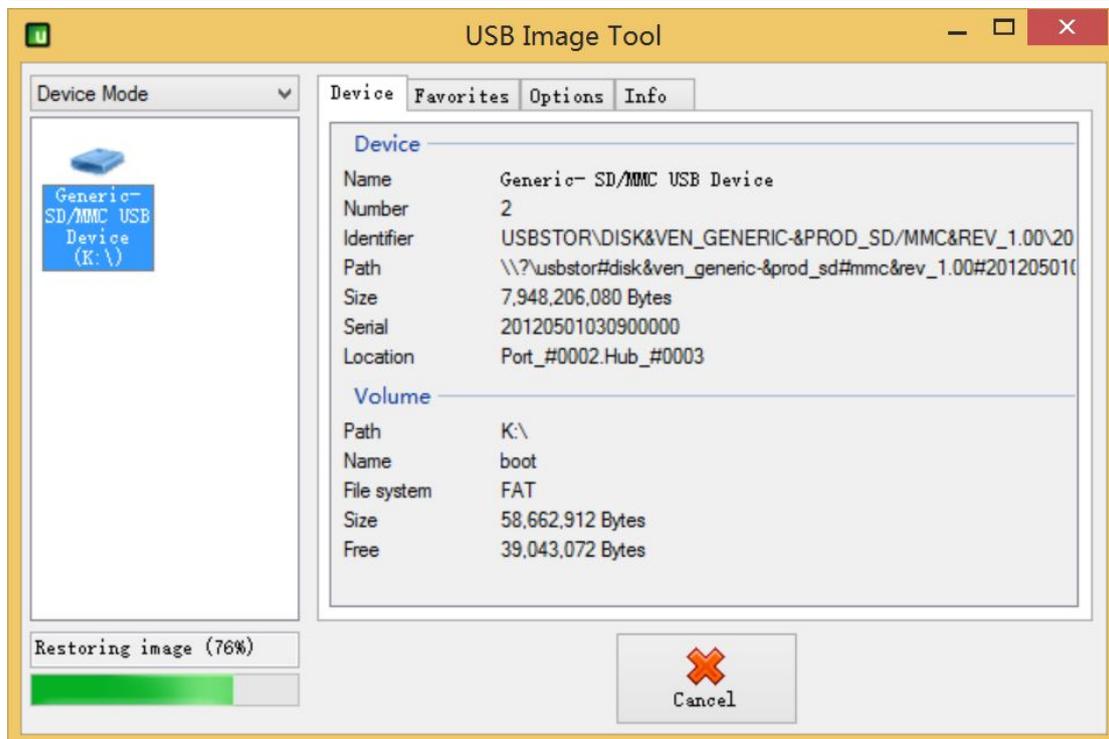
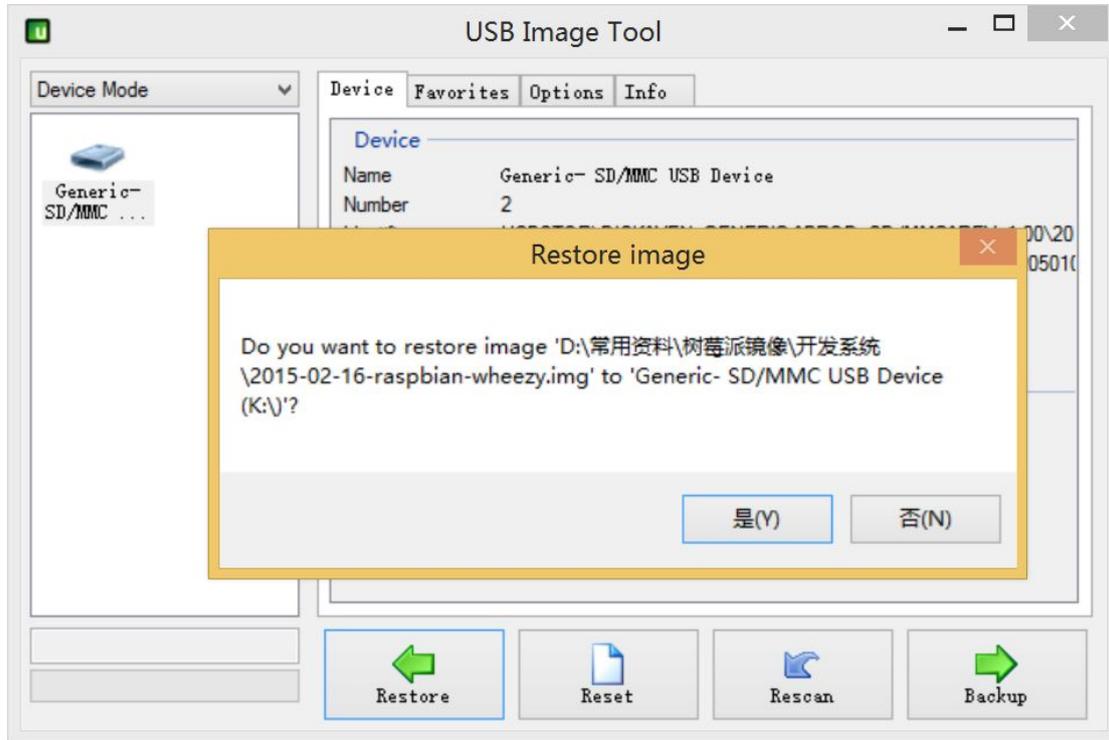
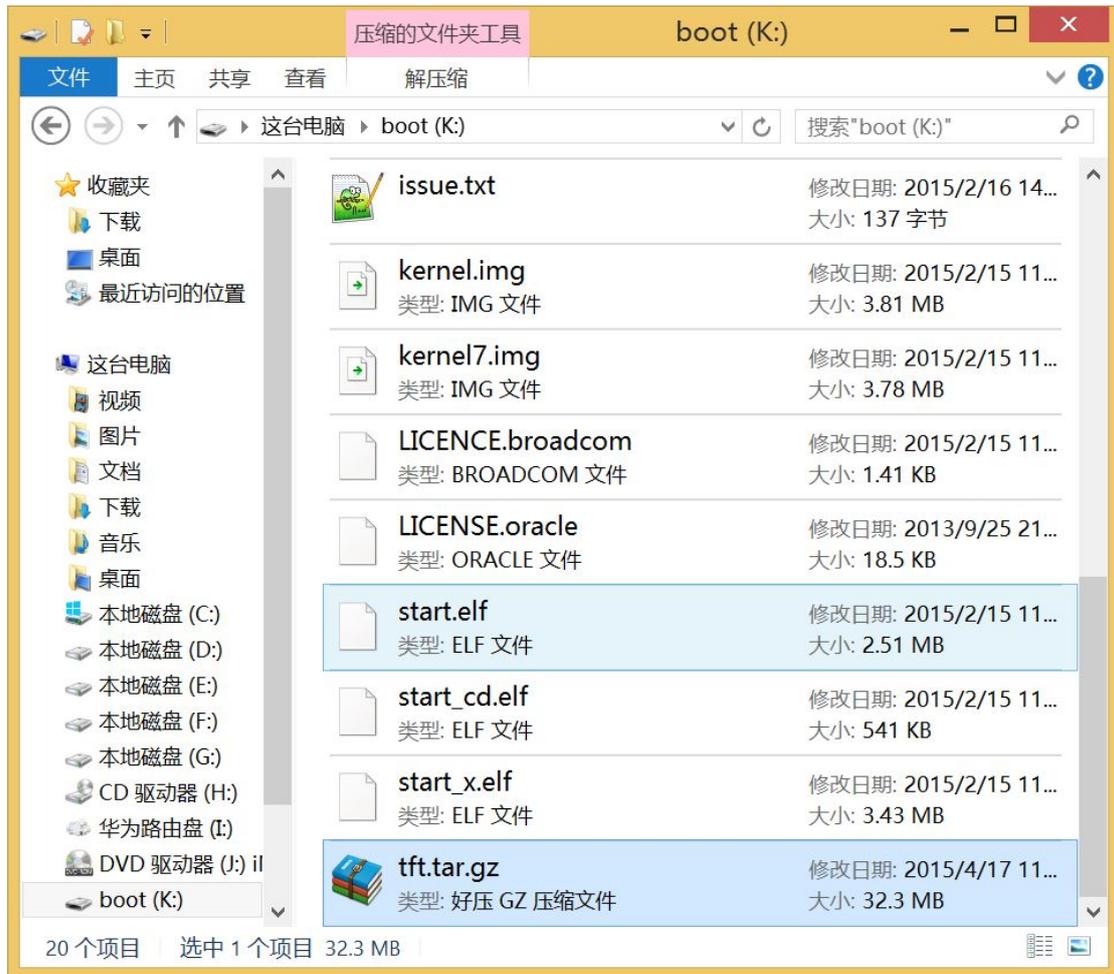


