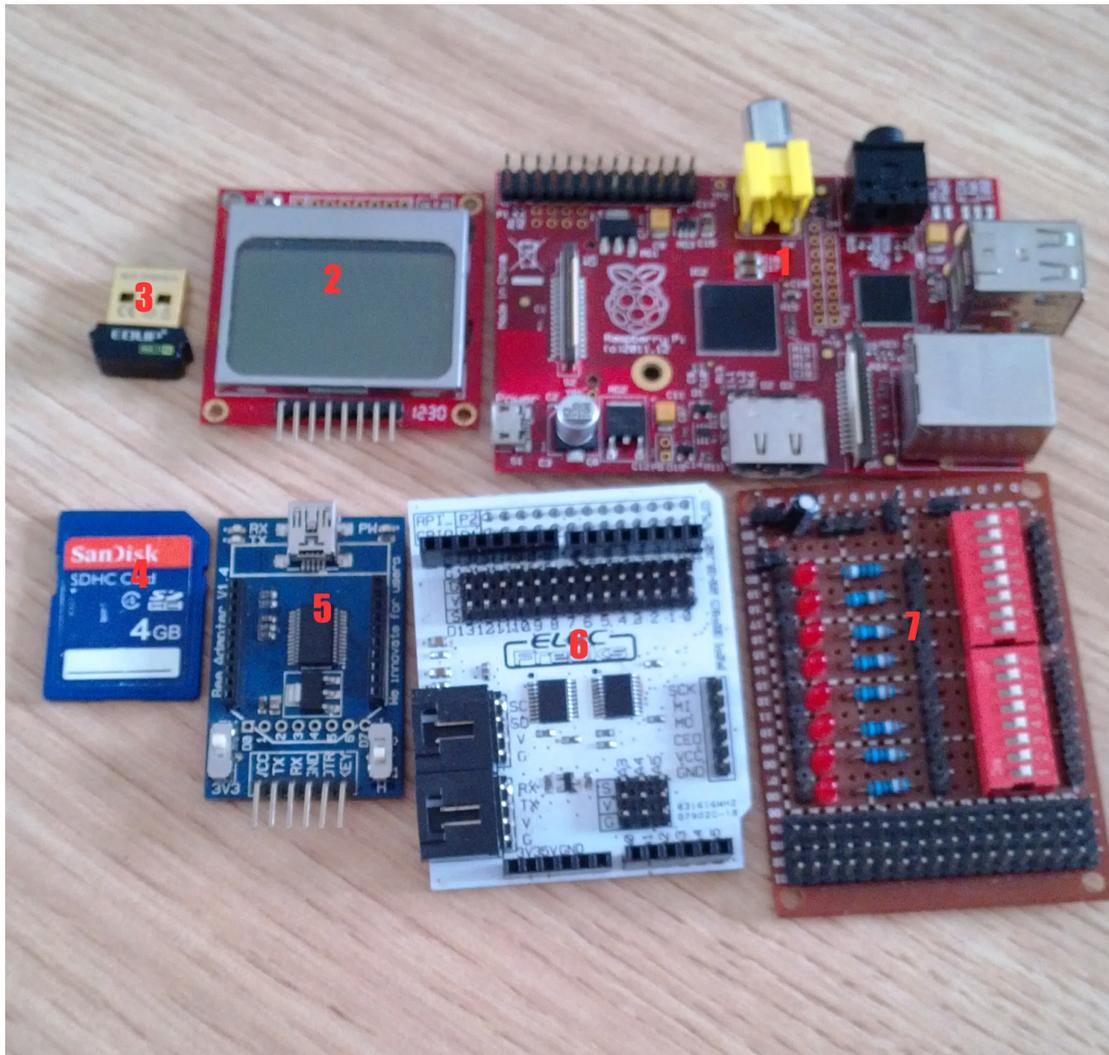


# Raspberry pi IO Expansion Board

## Part 1 Preparation

### Hardware Preparation

1. Raspberry pi Mainboard
2. 5110 LCD
3. Wireless USB adapter
4. SD card
5. Bee Adapter
6. GPIO module
7. LED board



### Software Preparation

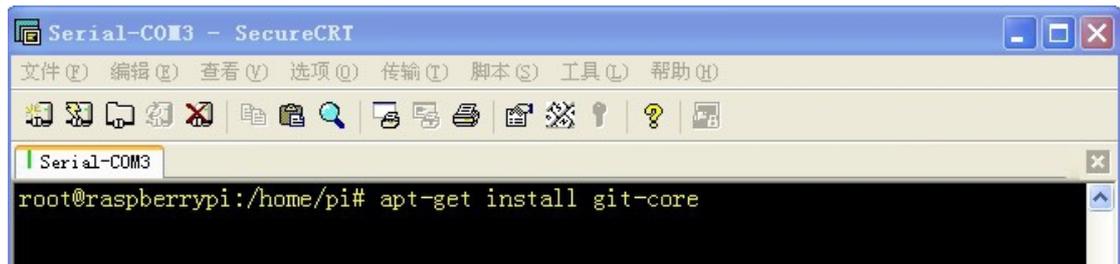
wiringPi library,  
[5110 LCd driver](#),  
FTP software

