# SBC21 / EC21 / NSD21

# Quick Start Guide

## Release Notes

| Version | Release Date | Notes |
|---|---|---|
| 1.0 | June 2013 | Initial release |
| 2.0 | October 2013 | Correct some typo errors |
| 3.1 | October 2013 | Modify some error |
| 4.0 | November 2013 | Add console connection setting |
| | | Add Ubuntu root password |
| 5.0 | December 2013 | Modify u-boot arguments |
| 6.0 | January 2013 | Add NSD2105 |
| 7.0 | February 2013 | Add the procedure of updating firmware via USB dongle or MicroSD |
| 8.0 | February 2013 | Remove WiFi Manager |
| | | |

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## 1.1 Single Board Computer

| Item | Notes |
|---|---|
| SBC2100 Board | |
| Power Adapter | |
| RS232 IDC cable | Pin header for DB9 |
| CD | Software and User's Manual |

## 1.2 NSD Smart Display

NSD smart display products include NSD2105, NSD2107, NSD2110, NSD2115, and NSD2122.

| Item | Notes |
|---|---|
| NSD21xx | |
| Power Adapter | |
| RS232 IDC cable | Pin header for DB9 |
| C220 Debug Board | *NSD2105 only* |
| CD | Software and User's Manual |

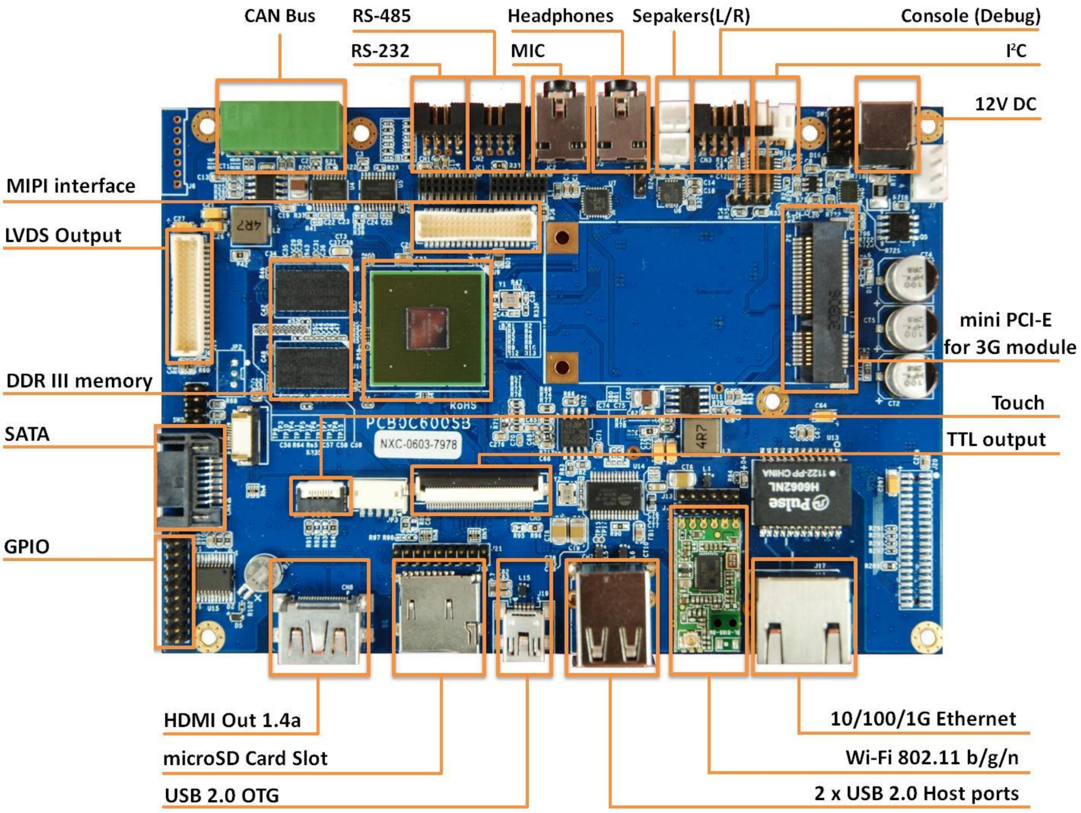
## 1.3 All-in-One Embedded Computer

All-in-One embedded computer products include EC2107 and EC2110.

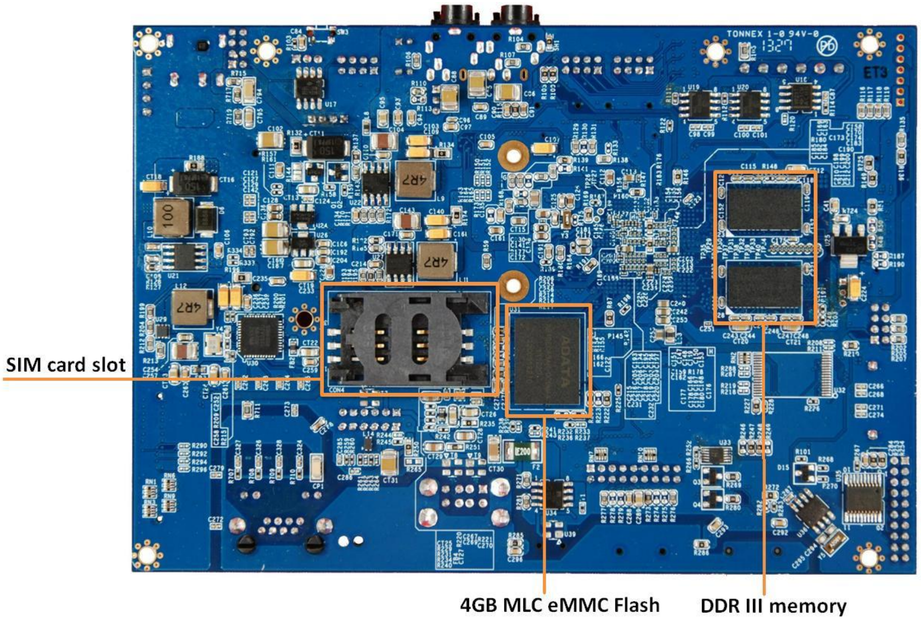
| Item | Notes |
|---|---|
| EC21xx | |
| Power Adapter | |
| RS232 IDC Cable | Pin Header for DB9 |
| CD | Software and User's Manual |

# 2. Overview

## 2.1 SBC21 Single Board Computer



Top View



Bottom View

## 2.2 NSD21 Smart Display

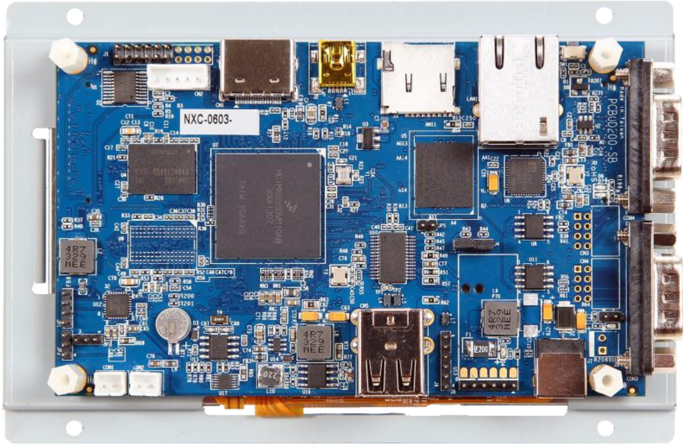
Android Enabled Device

Ubuntu Enabled Device

## 2.3 NSD2105 Smart Display

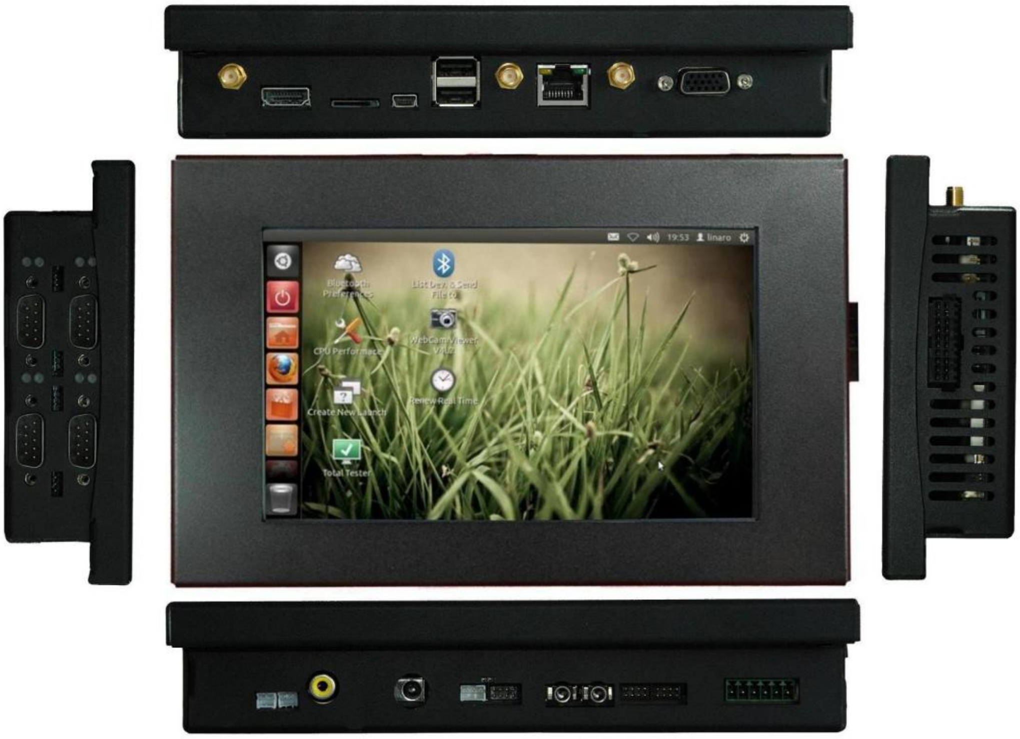
Android Enabled Device

Ubuntu Enabled Device



Bottom View

## 2.4 EC21 All-in-One Embedded Computer



Ubuntu enabled device showing ports on each side

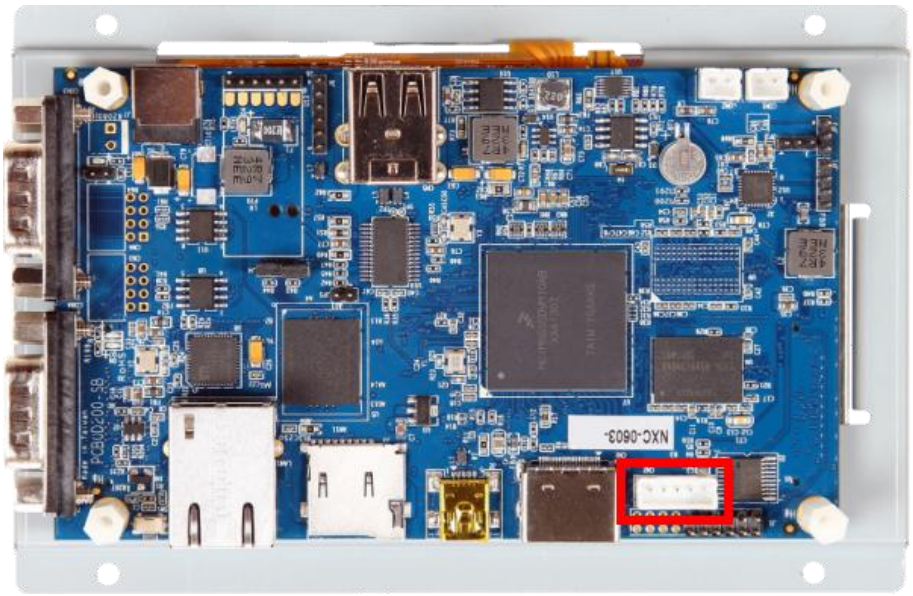
Android enabled device with wireless antennas attached

# 3. Setup

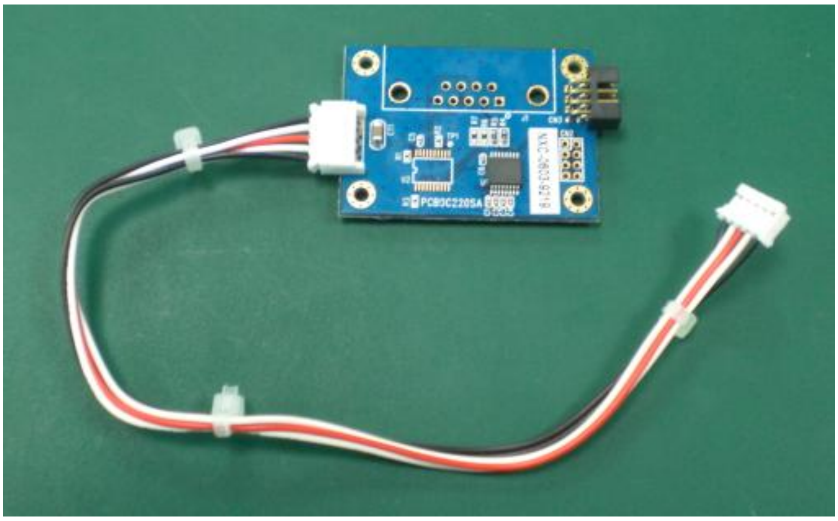
## 3.1 Connecting the Debug Port to PC

During development, it is a good idea to connect using the debug port.
There are different port location between NSD2105 and other 2100 series.

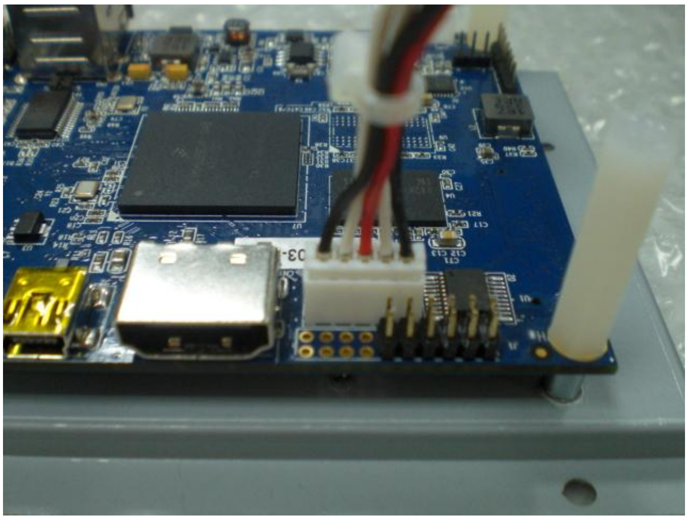
- NSD2105
  Find the debug port on NSD2105

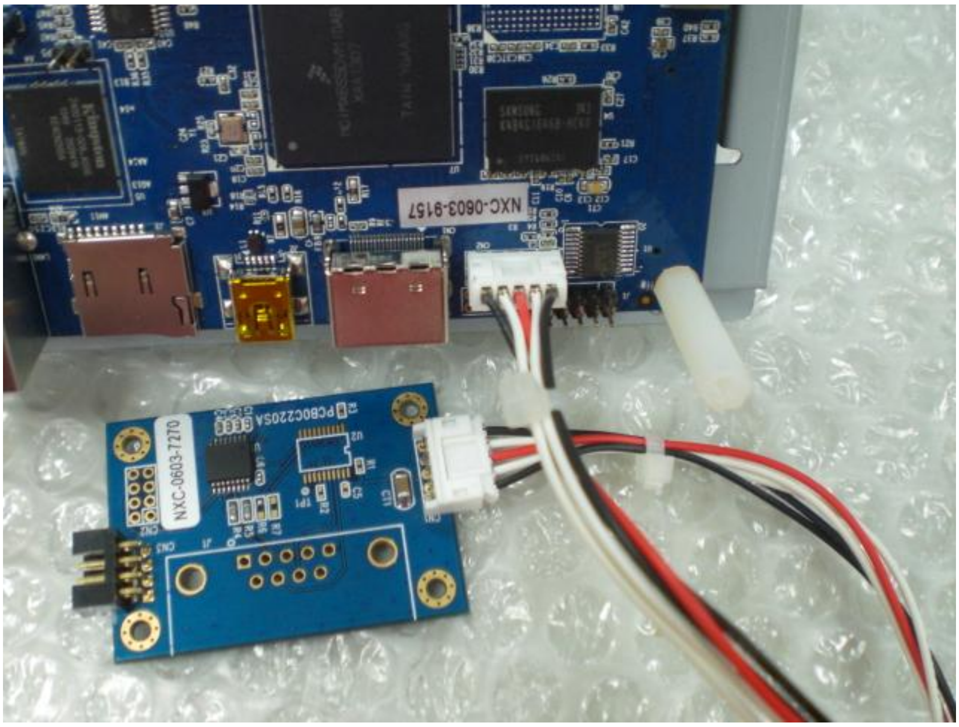


C220 debug board and the cable on it:

