

# keystudio

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## keystudio RPI JoyStick Shield



### Introduction

Welcome to the wonderful world of joystick control. Adding a joystick to your Raspberry Pi opens a lot of new doors. You can now use the Raspberry Pi and the joystick to control a robot, a camera, play games or do whatever you want.

The joystick shield provides two simple analog inputs and one analog output along with four separate buttons, one thumb joystick and two little buttons. We will provide installation package, source code and quickstart guide PDF. We will teach you step by step, so don't worry!

### Specification

Chip: pcf 85911

Supply Voltage: 5V

Four separate buttons, one thumb joystick and two little buttons

### Connection Diagram

Directly plug it into the pi and max it with copper pillar and screws as shown below.

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## Sample Code

```
#include <wiringPi.h>
#include <pcf8591.h>
#include <stdio.h>
```

```
#define Address 0x48
#define BASE 64
#define A0 BASE+0
#define A1 BASE+1
#define A2 BASE+2
#define A3 BASE+3
```

```
char dat;
```

```
int main(void)
{
    unsigned char value;
    wiringPiSetup();
    pinMode(25,INPUT);
    pinMode(7,INPUT);
    pinMode(0,INPUT);
    pinMode(2,INPUT);
    pinMode(3,INPUT);
    pinMode(4,INPUT);
    pinMode(5,INPUT);
```

```
    pullUpDnControl(25,PUD_UP);
    pullUpDnControl(7,PUD_UP);
```

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```
pullUpDnControl(0,PUD_UP);
pullUpDnControl(2,PUD_UP);
pullUpDnControl(3,PUD_UP);
pullUpDnControl(4,PUD_UP);
pullUpDnControl(5,PUD_UP);
pcf8591Setup(BASE,Address);

while(1)
{
    value=analogRead(A0);
    printf("X:%d  ",value);
    value=analogRead(A1);
    printf("Y:%d  ",value);

    dat=digitalRead(25);
    printf("K:%d  ",dat);

    dat=digitalRead(7);
    printf("A:%d  ",dat);

    dat=digitalRead(0);
    printf("B:%d  ",dat);

    dat=digitalRead(2);
    printf("C:%d  ",dat);

    dat=digitalRead(3);
    printf("D:%d  ",dat);

    dat=digitalRead(4);
    printf("E:%d  ",dat);

    dat=digitalRead(5);
    printf("F:%d\n",dat);
    delay(100);

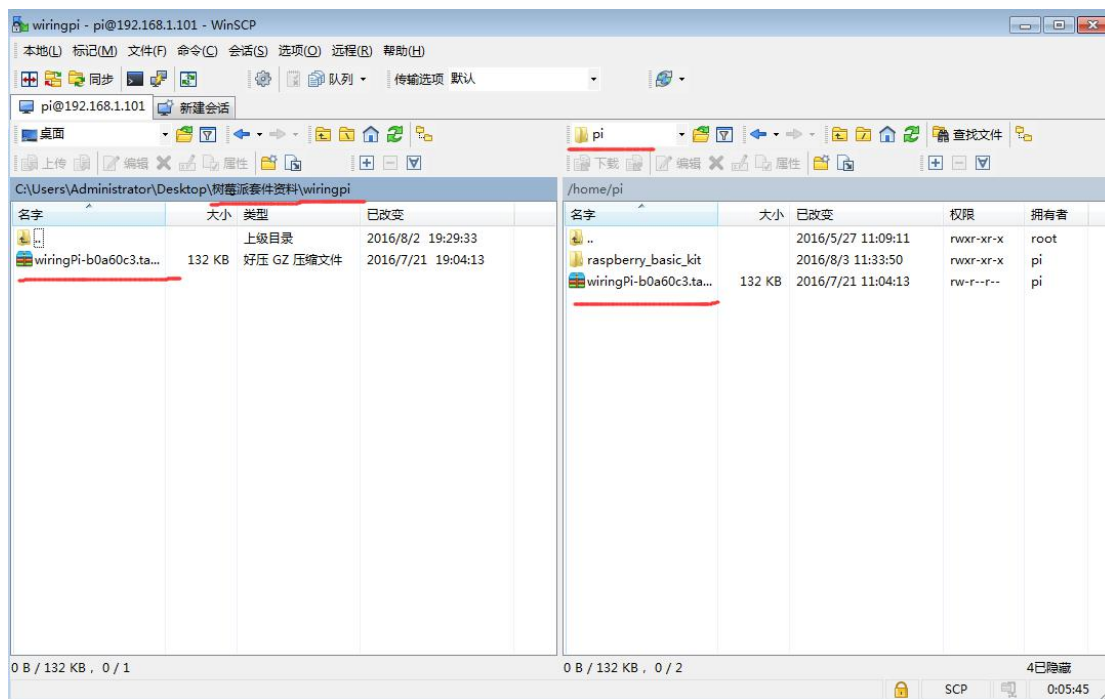
    // analogWrite(BASE,value++);
    // printf("AOUT:%d\n",value++);
    // delay(50);
}
}
```

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## Program Writing

### 1. Install Wiringpi Library

Wiring Pi is a library. WiringPi supports analog reading and writing, and while there is no native analog hardware on a Pi by default, modules are provided so other A/D and D/A devices can be implemented relatively easily. We will provide a Wiringpi installation package or click on this URL: <https://projects.drogon.net/raspberry-pi/wiringpi/download-and-install/> (it should open in a new page) to download the latest version. This will download a .tar file with a name like wiringPi-b0a60c3.tar. Then copy the file and put it into the raspberry pi file as shown in below figure:



Type in this command to unzip the source code and install:

