

7.About WiringPi library

1.Introduction of wiringPi

The wiringPi is a GPIO control library function for the Raspberry Pi platform. The wiringPi library contains a wealth of library functions such as GPIO library, I2C library, SPI library, UART library and software PWM library,etc.

2.Version information of wiringPi

You need to input: `gpio -v`. As shown in the figure below.

```
pi@yahboom4wd:~/WiringPi $ gpio -v
gpio version: 2.60
Copyright (c) 2012-2018 Gordon Henderson
This is free software with ABSOLUTELY NO WARRANTY.
For details type: gpio -warranty

Raspberry Pi Details:
Type: Pi 4B, Revision: 01, Memory: 0MB, Maker: Sony
* Device tree is enabled.
*--> Raspberry Pi 4 Model B Rev 1.1
* This Raspberry Pi supports user-level GPIO access.
```

3.Using of GPIO

You can input : `gpio readall` to get the correspondence between the wiringPi and the GPIO interface of the Raspberry Pi, as shown in the following figure:

```
pi@yahboom4wd:~/WiringPi $ gpio readall
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi |   Name   | Mode | V | Physical | V | Mode |   Name   | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 2   | 8   | SDA.1    | OUT  | 1 | 3   | 4   |      | 5v       |      |      | |
| 3   | 9   | SCL.1    | IN   | 1 | 5   | 6   |      | 0v       |      |      |
| 4   | 7   | GPIO. 7   | IN   | 1 | 7   | 8   | 1 | ALT0    | TxD   | 15   | 14   |
|     |     | 0v       |      |   | 9   | 10  | 1 | ALT0    | RxD   | 16   | 15   |
| 17  | 0   | GPIO. 0   | IN   | 0 | 11  | 12  | 0 | IN      | GPIO. 1 | 1   | 18   |
| 27  | 2   | GPIO. 2   | OUT  | 0 | 13  | 14  |   |          | 0v     |      |      |
| 22  | 3   | GPIO. 3   | OUT  | 0 | 15  | 16  | 0 | OUT     | GPIO. 4 | 4   | 23   |
|     |     | 3.3v     |      |   | 17  | 18  | 0 | OUT     | GPIO. 5 | 5   | 24   |
| 10  | 12  | MOSI     | ALT0 | 0 | 19  | 20  |   |          | 0v     |      |      |
| 9   | 13  | MISO     | OUT  | 0 | 21  | 22  | 0 | IN      | GPIO. 6 | 6   | 25   |
| 11  | 14  | SCLK     | OUT  | 0 | 23  | 24  | 1 | OUT     | CE0    | 10   | 8    |
|     |     | 0v       |      |   | 25  | 26  | 1 | IN      | CE1    | 11   | 7    |
| 0   | 30  | SDA.0    | IN   | 1 | 27  | 28  | 0 | OUT     | SCL.0  | 31   | 1    |
| 5   | 21  | GPIO.21  | IN   | 1 | 29  | 30  |   |          | 0v     |      |      |
| 6   | 22  | GPIO.22  | IN   | 1 | 31  | 32  | 0 | IN      | GPIO.26 | 26   | 12   |
| 13  | 23  | GPIO.23  | OUT  | 0 | 33  | 34  |   |          | 0v     |      |      |
| 19  | 24  | GPIO.24  | OUT  | 0 | 35  | 36  | 0 | OUT     | GPIO.27 | 27   | 16   |
| 26  | 25  | GPIO.25  | OUT  | 0 | 37  | 38  | 0 | OUT     | GPIO.28 | 28   | 20   |
|     |     | 0v       |      |   | 39  | 40  | 0 | OUT     | GPIO.29 | 29   | 21   |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi |   Name   | Mode | V | Physical | V | Mode |   Name   | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
pi@yahboom4wd:~/WiringPi $
```

The Physical column is the pin definition of the physical interface J8 of the Raspberry Pi.

The wPi column is the corresponding value of the GPIO in the wiringPi library.

The BCM column is the corresponding value of the GPIO in the BCM2835 C library.