Note: manually install its complexity!

1) Latest any system programming:

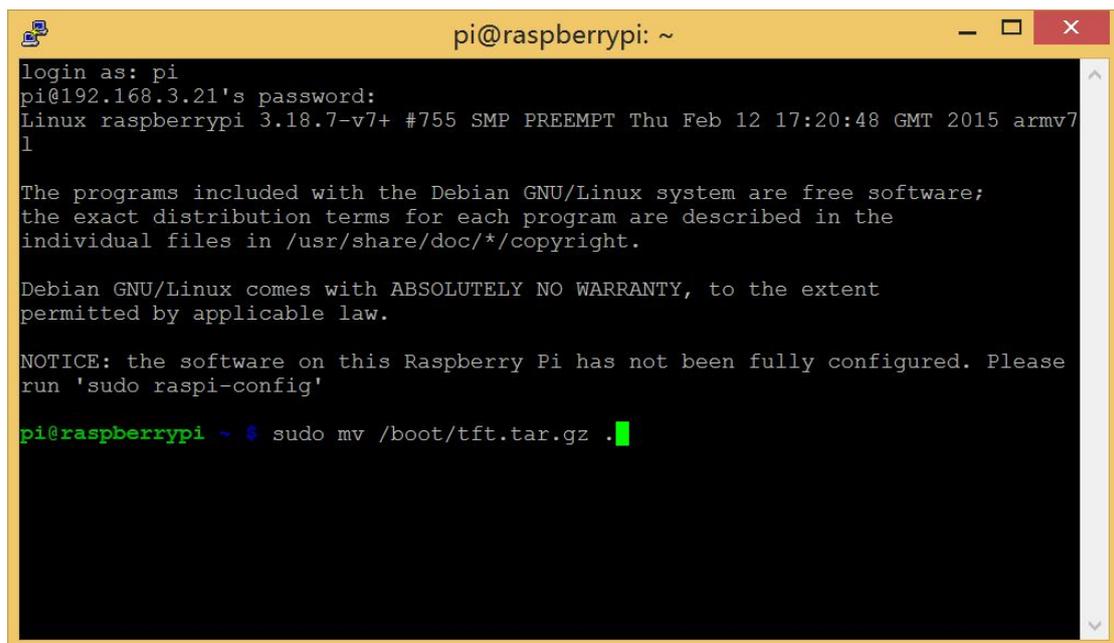


2) Copy the driver package to the / boot partition, this driver package will be constantly updated, and this driver package can not be opened in Windows, for compatibility with different screen follow-up, the drive also supports Pi / Pi2:

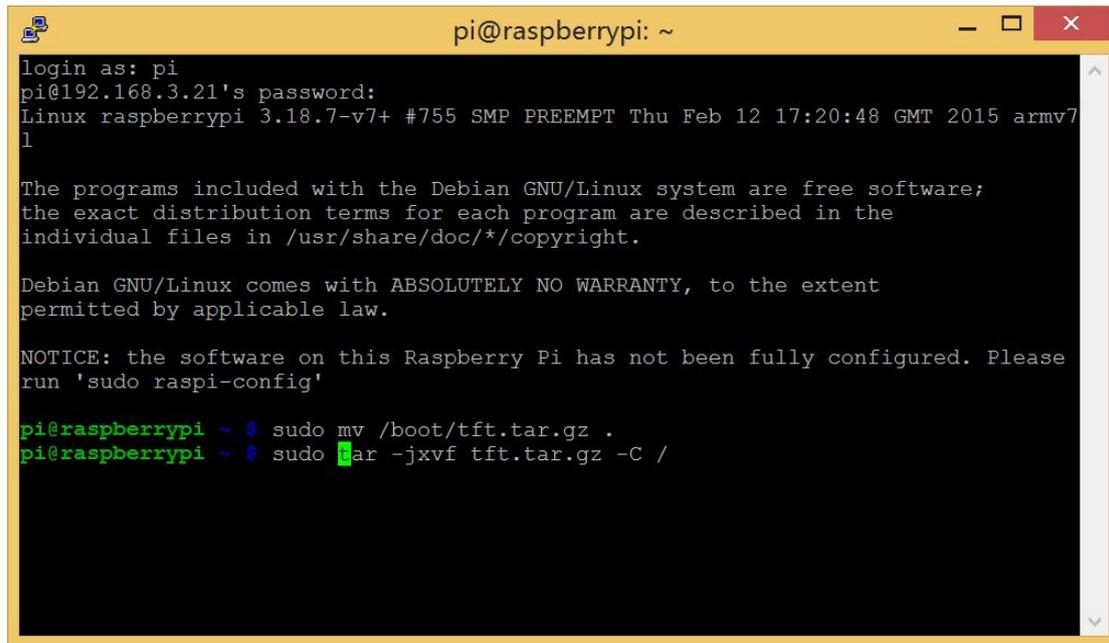


3) Raspberry Pi started using TTL or SSH to log in to Raspberry Pi.

