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树莓派

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树莓派教程系列7：wiringPi、bcm2835、python库安装

2015-8-26 17:53 | 发布者: waveshare-admin | 查看: 1312 | 评论: 1

摘要: 上一章我们讲解了在linux系统下如何通过读写设备文件的方式控制GPIO点亮LED灯，本章我们继续讲解如果通过使用中间层库函数编程控制GPIO。

一、wiringPi wiringPi是应用于树莓派平台的GPIO控制库函数，WiringPi中的函 ...

上一章我们讲解了在linux系统下如何通过读写设备文件的方式控制GPIO点亮LED灯，本章我们继续讲解如果通过使用中间层库函数编程控制GPIO。

一、wiringPi wiringPi是应用于树莓派平台的GPIO控制库函数，WiringPi中的函数类似于Arduino的wiring系统。官网：http://wiringpi.com/

1、wiringPi安装

(1) 方案1-使用GIT工具

通过GIT获得wiringPi的源码

1 git clone git://git.drogon.net/wiringPi

2 cd wiringPi

3 ./build

build脚本会帮助你编译和安装wiringPi

(2) 方案1-使用GIT工具

我们可以在网站上直接下载最新版本编译使用, https://git.drogon.net/?p=wiringPi;a=summary

Gordons Projects

→ Projects Top-Level GIT

/ wiringPi / summary

summary | shortlog | log | commit | submitdiff | tree

description wiringPi - A "wiring" like library for the Raspberry Pi

owner GIT

last change Mon, 9 Mar 2015 00:59:33 +0800 (16:59 +0800)

shortlog

2015-03-09 Gordon Henderson Updated the board types to cope with an 0014 version... [master](#) | [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2015-02-03 Gordon Henderson OK. So the Pi v2 I have had older firmware and it wasm... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2015-01-30 Gordon Henderson OK, you an easier way to manage versions. [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2015-01-30 Gordon Henderson Updates to the build process [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2015-01-29 Gordon Henderson Updated a technicality in softPwm, and added a suggeste... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2015-01-07 Gordon Henderson Updated versions for new maker - abest [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-11-10 Gordon Henderson Fixed changes to the Pcf8574 code - got the orange ... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-07-17 Gordon Henderson Fixed a bug in the gpio readall command on model B... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-07-14 Gordon Henderson Updated mostly to the gpio readall command to support... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-06-27 Gordon Henderson Fixed a small bug in the ISR code where it was looking... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-06-24 Gordon Henderson Dumped version to 2.15 [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-06-24 Gordon Henderson Updates for the Raspberry Pi Compute Module - changes... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2014-05-20 Gordon Henderson changed to pin mode to support softPwm. [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2013-09-03 Gordon Henderson Added some tweaks to gpio to set all modes on pins... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2013-07-20 Gordon Henderson Dumped version [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

2013-07-20 Gordon Henderson It helps if you add the files into GIT... [commit](#) | [commitdiff](#) | [tree](#) | [submitdiff](#)

heads

4 months ago [master](#) | [shortlog](#) | [log](#) | [tree](#)

wiringPi - A "wiring" like library for the Raspberry Pi

view raw

在windows上下载wiringPi库，并复制到树莓派中，运行如下命令解压安装。(xxx代表版本号)

1 tar -zxvf wiringPi-xxx.tar.gz

2 cd wiringPi-xxx

3 ./build

详细安装教程请参考wiringPI官网：http://wiringpi.com/download-and-install/

2、测试

wiringPi包括一套gpio命令，使用gpio命令可以控制树莓派上的各种接口，通过以下指令可以测试wiringPi是否安装成功。

1 gpio -v

2 gpio readall

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树莓派

Arduino

C8051

PIC

STM8

FPGA

树莓派

01 Alphabot树莓派教程

lede是openwrt的一个分

有支持pi3

02 Alphabot树莓派教程

03 树莓派系列教程18：...

04 树莓派系列教程17：...

05 树莓派系列教程16：...

06 树莓派系列教程15：...

07 树莓派系列教程14：...