When using the Raspberry Pi to enter the `gpio readall` command to view the pin status, the system prompts:

```
Oops - unable to determine board type... model: 17
```

The reason for this problem is that the current wiringpi version of the system does not support Raspberry Pi 4B, but this problem will not affect the function of all the pins we use to program Raspberry Pi.

Steps to solve this problem:

1. Enter the Raspberry Pi system, make sure that the Raspberry Pi can access the Internet normally.

We can enter the command to determine if the Raspberry Pi can access the Internet normally.

`ping www.baidu.com`

```
pi@yahboom4wd:~/WiringPi $ ping www.baidu.com
PING www.wshifen.com (104.193.88.77) 56(84) bytes of data.
64 bytes from 104.193.88.77 (104.193.88.77): icmp_seq=1 ttl=50 time=232 ms
64 bytes from 104.193.88.77 (104.193.88.77): icmp_seq=2 ttl=50 time=189 ms
64 bytes from 104.193.88.77 (104.193.88.77): icmp_seq=3 ttl=50 time=188 ms
64 bytes from 104.193.88.77 (104.193.88.77): icmp_seq=4 ttl=50 time=188 ms
^Z
[1]+ 已停止                  ping www.baidu.com
```

As shown in the figure above, a normally ping indicates that the Raspberry Pi can access the Internet normally, and we can perform the following steps.

2. Input the following command to install Git.

`sudo apt-get install git-core`

```
pi@yahboom4wd:~ $ sudo apt-get install git-core
正在读取软件包列表... 完成
正在分析软件包的依赖关系树
正在读取状态信息... 完成
注意，选中 'git' 而非 'git-core'
git 已经是最新版 (1:2.20.1-2)。
下列软件包是自动安装的并且现在不需要了：
  libboost-system1.62.0 libboost-thread1.62.0
使用 'sudo apt autoremove' 来卸载它(它们)。
升级了 0 个软件包，新安装了 0 个软件包，要卸载 0 个软件包，有 140 个软件包未被升级。
```

Wait patiently for its installation to complete.

3. Enter the following command to download the WiringPi file to the current directory on the Raspberry Pi system.

`sudo git clone https://github.com/WiringPi/WiringPi`

```
pi@yahboom4wd:~ $ sudo git clone https://github.com/WiringPi/WiringPi
正克隆到 'WiringPi'...
remote: Enumerating objects: 1385, done.
remote: Total 1385 (delta 0), reused 0 (delta 0), pack-reused 1385
接收对象中: 100% (1385/1385), 713.54 KiB | 9.00 KiB/s, 完成。
处理 delta 中: 100% (861/861), 完成。
```

Wait patiently for its installation to complete.

4. After the download is complete, we can see a WiringPi folder in the current directory. As shown below.

```
pi@yahboom4wd:~ $ ls
advance.c      MagPi          Pictures       wiringPi
bluetooth.sh   master.zip     Public        WiringPi
ColorLED.c     mjpg-streamer-master  python        wiringpi-latest.deb
Desktop        Music          SmartCar      ZZX_test
Documents      pi3-miniuart-bt-overlay.dtb  Templates
Downloads      pi3-miniuart-bt-overlay.zip  Videos
```

5. Input the following command to enter the WiringPi folder directory.

cd WiringPi/

```
pi@yahboom4wd:~ $ cd WiringPi/
```

6. Input the following command to install WiringPi.

sudo ./build

```
pi@yahboom4wd:~/WiringPi $ sudo ./build
wiringPi Build script
=====

WiringPi Library
[UnInstall]
[Compile] wiringPi.c
[Compile] wiringSerial.c
[Compile] wiringShift.c
[Compile] piHiPri.c
[Compile] piThread.c
[Compile] wiringPiSPI.c
[Compile] wiringPiI2C.c
[Compile] softPwm.c
[Compile] softTone.c
wiringPi.c:1327:21: warning: 'digitalWrite8Dummy' defined but not used [-Wunused-function]
    static void digitalWrite8Dummy (UNU struct wiringPiNodeStruct *node, UNU int pin, UNU int value) { return ; }
                    ^
wiringPi.c:1326:21: warning: 'digitalRead8Dummy' defined but not used [-Wunused-function]
    static unsigned int digitalRead8Dummy (UNU struct wiringPiNodeStruct *node, UNU int UNU pin) { return 0 ; }
                    ^
[Compile] mcp23008.c
[Compile] mcp23016.c
[Compile] mcp23017.c
[Compile] mcp23s08.c
[Compile] mcp23s17.c
[Compile] sr595.c
```