4) To avoid driver installation fails, such as permissions issues, space issues, the driver package to move to the current directory, the following command:



5) Driven decompression is then performed, the following command:



```
pi@raspberrypi: ~
login as: pi
pi@192.168.3.21's password:
Linux raspberrypi 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

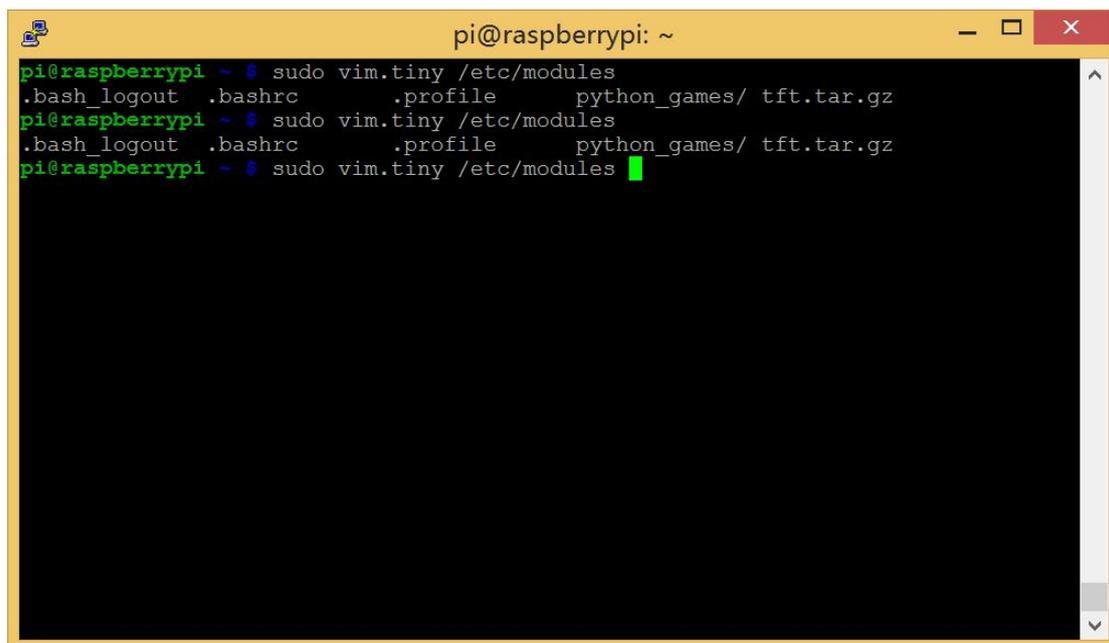
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

NOTICE: the software on this Raspberry Pi has not been fully configured. Please
run 'sudo raspi-config'

pi@raspberrypi ~$ sudo mv /boot/tft.tar.gz .
pi@raspberrypi ~$ sudo tar -jxvf tft.tar.gz -C /
```

6) Modify / etc / modules file, you can use your familiar editor, such as nano, vim, etc., ordered as follows:



```
pi@raspberrypi ~$ sudo vim.tiny /etc/modules
.pi@raspberrypi ~$ sudo vim.tiny /etc/modules
.pi@raspberrypi ~$ sudo vim.tiny /etc/modules
```

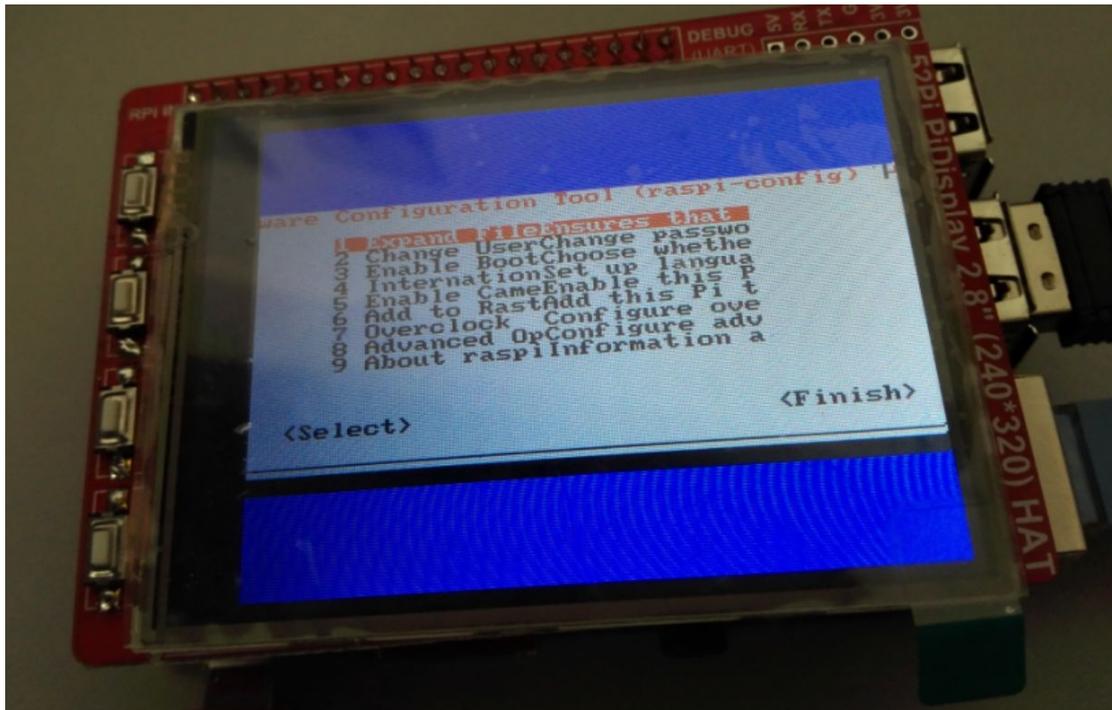
7) Add the following two lines, you can enable the screen driver [Line 17 - 18], if you use the other screen, replace rpi-tftscreen fields:

```
pi@raspberrypi: ~  
1 # /etc/modules: kernel modules to load at boot time.  
2 #  
3 # This file contains the names of kernel modules that should be loaded  
4 # at boot time, one per line. Lines beginning with "#" are ignored.  
5 # Parameters can be specified after the module name.  
6  
7 #tft parameter note:  
8 #fbtft_device name=your_screen_dev_name rotate=[0,90,180,270] speed=[Hz]  
9 #If you are not overclocking fbtft, do not use speed and fps.  
10  
11 #example parameter:  
12 #fbtft dma  
13 #fbtft_device name=screen rotate=270 speed=64000000 fps=50  
14  
15 snd-bcm2835  
16  
17 fbtft dma  
18 fbtft_device name=rpi-tftscreen rotate=270  
  
:set nu
```