```
tar xvf wiringPi-98bcb20.tar.gz
```

```
cd wiringPi-98bcb20
```

```
./build
```

Note that the actual file name will be different (may not be 98bcb20) – you will have to check the name and adjust accordingly. Here is the interface after installing WiringPi as shown in below figure.

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```
COM74 - PuTTY
[Compile] lcd.c
[Compile] scrollPhat.c
[Compile] piGlow.c
[Link (Dynamic)]
[Install Headers]
[Install Dynamic Lib]

GPIO Utility
[Compile] gpio.c
[Compile] pins.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).

pi@raspberrypi:~/wiringPi-b0a60c3$
```

WiringPi includes a set of gpio commands to control the GPIO pins of the Raspberry Pi. Type in the command to check the installation:

```
gpio -v
```

```
gpio readall
```

The interface as shown in below figure means complete installation.

```
COM74 - PuTTY
-> See the man-page for more details
-> ie. export WIRINGPI_GPIOMEM=1
pi@raspberrypi:~/wiringPi-b0a60c3$ gpio readall
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| BCM | wPi |   Name   | Mode | V | Physical | V | Mode |   Name   | wPi | BCM |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|     |     | 3.3v     |      |   | 1 || 2 |     |     | 5v       |     |     |
|  2  |  8  | SDA.1    | IN   | 1 | 3 || 4 |     |     | 5V       |     |     |
|  3  |  9  | SCL.1    | IN   | 1 | 5 || 6 |     |     | 0v       |     |     |
|  4  |  7  | GPIO. 7  | IN   | 1 | 7 || 8 |  0  | ALTO | TxD      | 15  | 14  |
|     |     | 0v       |      |   | 9 || 10|  1  | ALTO | RxD      | 16  | 15  |
| 17  |  0  | GPIO. 0  | IN   | 0 | 11|| 12|  0  | IN   | GPIO. 1  |  1  | 18  |
| 27  |  2  | GPIO. 2  | IN   | 0 | 13|| 14|     |     | 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     | IN   | 0 | 19|| 20|     |     | 0v       |     |     |
|  9  | 13  | MISO     | IN   | 0 | 21|| 22|  0  | IN   | GPIO. 6  |  6  | 25  |
| 11  | 14  | SCLK     | IN   | 0 | 23|| 24|  1  | IN   | CE0      | 10  |  8  |
|     |     | 0v       |      |   | 25|| 26|  1  | IN   | CE1      | 11  |  7  |
|  0  | 30  | SDA.0    | IN   | 1 | 27|| 28|  1  | IN   | 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  | IN   | 0 | 33|| 34|     |     | 0v       |     |     |
| 19  | 24  | GPIO.24  | IN   | 0 | 35|| 36|  1  | OUT  | 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:~/wiringPi-b0a60c3$
```