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020 树莓派系列教程3：

021 树莓派系列教程3：

022 树莓派系列教程2：

023 树莓派系列教程1：

http://www.waveshare.net/study/article-742-1.html

1/5

```

pi@raspberrypi ~ $ gpio readall
gpio version: 2.26
Copyright (c) 2012-2015 Gordon Henderson
This is free software with ABSOLUTELY NO WARRANTY.
For details type: gpio -warranty

Raspberry Pi Details:
Type: Model 2, Revision: 1.1, Memory: 1024MB, Maker: Sony
pi@raspberrypi ~ $ gpio readall
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi | Name | Mode | V | Physical | V | Mode | Name | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|      |      | 3.3v |      |   | 1 | 2 |      | 5v |      |      | |
| 2 | 8 | SDA.1 | ALTO | 1 | 3 | 4 |      | 5V |      |      |
| 3 | 9 | SCL.1 | ALTO | 1 | 5 | 6 |      | 0v |      |      |
| 4 | 7 | GPIO. 7 | IN | 0 | 7 | 8 | 1 | ALTO | TxD | 15 | 14 |
|      |      | 0v |      |   | 9 | 10 |      | RxD | 16 | 15 |
| 17 | 0 | GPIO. 0 | OUT | 0 | 11 | 13 | 1 | IN | GPIO. 1 | 1 | 18 |
| 27 | 2 | GPIO. 2 | IN | 0 | 13 | 14 | 1 | IN | 0v |      |      |
| 22 | 3 | GPIO. 3 | IN | 0 | 15 | 16 | 0 | IN | GPIO. 4 | 4 | 23 |
|      |      | 3.3v |      |   | 17 | 18 | 0 | IN | GPIO. 5 | 5 | 24 |
| 10 | 12 | MOSI | ALTO | 0 | 19 | 20 | 0 | IN | 0v |      |      |
| 9 | 13 | MISO | ALTO | 0 | 21 | 22 | 0 | IN | GPIO. 6 | 6 | 25 |
| 11 | 14 | SCLK | ALTO | 0 | 23 | 24 | 1 | ALTO | CE0 | 10 | 8 |
|      |      | 0v |      |   | 25 | 26 | 1 | ALTO | CE1 | 11 | 7 |
| 0 | 30 | SDA.0 | IN | 1 | 27 | 28 | 1 | IN | SCL.0 | 31 | 1 |
| 5 | 21 | GPIO.21 | OUT | 1 | 29 | 30 |      | 0v |      |      |
| 6 | 22 | GPIO.22 | IN | 1 | 31 | 32 | 0 | IN | GPIO.26 | 26 | 12 |
| 13 | 23 | GPIO.23 | IN | 0 | 33 | 34 |      | 0v |      |      |
| 19 | 24 | GPIO.24 | IN | 0 | 35 | 36 | 0 | IN | GPIO.27 | 27 | 16 |
| 26 | 25 | GPIO.25 | IN | 0 | 37 | 38 | 0 | IN | GPIO.28 | 28 | 20 |
|      |      | 0v |      |   | 39 | 40 | 0 | IN | GPIO.29 | 29 | 21 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi | Name | Mode | V | Physical | V | Mode | Name | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
pi@raspberrypi ~ $

```

从上图可以知道树莓派管脚有三种编号方式，下面以Pioneer600扩展板的LED1为例，第一种为板上编号（37），即中间两列，表示第几号插针。第二中为wiringPi编码（25），使用wiringPi库编程时是用wiringPi编号，第三种为BCM编号，这个是更加BCM管脚来编号的，使用bcm2835库或python的RPi.GPIO编程时使用BCM编号。

关于更多wiringPi的库函数，可参看wiringPi官网，也可参考wiringPi用户手册。

http://wenku.baidu.com/link?url=U-APBvE_ga5pSSwPwWABIGJymLVwyC-0W9AEOT2cjhZzoLywa0-QpElyNT2yHvNV0P7BbqTZCgG0ctaQZLi_ovkAGXREBOE6h68eTt-Q3y

二、bcm2835

bcm2835库是树莓派cpu芯片的库函数，相当于stm32的固件库一样，底层是直接操作寄存器。而wiringPi库和python的RPi.GPIO库其底层都是通过读写linux系统的设备文件操作设备。

安装bcm2835库

从bcm2835官网（<http://www.airspayce.com/mikem/bcm2835/>）下载最新版本的库，然后解压安装。

```

1 tar -zxvf bcm2835-1.xx.tar.gz
2 cd bcm2835-1.xx
3 ./configure
4 make
5 sudo make check
6 sudo make install