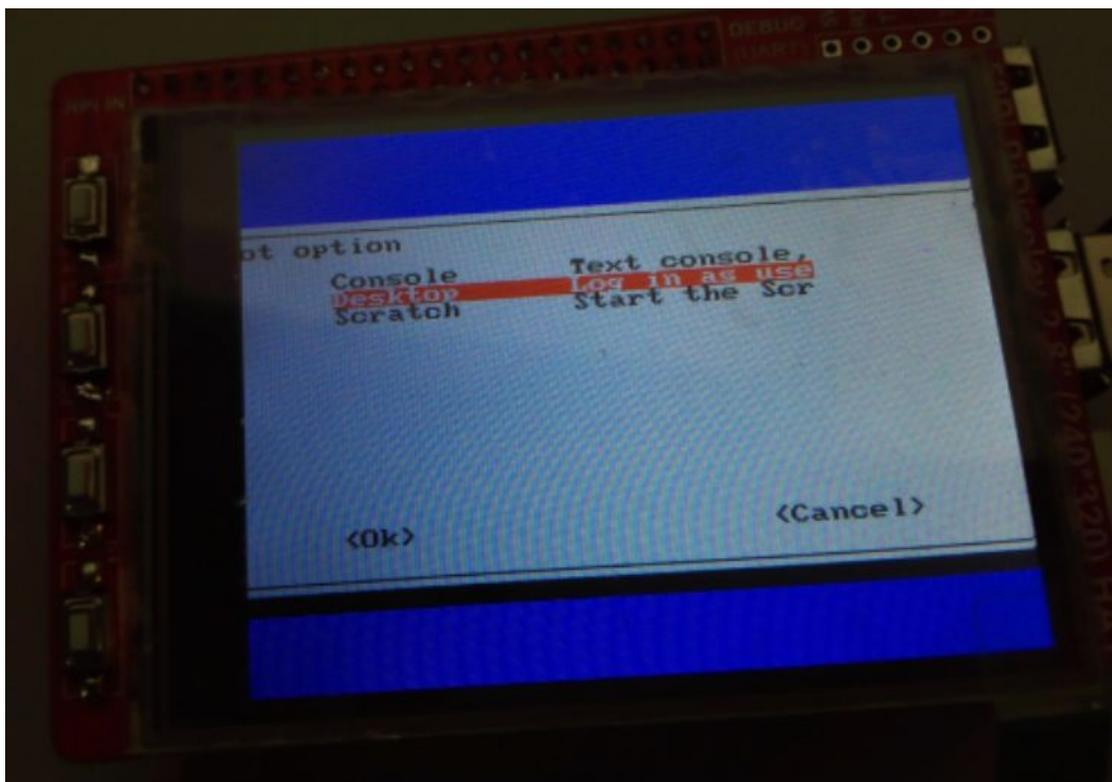
8) If you need a touch screen driver, also add the following line [Line 19 - 21], you can fine-tune these parameters:

```
pi@raspberrypi: ~  
# at boot time, one per line. Lines beginning with "#" are ignored.  
# Parameters can be specified after the module name.  
  
#tft parameter note:  
#fbtft_device name=your_screen_dev_name rotate=[0,90,180,270] speed=[Hz] fps=[X]  
#If you are not overclocking fbtft, do not use speed and fps.  
  
#example parameter:  
#fbtft dma  
#fbtft_device name=screen rotate=270 speed=64000000 fps=50  
  
snd-bcm2835  
  
fbtft dma  
fbtft_device name=rpi-tftscreen rotate=270  
stmpe_ts  
ads7846  
ads7846_device pressure_max=255 y_min=190 y_max=3850 gpio_pendown=25 x_max=3850  
x_min=230 cs=0 x_plate_ohms=60 swap_xy=0 keep_vref_on=  
"/etc/modules" 21L, 725C written
```

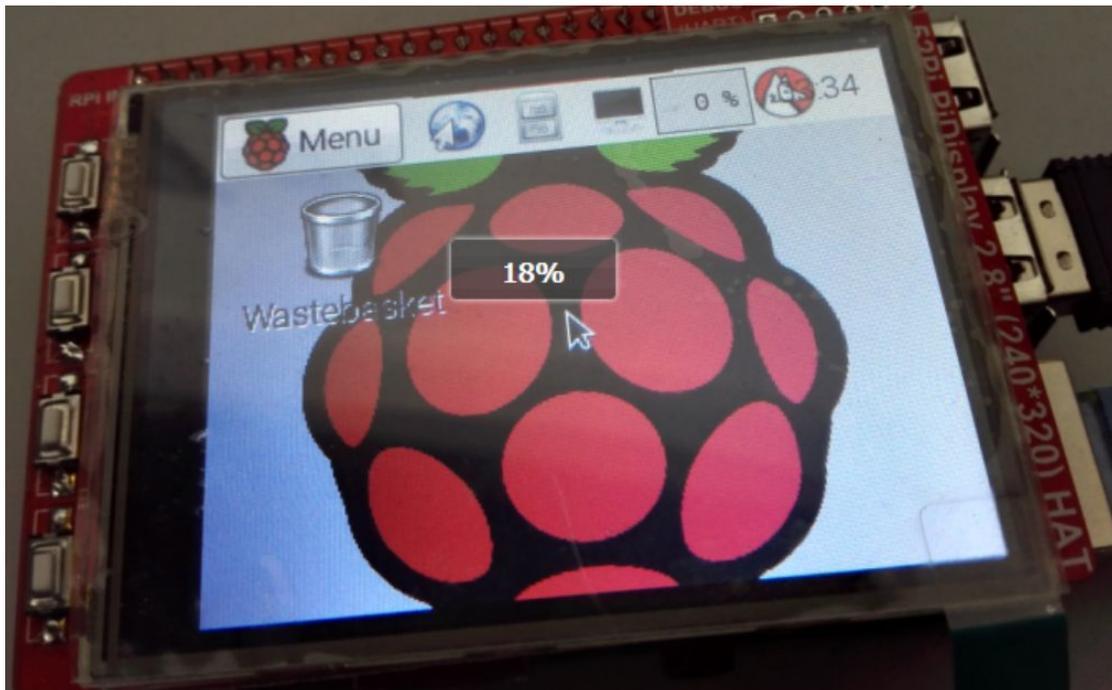
9) Now, you can restart your Raspberry Pi, enter the initial configuration, we can adjust to let him start to the desktop, you can also choose other ways.



10) Select the boot to the desktop:



11) Now Restart your raspberrypi, you can boot to the desktop.



12) Re-use SSH, or serial port, or a keyboard and mouse connected Raspberry Pi, installation evtest tools, below is a method Raspbian:

```
pi@raspberrypi: ~  
pi@raspberrypi ~$ sudo apt-get update  
Get:1 http://archive.raspberrypi.org wheezy Release.gpg [490 B]  
Get:2 http://mirrordirector.raspbian.org wheezy Release.gpg [490 B]  
Get:3 http://archive.raspberrypi.org wheezy Release [10.2 kB]  
Get:4 http://mirrordirector.raspbian.org wheezy Release [14.4 kB]  
Get:5 http://raspberrypi.collabora.com wheezy Release.gpg [836 B]  
Get:6 http://archive.raspberrypi.org wheezy/main armhf Packages [118 kB]  
Get:7 http://mirrordirector.raspbian.org wheezy/main armhf Packages [6,904 kB]  
Get:8 http://raspberrypi.collabora.com wheezy Release [7,514 B]  
Get:9 http://raspberrypi.collabora.com wheezy/rpi armhf Packages [2,214 B]  
Ign http://raspberrypi.collabora.com wheezy/rpi Translation-en_GB  
Ign http://raspberrypi.collabora.com wheezy/rpi Translation-en  
Ign http://archive.raspberrypi.org wheezy/main Translation-en_GB  
Ign http://archive.raspberrypi.org wheezy/main Translation-en  
66% [7 Packages 4,507 kB/6,904 kB 65%] 218 kB/s 11s
```

```
pi@raspberrypi: ~  
Ign http://mirrordirector.raspbian.org wheezy/contrib Translation-en  
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en_GB  
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en  
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en_GB  
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en  
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en_GB  
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en  
Fetched 7,132 kB in 1min 5s (109 kB/s)  
Reading package lists... Done  
pi@raspberrypi ~ $ sudo apt-get install evtest  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following NEW packages will be installed:  
  evtest  
0 upgraded, 1 newly installed, 0 to remove and 57 not upgraded.  
Need to get 21.9 kB of archives.  
After this operation, 100 kB of additional disk space will be used.  
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main evtest armhf 1:1.  
30-1 [21.9 kB]  
Fetched 21.9 kB in 1s (15.5 kB/s)  
Selecting previously unselected package evtest.  
Reading database ... 95%
```