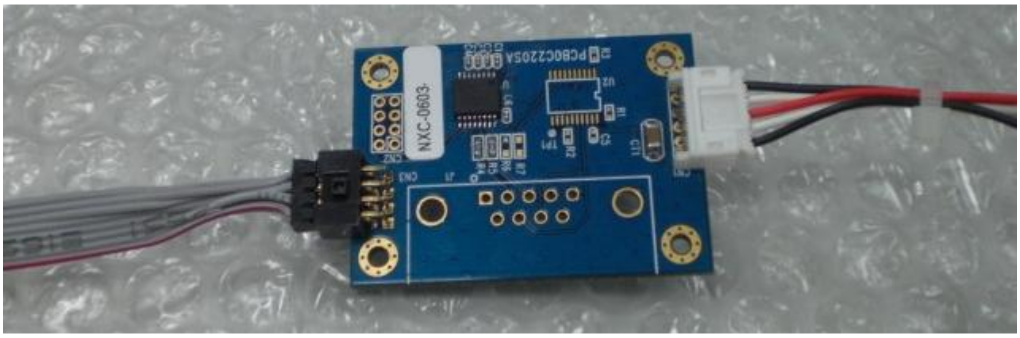


Connect the cable on C220 debug board to the debug port of NSD2105

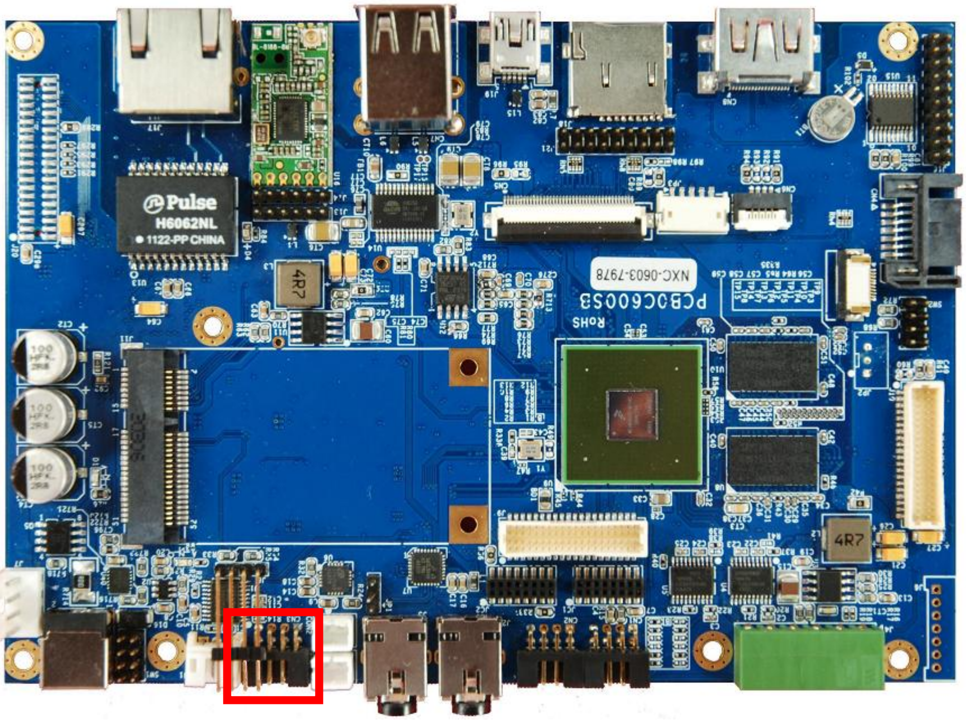




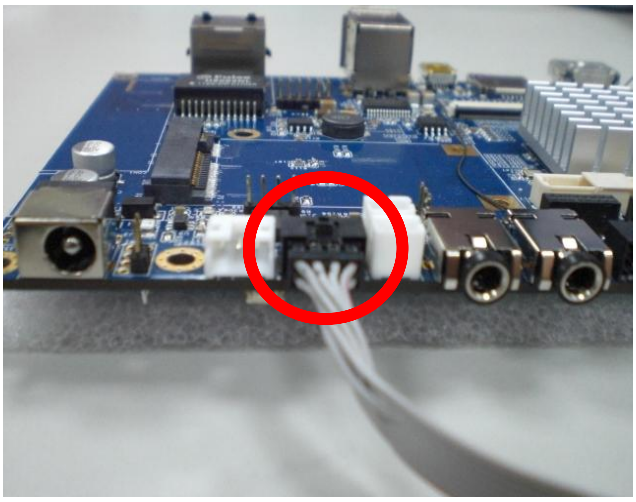
Connect a RS232 IDC cable to C220 debug board



- Other 2100 series (including SBC2100, NSD2107/10/15/22, EC2107/10)
  Find the debug port on SBC2100 series board

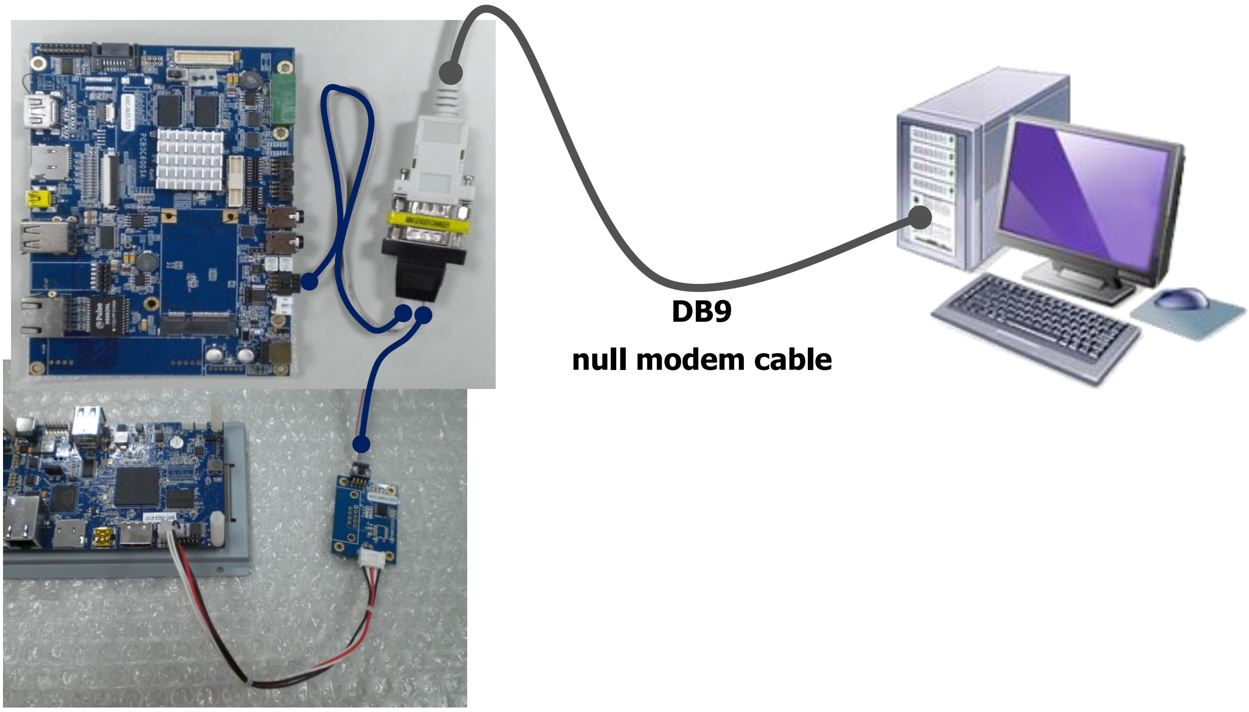


Connect a RS232 IDC cable to the debug port

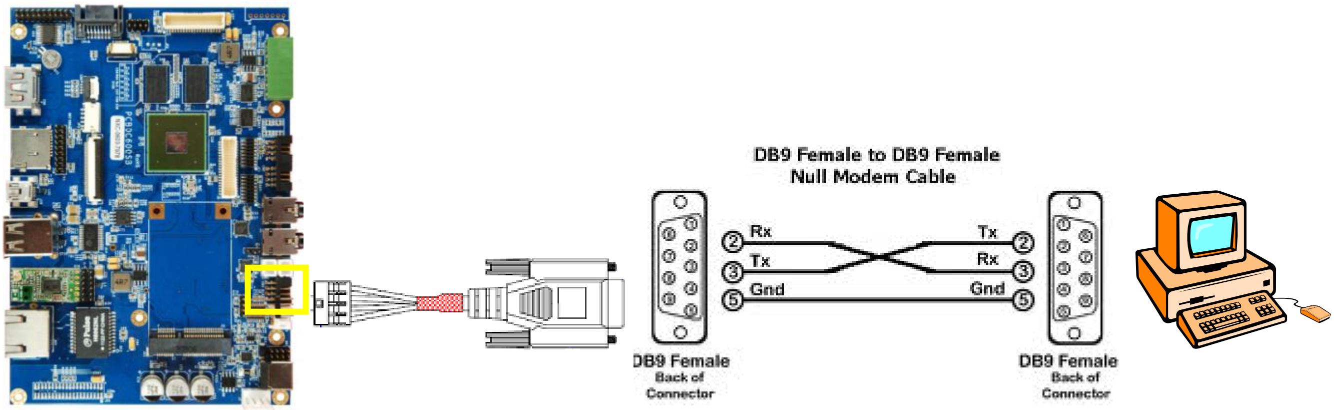


## Connect to PC

Turn on the PC, run the terminal program, and open the COM port. We use ***TeraTerm****.* You can find this tool and the user guide on our wiki page online.



## Console / Debug Port Connection Diagram



UART1 is dedicated as the debug port. UART1 default settings are ***Baud Rate 115200, 8 data bits, no parity, 1 stop bit and no flow control***.

A DB9 **null modem cable** (or adapter) is required when you want to connect UART1 to a PC with terminal emulation software such as TeraTerm.

## 3.2 Start Running

After connecting to the debug port, please power on the device to start.

Before logging into the system, you can enter into the U-Boot environment to check some variables. After powering on, quickly hit the **Enter** key within 3 seconds when you see the message below.

```
Hit any key to stop autoboot:   3
```

Type **'?'** or **'help'** to get all U-Boot commands and more details.
Type **printev** on the U-Boot shell to see the current environmental variables

```
> printenv
```

Use the command below to modify an environment variable.

```
> setenv variable 'string value'
```

If you need to change your output display, do the following command to set the variable **"panel"**; otherwise, we do not recommend you doing this step.

- Android

```
//HDMI (1920 x 1080)
> setenv panel 'video=mxcfb0:dev=hdmi,1920x1080M@60,if=RGB24,bpp=32 video=mxcfb1:off cea'
//7" LCD-PT (800 x 480) with RTP
> setenv panel 'video=mxcfb0:dev=lcd,LCD-WVGA,if=RGB24,bpp=32 video=mxcfb1:off'
//7" LCD-AWT (800 x 480) with RTP
> setenv panel 'video=mxcfb0:dev=lcd,AWT-WVGA,if=RGB24,bpp=32 video=mxcfb1:off'
```

- Ubuntu

```
//HDMI (1920 x 1080)
> setenv panel 'video=mxcfb0:dev=hdmi,1920x1080M@60,if=RGB24 video=mxcfb1:off'
//7" LCD (800 x 480) with RTP
> setenv panel 'video=mxcfb0:dev=lcd,LCD-WVGA,if=RGB24 video=mxcfb1:off'
//7" LCD-AWT (800 x 480) with RTP
> setenv panel 'video=mxcfb0:dev=lcd,SEIKO-WVGA,if=RGB24 video=mxcfb1:off'
```

★ For other LCD / LVDS panels we support, please contact to our sales in order to get right string value.

Use the command **saveenv** to save the environment variables that you have modified. If not saved, then any changes to the variables will not persist after a restart.

```
            > saveenv
Saving Environment to SPI Flash...
Erasing SPI flash...Writing to SPI flash..........................SUCCESS

done
```

Use the command boot to start the operating system.

```
            > boot
```

## 3.3 Connecting to the PC (for Android 4.2)

For Android systems, connect to a Windows PC by following the steps below:

Install Android SDK
Connect to PC with USB OTG cable
Install USB driver

### 3.3.1 Installing the Android SDK

This chapter is intended for developers to quickly setup an EC/NSD/SBC and know how to launch EC/NSD/SBC demo applications from a host PC via a USB interface. The host PC requires a Windows system (for example Windows XP or 7) and at least a few gigabytes free disk space. The first time you launch a demo app from the host PC, you will have to install a driver into the host PC.

Follow the steps below to install the driver and make the hardware connection:

Insert the software DVD into the host PC and find the Android SDK folder. Copy to the host PC in a folder named **<SDK>**

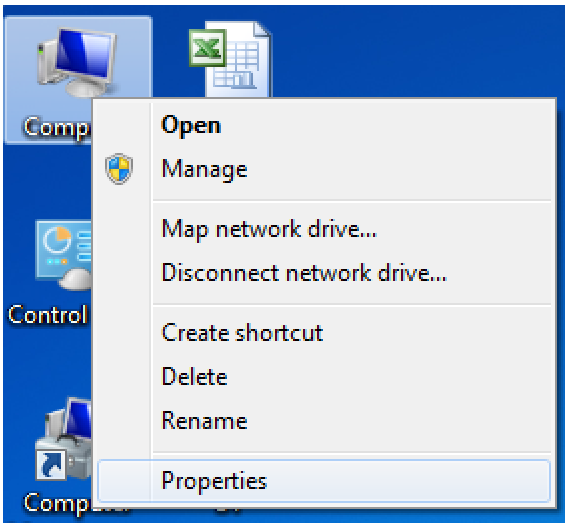
Add the **<SDK>** folders to the **path** environment variable of the host PC:

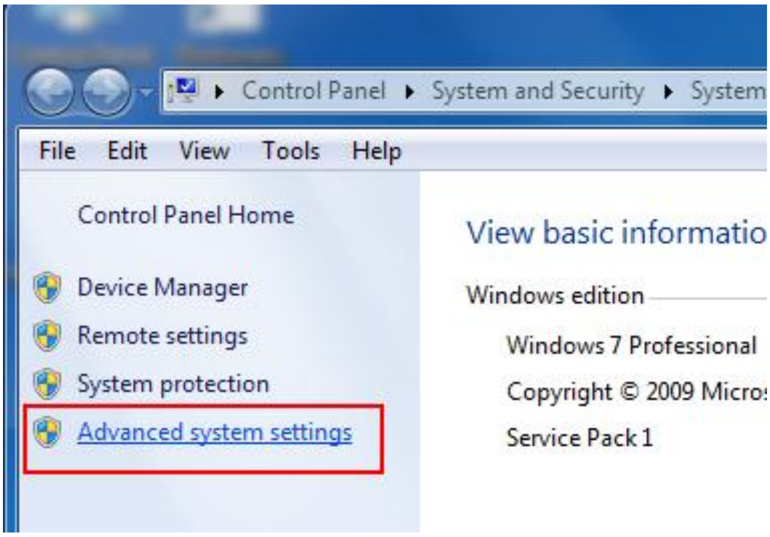
;**<SDK>**\tools;**<SDK>**\platform-tools

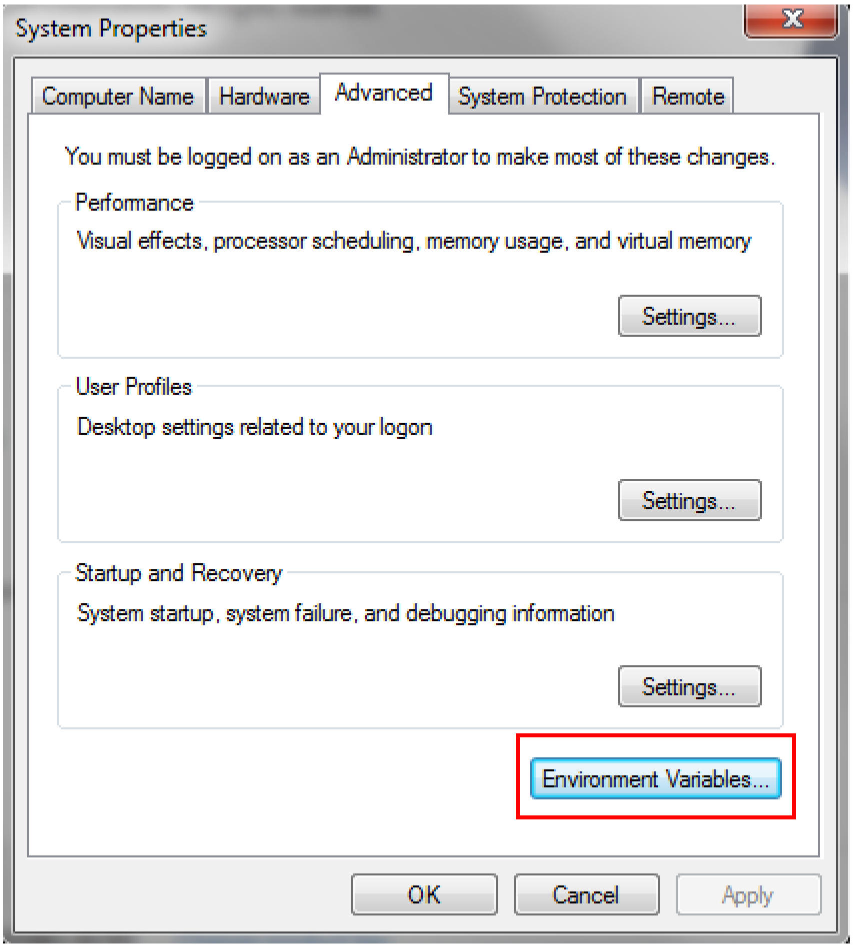
The following figures illustrate the steps to add a **path** on a Windows 7 PC:

Computer > Properties > Advanced system settings > Environment Variables… > Path > Edit…

Screenshots for Windows 7







You must be logged on as an Administrator to make most of these changes.

