

StarFive  
赛昉科技

# Using VisionFive GPIO to Make A Buzzer Beep

with Python

Application Note

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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 application note provides steps to use VisionFive's GPIO pins to make a buzzer beep through an example program with Python.

## Revision History

Table 0-1 Revision History

Version	Released	Revision
V1.1	2022-07-29	Added "cd" in the codeblock <pre>cd /usr/local/lib64/python3.9/site-packages</pre> to make it a complete command.

## 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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# Contents

- List of Tables.....5
- List of Figures..... 6
- Legal Statements..... ii
- Preface..... iii
- 1. Introduction.....7**
  - 1.1. 40-Pin Header Definition.....7
- 2. Preparation.....8**
  - 2.1. Preparing Hardware..... 8
    - 2.1.1. Hardware Setup.....8
  - 2.2. Preparing Software.....9
- 3. Running Demo Code.....11**
- 4. Demo Source Code..... 13**

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# List of Tables

Table 0-1 Revision History..... iii

Table 2-1 Hardware Preparation..... 8

Table 2-2 Connect Buzzer to the 40-Pin Header.....9

# List of Figures

Figure 1-1 40-Pin Definition..... 7  
Figure 2-1 Connect Buzzer to the 40-Pin Header..... 9

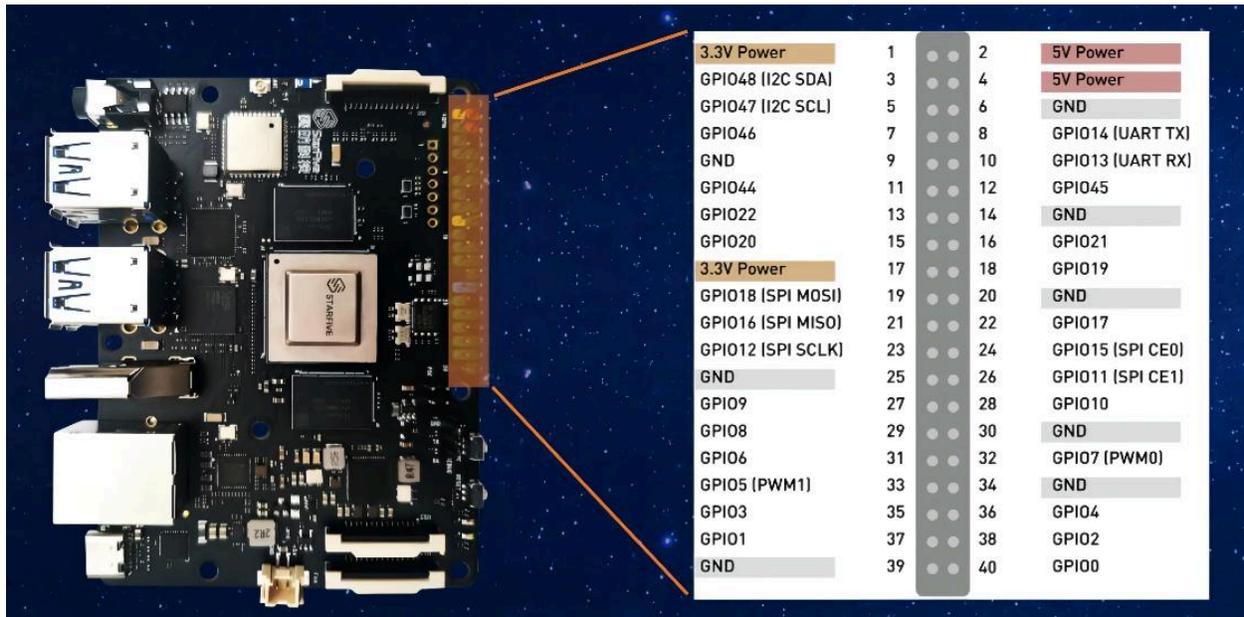
# 1. Introduction

This application note provides steps to use VisionFive's GPIO pins to make a buzzer beep through an example program with Python.