## Part 2 Software Installation

### 2.1 wiringPi library installation

#### (1) Install git-core

Type `apt-get install git-core` in the Terminal to install git-core



```
Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
root@raspberrypi:/home/pi# apt-get install git-core
```

#### (2) Download wiringPi library

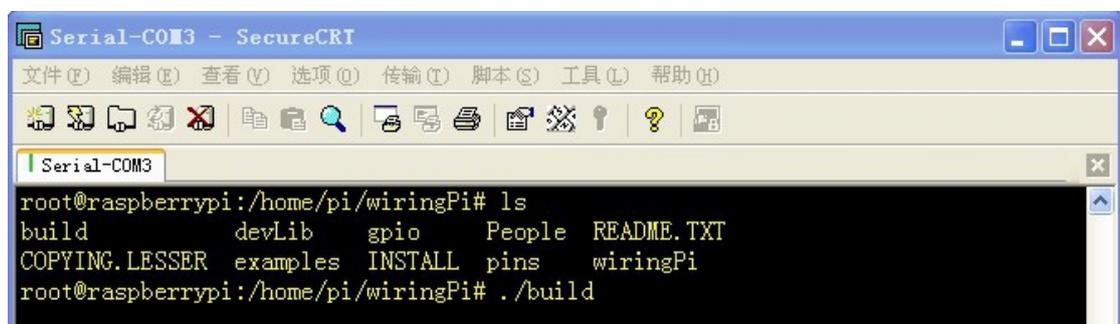
In the Terminal, type `git clone git://git.drogon.net/wiringPi` to download wiringPi



```
Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
root@raspberrypi:/home/pi# git clone git://git.drogon.net/wiringPi
```

#### (3) Compiling and installing wiringPi library

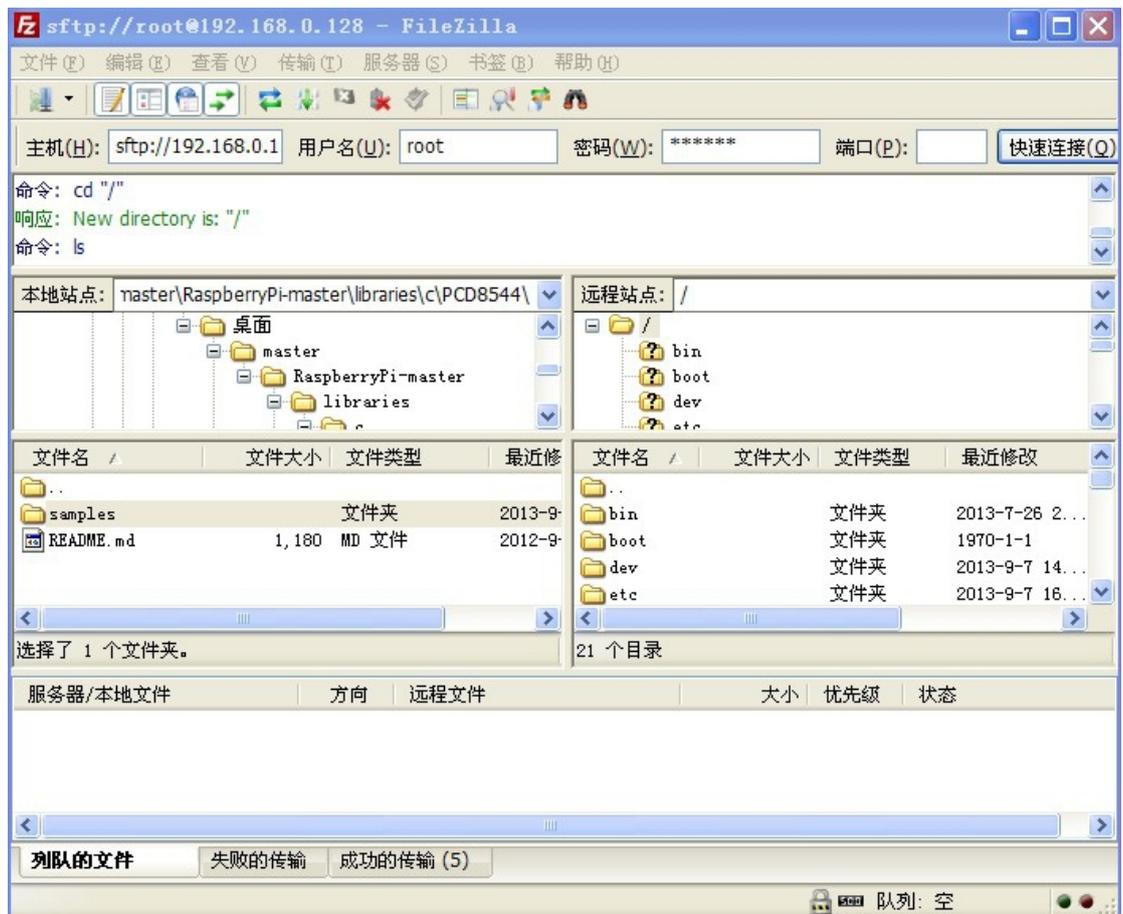
Enter wiringPi directory to carry out `./build` command



```
Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
root@raspberrypi:/home/pi/wiringPi# ls
build      devLib    gpio     People  README.TXT
COPYING.LESSER  examples  INSTALL  pins    wiringPi
root@raspberrypi:/home/pi/wiringPi# ./build
```