Performance

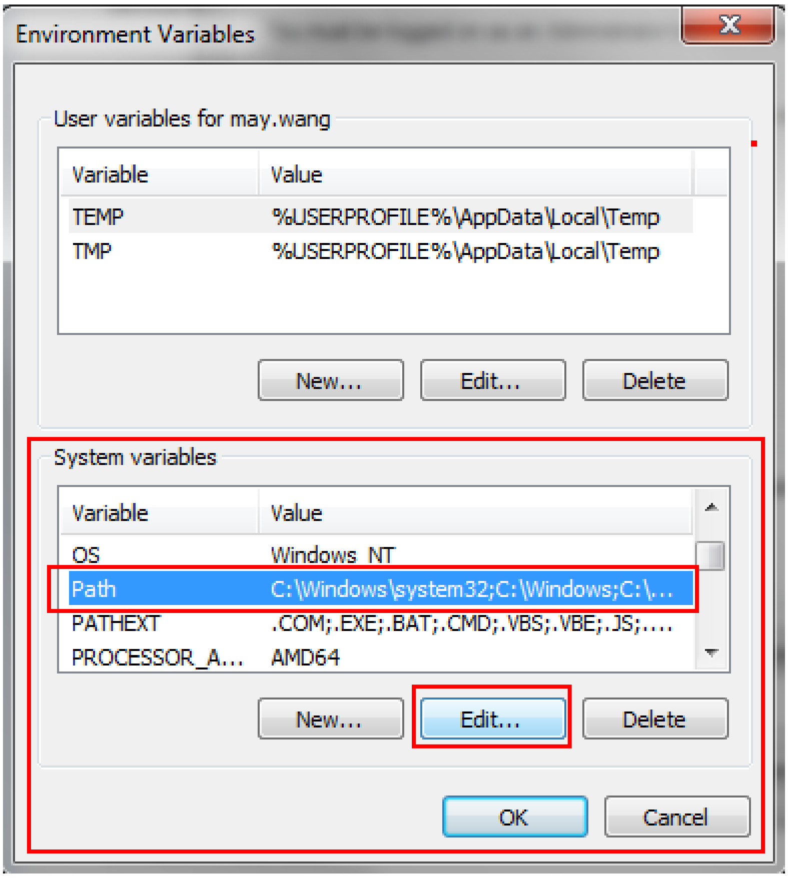
Visual effects, processor scheduling, memory usage, and virtual memory

User Profiles

Desktop settings related to your logon

Startup and Recovery

System startup, system failure, and debugging information



User variables for may.wang

| Variable | Value |
|---|---|
| TEMP | %USERPROFILE%\AppData\Local\Temp |
| TMP | %USERPROFILE%\AppData\Local\Temp |

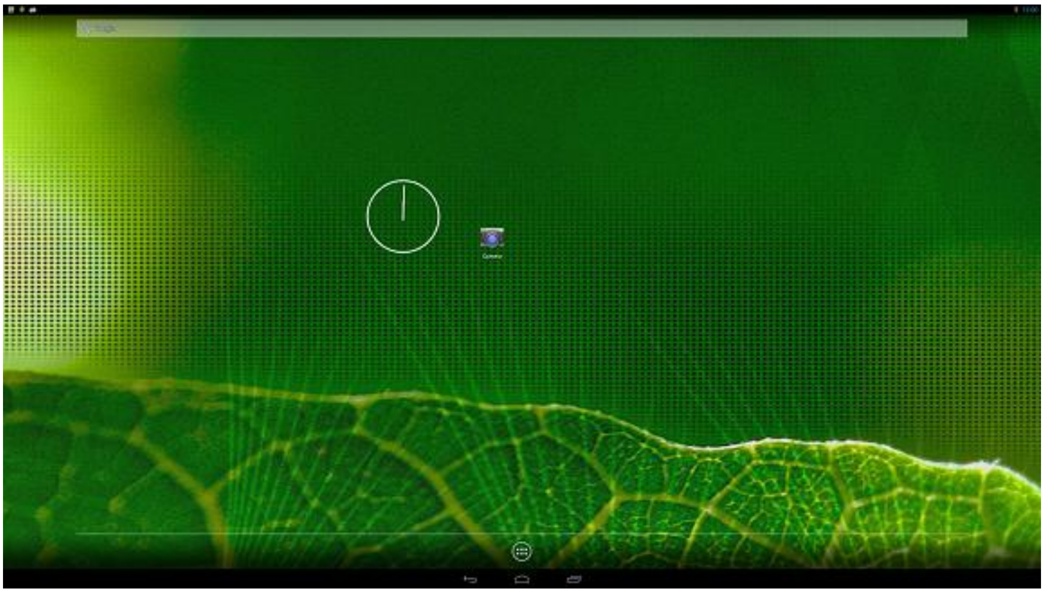
System variables

| Variable | Value |
|---|---|
| OS | Windows_NT |
| Path | C:\Windows\system32;C:\Windows;C:\... |
| PATHEXT | .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.... |
| PROCESSOR_A... | AMD64 |

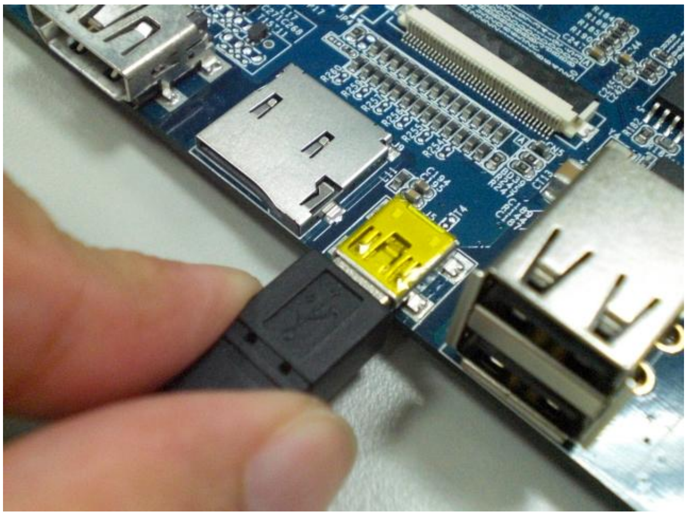
### 3.3.2 Connecting to the PC with a USB OTG cable

Connect the power adapter to an EC21/NSD21/SBC21 power jack and plug the power adapter to an AC outlet.

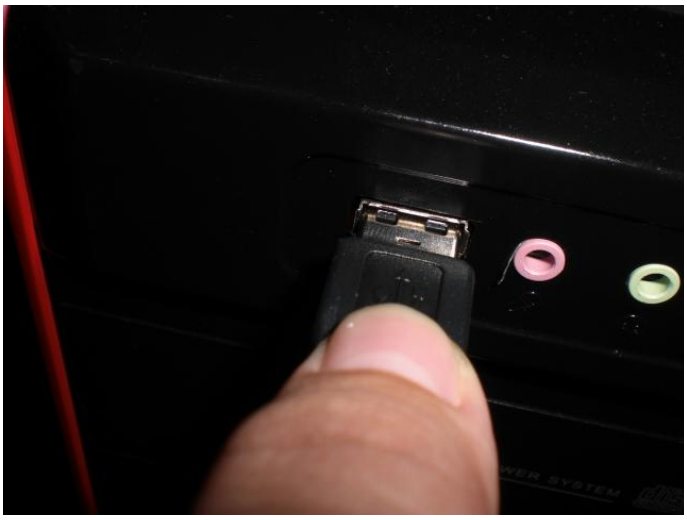
Wait for the EC21/NSD21/SBC21 to boot up and show a standard desktop on the LCD screen. A standard Android desktop is similar to the following figure.



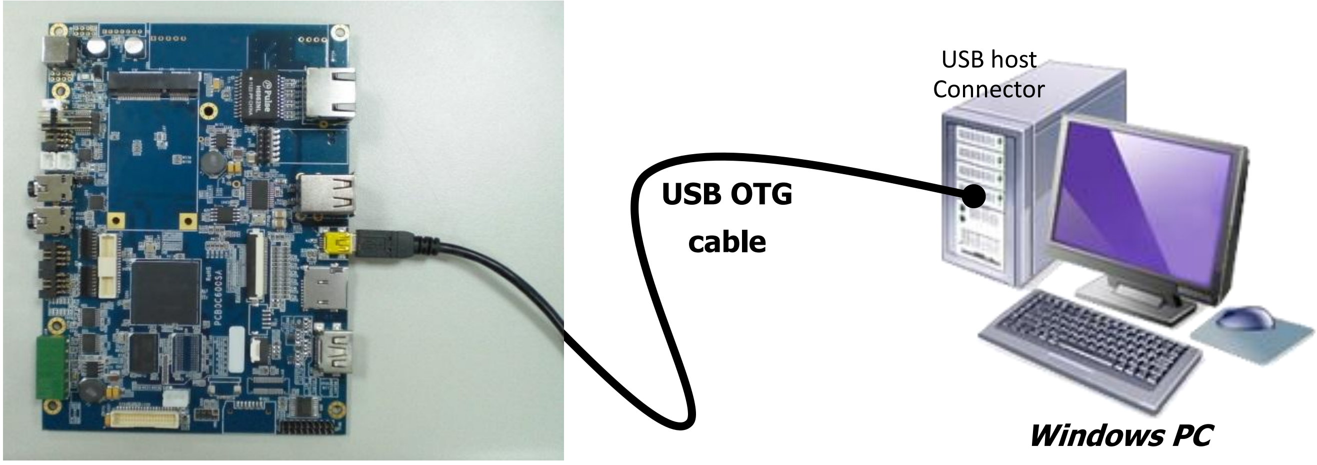
Connect a USB cable to EC21/NSD21/SBC21 mini-USB connector.



Connect the USB cable to a USB port on the host PC.



The following diagram shows a USB connected EC/NSD/SBC and a Windows PC.



### 3.3.3 Installing the USB Driver (Android ADB Interface)

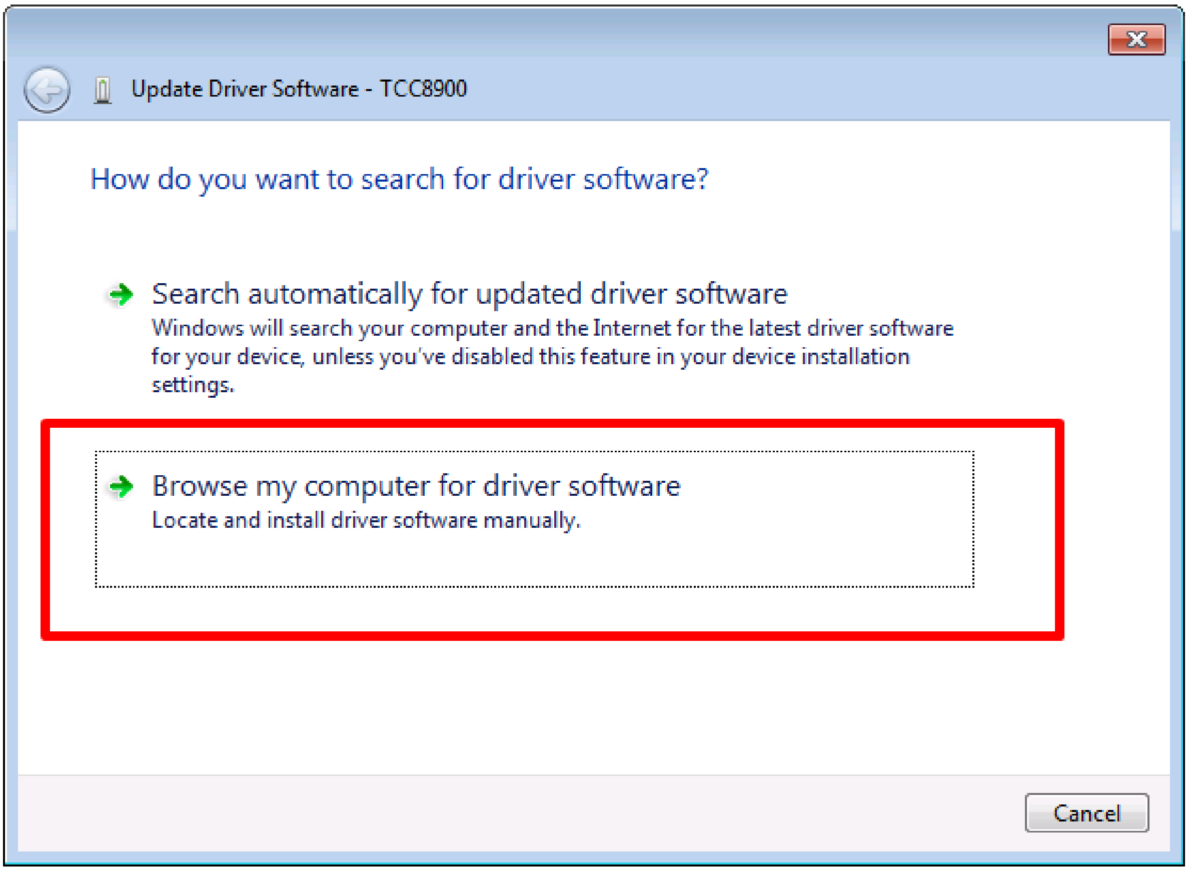
When first connected, the host PC will prompt you about detecting an unknown USB device and ask you to install a driver. Choose to install software from a specific location.

Find the USB driver in the software DVD and copy it to the host PC. Add the path of Android USB driver as the search path for the wizard:

;D:\android-sdk-windows\extras\google\usb_driver

After the driver is successfully installed, you will find an "Android Phone" with the Android ADB interface in Device Manager.

Screenshots for Windows 7

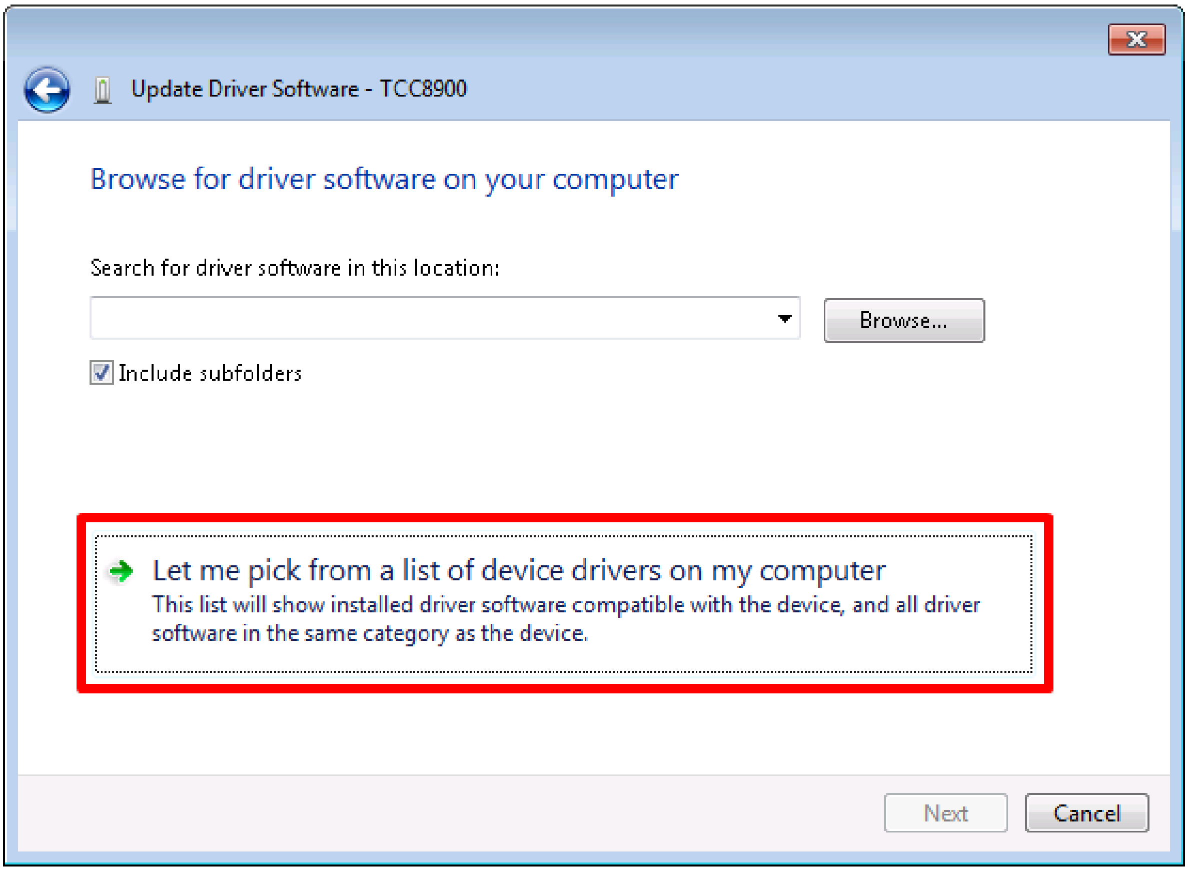


Update Driver Software - TCC8900

How do you want to search for driver software?

Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

Browse my computer for driver software
Locate and install driver software manually.



Update Driver Software - TCC8900

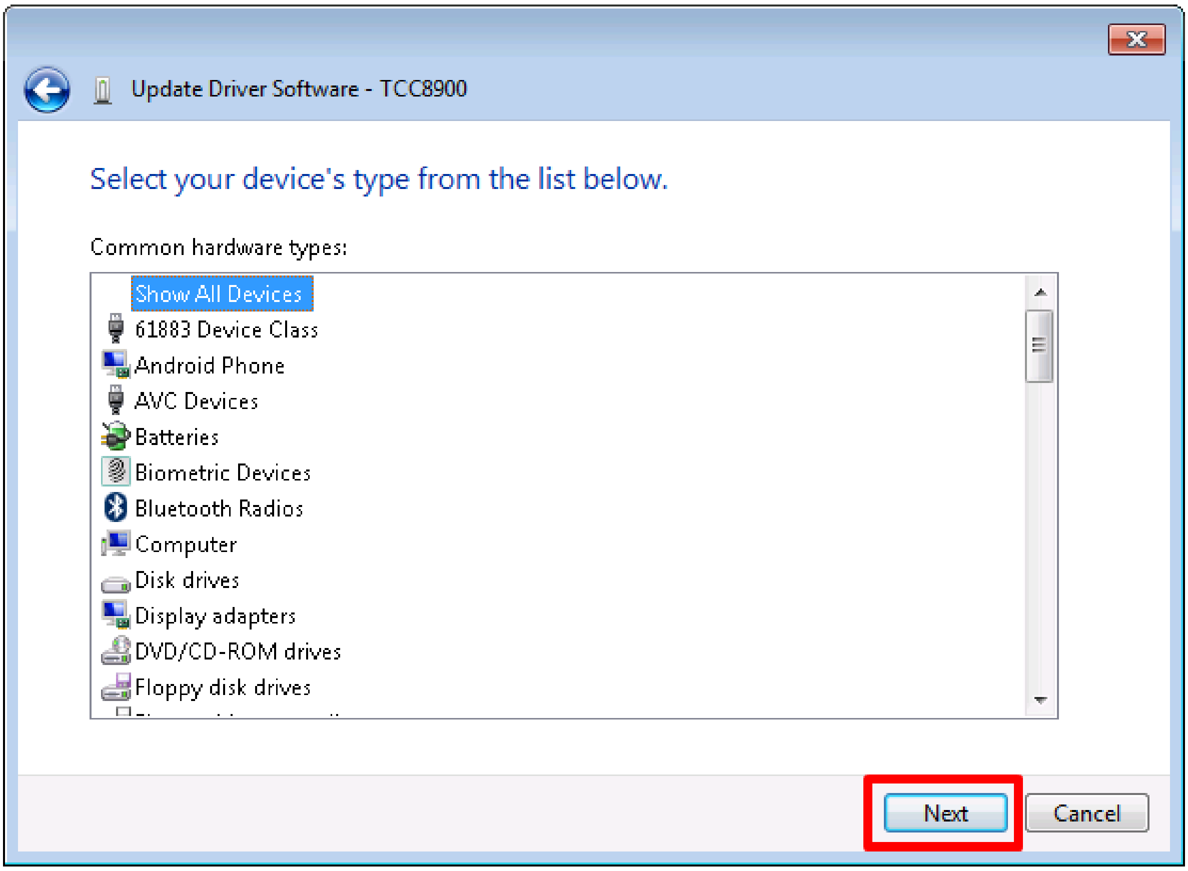
Browse for driver software on your computer

Search for driver software in this location:

☑ Include subfolders

Let me pick from a list of device drivers on my computer

This list will show installed driver software compatible with the device, and all driver software in the same category as the device.