```

三、python

1、安装RPi.GPIO

（1）先安装python-dev,输入以下指令。

```
1 sudo apt-get install python-dev
```

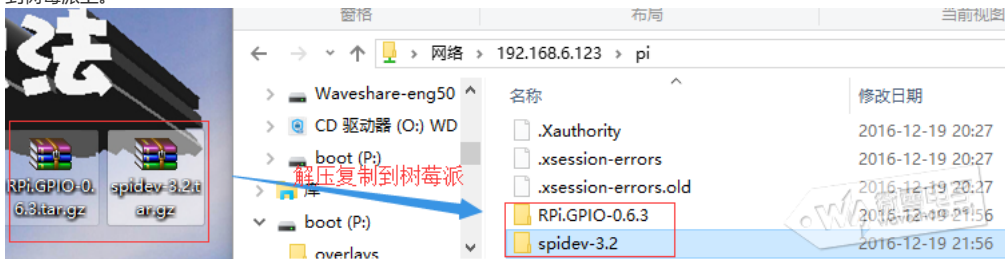
```

pi@raspberrypi:~$ sudo apt-get update
Get:1 http://mirrordirector.raspbian.org/jessie InRelease [13.2 kB]
Get:2 http://mirrordirector.raspbian.org/jessie/main armhf Packages [8,981 kB]
Get:3 http://archive.raspberrypi.org/jessie InRelease [13.2 kB]
Get:4 http://archive.raspberrypi.org/jessie/main armhf Packages [130 kB]
Get:5 http://archive.raspberrypi.org/jessie/ui armhf Packages [53.6 kB]
Ign http://archive.raspberrypi.org/jessie/main Translation-en_GB
Ign http://archive.raspberrypi.org/jessie/main Translation-en
Ign http://archive.raspberrypi.org/jessie/ui Translation-en_GB
Ign http://archive.raspberrypi.org/jessie/ui Translation-en
Get:6 http://mirrordirector.raspbian.org/jessie/contrib armhf Packages [37.5 kB]
Get:7 http://mirrordirector.raspbian.org/jessie/non-free armhf Packages [70.3 kB]
Get:8 http://mirrordirector.raspbian.org/jessie/rpi armhf Packages [1,356 B]
Ign http://mirrordirector.raspbian.org/jessie/contrib Translation-en_GB
Ign http://mirrordirector.raspbian.org/jessie/contrib Translation-en
Ign http://mirrordirector.raspbian.org/jessie/main Translation-en_GB
Ign http://mirrordirector.raspbian.org/jessie/main Translation-en
Ign http://mirrordirector.raspbian.org/jessie/non-free Translation-en_GB
Ign http://mirrordirector.raspbian.org/jessie/non-free Translation-en
Ign http://mirrordirector.raspbian.org/jessie/rpi Translation-en_GB
Ign http://mirrordirector.raspbian.org/jessie/rpi Translation-en
Fetched 9,302 kB in 4min 12s (36.8 kB/s)
Reading package lists... Done
pi@raspberrypi:~$ sudo apt-get install python-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libpython-dev libpython2.7-dev python2.7-dev
The following NEW packages will be installed:
  libpython-dev libpython2.7-dev python-dev python2.7-dev
0 upgraded, 4 newly installed, 0 to remove and 45 not upgraded.
Need to get 18.2 MB of archives.
After this operation, 25.7 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://mirrordirector.raspbian.org/raspbian/ jessie/main libpython2.7-dev armhf 2.7.9-2+deb8u1 [17.9 MB]
Get:2 http://mirrordirector.raspbian.org/raspbian/ jessie/main libpython-dev armhf 2.7.9-1 [19.6 kB]
Get:3 http://mirrordirector.raspbian.org/raspbian/ jessie/main python-dev armhf 2.7.9-1 [1,188 B]
Get:4 http://mirrordirector.raspbian.org/raspbian/ jessie/main python2.7-dev armhf 2.7.9-2+deb8u1 [287 kB]
Fetched 18.2 MB in 38s (467 kB/s)
Selecting previously unselected package libpython2.7-dev:armhf.
(Reading database ... 122916 files and directories currently installed.)
Preparing to unpack .../libpython2.7-dev_2.7.9-2+deb8u1_armhf.deb ...
Unpacking libpython2.7-dev:armhf (2.7.9-2+deb8u1) ...
Selecting previously unselected package libpython-dev:armhf.
Preparing to unpack .../libpython-dev_2.7.9-1_armhf.deb ...
Unpacking libpython-dev:armhf (2.7.9-1) ...
Selecting previously unselected package python2.7-dev.
Preparing to unpack .../python2.7-dev_2.7.9-2+deb8u1_armhf.deb ...
Unpacking python2.7-dev (2.7.9-2+deb8u1) ...
Selecting previously unselected package python-dev.
Preparing to unpack .../python-dev_2.7.9-1_armhf.deb ...
Unpacking python-dev (2.7.9-1) ...
Processing triggers for man-db (2.7.0.2-5) ...
Setting up libpython2.7-dev:armhf (2.7.9-2+deb8u1) ...
Setting up libpython-dev:armhf (2.7.9-1) ...
Setting up python2.7-dev (2.7.9-2+deb8u1) ...