## 2.2 5110 LCD Driver Preparation

- (1) From <https://github.com/binerry/RaspberryPi> , download one master package.
- (2) Unzip the above package, and open the file of RaspberryPi-master. Copy PCD8544.c and PCD8544.h into the samples directory.
- (3) Transmit the file of samples to the system of Raspberry pi via FileZilla.



**Samples file transmission configuration**

Demonstration: the Host refers to the Raspberry pi IP address, and the User Name refers to the Raspberry pi root account, and the Password refers to raspberry pi root account password, and the default port is 22. From the above screenshot, we can also see that the samples file do not transmit from the windows system to the directory of Raspberry pi system.

```

Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
root@raspberrypi:/# ls
bin  dev  home  lost+found  mnt  proc  run      sbin  srv  tmp  var
boot  etc  lib   media      opt  root  samples  selinux  sys  usr
root@raspberrypi:/#

```

the samples file in the directory

## Part3 Experimental Test

### 3.1 5110 LCD Display Test

#### (1) 5110 LCD



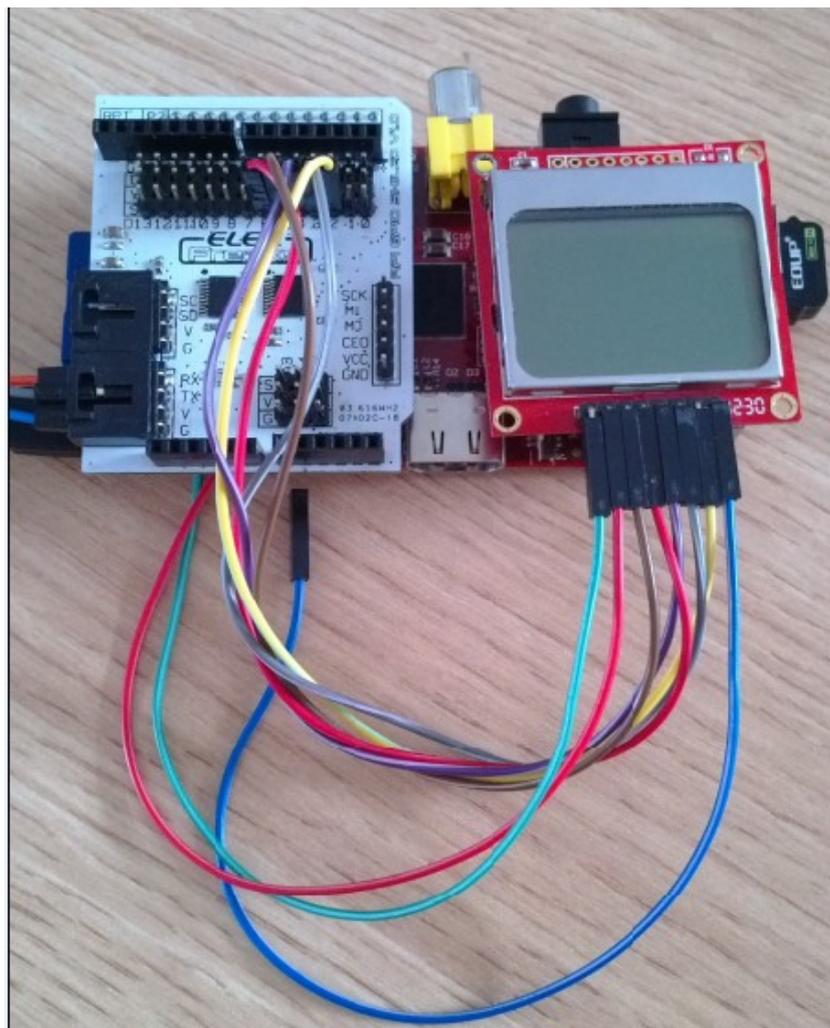
5110 LCD Pining Information:

Pin	Symbol	Description
1	VCC	Power supply(3.3V)
2	GND	Power Ground
3	SCE	Chip select signals
4	RST	Reset signal
5	D/C	Data / command selection
6	DIN	Data input
7	SCK	Clock line
8	LED	Backlight Power supply

## (2) 5110 LCD and GPIO module Connection

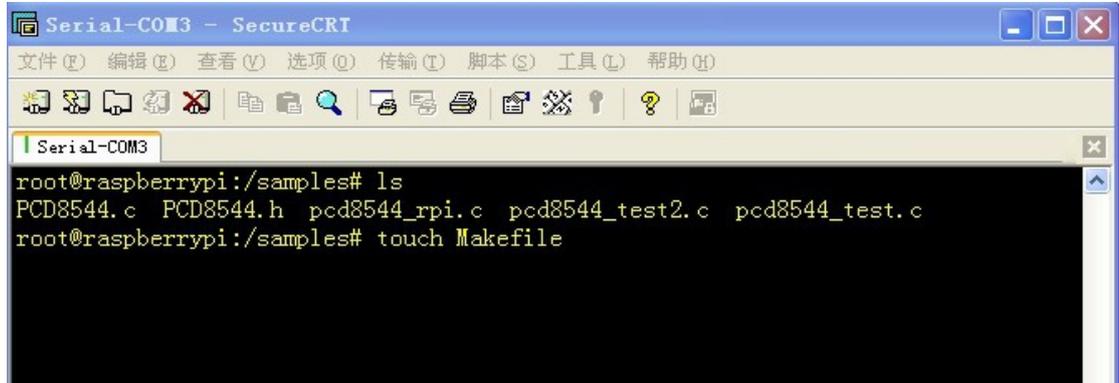
5110 and GPIO connection chart

5110 LCD	GPIO Module
VCC	3V3
GND	GND
SCE	D5
RST	D6
D/C	D4
DIN	D3
SCLK	D2
LED	3V3



### (3) 5110 Examples Demonstration

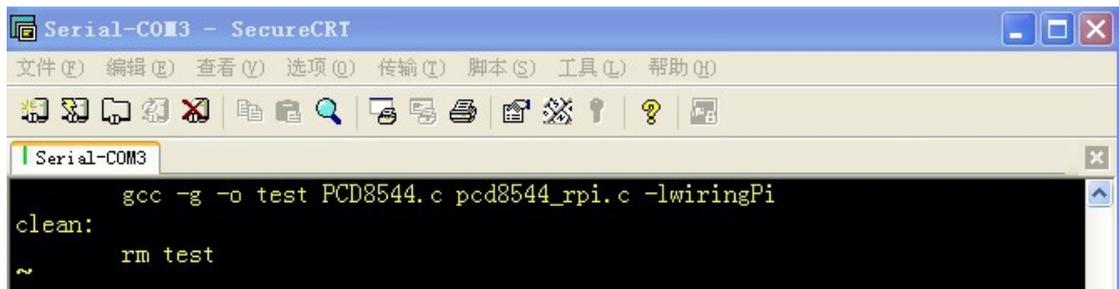
Enter the Raspberry pi System samples directory, and through touch Makefile command to set up the file of Makefile



```
Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
root@raspberrypi:/samples# ls
PCD8544.c PCD8544.h pcd8544_rpi.c pcd8544_test2.c pcd8544_test.c
root@raspberrypi:/samples# touch Makefile
```