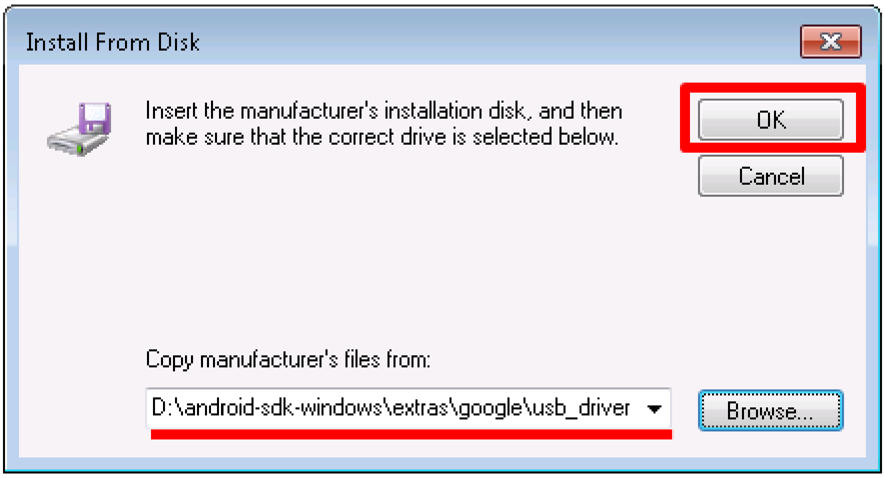


Update Driver Software - TCC8900

Select your device's type from the list below.

Common hardware types:

- Show All Devices
- 61883 Device Class
- Android Phone
- AVC Devices
- Batteries
- Biometric Devices
- Bluetooth Radios
- Computer
- Disk drives
- Display adapters
- DVD/CD-ROM drives
- Floppy disk drives

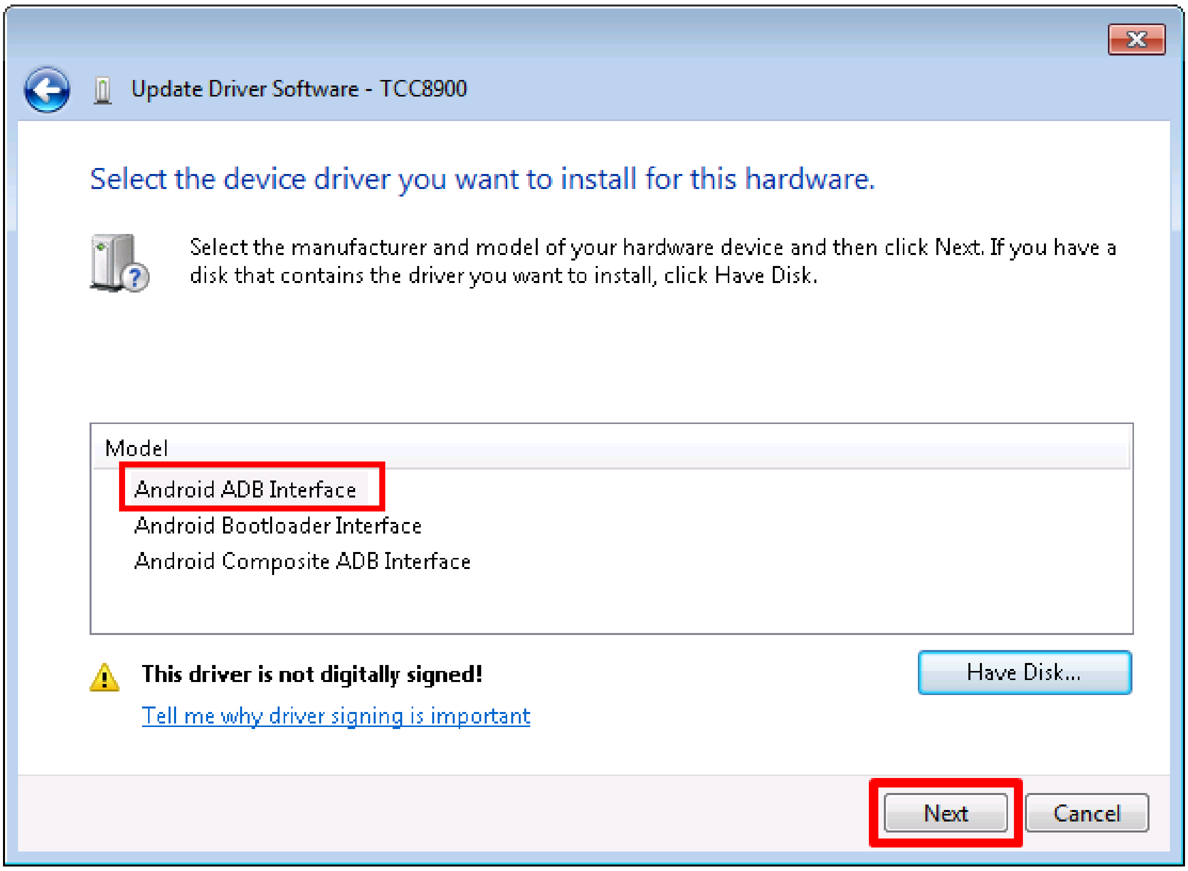


Install From Disk

Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.

Copy manufacturer's files from:

D:\android-sdk-windows\extras\google\usb_driver



Update Driver Software - TCC8900

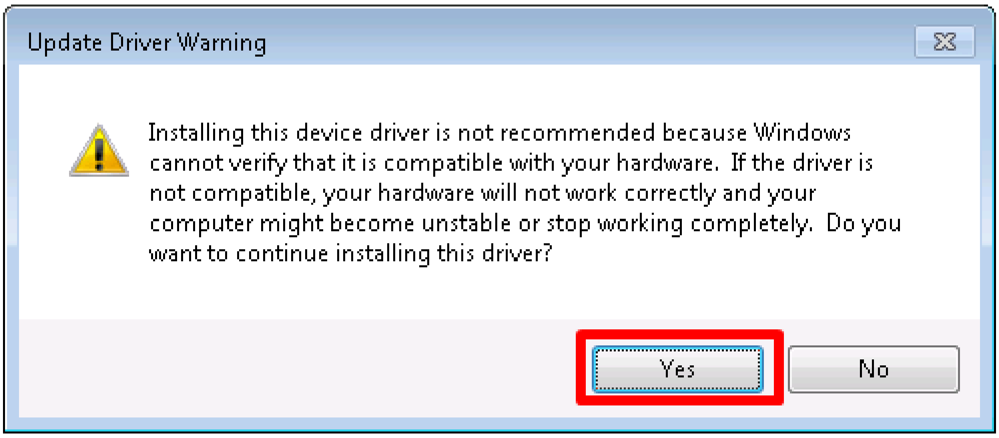
Select the device driver you want to install for this hardware.

Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.

| Model |
|---|
| Android ADB Interface |
| Android Bootloader Interface |
| Android Composite ADB Interface |

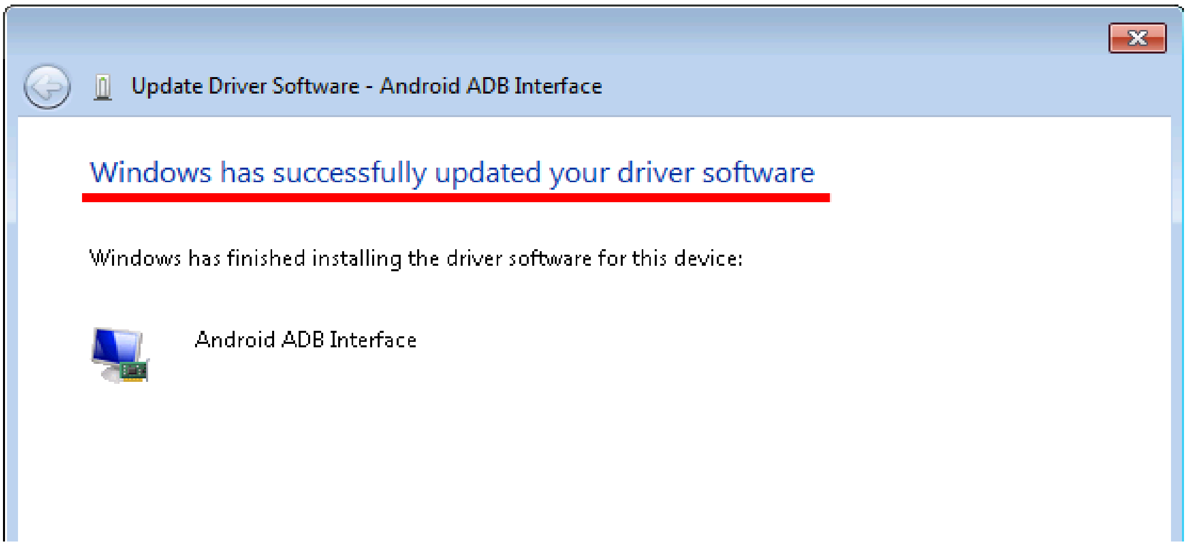
This driver is not digitally signed!

Tell me why driver signing is important



Update Driver Warning

Installing this device driver is not recommended because Windows cannot verify that it is compatible with your hardware. If the driver is not compatible, your hardware will not work correctly and your computer might become unstable or stop working completely. Do you want to continue installing this driver?

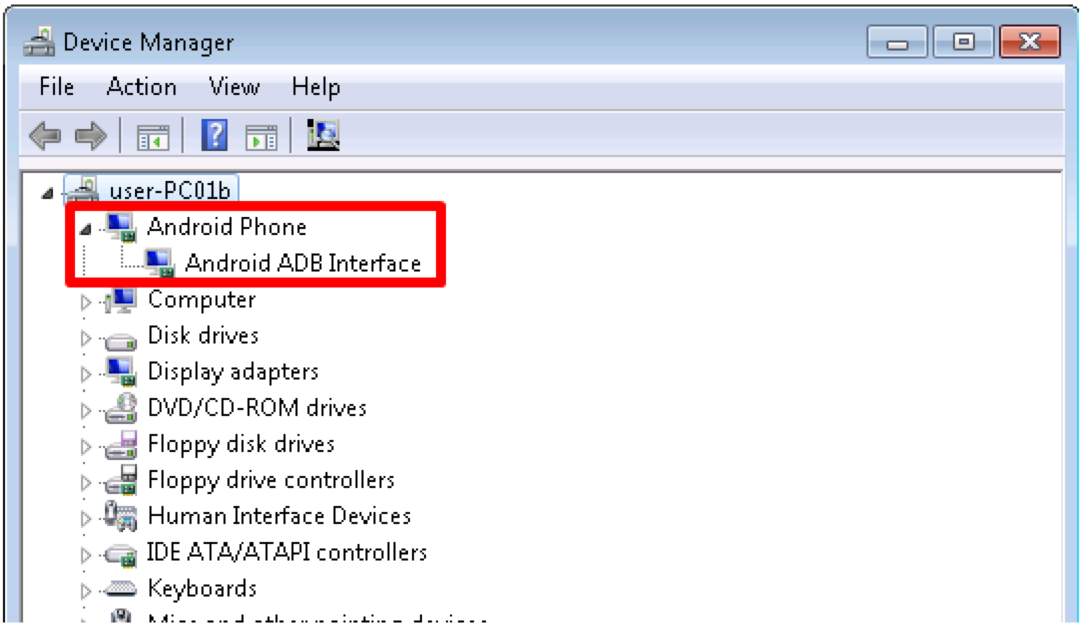


Update Driver Software - Android ADB Interface

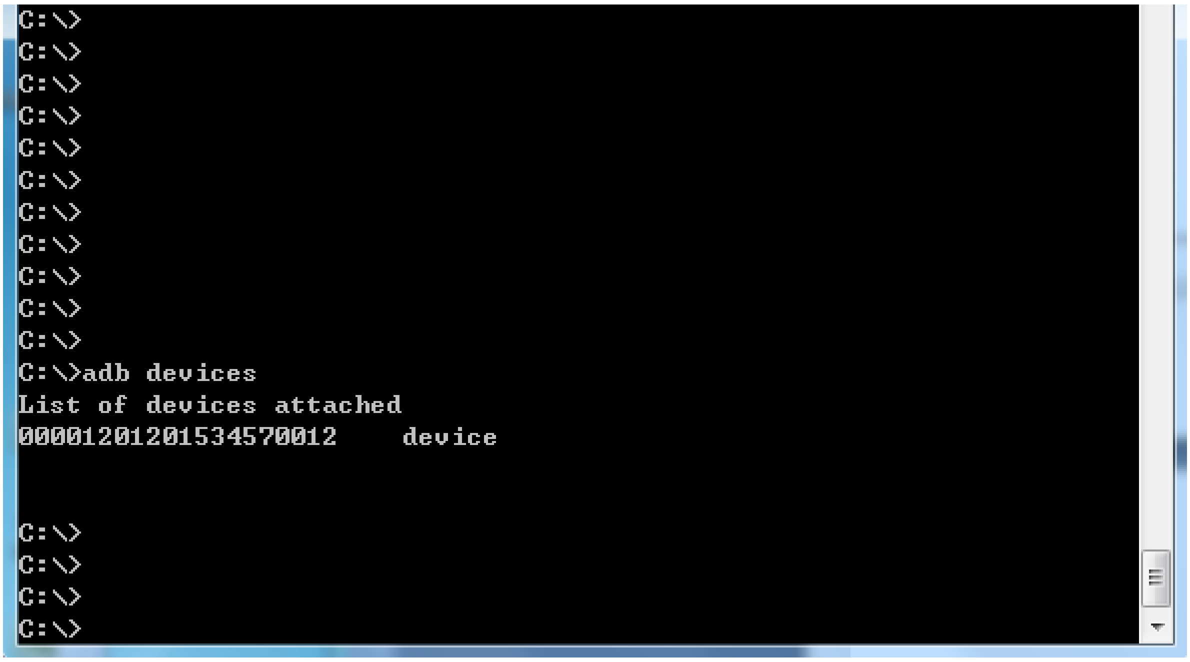
Windows has successfully updated your driver software

Windows has finished installing the driver software for this device:

Android ADB Interface



To verify whether or not the driver is correctly installed, you can type **adb devices** at the Windows command prompt. The attached EC21/NSD21/SBC21 device will be listed with the device ID. If it does not show any attached devices, repeat the previous steps to install the driver again.



```
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>adb devices
List of devices attached
00001201201534570012    device


C:\>
C:\>
C:\>
C:\>
```

Now you can use the **adb** command at the command line to manage your connected device. This allows you to copy files/directories to or from the device, run a remote shell, install files/apps to the device, and can even run applications you develop directly through an emulator.

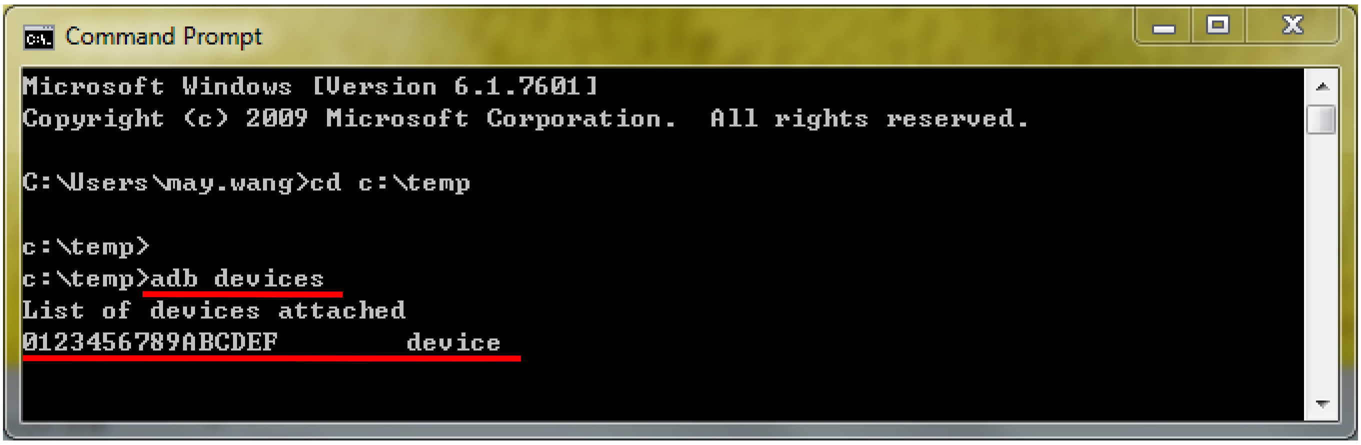
We list some basic ADB command options here. This link has more details.

| | |
|---|---|
| `adb push <local> <remote>` | Copy file/dir to device |
| `adb pull <remote> [<local>]` | Copy file/dir from device |
| `adb sync [ <directory> ]` | Copy host->device only if changed (-l means list but don't copy) |
| `adb shell` | Run remote shell interactively |

### 3.3.4 Installing Extra Apps

This part shows you how to install extra apps from the PC to the connected device.

