StarFive 赛昉科技

Using VisionFive IIC to Read SHTC3 Data Application Note

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About This Manual

Introduction

This application note provides steps to use VisionFive's IIC to read SHTC3 data through an example program.

Revision History

Version	Released	Revision
V1.0	2021-12-15	Preliminary release.
V1.1	2022-01-12	• Added description for <User_Name>. • Updated the demo file name as test-shtc3.c.

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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.
I2C Demo	M	• Sense Hat (B) • Dupont Line	The Sense HAT (B) integrates multi powerful sensors such as gyroscope, accelerometer, magnetometer, barometer, temperature and humidity sensor, etc. It is communicated via I2C interface, and allows to connect more external sensors if you need. For detailed specifications, refer to Sen Hat (B) Wiki.

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

1.1.2 Hardware Setup

The following table and figure describe how to connect Sense HAT to the 40-pin header:

Table 1-2 Connect Sense Hat (B) to the 40-Pin Header

Sense HAT (B)	Pin Number
3V3	1
GND	9
SDA	3
SCL	5

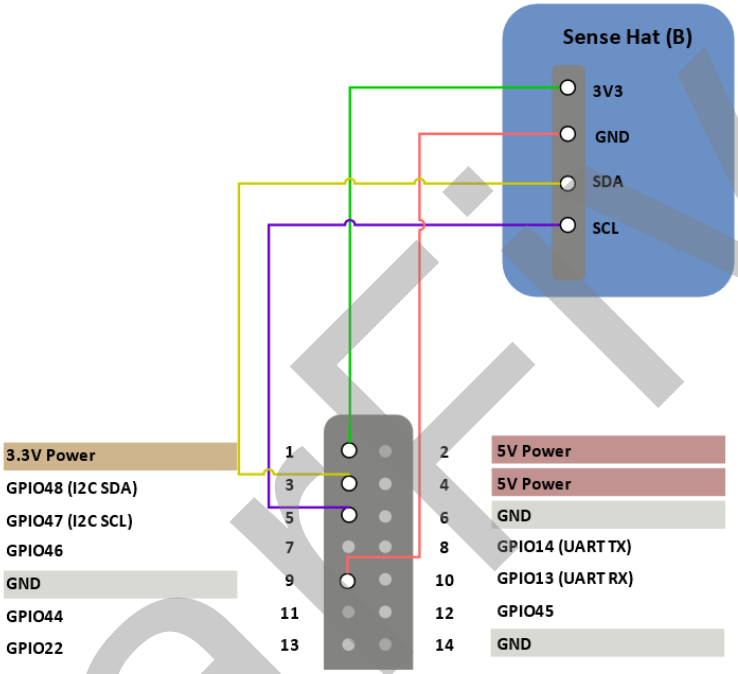

Figure 1-1 Connect Sense Hat (B) to the 40-Pin Header

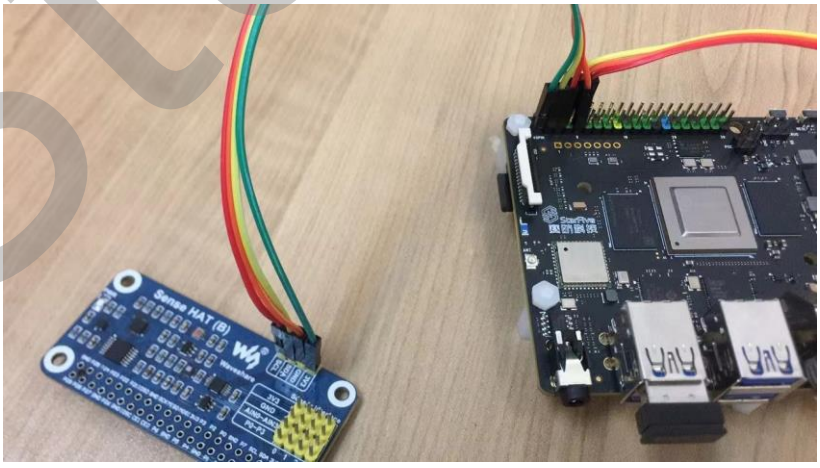

Figure 1-2 Connect Sense Hat (B) to the 40-Pin Header

1.2 Preparing Software

Make sure the following procedures are performed:

1. Flash Fedora OS into a Micro-SD card and compile and replace dtb files as described in the *Preparing Software* section in *StarFive 40-Pin GPIO Header User Guide*.
2. Configure the dts file as described in the *Configuring dts File* section in the *StarFive 40-Pin GPIO Header User Guide*.

2 Running Demo Codes

To run the demo codes, perform the following:

Step 1 Download the source code from: test-shtc3.c.

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:

```
Thread model: posix
gcc version 9.3.0 (Ubuntu 9.3.0-17ubuntu1~20.04)
```

Figure 2-1 Example Output

Step 3 Execute the following to compile:

```
riscv64-linux-gnu-gcc -o test-shtc3 test-shtc3.c
```

Result:

The output file is `test-shtc3` in the same directory.

`UCB RISC-V` in the following output indicates that executable codes to run on RISC-V platform are successfully generated:

```
Riscv@starfive:~/work/app/iic$ file test-shtc3
test-shtc3: 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]=560aeb713ece667ab5f3a5f0dcbd75a149216e6f, not
strippe
```

Step 4 Execute the following in the Ubuntu environment to upload the executable codes from the `test-shtc3` file to the board through the Ethernet:

```
rsync ./test-shtc3 <User_Name>@<Board_IP_Address>:/home/riscv
```

> **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-shtc3 riscv@192.168.92.133:/home/riscv
```

Step 5 Execute the following command on VisionFive to run the codes:

```
./test-shtc3
```

Result:

The following output indicates the execution is successful:

```
[root@fedora-starfive test]# ./test-shtc3
 SHTC3 Sensor Test Program ...
Fopen : /dev/i2c-1
Temperature =  -7.30°C , Humidity =  21.28%
Temperature =  25.74°C , Humidity =  21.26%
Temperature =  25.72°C , Humidity =  21.24%
Temperature =  25.74°C , Humidity =  21.24%
Temperature =  25.75°C , Humidity =  21.21%
Temperature =  25.75°C , Humidity =  21.21%
Temperature =  25.77°C , Humidity =  21.19%
Temperature =  25.76°C , Humidity =  21.18%
Temperature =  25.76°C , Humidity =  21.15%
Temperature =  25.77°C , Humidity =  21.15%
Temperature =  25.74°C , Humidity =  21.12%
Temperature =  25.76°C , Humidity =  21.12%
Temperature =  25.75°C , Humidity =  21.09%
Temperature =  25.78°C , Humidity =  21.09%
Temperature =  25.75°C , Humidity =  21.08%
Temperature =  25.81°C , Humidity =  21.09%
Temperature =  25.76°C , Humidity =  21.05%
Temperature =  25.77°C , Humidity =  21.03%
Temperature =  25.76°C , Humidity =  21.03%
Temperature =  25.78°C , Humidity =  21.02%
Temperature =  25.77°C , Humidity =  21.01%
Temperature =  25.75°C , Humidity =  20.98%
Temperature =  25.78°C , Humidity =  20.99%
Temperature =  25.75°C , Humidity =  20.96%
Temperature =  25.78°C , Humidity =  20.95%
```

Now we have successfully read the temperature and humidity data.