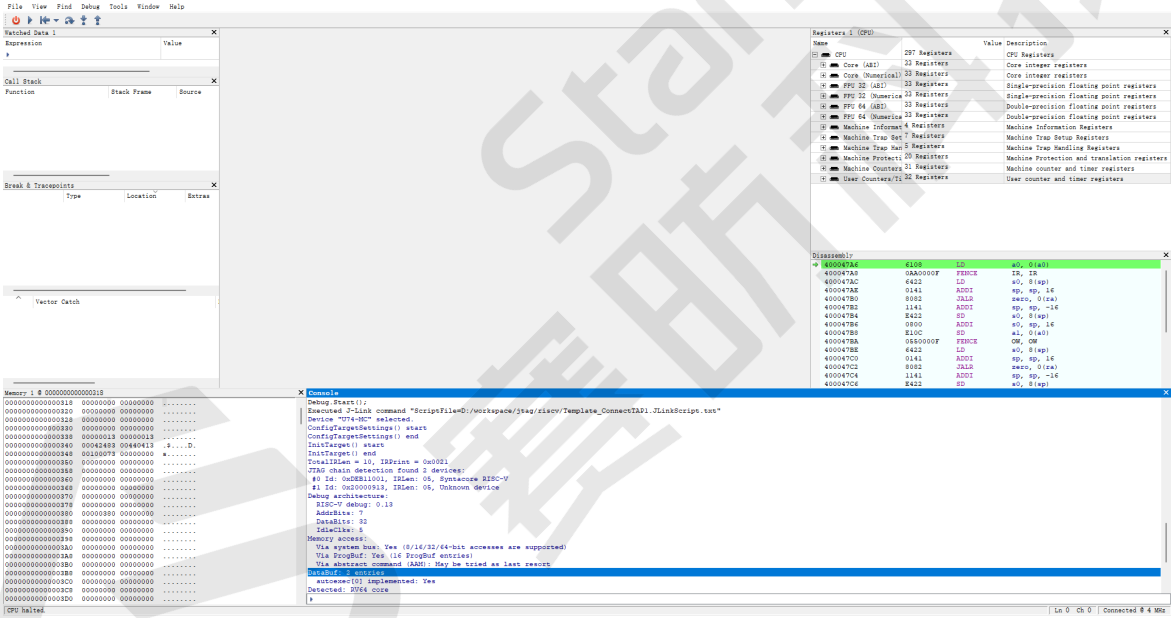
Figure 2-14 J-Link Script File

TAP0 is connected to S76 core while TAP1 is connected to U74 core, please choose the required file to download:

- ConnectTAP0
- ConnectTAP1

7. The output below means the devices is connected successfully.

Figure 2-15 Example Output



3. Buy Now

Click on this tab to find all the online shops and compatible accessories.

Buy SBC

Use the following page to find your nearest sales channel or the global channels for purchasing a VisionFive 2 Single Board Computer (SBC).

- Buy VisionFive 2

Buy Parts

Use the following page to find the parts that are tested as compatible with VisionFive 2.

- Buy Accessory