## 1.1. 40-Pin Header Definition

The following figure shows the location of the 40-pin header. The VisionFive board is taken as an example:

Figure 1-1 40-Pin Definition



## 2. Preparation

Before executing the demo program, make sure you prepare the following:

### 2.1. Preparing Hardware

Prepare the following hardware items before running the demo code:

**Table 2-1 Hardware Preparation**

Type	M/O*	Item	Notes
General	M	StarFive single board computer	The following boards are applicable: <ul style="list-style-type: none"><li>• StarLight</li><li>• VisionFive</li></ul>
General	M	<ul style="list-style-type: none"><li>• 16 GB (or more) micro-SD card</li><li>• micro-SD card reader</li><li>• Computer (Windows/MAC/Linux)</li><li>• USB to serial converter (3.3 V I/O)</li><li>• Ethernet cable</li><li>• Power adapter (5 V / 3 A)</li><li>• USB Type-C Cable</li></ul>	These items are used for flashing Fedora OS into a micro-SD card.
GPIO Demo (Buzzer)	M	A passive buzzer	-



**Note:**

\*: M: Mandatory, O: Optional

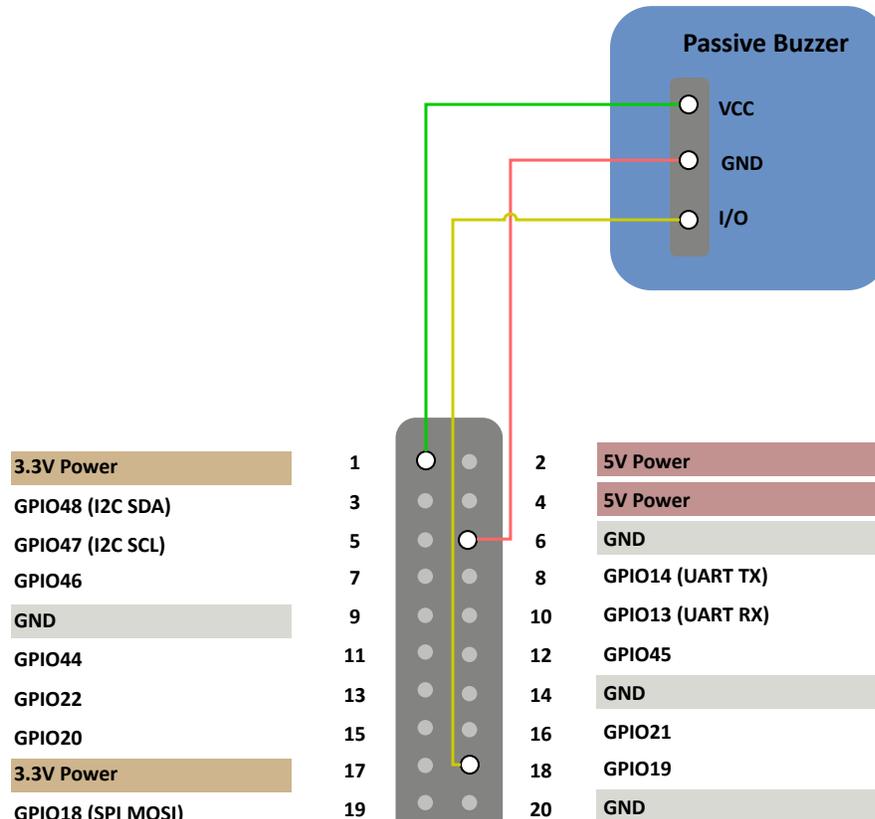
#### 2.1.1. Hardware Setup

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

Table 2-2 Connect Buzzer to the 40-Pin Header

Passive Buzzer	40-Pin GPIO Header	
	Pin Number	Pin Name
VCC	1	3.3V Power
GND	6	GND
I/O	18	GPIO19

Figure 2-1 Connect Buzzer to the 40-Pin Header



## 2.2. Preparing Software

Make sure the following procedures are performed:

1. Flash Fedora OS into a Micro-SD card as described in the *Flashing Fedora OS to a Micro-SD Card* section in the *VisionFive Single Board Computer Quick Start Guide*.
2. Log into the Fedora and make sure VisionFive is connected to the Internet. For detailed instructions, refer to the *Using SSH over Ethernet* or *Using a USB to Serial Converter* section in the *VisionFive Single Board Computer Quick Start Guide*.
3. Execute the `pip` command on VisionFive Fedora to install the `VisionFive.gpio` package:

```
sudo pip install VisionFive.gpio
```