13) Use evtest test touch:

```
pi@raspberrypi ~ $ sudo evtest  
No device specified, trying to scan all of /dev/input/event*  
Available devices:  
/dev/input/event0:      SAGE SAGE AirMouse  
/dev/input/event1:      SAGE SAGE AirMouse  
/dev/input/event2:      ADS7846 Touchscreen  
Select the device event number [0-2]: 2  
Input driver version is 1.0.1  
Input device ID: bus 0x0 vendor 0x0 product 0x0 version 0x0  
Input device name: "ADS7846 Touchscreen"  
Supported events:  
Event type 0 (EV_SYN)  
Event type 1 (EV_KEY)  
  Event code 330 (BTN_TOUCH)  
Event type 3 (EV_ABS)  
  Event code 0 (ABS_X)  
    Value      0  
    Min       230  
    Max      3850  
  Event code 1 (ABS_Y)  
    Value      0  
    Min       190
```

14) Random touch will make a lot of data:

```
pi@raspberrypi: ~  
Event: time 1429242060.569275, ----- SYN_REPORT -----  
Event: time 1429242060.578688, type 1 (EV_KEY), code 330 (BTN_TOUCH), value 0  
Event: time 1429242060.578688, type 3 (EV_ABS), code 24 (ABS_PRESSURE), value 0  
Event: time 1429242060.578688, ----- SYN_REPORT -----  
Event: time 1429242061.219260, type 1 (EV_KEY), code 330 (BTN_TOUCH), value 1  
Event: time 1429242061.219260, type 3 (EV_ABS), code 0 (ABS_X), value 618  
Event: time 1429242061.219260, type 3 (EV_ABS), code 1 (ABS_Y), value 645  
Event: time 1429242061.219260, type 3 (EV_ABS), code 24 (ABS_PRESSURE), value 115  
Event: time 1429242061.219260, ----- SYN_REPORT -----  
Event: time 1429242061.228749, type 1 (EV_KEY), code 330 (BTN_TOUCH), value 0  
Event: time 1429242061.228749, type 3 (EV_ABS), code 24 (ABS_PRESSURE), value 0  
Event: time 1429242061.228749, ----- SYN_REPORT -----  
Event: time 1429242061.809298, type 1 (EV_KEY), code 330 (BTN_TOUCH), value 1  
Event: time 1429242061.809298, type 3 (EV_ABS), code 0 (ABS_X), value 3265  
Event: time 1429242061.809298, type 3 (EV_ABS), code 1 (ABS_Y), value 519  
Event: time 1429242061.809298, type 3 (EV_ABS), code 24 (ABS_PRESSURE), value 121  
Event: time 1429242061.809298, ----- SYN_REPORT -----  
Event: time 1429242061.818733, type 1 (EV_KEY), code 330 (BTN_TOUCH), value 0  
Event: time 1429242061.818733, type 3 (EV_ABS), code 24 (ABS_PRESSURE), value 0  
Event: time 1429242061.818733, ----- SYN_REPORT -----
```

15) Then install the calibration module:

```
pi@raspberrypi ~ $ sudo apt-get install xinput evtest tslib libts-bin  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Note, selecting 'libts-0.0-0' instead of 'tslib'  
evtest is already the newest version.  
libts-0.0-0 is already the newest version.  
libts-0.0-0 set to manually installed.  
xinput is already the newest version.  
The following NEW packages will be installed:  
  libts-bin  
0 upgraded, 1 newly installed, 0 to remove and 57 not upgraded.  
Need to get 33.1 kB of archives.  
After this operation, 119 kB of additional disk space will be used.  
Do you want to continue [Y/n]? y  
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libts-bin armhf 1  
.0-11 [33.1 kB]  
Fetched 33.1 kB in 1s (31.3 kB/s)  
Selecting previously unselected package libts-bin.  
(Reading database ... 76953 files and directories currently installed.)
```

16) Just know that it is / dev / input / event2 for the touch screen, so this correction.

```
pi@raspberrypi ~ $ sudo TSLIB_TSDEVICE=/dev/input/event2 ts_calibrate
```



17) You can make some tests:

```
pi@raspberrypi: ~  
pi@raspberrypi ~$ sudo TSLIB_TSDEVICE=/dev/input/event2 ts_calibrate  
xres = 320, yres = 240  
Took 8 samples...  
Top left : X = 940 Y = 3089  
Took 6 samples...  
Top right : X = 905 Y = 724  
Took 8 samples...  
Bot right : X = 3049 Y = 747  
Took 7 samples...  
Bot left : X = 3131 Y = 3232  
Took 1 samples...  
Center : X = 1964 Y = 1972  
330.245514 0.003483 -0.090744  
-6.051331 0.064623 -0.001564  
Calibration constants: 21642970 228 -5946 -396580 4235 -102 65536  
pi@raspberrypi ~$ sudo TSLIB_TSDEVICE=/dev/input/event2 ts_test
```

```
pi@raspberrypi: ~  
1429242518.129176: 252 141 139  
1429242518.149122: 251 141 140  
1429242518.169226: 252 140 140  
1429242518.179251: 252 139 141  
1429242518.189157: 252 139 143  
1429242518.199124: 253 138 144  
1429242518.209102: 254 138 144  
1429242518.229233: 255 140 143  
1429242518.239232: 255 142 143  
1429242518.239232: 255 144 143  
1429242518.249160: 256 145 144  
1429242518.269209: 256 147 147  
1429242518.279336: 255 148 147  
1429242518.289312: 255 148 146  
1429242518.299317: 254 147 146  
1429242518.309283: 254 147 146  
1429242518.319336: 253 147 146  
1429242518.329347: 253 147 141  
1429242518.338687: 253 147 0
```



18) Then you can use tslib library[<https://github.com/kergoth/tslib>], calibration can also use other methods, we recommend xinput-calibrator, if used xinput-calibrator you need to install libx11-dev libxext-dev libxi-dev x11proto-input-dev, Ubuntu systems can be installed directly xinput-calibrator.

```
pi@raspberrypi: ~
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libpthread-stubs0 libpthread-stubs0-dev libx11-6 libx11-doc libxau-dev
  libxcb1-dev libxdmcp-dev x11proto-core-dev x11proto-kb-dev x11proto-xext-dev
  xorg-sgml-doctools xtrans-dev
Suggested packages:
  libxcb-doc libxext-doc
The following NEW packages will be installed:
  libpthread-stubs0 libpthread-stubs0-dev libx11-dev libx11-doc libxau-dev
  libxcb1-dev libxdmcp-dev libxext-dev libxi-dev x11proto-core-dev
  x11proto-input-dev x11proto-kb-dev x11proto-xext-dev xorg-sgml-doctools
  xtrans-dev
The following packages will be upgraded:
  libx11-6
1 upgraded, 15 newly installed, 0 to remove and 56 not upgraded.
Need to get 6,530 kB of archives.
After this operation, 18.7 MB of additional disk space will be used.
Do you want to continue [Y/n]? █
```

```
pi@raspberrypi: ~
Selecting previously unselected package libxi-dev.
Unpacking libxi-dev (from ../libxi-dev_2%3a1.6.1-1+deb7u1_armhf.deb) ...
Processing triggers for man-db ...
Setting up libx11-6:armhf (2:1.5.0-1+deb7u2) ...
Setting up libpthread-stubs0:armhf (0.3-3) ...
Setting up libpthread-stubs0-dev:armhf (0.3-3) ...
Setting up xorg-sgml-doctools (1:1.10-1) ...
Setting up x11proto-core-dev (7.0.23-1) ...
Setting up libxau-dev:armhf (1:1.0.7-1) ...
Setting up libxdmcp-dev:armhf (1:1.1.1-1) ...
Setting up x11proto-input-dev (2.2-1) ...
Setting up x11proto-kb-dev (1.0.6-2) ...
Setting up xtrans-dev (1.2.7-1) ...
Setting up libxcb1-dev:armhf (1.8.1-2+deb7u1) ...
Setting up libx11-dev:armhf (2:1.5.0-1+deb7u2) ...
Setting up libx11-doc (2:1.5.0-1+deb7u2) ...
Setting up x11proto-xext-dev (7.2.1-1) ...
Setting up libxext-dev:armhf (2:1.3.1-2+deb7u1) ...
Setting up libxi-dev (2:1.6.1-1+deb7u1) ...
pi@raspberrypi ~ $ █
```