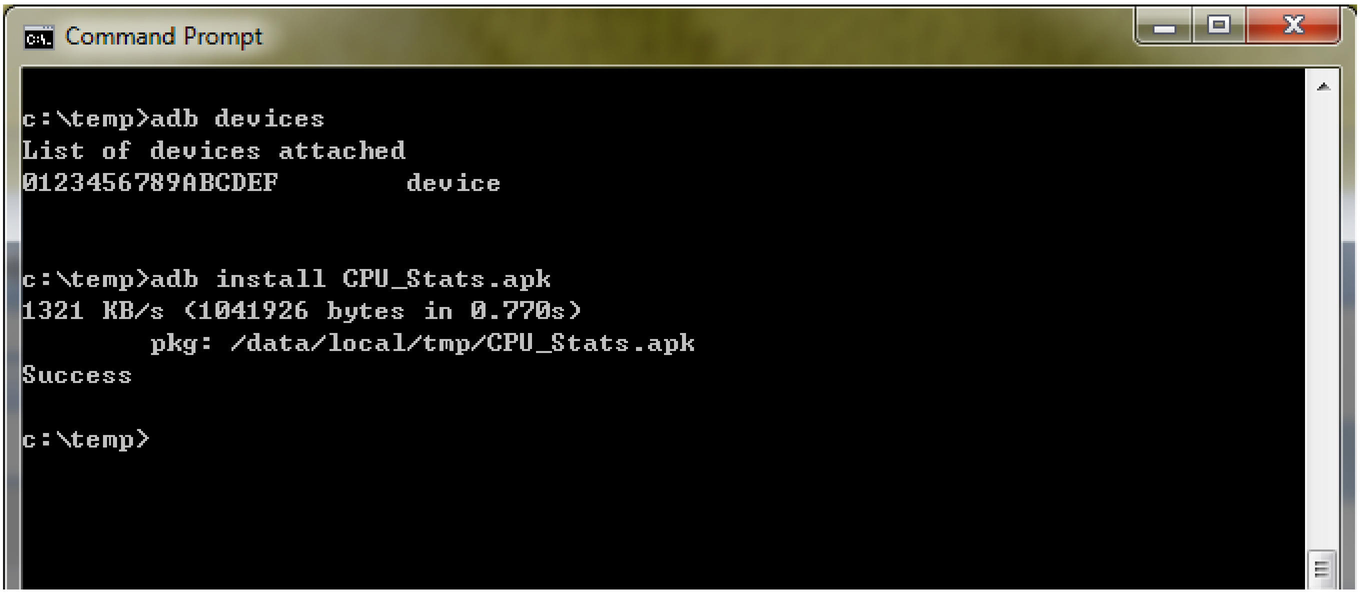
After installing the Android ADB interface, connect the EC21/NSD21/SBC21 device to the PC and verify that the device is attached.



```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Users\may.wang>cd c:\temp

c:\temp>
c:\temp>adb devices
List of devices attached
0123456789ABCDEF        device
```

The install file should be an **.apk** file. Type the command:

**adb install <*APK_file*>**



```

c:\temp>adb devices
List of devices attached
0123456789ABCDEF        device


c:\temp>adb install CPU_Stats.apk
1321 KB/s (1041926 bytes in 0.770s)
        pkg: /data/local/tmp/CPU_Stats.apk
Success

c:\temp>
```

When it shows **Success**, your app has installed successful.

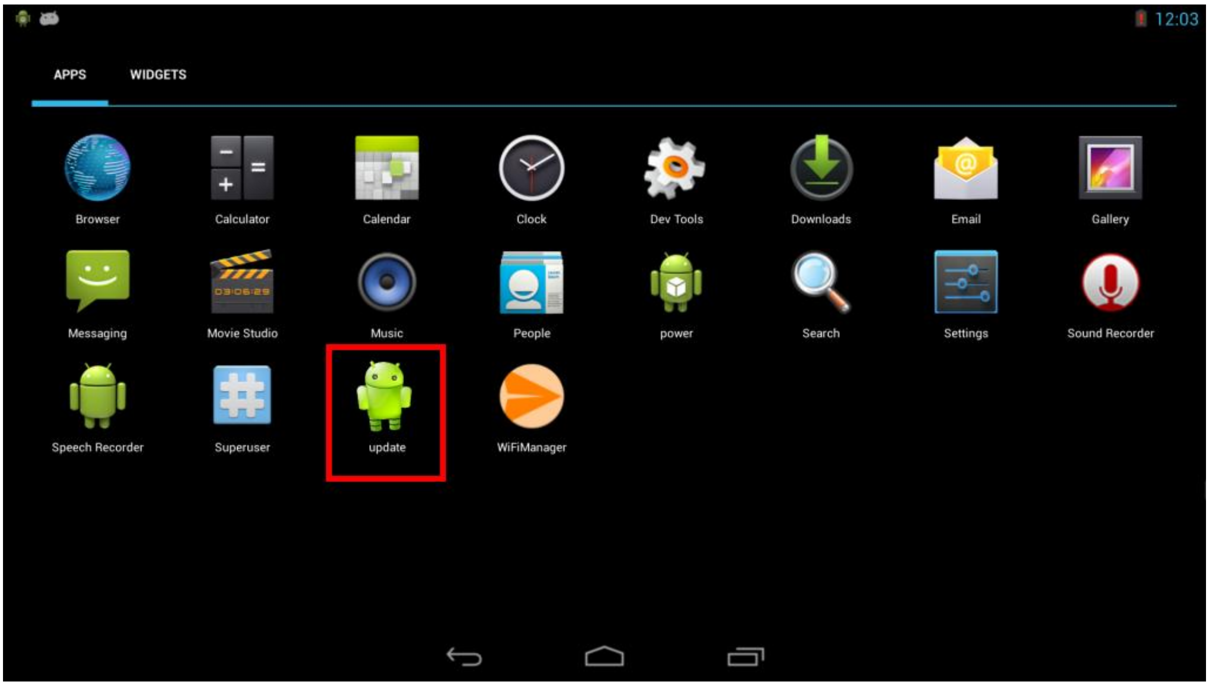
## 3.4 Update firmware via USB dongle (for Android 4.2)

This section shows you how to update the firmware easily via USB dongle. You only need to prepare the necessary image file and script file to achieve it.

- Hardware preparation:
  1. Empty USB mass storage device(USB dongle) or empty MicroSD card.

- Software preparation:
  1. The script file
     (This can be found in your resource CD which is attached to the shipment and the files are under the folder: \Tool\Android\System Update\)
  2. Latest firmware image file.
     (This can be found in your resource CD which is attached to the shipment and the files are under the folder: \Binary Images\)

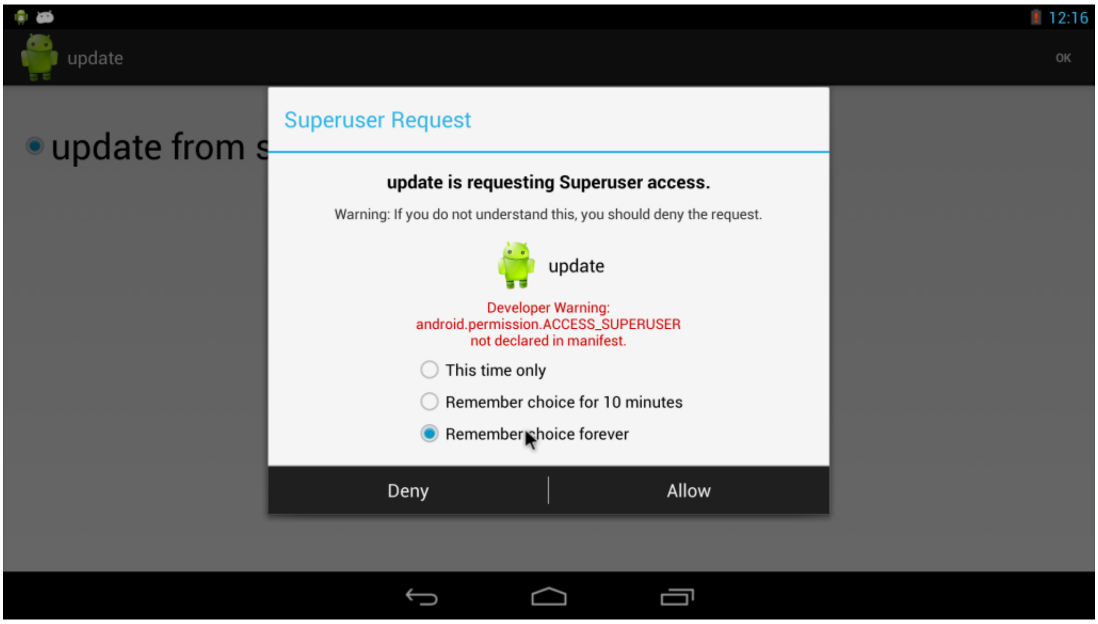
In your system application programs collection, there is an APP named “update” which is for you updating the system firmware more easily.



**Step 1:** copy the system update files(\Tool\Android\System Update\) into the empty USB mass storage or MicroSD card.

**Step 2:** copy the latest image files(\Binary Images\) into the empty USB mass storage or MicroSD card.

**Step 3:** Execute the “update” app and the superuser authorization dialog will pop-up, select the “**remember choice forever**” and click the button “**Allow**”.



Superuser Request

update is requesting Superuser access.

Warning: If you do not understand this, you should deny the request.

update

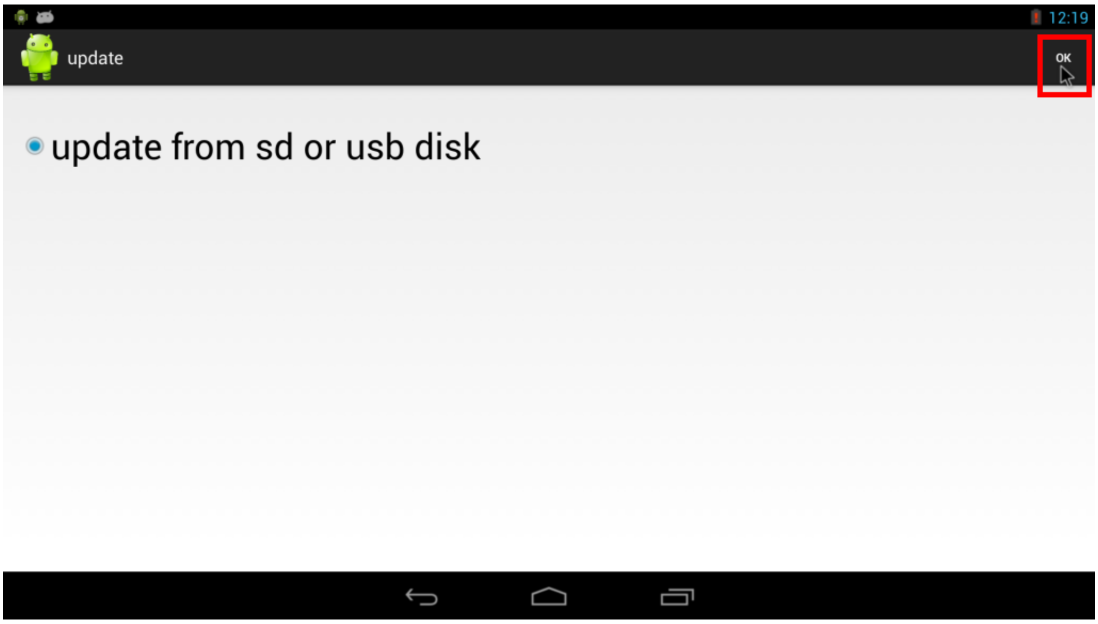
Developer Warning:
android.permission.ACCESS_SUPERUSER
not declared in manifest.

○ This time only

○ Remember choice for 10 minutes

● Remember choice forever

**Step 4:** Insert the USB mass storage or MicroSD card and press “OK”.



● update from sd or usb disk

**Step 5:** The system will be restart and update the firmware. After finished the process.

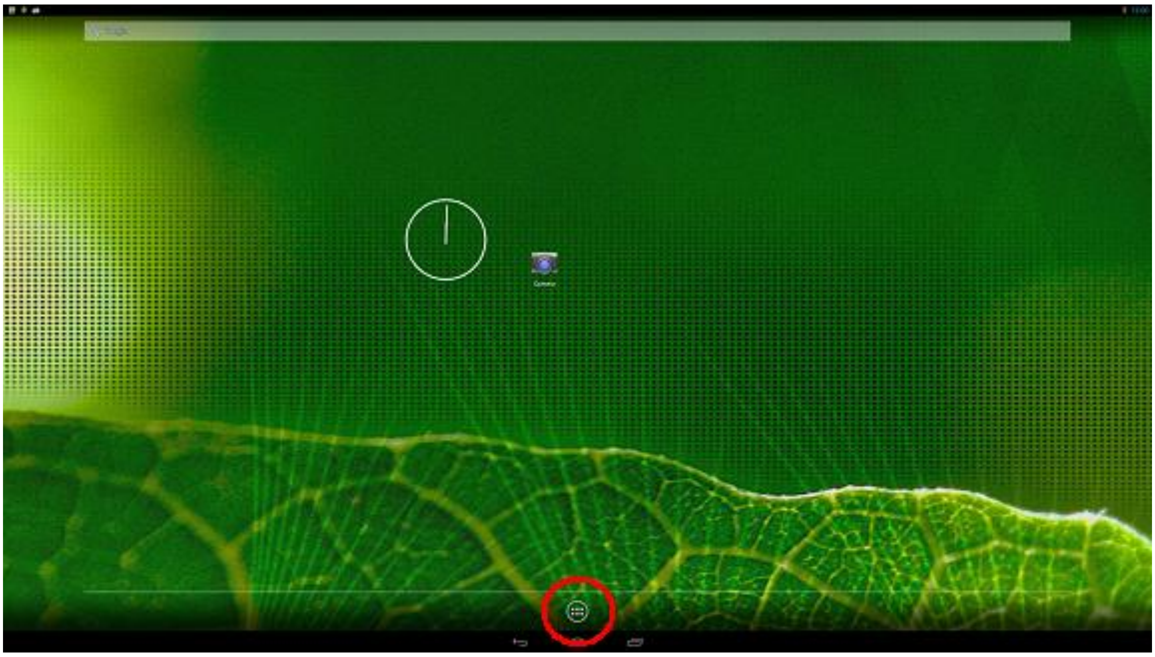
**Step 6:** Unplug the power adaptor to reboot the device, the device is accomplished the system update procedure.

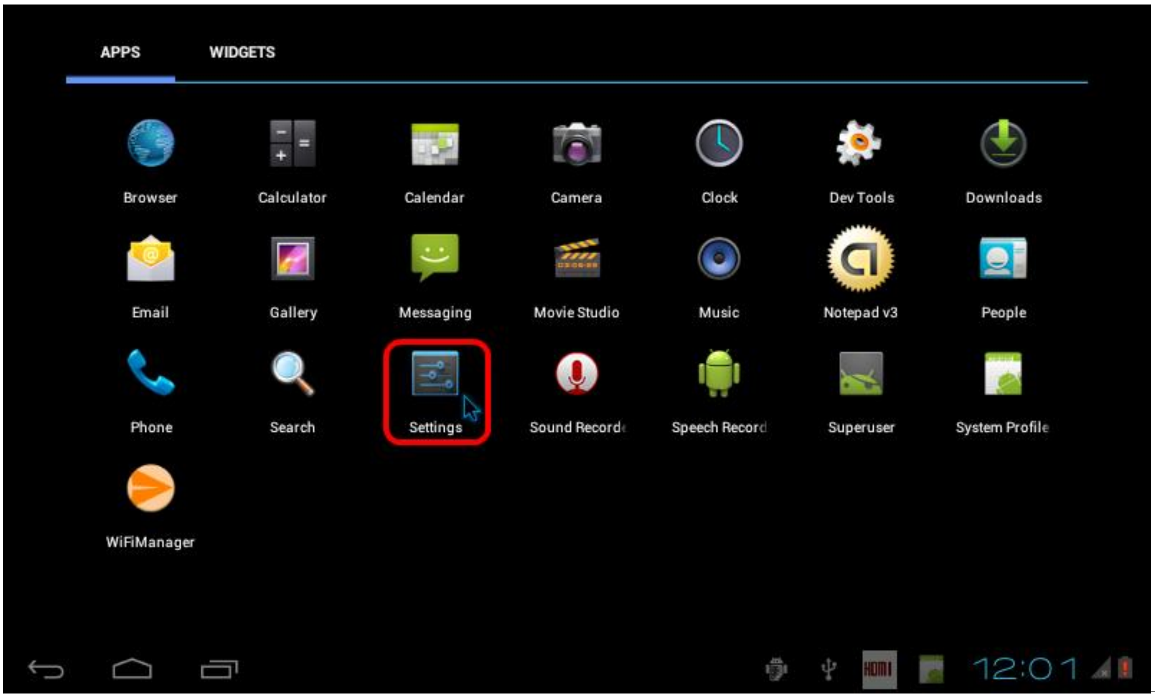
# 4. Running Software

## 4.1 Android

### 4.1.1 Settings

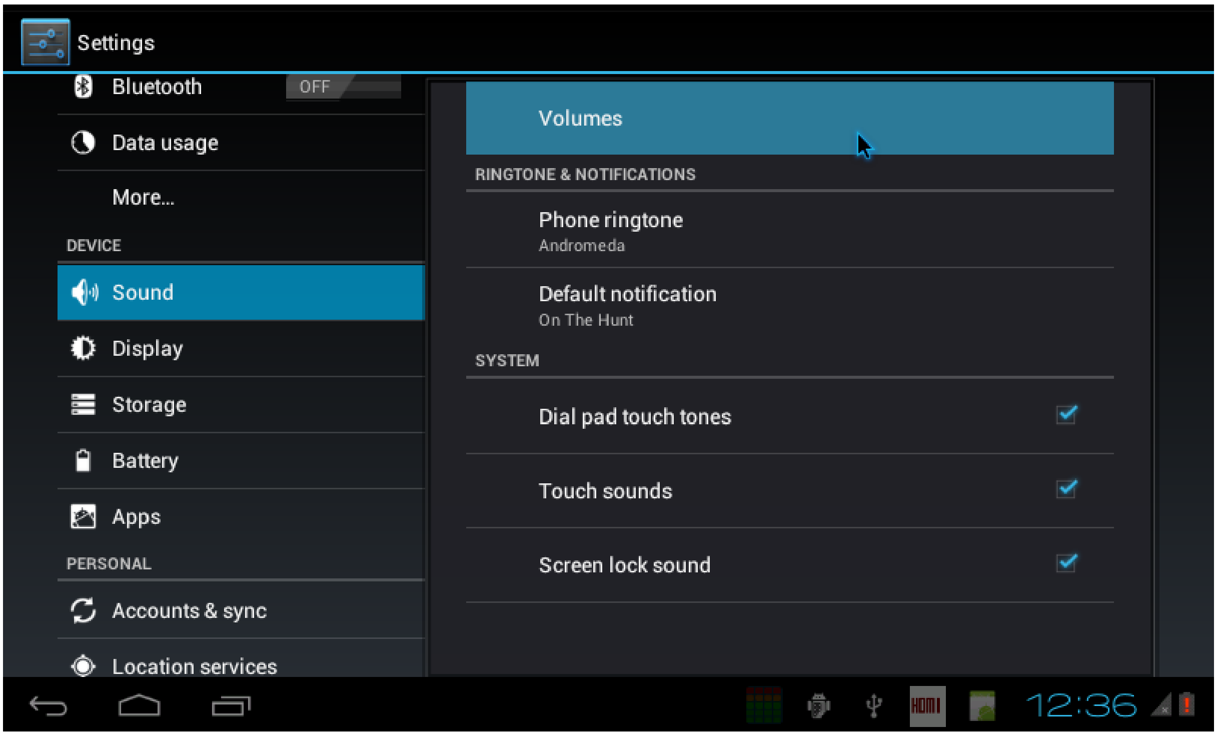
Click the app drawer icon .