Alternatively, you can execute the following command:

```
sudo pip3 install VisionFive.gpio
```

4. (Optional) If you copy the source code to the local directory under VisionFive Fedora, execute the following commands under the source code directory:



**Tip:**

The source code can be downloaded by clicking the following link: [VisionFive.gpio](#).

```
sudo yum install python-devel python3-devel  
sudo python setup.py install
```

Alternatively, you can execute the following command:

```
sudo python3 setup.py install
```

---

## 3. Running Demo Code

To run the demo code, perform the following on VisionFive Fedora:

1. Locate to the directory where the test code, `buzzer.py`, exists:

- a. Execute the following command to get the directory where `VisionFive.gpio` exists:

```
pip show VisionFive.gpio
```

### Example Result:

```
Location: /usr/local/lib64/python3.9/site-packages
```



### Note:

The actual output depends on how the application is installed.

- b. Execute the following to enter the directory, for example, `/usr/local/lib64/python3.9/site-packages` as indicated in the previous step output:

```
cd /usr/local/lib64/python3.9/site-packages
```

- c. Execute the following command to enter the `sample-code` directory:

```
cd ./VisionFive/sample-code/
```

2. Under the `sample-code` directory, execute the following command:

```
sudo python buzzer.py
```

Alternatively, you can execute the following command:

```
sudo python3 buzzer.py
```

3. Enter the values as prompted to configure the pitch and the lasting time of the beeps as prompted:

- **Enter Pitch (200 to 20000):** The frequency (Range: 200 to 20000) of the buzzer. Unit: Hz. For example, 400.



### Note:

If the value is out of the range (200 to 20000 Hz), a warning message will display, and you need to re-enter the pitch value.

- **Enter Cycle (seconds):** The time in seconds when the buzzer keeps beeping. For example, 100

**Example:**

```
[riscv@fedora-starfive sample-code]$ sudo python3 buzzer.py
Enter Pitch (200 to 20000): 400
Enter Cycle (seconds): 100
```

**Result:**

The buzzer keeps beeping for 100 seconds at 400 Hz.

---

## 4. Demo Source Code

The Python source code of this demo is provided for reference purpose only.

buzzer.py:

```
'''
Please make sure the buzzer is connected to the correct pins.
The following table describes how to connect the buzzer to the 40-pin
header.
-----
Passive Buzzer__Pin Number____Pin Name
    VCC                1          3.3V Power
    GND                6           GND
    I/O               18         GPIO19
-----
'''

import VisionFive.gpio as GPIO
import time

buzz_pin = 19
ErrOutOfRange = 0

def setup():
    #Configure the direction of buzz_pin as out.
    GPIO.setup(buzz_pin, GPIO.OUT)
    #Configure the voltage level of buzz_pin as high.
    GPIO.output(buzz_pin, GPIO.HIGH)

def pitch_in_check():
    val_in = input('Enter Pitch (200 to 20000): ')
    val = float(val_in)

    if 200 <= val <= 20000:
        return val
    else:
        print('The input data is out of range (200 to 20,000 Hz). Please
re-enter.')
        return ErrOutOfRange

def loop(pitch, cycle):
    delay = 1.0 / pitch
    cycle = int((cycle * pitch)/2)

    #Buzzer beeps.
    while cycle >= 0:
        GPIO.output(buzz_pin, GPIO.LOW)
```

```
        time.sleep(delay)
        GPIO.output(buzz_pin, GPIO.HIGH)
        time.sleep(delay)

        cycle = cycle - 1

def destroy():
    GPIO.output(buzz_pin, GPIO.HIGH)
    GPIO.cleanup()

if __name__ == '__main__':
    setup()
    try:
        #Input value of pitch (200 to 20,000 Hz).
        pitch = pitch_in_check()
        while pitch == 0:
            pitch = pitch_in_check()

        #Input value of cycle time (seconds).
        cycle_in = input("Enter Cycle (seconds): ")
        cycle = int(cycle_in)

        #The buzzer beeps with the specified pitch and cycle.
        loop(pitch, cycle)
    finally:
        destroy()
```