19) Calibration software is provided by https://github.com/tias/xinput_calibrator, the latest version of Download is http://github.com/downloads/tias/xinput_calibrator/xinput_calibrator-0.7.5.tar.gz.

```
pi@raspberrypi: ~
Connecting to github.com (github.com)|192.30.252.130|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://cloud.github.com/downloads/tias/xinput_calibrator/xinput_calib
rator-0.7.5.tar.gz [following]
--2015-04-17 04:43:22-- https://cloud.github.com/downloads/tias/xinput_calibrat
or/xinput_calibrator-0.7.5.tar.gz
Resolving cloud.github.com (cloud.github.com)... 54.230.159.58, 54.230.159.105,
54.230.156.245, ...
Connecting to cloud.github.com (cloud.github.com)|54.230.159.58|:443... connecte
d.
HTTP request sent, awaiting response... 200 OK
Length: 355313 (347K) [application/octet-stream]
Saving to: `xinput_calibrator-0.7.5.tar.gz'

100%[=====] 355,313      130K/s   in 2.7s

2015-04-17 04:43:31 (130 KB/s) - `xinput_calibrator-0.7.5.tar.gz' saved [355313/
355313]

pi@raspberrypi ~ $ █
```

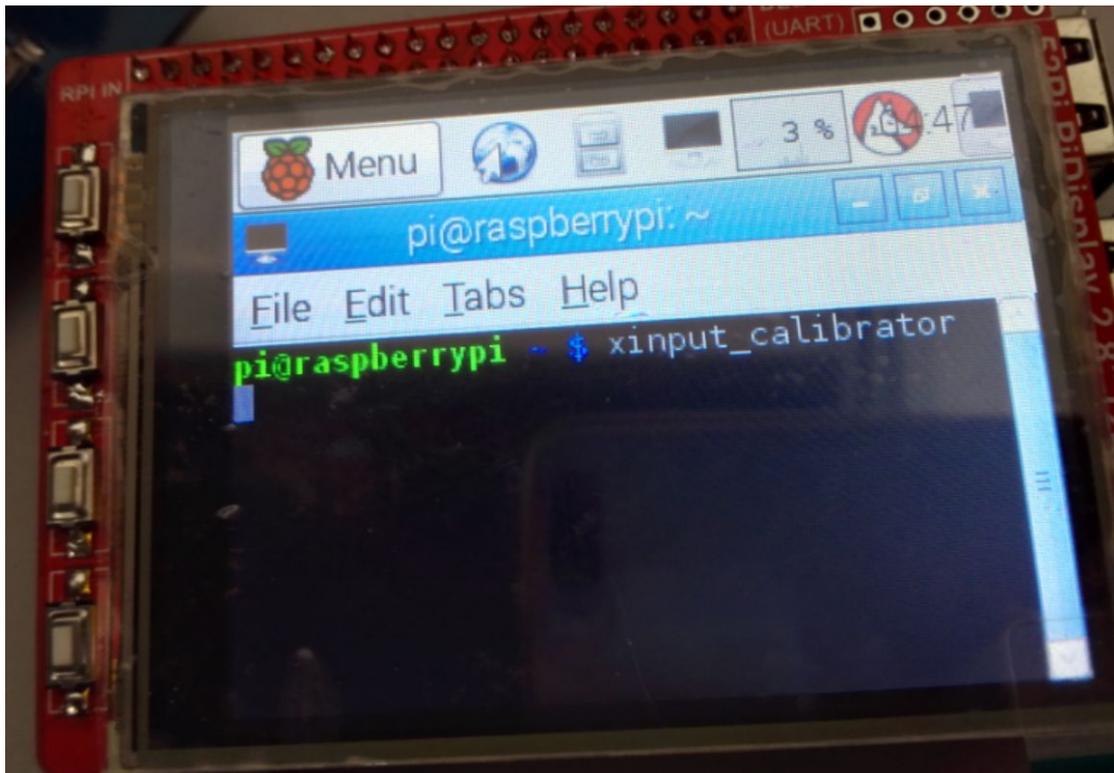
20) Installation:

```
pi@raspberrypi: ~/xinput_calibrator-0.7.5
pi@raspberrypi ~/xinput_calibrator-0.7.5 $ ls
aclocal.m4  config.guess  configure.ac  install-sh  Makefile.in  README
autogen.sh  config.sub    COPYING      ltmain.sh   man          scripts
Changelog   configure     depcomp      Makefile.am  missing     src
pi@raspberrypi ~/xinput_calibrator-0.7.5 $ ./configure
```

