StarFive 赛昉科技

Testing VisionFive GPIO Application Note

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About This Manual

Introduction

This application note provides two methods to test VisionFive GPIO:

- Test with command lines.
- Test with demo code.

Revision History

Version	Released	Revision
V1.0	2021-12-15	Preliminary release.
V1.1	2021-12-27	In the *Running Demo Codes* section: • Added description for the app directory. • Added description for the rsync command. • Added description for <User_Name>. • Fixed a typo.

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1 Preparation

Before executing the demo program, make sure you have prepared the following:

1.1 Preparing Hardware

Prepare the following hardware items before running the demo codes:

Table 1-1 Hardware Preparation

Type	M/O	Item	Notes
General	M	A Single Board Computer	The following boards are applicable: • StarLight • VisionFive
General	M	• 16GB (or more) micro-SD card • micro-SD card reader • Computer (PC/Mac/Linux) • USB to serial converter (3.3 V I/O) • Ethernet cable • Power adapter (5 V / 3 A) • USB Type-C Cable	These items are used for flashing Fedora OS into a micro-SD card.
GPIO	M	An oscilloscope	The oscilloscope is used to verify the GPIO voltage.

*M/O: M (Mandatory)/ O (Optional)

1.2 Preparing Software

- Software Environment
  - PC: Ubuntu 20.04
  - RISC-V Platform: Linux 5.16.0
- Flash Fedora OS into a Micro-SD card and compile and replace dtb files as described in the *Preparing Software* section in the *StarFive 40-Pin GPIO Header User Guide*.

2 Testing GPIO with Command Lines

Test the GPIO0 as described in the *Configuring GPIO* section in the StarFive 40-Pin GPIO Header User Guide.

3 Running Demo Codes

To run the demo codes, perform the following:

3.1 Compiling the Source Codes

Step 1 Download the source code test-gpio.c file to your desired directory under Ubuntu. For example, app directory.

Step 2 (Optional) Install the tool to compile. The following is an example to install:

```
sudo apt-get install gcc-riscv64-linux-gnu
```

> **Information:**
>
> This step can be skipped if the tool has been installed.

After successful installation, check the version by running: `linus@star-five$ riscv64-linux-gnu-gcc -v`. The following is the example output:

Figure 3-1 Example Output

Step 3 Compile the source code by executing the following:

```
riscv64-linux-gnu-gcc -o test-gpio test-gpio.c
```

Result:

The executable test-gpio file is generated in the current directory.

Step 4 Execute the following to see if the compilation is successful:

```
file test-gpio
```

Result:

`UCB RISC-V` in the following output indicates the compilation is successful:

```
Riscv@starfive:~/work/app$ file test-gpio
test-gpio: ELF 64-bit LSB executable, UCB RISC-V, version 1
(SYSV), dynamically linked, interpreter /lib/ld-linux-riscv64-
lp64d.so.1, for GNU/Linux 4.15.0,
BuildID[sha1]=476d5a99c84f995d03227a18285222ac25e2cd0d, not
stripped
c-v2x@starfive:~/work/app$
```

3.2 Testing GPIO with Demo Codes

Power on the VisionFive, and check the GPIO22 voltage changes.

Step 1 Execute the following command in Ubuntu to upload the executable file test-gpio to your desired directory of the board, for example, `test`:

```
rsync ./test-gpio <User_Name>@<Board_IP_Address>:/home/riscv/test
```

Information:

- `<User_Name>`: Your user name of the board. For example, riscv.
- `<Board_IP_Address>`: The board IP address. For example, 192.168.92.133.

Example:

```
rsync ./test-gpio riscv@192.168.92.133:/home/riscv/test
```

Step 2 Execute the following on VisionFive to run the demo codes:

```
./test-gpio
```

The following is an example output:

```
[root@fedora-starfive test]#
[root@fedora-starfive test]# ./test-gpio
        ********************************************
        ********  StarF_GPIO_TEST_DEMO  ************
        ********  Version date: 2021/12 ************
        ********************************************
Gpio begin to init
Gpio init ok
Gpio off
Gpio on
Gpio off
Gpio on
Gpio off
Gpio on
Gpio off
Gpio on
Gpio off
Gpio on
Gpio off
Gpio on
Gpio off
Gpio on
Gpio off
```

Figure 3-2 Example Output

Information:

- `Gpio on`: High voltage
- `Gpio off`: Low voltage