## 2. Enable I2C Utility

The I2C bus allows multiple devices to be connected to your Raspberry Pi. Before using I2C it

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needs to be configured. Run this command: `sudo raspi-config` and follow the prompts to install I2C. Now complete the following steps :

Select “9 Advanced Options”

Select “A6 I2C”

The screen will ask if you want the ARM I2C interface to be enabled :

Select “Yes”

Select “Ok”

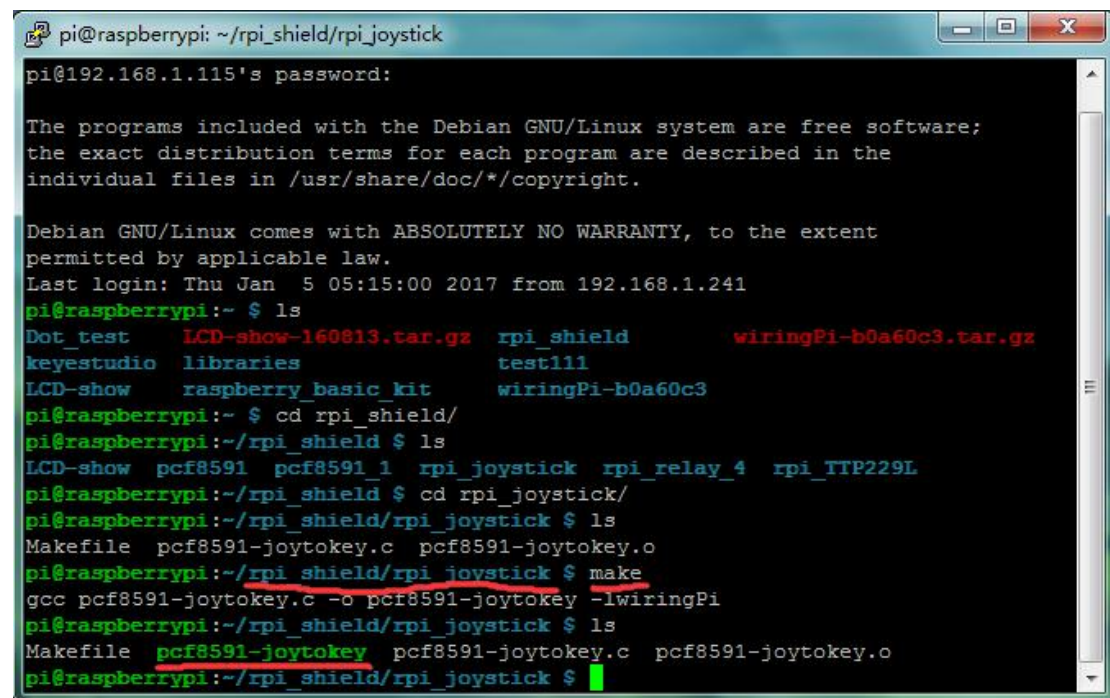
Select “Finish” to return to the command line

When you next reboot the I2C module will be loaded.

### 3. Programming

Copy the file `rpi_joystick` provided by us and put it into your pi directory through winSCP. Next , type this command: `cd rpi_joystick` to go inside the `rpi_joystick` folder. Then type this command: `make` to make an executable file `pcf8591-joytokey` as shown in below figure. This means this is the file we run to launch the program.

Finally type this: `sudo ./pcf8591-joytokey` to launch the program.