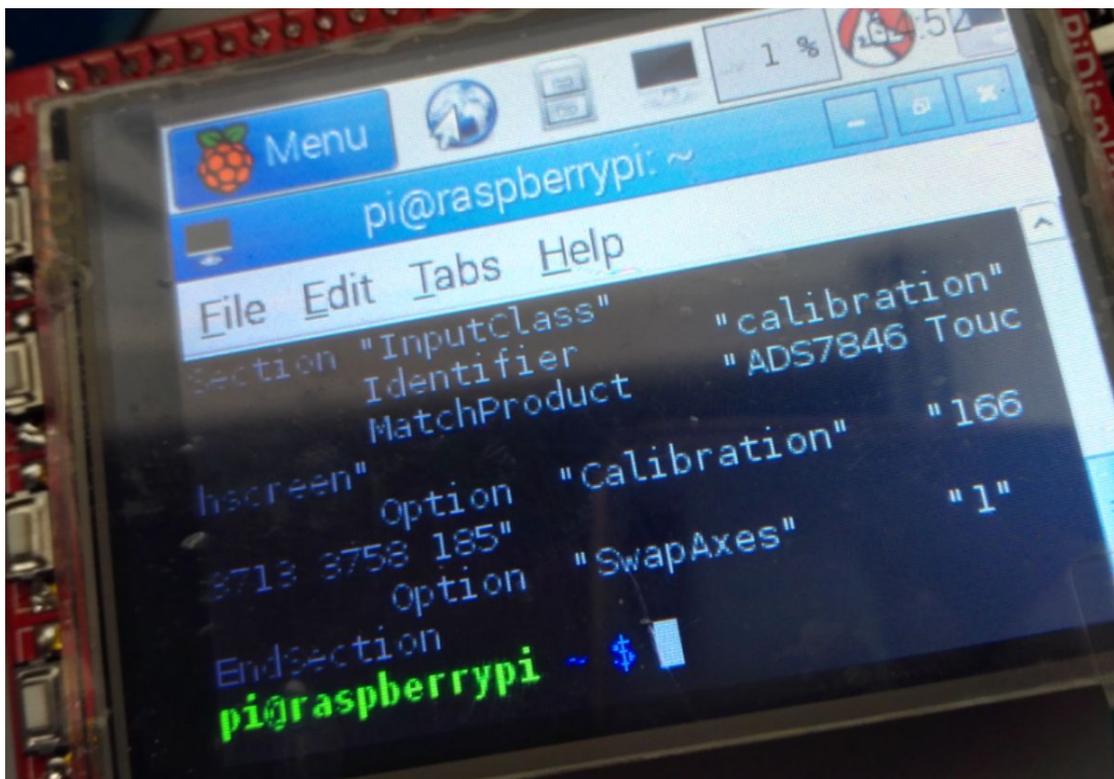
```
pi@raspberrypi: ~/xinput_calibrator-0.7.5
checking for _Bool... yes
checking for working strtod... yes
checking for pkg-config... /usr/bin/pkg-config
checking pkg-config is at least version 0.9.0... yes
checking for XINPUT... yes
checking for XI_PROP... yes
checking gui... default
checking for GTKMM... no
checking for X11... yes
checking for XRANDR... no
configure: creating ./config.status
config.status: creating Makefile
config.status: creating scripts/Makefile
config.status: creating src/Makefile
config.status: creating src/calibrator/Makefile
config.status: creating src/gui/Makefile
config.status: creating man/Makefile
config.status: executing depfiles commands
config.status: executing libtool commands
pi@raspberrypi ~/xinput_calibrator-0.7.5 $ make
```

```
pi@raspberrypi: ~/xinput_calibrator-0.7.5
mv -f .deps/xinput_calibrator-main_x11.Tpo .deps/xinput_calibrator-main_x11.Po
/bin/bash ../libtool --tag=CXX --mode=link g++ -Wall -ansi -pedantic -Wmissing-declarations -g -O2 -o xinput_calibrator xinput_calibrator-main_x11.o -lX11 -lXext -lXi -lX11
libtool: link: g++ -Wall -ansi -pedantic -Wmissing-declarations -g -O2 -o xinput_calibrator xinput_calibrator-main_x11.o -lXext -lXi -lX11
make[2]: Leaving directory '/home/pi/xinput_calibrator-0.7.5/src'
make[1]: Leaving directory '/home/pi/xinput_calibrator-0.7.5/src'
Making all in man
make[1]: Entering directory '/home/pi/xinput_calibrator-0.7.5/man'
make[1]: Nothing to be done for 'all'.
make[1]: Leaving directory '/home/pi/xinput_calibrator-0.7.5/man'
Making all in scripts
make[1]: Entering directory '/home/pi/xinput_calibrator-0.7.5/scripts'
make[1]: Nothing to be done for 'all'.
make[1]: Leaving directory '/home/pi/xinput_calibrator-0.7.5/scripts'
make[1]: Entering directory '/home/pi/xinput_calibrator-0.7.5'
make[1]: Nothing to be done for 'all-am'.
make[1]: Leaving directory '/home/pi/xinput_calibrator-0.7.5'
pi@raspberrypi ~/xinput_calibrator-0.7.5 $ sudo make install
```

21) Then calibrate the screen, you need to enter this command on the TFT:



22) Calibration results obtained!