```

(2) 安装RPi.GPIO和spidev, 先下载安装包 (RPi.GPIO安装包和spidev安装包, 参

见: <https://pypi.python.org/pypi/RPi.GPIO><https://pypi.python.org/pypi/spidev>), 然后通过samba等方式把下载好的文件解压到树莓派上。



然后对应进到文件夹内, 执行安装:

```

pi@raspberrypi:~$ ls
AlphaBot Documents Music Public RPi.GPIO-0.6.3 Templates
Desktop Downloads Pictures python_games spidev-3.2 Videos
pi@raspberrypi:~$ cd RPi.GPIO-0.6.3/
pi@raspberrypi:~/RPi.GPIO-0.6.3$ ls
CHANGELOG.txt create_gpio_user_permissions.py INSTALL.txt LICENCE.txt PKG-INFO README.txt RPi setup.py source test
pi@raspberrypi:~/RPi.GPIO-0.6.3$ sudo python setup.py install
running install
running build
running build_py
creating build
creating build/lib.linux-armv7l-2.7
creating build/lib.linux-armv7l-2.7/RPi
copying RPi/_init_.py -> build/lib.linux-armv7l-2.7/RPi
creating build/lib.linux-armv7l-2.7/RPi/GPIO
copying RPi/GPIO/_init_.py -> build/lib.linux-armv7l-2.7/RPi/GPIO
running build_ext
building 'RPi.GPIO' extension
creating build/temp.linux-armv7l-2.7

```

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pi@raspberrypi:~\$ ls
Documents Music Public BP1-SPID-0.0.3 Templates
Downloads Pictures python_games [spidev-3.2] Videos
pi@raspberrypi:~\$ cd spidev-3.2

```
pi@raspberrypi:~/spidev-3.2$ ls  
CHANGELOG.md LICENSE.md PKG-INFO README.md setup.cfg setup.py spidev_module.c  
pi@raspberrypi:~/spidev-3.2$ sudo python setup.py install  
running install  
running build  
running build_ext  
building 'spidev' extension  
creating build  
creating build/temp.linux-armv7l-2.7  
arm-linux-gnueabi-gcc -pthread -DDEBUG -g -fwrapv -O2 -Wall -Wstrict-prototypes -fno-strict-aliasing -D_FORTIFY_SOURCE=2 -g -fstack-protector-strong -Wformat -Werror=format-security -fPIC -I/usr/include/python2.7 -c spidev_module.c -o build/temp.linux-armv7l-2.7/spidev_module.o  
creating build/lib.linux-armv7l-2.7  
arm-linux-gnueabi-gcc -pthread -shared -Wl,-O1 -Wl,-Bsymbolic-functions -Wl,-z,relro -fno-strict-aliasing -DDEBUG -g -fwrapv -O2 -Wall -Wstrict-prototypes -D_FORTIFY_SOURCE=2 -g -fstack-protector-strong -Wformat -Werror=format-security -Wl,-z,relro -D_FORTIFY_SOURCE=2 -g -fstack-protector-strong -Wformat -Werror=format-security build/temp.linux-armv7l-2.7/spidev_module.o -o build/lib.linux-armv7l-2.7/spidev.so  
running install_lib  
copying build/lib.linux-armv7l-2.7/spidev.so -> /usr/local/lib/python2.7/dist-packages  
running install_egg_info  
Writing /usr/local/lib/python2.7/dist-packages/spidev-3.2.egg-info
```

安装smbus库，I2C接口库函数

```
pi@raspberrypi:~$ sudo apt-get install python-smbus  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
python-smbus is already the newest version.  
0 upgraded, 0 newly installed, 0 to remove and 45 not upgraded.
```

安装serial库，UART接口库函数

```
pi@raspberrypi:~$ sudo apt-get install python-serial  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
python-serial is already the newest version.  
0 upgraded, 0 newly installed, 0 to remove and 45 not upgraded.
```

对python语言不是很熟悉的孩童，可以查看Python基础教程：
<http://www.runoob.com/python/python-tutorial.html>

这里有一个python语言的wiringPi库，有兴趣的可以参考：<https://github.com/WiringPi/WiringPi2-Python>



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