Wait patiently for its installation to complete. The interface shown below, without any error, it means that the installation is complete.

```
GPIO Utility
[Compile] gpio.c
[Compile] readall.c
[Link]
[Install]
All Done.

NOTE: To compile programs with wiringPi, you need to add:
    -lwiringPi
to your compile line(s) To use the Gertboard, MaxDetect, etc.
code (the devLib), you need to also add:
    -lwiringPiDev
to your compile line(s).
```

7. Enter the following command to view the version number.

`gpio -v`

```
pi@yahboom4wd:~/WiringPi $ gpio -v
gpio version: 2.60
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Raspberry Pi Details:
Type: Pi 4B, Revision: 01, Memory: 0MB, Maker: Sony
* Device tree is enabled.
*--> Raspberry Pi 4 Model B Rev 1.1
* This Raspberry Pi supports user-level GPIO access.
```

8. We enter `gpio readall`, we will find that there is no error prompt, and we can display the status of each pin of Raspberry Pi, as shown in the figure below.

```

pi@yahboom4wd:~/WiringPi $ gpio readall
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi |   Name   | Mode | V | Physical | V | Mode |   Name   | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|      |      | 3.3v     |      |   | 1  | 2  |      | 5v       |      |      | |
|  2  |  8  | SDA.1    | OUT  | 1 | 3  | 4  |      | 5v       |      |      |
|  3  |  9  | SCL.1    | IN   | 1 | 5  | 6  |      | 0v       |      |      |
|  4  |  7  | GPIO. 7  | IN   | 1 | 7  | 8  | 1  | ALT0    | TxD  | 15  | 14  |
|      |      | 0v       |      |   | 9  | 10 | 1  | ALT0    | RxD  | 16  | 15  |
| 17  |  0  | GPIO. 0  | IN   | 0 | 11 | 12 | 0  | IN      | GPIO. 1 | 1  | 18  |
| 27  |  2  | GPIO. 2  | OUT  | 0 | 13 | 14 |      | 0v       |      |      |
| 22  |  3  | GPIO. 3  | OUT  | 0 | 15 | 16 | 0  | OUT     | GPIO. 4 | 4  | 23  |
|      |      | 3.3v     |      |   | 17 | 18 | 0  | OUT     | GPIO. 5 | 5  | 24  |
| 10  | 12  | MOSI     | ALT0 | 0 | 19 | 20 |      | 0v       |      |      |
|  9  | 13  | MISO     | OUT  | 0 | 21 | 22 | 0  | IN      | GPIO. 6 | 6  | 25  |
| 11  | 14  | SCLK     | OUT  | 0 | 23 | 24 | 1  | OUT     | CE0    | 10  | 8   |
|      |      | 0v       |      |   | 25 | 26 | 1  | IN      | CE1    | 11  | 7   |
|  0  | 30  | SDA.0    | IN   | 1 | 27 | 28 | 0  | OUT     | SCL.0  | 31  | 1   |
|  5  | 21  | GPIO.21  | IN   | 1 | 29 | 30 |      | 0v       |      |      |
|  6  | 22  | GPIO.22  | IN   | 1 | 31 | 32 | 0  | IN      | GPIO.26 | 26  | 12  |
| 13  | 23  | GPIO.23  | OUT  | 0 | 33 | 34 |      | 0v       |      |      |
| 19  | 24  | GPIO.24  | OUT  | 0 | 35 | 36 | 0  | OUT     | GPIO.27 | 27  | 16  |
| 26  | 25  | GPIO.25  | OUT  | 0 | 37 | 38 | 0  | OUT     | GPIO.28 | 28  | 20  |
|      |      | 0v       |      |   | 39 | 40 | 0  | OUT     | GPIO.29 | 29  | 21  |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi |   Name   | Mode | V | Physical | V | Mode |   Name   | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

```