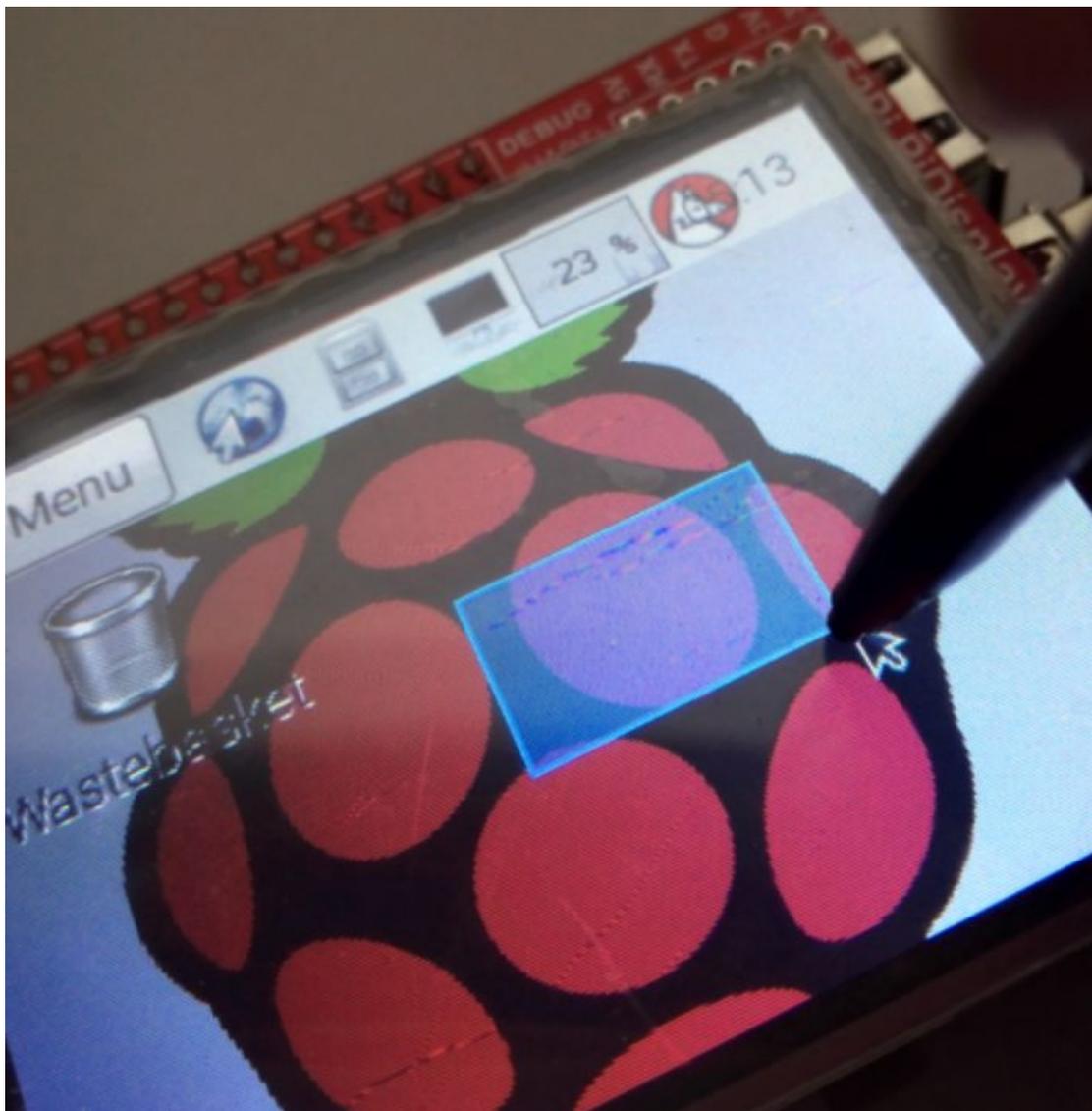


23) Writes the calibration result /usr/share/X11/xorg.conf.d/01-input.conf:

```
pi@raspberrypi: ~/xinput_calibrator-0.7.5
Section "InputClass"
Identifier "calibration"
MatchProduct "ADS7846 Touchscreen"
Option "Calibration" "121 1917 317 1741"
Option "SwapAxes" "1"
EndSection

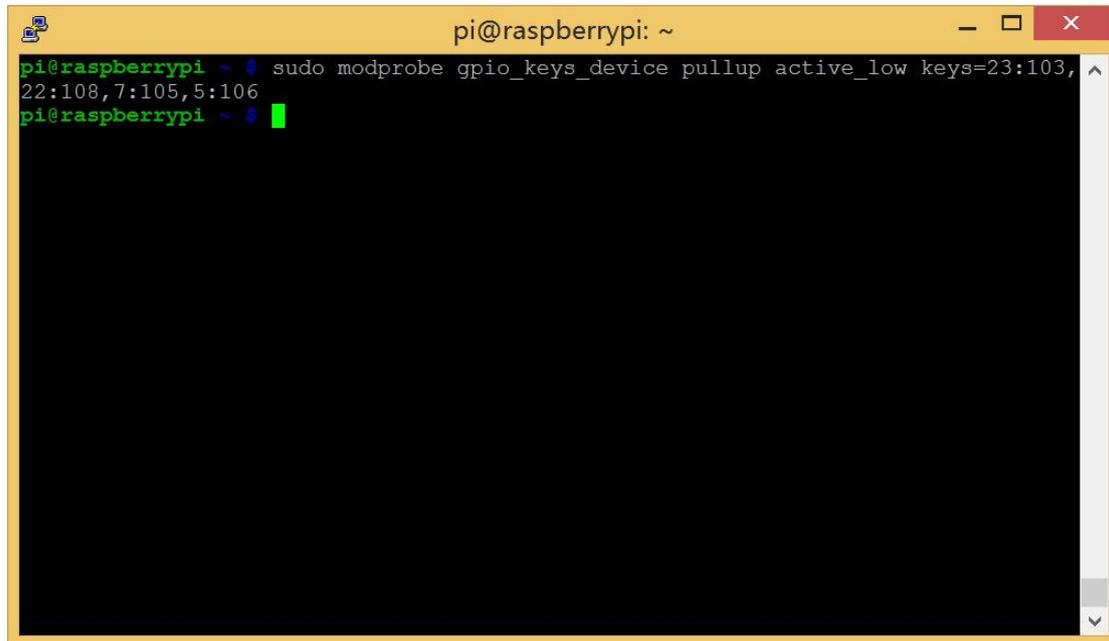
"/usr/share/X11/xorg.conf.d/01-input.conf" [New] 6L, 155C written
```

24) Restart your Raspberry Pi, you can use the pi:



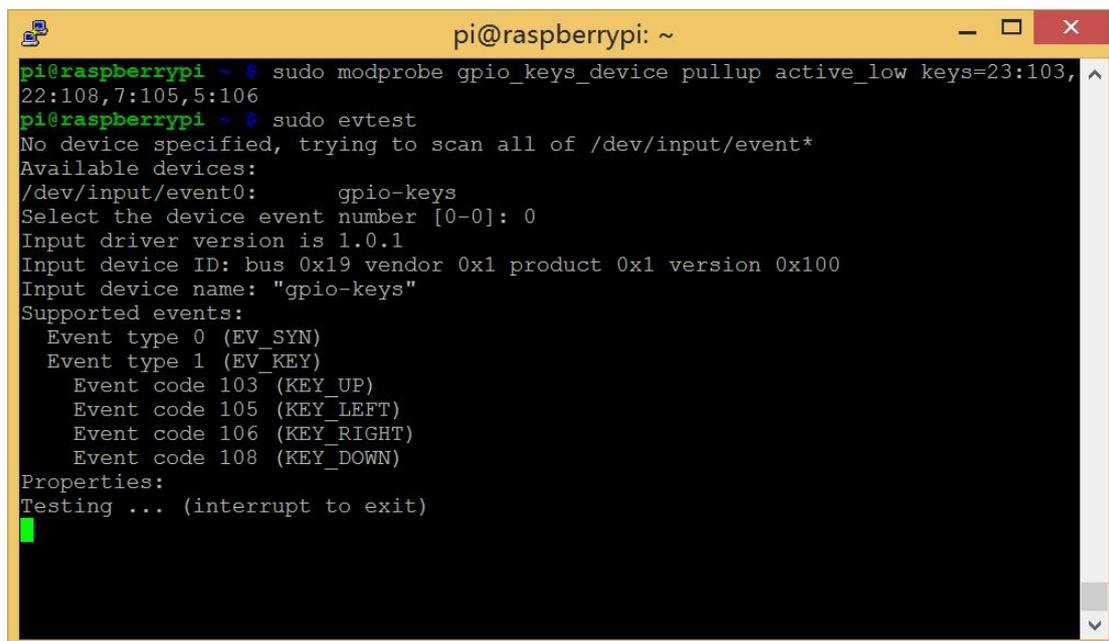
25) Then you can continue to configure the buttons on the screen button [from the top]

respectively control K1 control GPIO23, K2 control GPIO22, K3 control GPIO7, K4 control GPIO5, such as configuration means K1 = KEY_UP [103], K2 = KEY_DOWN [108], K3 = KEY_LEFT [105], K4 = KEY_RIGHT [106]:



```
pi@raspberrypi: ~  
pi@raspberrypi ~$ sudo modprobe gpio_keys_device pullup active_low keys=23:103,22:108,7:105,5:106  
pi@raspberrypi ~$
```

26) Followed by the key test[by use evtest]:



```
pi@raspberrypi: ~  
pi@raspberrypi ~$ sudo modprobe gpio_keys_device pullup active_low keys=23:103,22:108,7:105,5:106  
pi@raspberrypi ~$ sudo evtest  
No device specified, trying to scan all of /dev/input/event*  
Available devices:  
/dev/input/event0:      gpio-keys  
Select the device event number [0-0]: 0  
Input driver version is 1.0.1  
Input device ID: bus 0x19 vendor 0x1 product 0x1 version 0x100  
Input device name: "gpio-keys"  
Supported events:  
  Event type 0 (EV_SYN)  
  Event type 1 (EV_KEY)  
    Event code 103 (KEY_UP)  
    Event code 105 (KEY_LEFT)  
    Event code 106 (KEY_RIGHT)  
    Event code 108 (KEY_DOWN)  
Properties:  
Testing ... (interrupt to exit)  
█
```

```
pi@raspberrypi: ~
Available devices:
/dev/input/event0:      gpio-keys
Select the device event number [0-0]: 0
Input driver version is 1.0.1
Input device ID: bus 0x19 vendor 0x1 product 0x1 version 0x100
Input device name: "gpio-keys"
Supported events:
  Event type 0 (EV_SYN)
  Event type 1 (EV_KEY)
    Event code 103 (KEY_UP)
    Event code 105 (KEY_LEFT)
    Event code 106 (KEY_RIGHT)
    Event code 108 (KEY_DOWN)
Properties:
Testing ... (interrupt to exit)
Event: time 1429264825.467570, type 1 (EV_KEY), code 103 (KEY_UP), value 0
Event: time 1429264825.467570, ----- SYN_REPORT -----
Event: time 1429264825.567535, type 1 (EV_KEY), code 103 (KEY_UP), value 1
Event: time 1429264825.567535, ----- SYN_REPORT -----
Event: time 1429264826.127543, type 1 (EV_KEY), code 108 (KEY_DOWN), value 0
Event: time 1429264826.127543, ----- SYN_REPORT -----
Event: time 1429264826.237531, type 1 (EV_KEY), code 108 (KEY_DOWN), value 1
Event: time 1429264826.237531, ----- SYN_REPORT -----
```