## Sound

Adjust the volume



Volumes

RINGTONE & NOTIFICATIONS

Phone ringtone
Andromeda

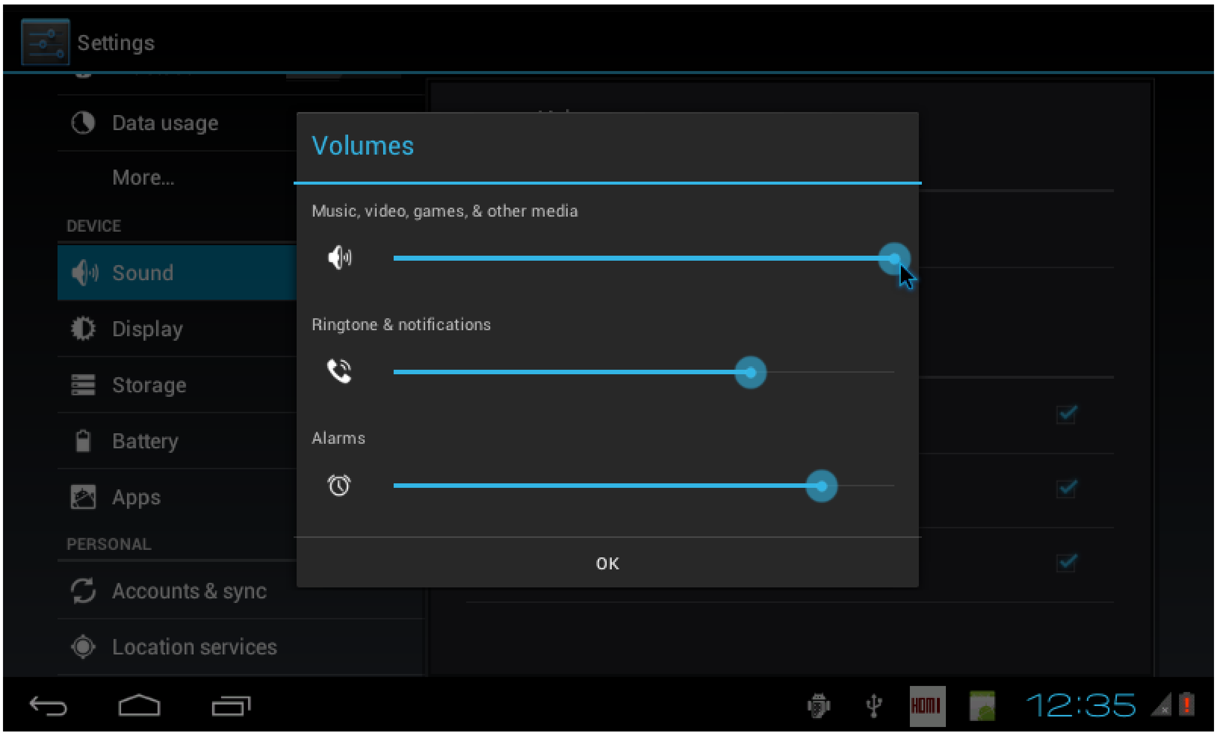
Default notification
On The Hunt

SYSTEM

Dial pad touch tones ☑

Touch sounds ☑

Screen lock sound ☑



Volumes

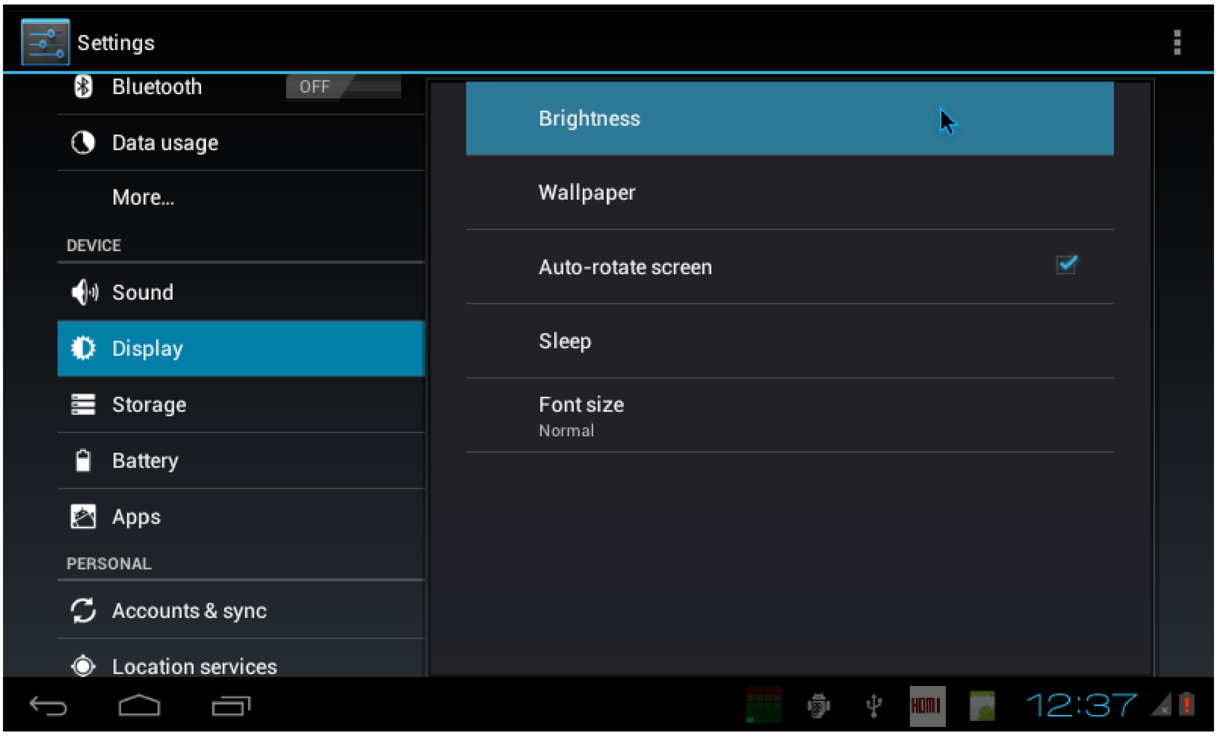
Music, video, games, & other media

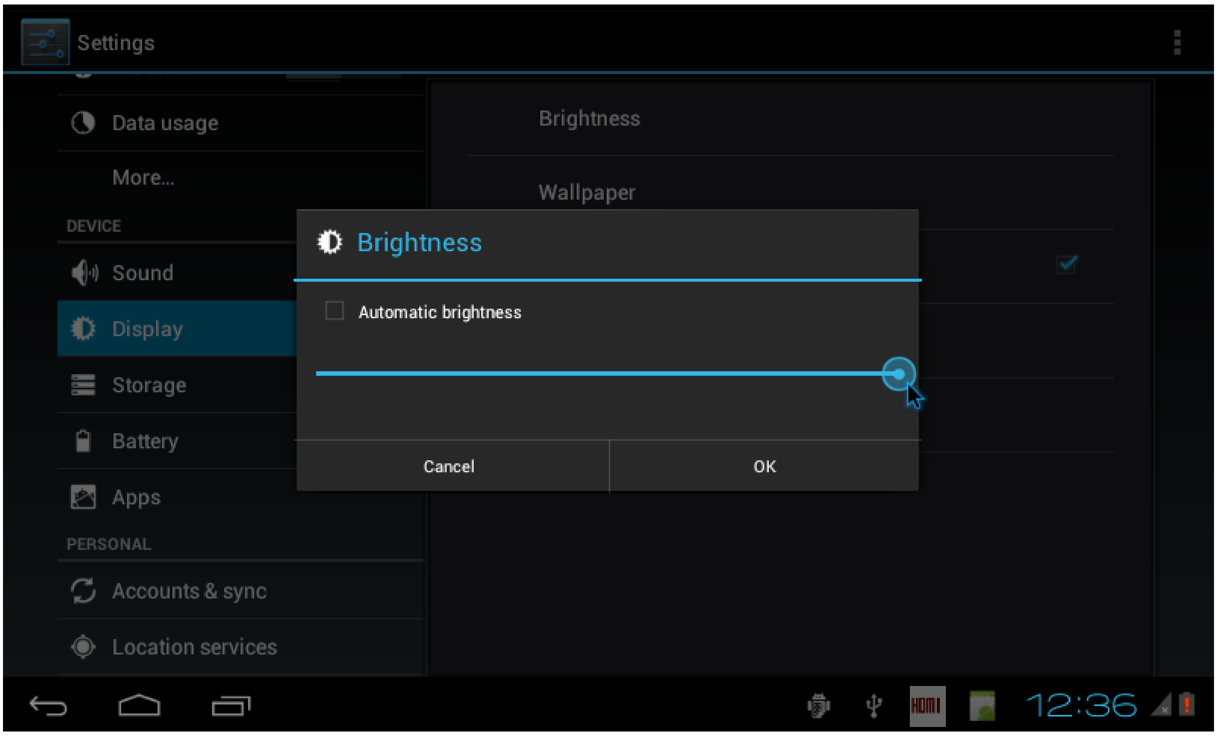
Ringtone & notifications

Alarms

### Display

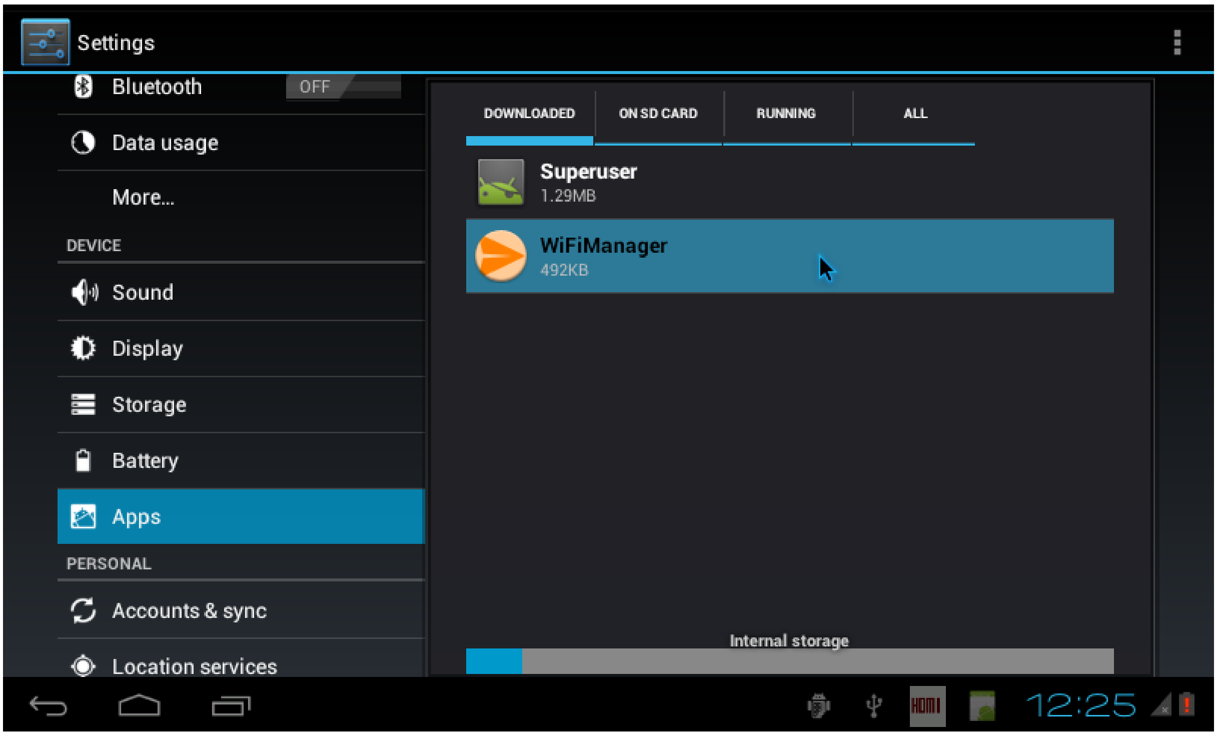
Adjust the brightness, if supported by the panel.

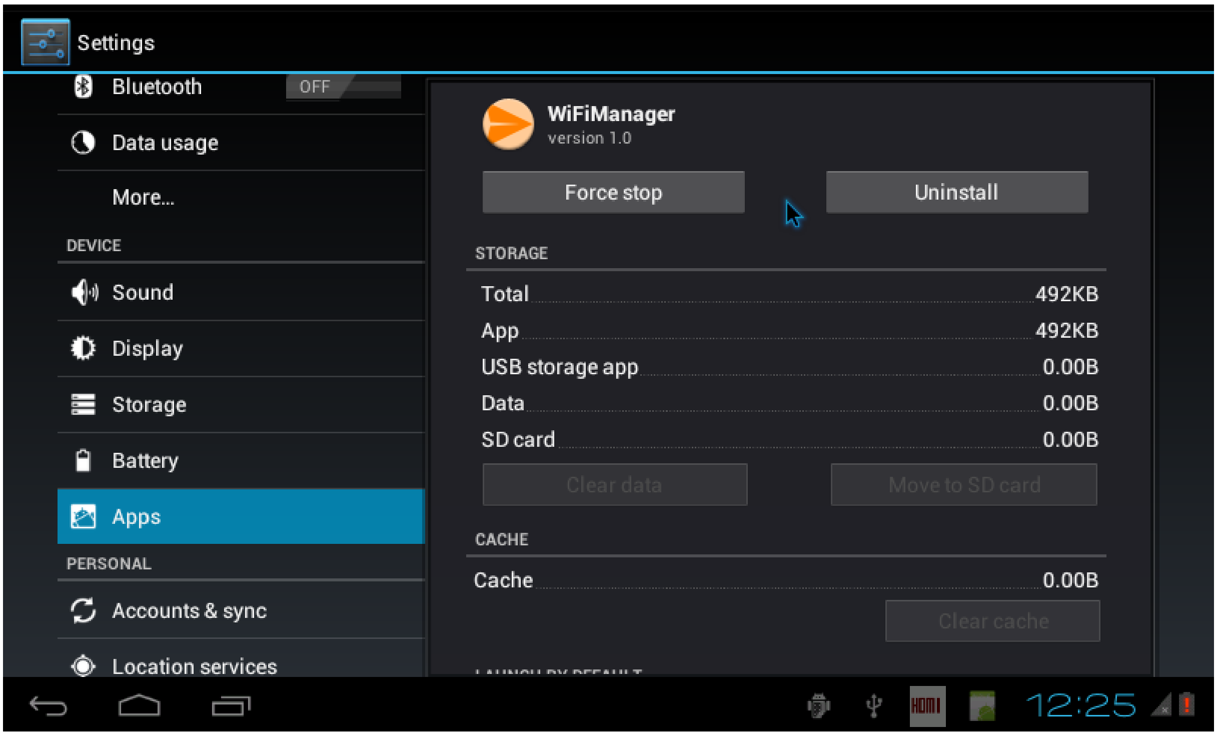




### Apps

Manage all apps. You can force-stop or uninstall an app that you have installed.





STORAGE

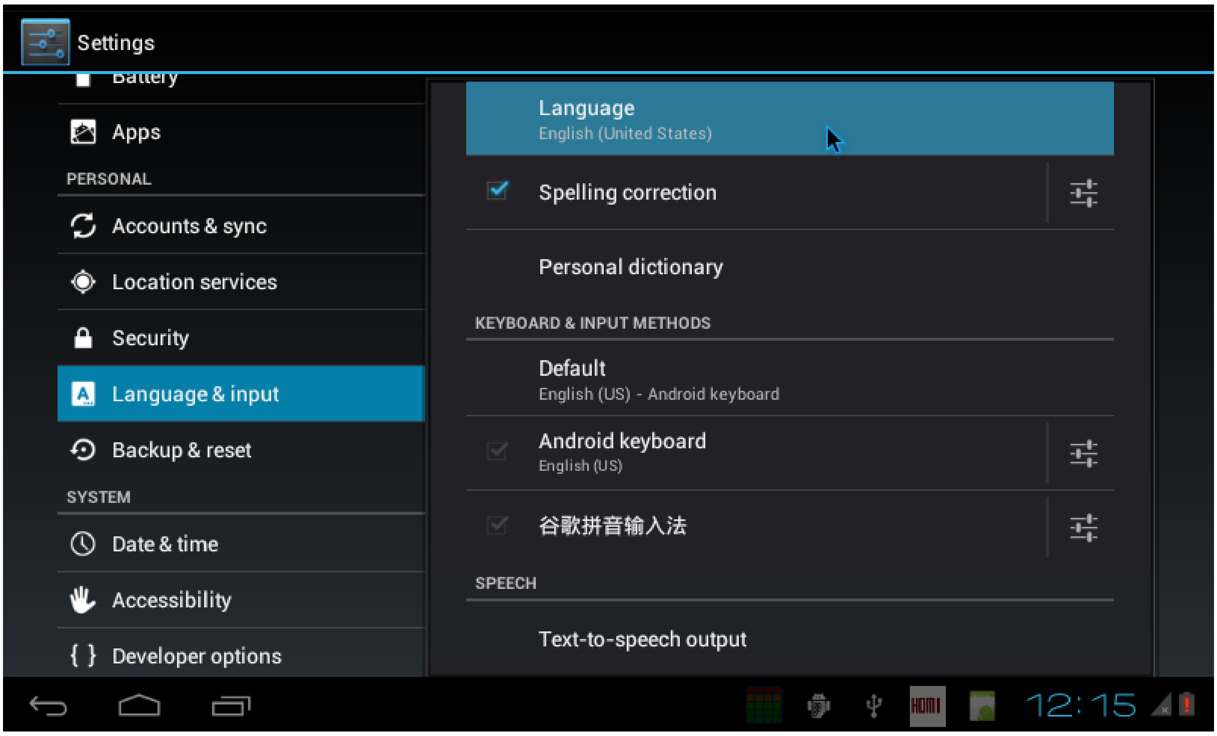
| | |
|---|---|
| Total | 492KB |
| App | 492KB |
| USB storage app | 0.00B |
| Data | 0.00B |
| SD card | 0.00B |

CACHE

| | |
|---|---|
| Cache | 0.00B |

## Language & Input

You can change the UI display language and the default input methods.