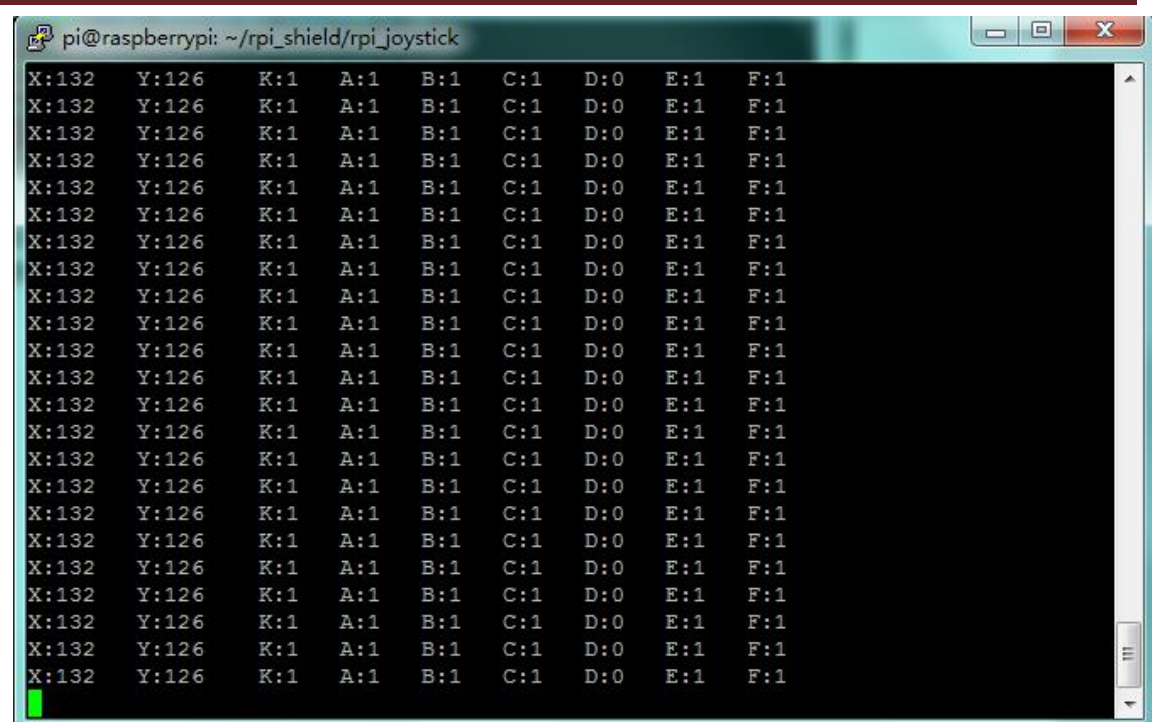
```
pi@raspberrypi: ~/rpi_shield/rpi_joystick
pi@192.168.1.115's password:
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Jan  5 05:15:00 2017 from 192.168.1.241
pi@raspberrypi:~$ ls
Dot_test      LCD-show-160813.tar.gz  rpi_shield      wiringPi-b0a60c3.tar.gz
keystudio    libraries              test111
LCD-show     raspberry_basic_kit    wiringPi-b0a60c3
pi@raspberrypi:~$ cd rpi_shield/
pi@raspberrypi:~/rpi_shield$ ls
LCD-show  pcf8591  pcf8591_1  rpi_joystick  rpi_relay_4  rpi_TTP229L
pi@raspberrypi:~/rpi_shield$ cd rpi_joystick/
pi@raspberrypi:~/rpi_shield/rpi_joystick$ ls
Makefile  pcf8591-joytokey.c  pcf8591-joytokey.o
pi@raspberrypi:~/rpi_shield/rpi_joystick$ make
gcc pcf8591-joytokey.c -o pcf8591-joytokey -lwiringPi
pi@raspberrypi:~/rpi_shield/rpi_joystick$ ls
Makefile  pcf8591-joytokey  pcf8591-joytokey.c  pcf8591-joytokey.o
pi@raspberrypi:~/rpi_shield/rpi_joystick$
```

### Result

Press the thumb joystick and buttons, and values are printed on the terminal as shown in below figure. Then use `Ctrl+C` to quit the program.

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```
pi@raspberrypi: ~/rpi_shield/rpi_joystick
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
X:132 Y:126 K:1 A:1 B:1 C:1 D:0 E:1 F:1
```

## Links

Installation Package:

<http://www.keystudio.com/files/index/download/id/1484009626/>

Source Code:

<http://www.keystudio.com/files/index/download/id/1484009627/>

PDF:

<http://www.keystudio.com/files/index/download/id/1484009932/>