**newly set up Makefile**

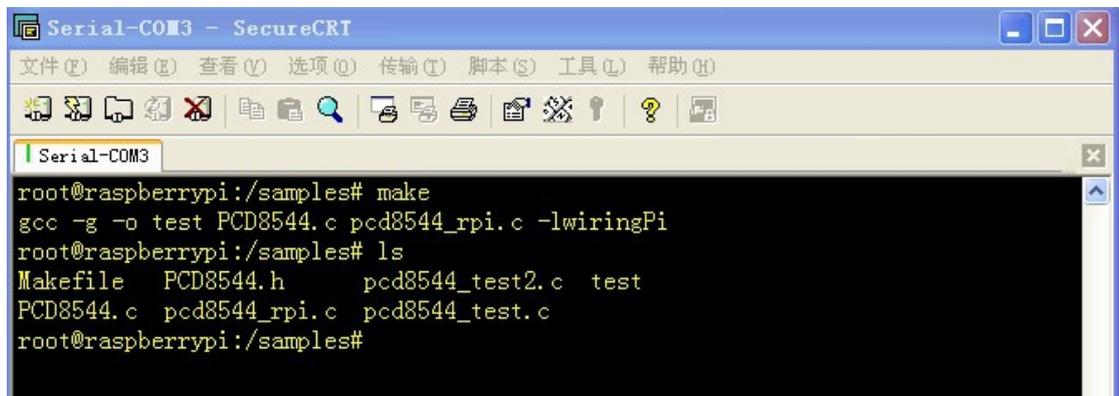
Open Makefile through vim, and write the following content into the file.



```
Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
gcc -g -o test PCD8544.c pcd8544_rpi.c -lwiringPi
clean:
rm test
~
```

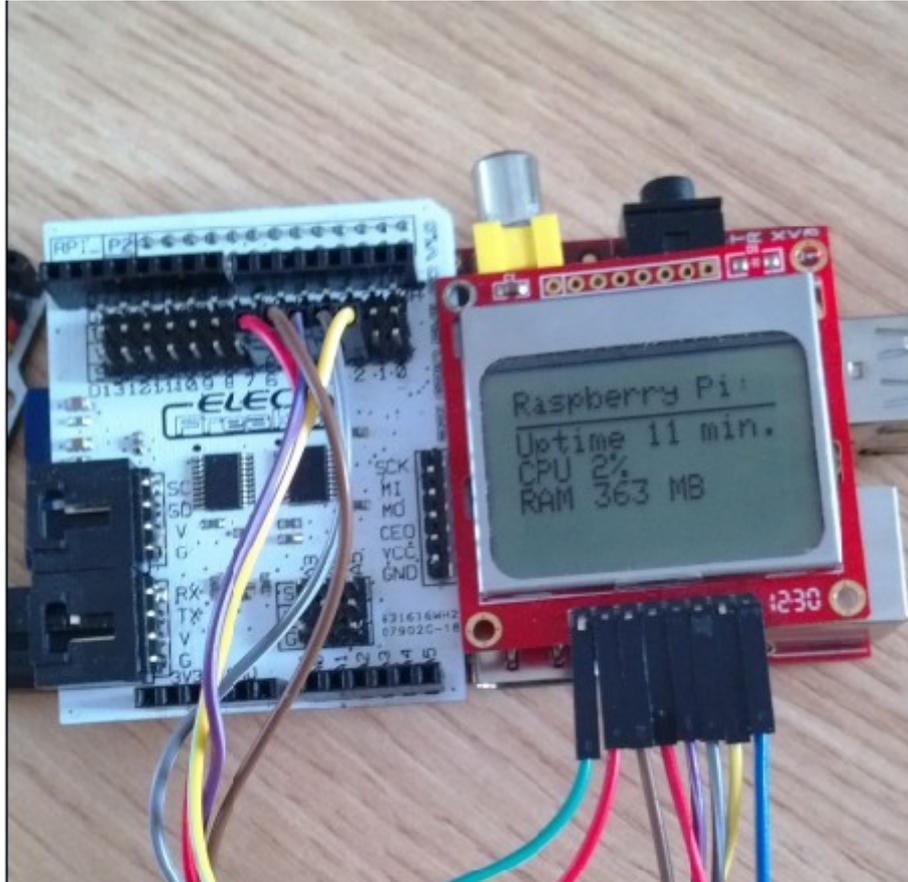
**the content written into the Makefile**

Save makefile and type make command in the Terminal, then the test executable file would generated. In the Terminal the execution of ./test can run this file.



```
Serial-COM3 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)
Serial-COM3
root@raspberrypi:/samples# make
gcc -g -o test PCD8544.c pcd8544_rpi.c -lwiringPi
root@raspberrypi:/samples# ls
Makefile PCD8544.h pcd8544_test2.c test
PCD8544.c pcd8544_rpi.c pcd8544_test.c
root@raspberrypi:/samples#
```

**Generate executable file**



### Execute test effect

Users can modify pcd8544\_XXXX.c of Makefile, and the replacement of other .c file can use other two samples.