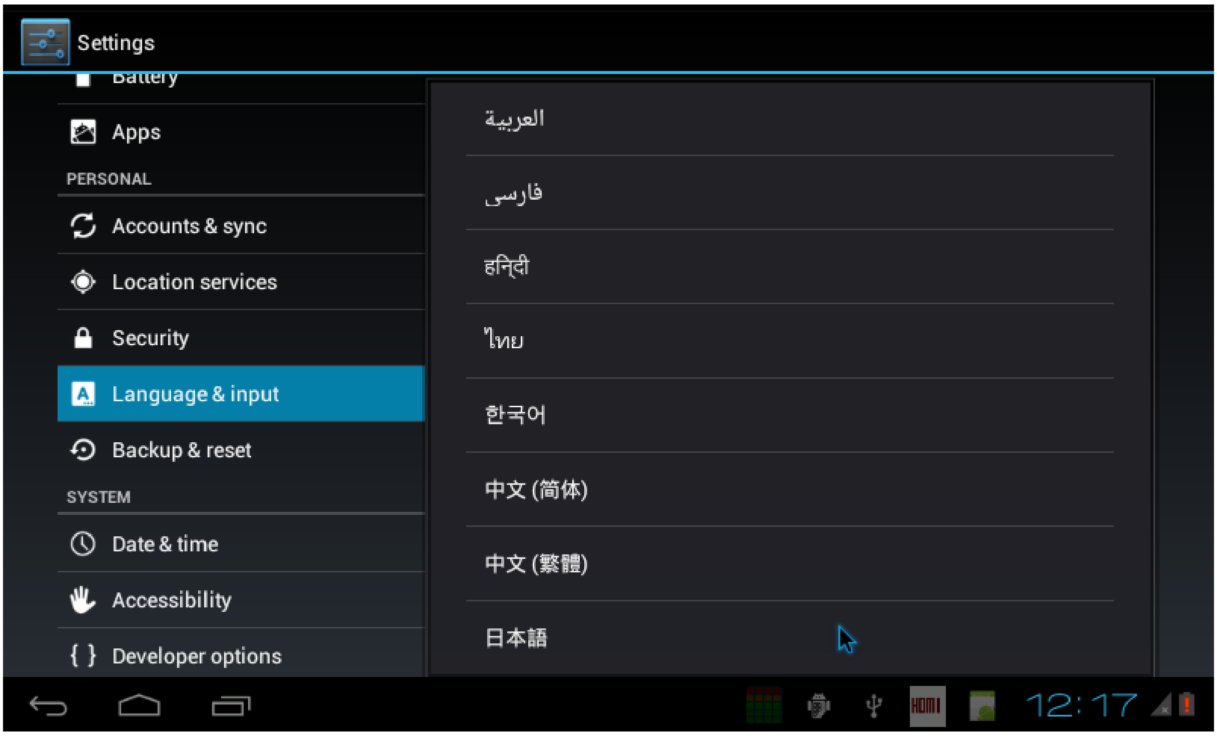


Language
English (United States)

☑ Spelling correction

Default
English (US) - Android keyboard

☑ Android keyboard
English (US)

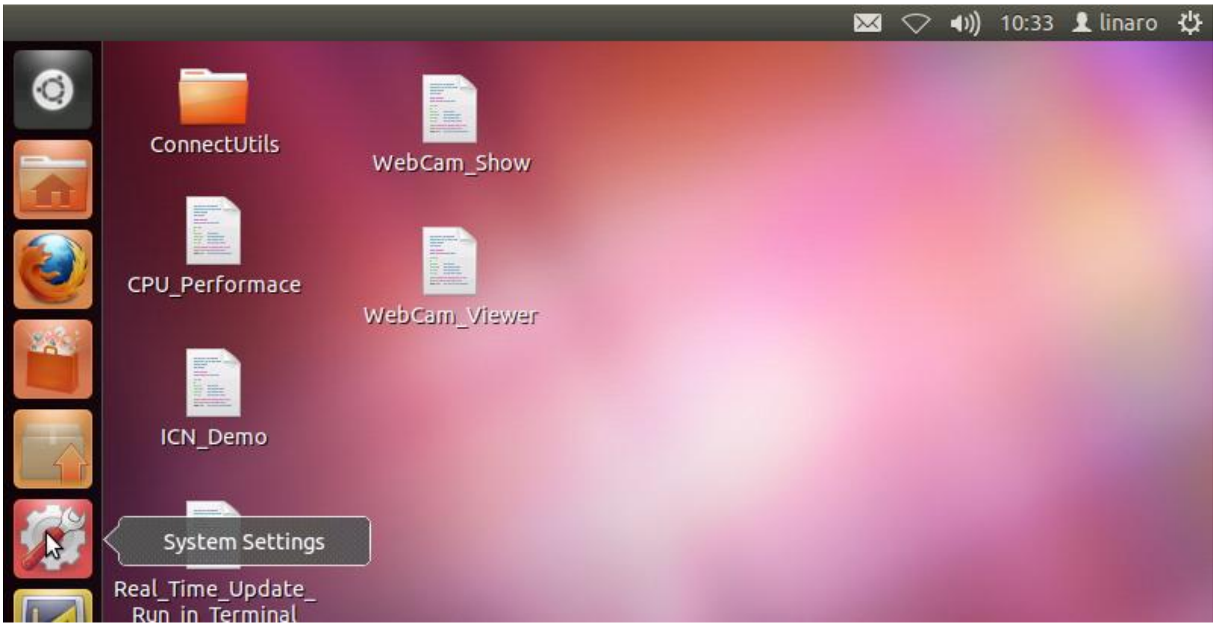


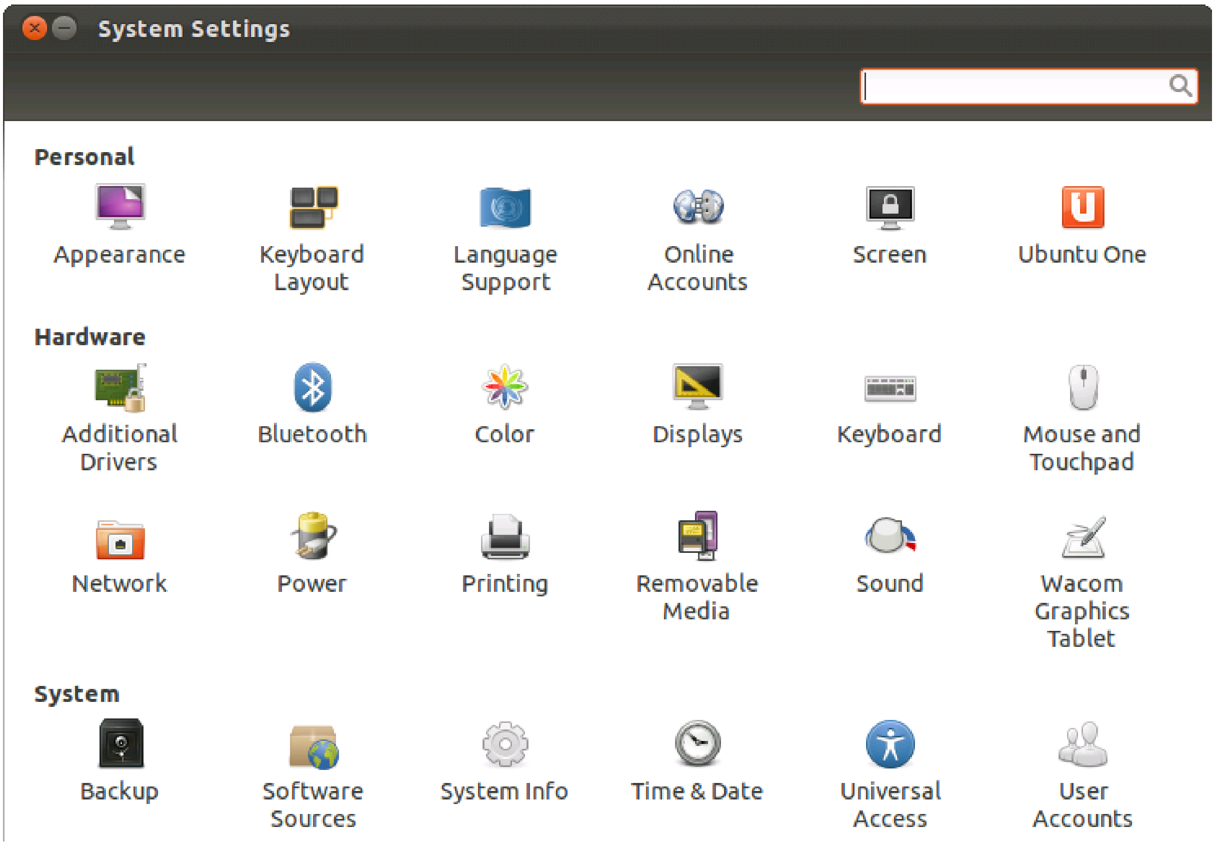
## 4.2 Ubuntu Linux

**Root Password: *linaro***

### 4.2.1 System Settings

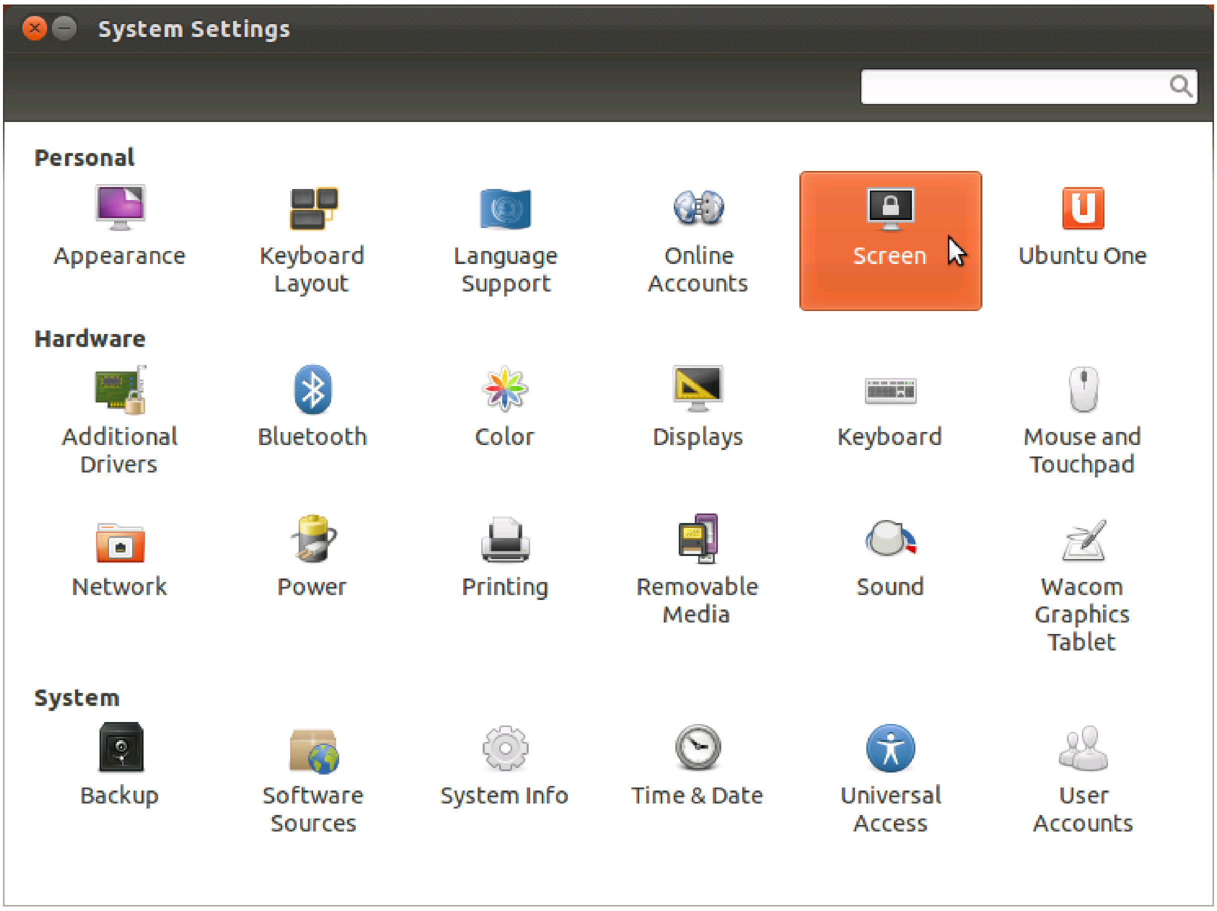
You can reach settings and information for personal, hardware, and system here.

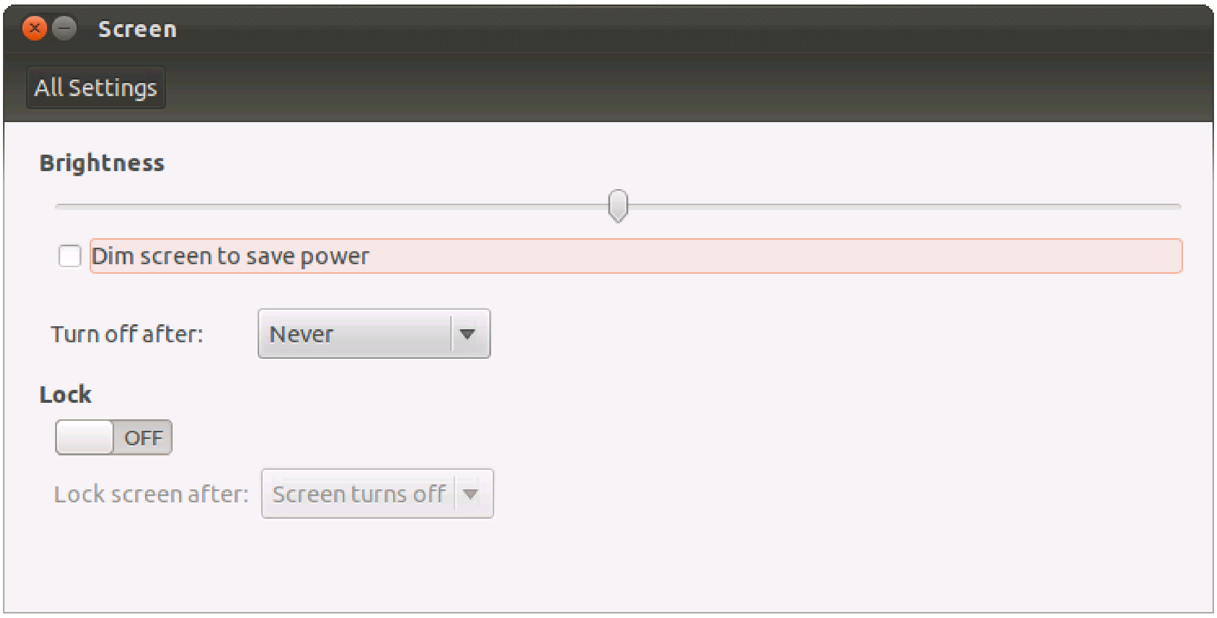




### Screen

If you want to disable screen lock or disable turn off/dim screen, go to the **Screen** option to change the settings.





Brightness

□ Dim screen to save power

Turn off after: Never

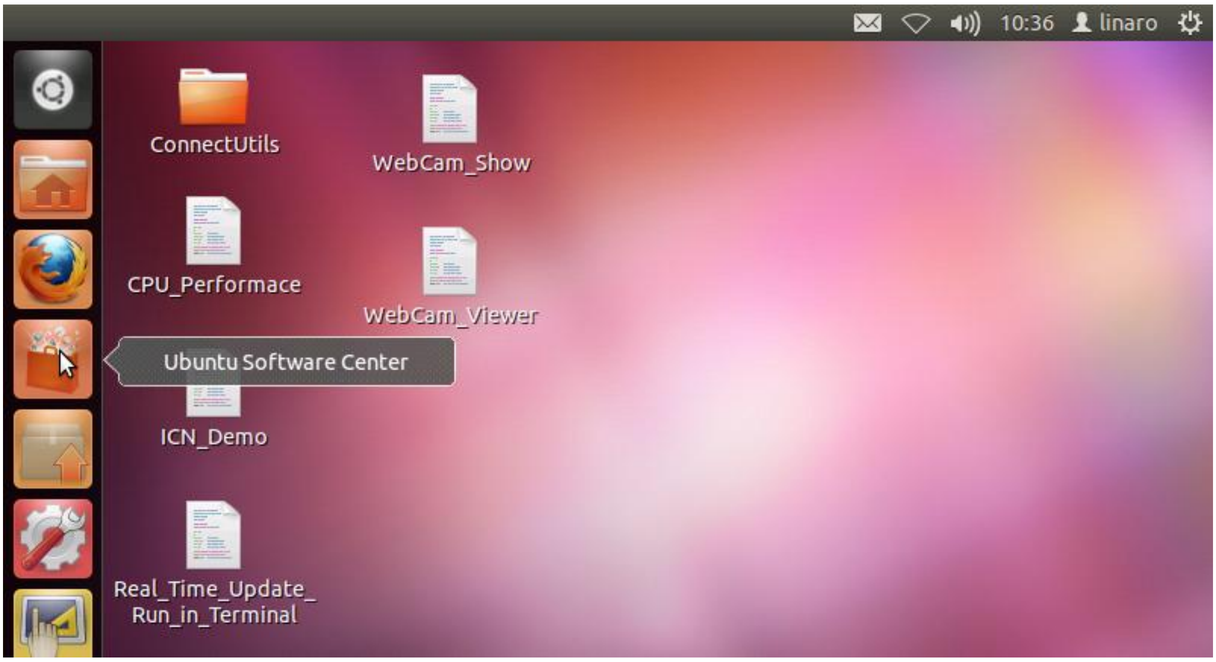
Lock

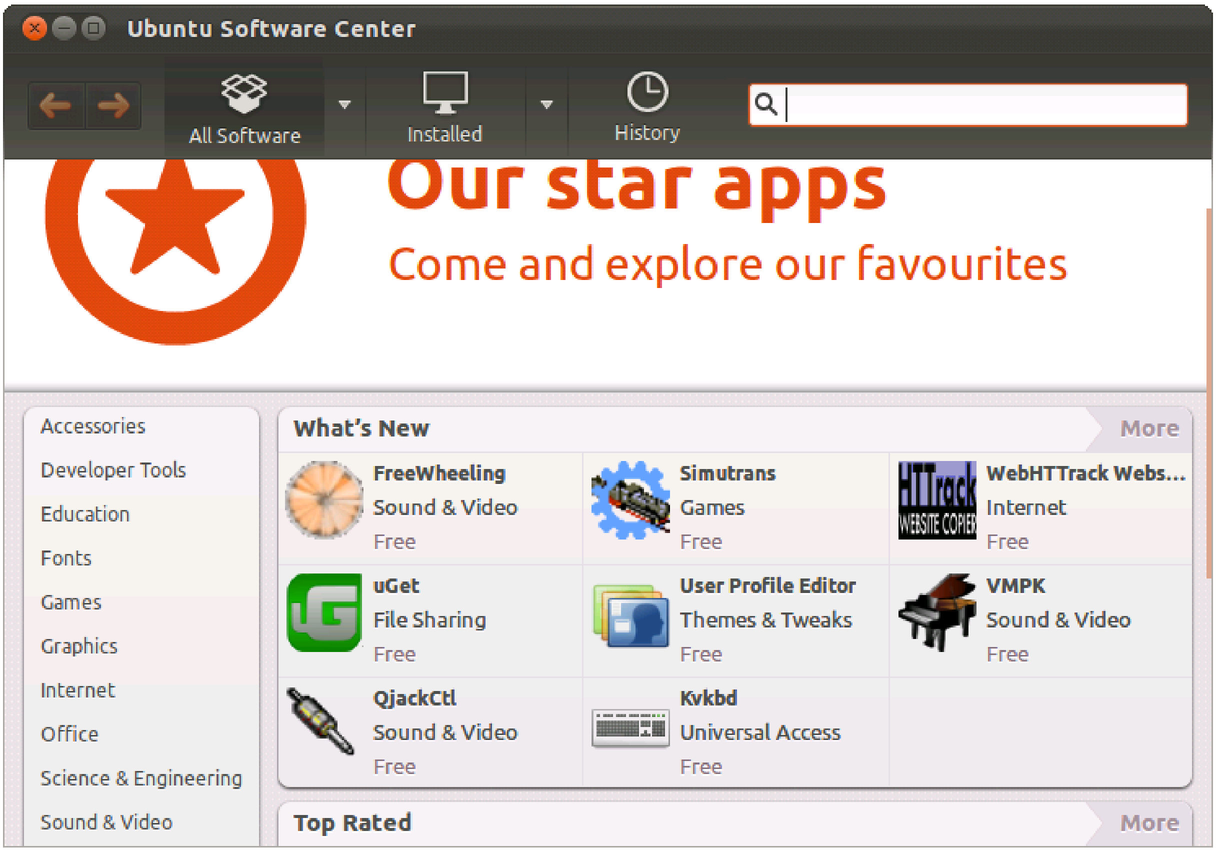
OFF

Lock screen after: Screen turns off

## 4.2.2 Software Center

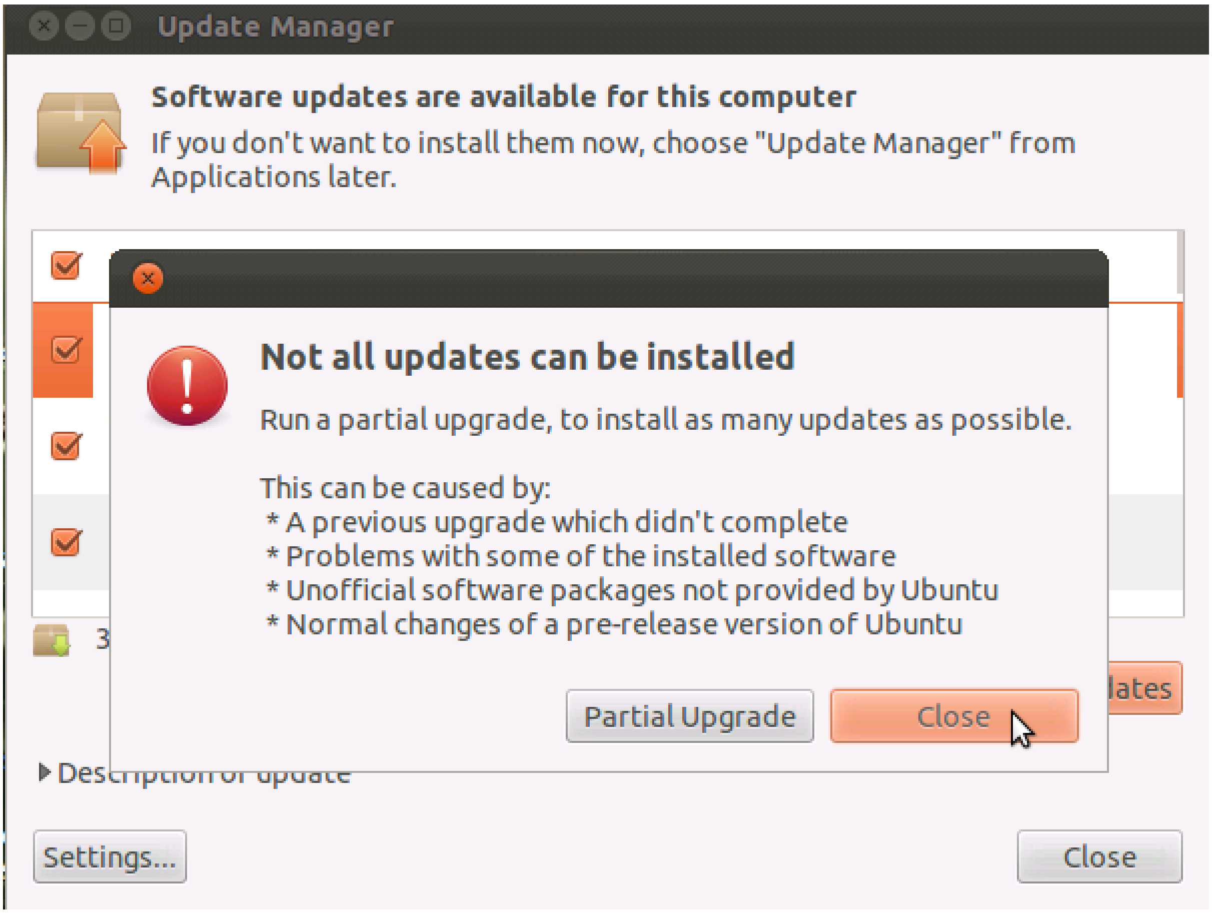
You can use the Ubuntu Software Center to install extra software.





### 4.2.3 Update Manager

If the Update Manager for Ubuntu appears, **please close it**. Do not use it to update the system. We do not offer any support should you use the system update manager.



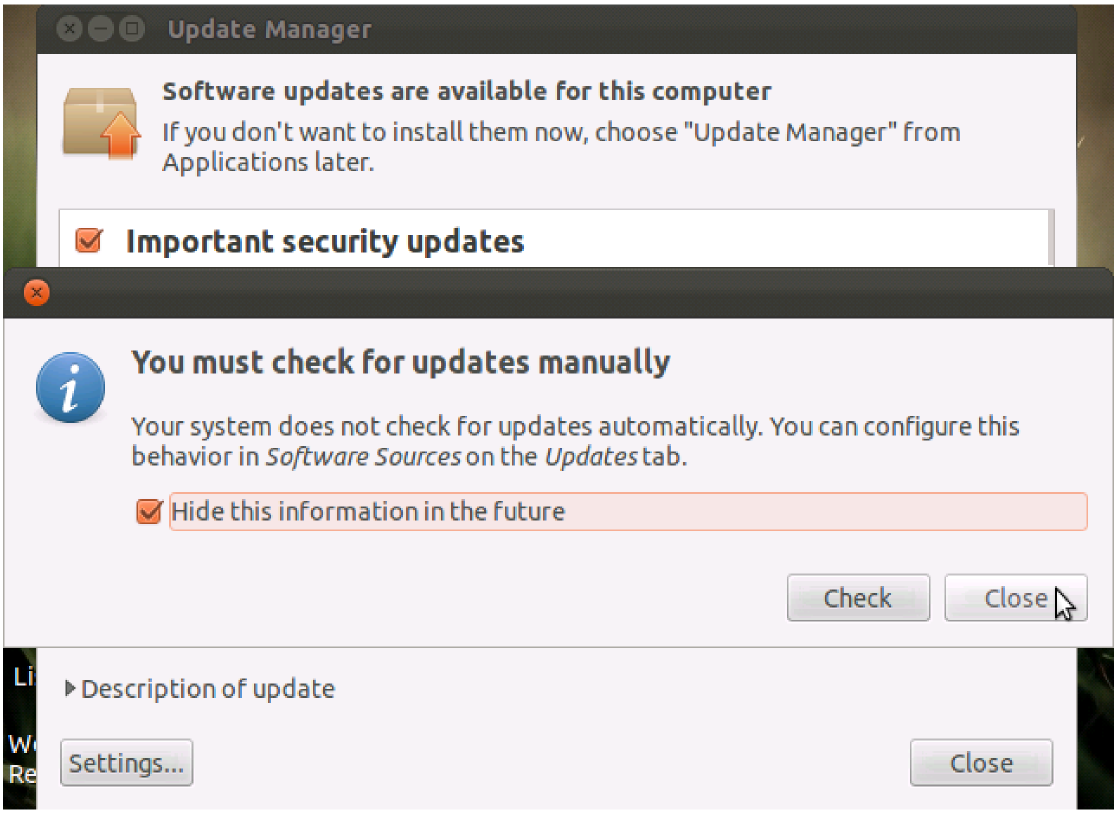
**Software updates are available for this computer**

If you don't want to install them now, choose "Update Manager" from Applications later.

**Not all updates can be installed**

Run a partial upgrade, to install as many updates as possible.

This can be caused by:
* A previous upgrade which didn't complete
* Problems with some of the installed software
* Unofficial software packages not provided by Ubuntu
* Normal changes of a pre-release version of Ubuntu



**Software updates are available for this computer**

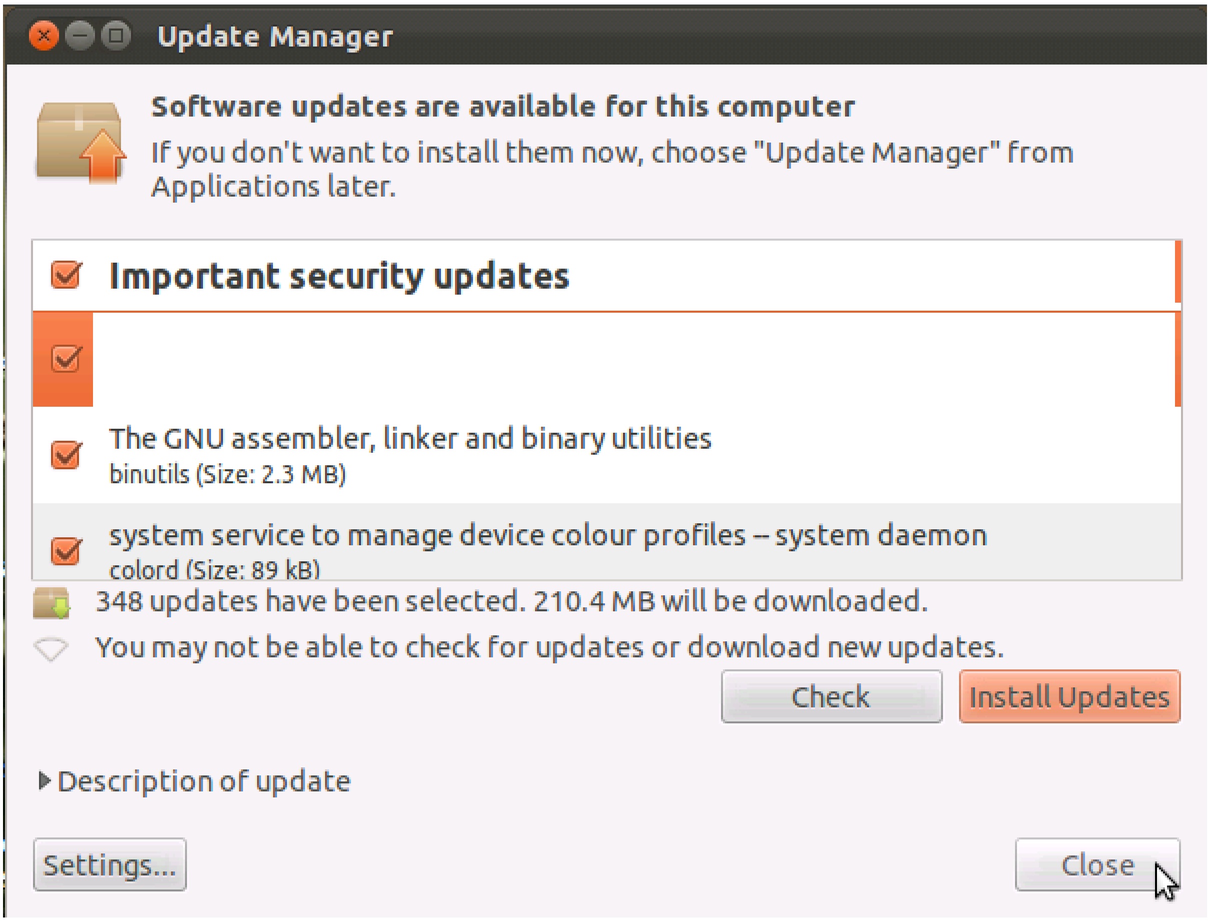
If you don't want to install them now, choose "Update Manager" from Applications later.

☑ **Important security updates**

**You must check for updates manually**

Your system does not check for updates automatically. You can configure this behavior in *Software Sources* on the *Updates* tab.

☑ Hide this information in the future



**Software updates are available for this computer**

If you don't want to install them now, choose "Update Manager" from Applications later.

☑ **Important security updates**

☑

☑ The GNU assembler, linker and binary utilities
binutils (Size: 2.3 MB)

☑ system service to manage device colour profiles – system daemon
colord (Size: 89 kB)

348 updates have been selected. 210.4 MB will be downloaded.

You may not be able to check for updates or download new updates.

# 5. Touch Panel Calibration

## 5.1 Android RTP re-calibrate procedure

If you want or need to calibrate the touch for any reason such as:

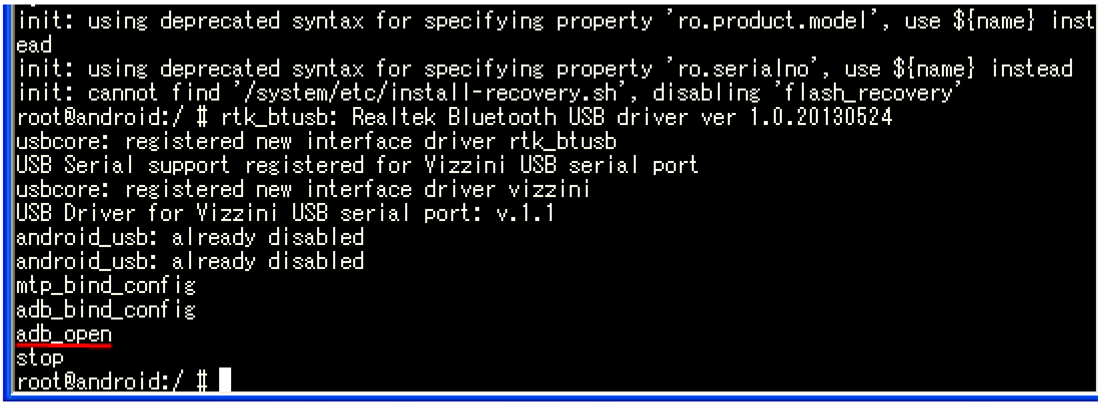
- Touch is not accurate
- You have changed output
- It is your first boot after you updated firmware and set output.

Use the commands to calibrate after devices boot.

When device power on, please notice the messages from console show **‘adb_open’**, while the message occurred, quick input or paste character **“stop”** and press “Enter” key to stop the system booting process. Further then input below commands:

```
        adb_bind_config

        adb_open

        # stop

//now the system would stop and display stays at penguin icon

        # ts_calibrator

//now there would be a white ‘┼’ at left, it is calibration point
```

Here is an example of the console message.



```
init: using deprecated syntax for specifying property 'ro.product.model', use ${name} inst
ead
init: using deprecated syntax for specifying property 'ro.serialno', use ${name} instead
init: cannot find '/system/etc/install-recovery.sh', disabling 'flash_recovery'
root@android:/ # rtk_btusb: Realtek Bluetooth USB driver ver 1.0.20130524
usbcore: registered new interface driver rtk_btusb
USB Serial support registered for Vizzini USB serial port
usbcore: registered new interface driver vizzini
USB Driver for Vizzini USB serial port: v.1.1
android_usb: already disabled
android_usb: already disabled
mtp_bind_config
adb_bind_config
adb_open
stop
root@android:/ #
```

When the calibration point '+' shows, please quickly and accurately touch the cross on panel. Be careful that this calibrator is with timeout function. If it is timeout, just input **ts_calibrator** again.

After touching several crosses, there will appear a green and red small square. Touch the left green one a while. It is accurate confirmation function; all blue crosses should be within the green square. If not, the calibrator will let you calibrate again automatically.

Finally, reset power or keyin **start** to continue system.

```
# start
```

## 5.2 Ubuntu RTP re-calibrate procedure

If you want to re-calibrate, please key in following commands on the console terminal after system booted:

```
            # rm -f /etc/pointercal
//delete calibration file
            # shutdown –r now
//then reboot
```