TCC893X
ANDROID SDK
APPLICATION START GUIDE

TCC893x_Android 4.4.2(Kitkat)_v1.00E

Rev. 1.00

Mar 31, 2014

Telechips

DISCLAIMER

All information and data contained in this material are without any commitment, are not to be considered as an offer for conclusion of a contract, nor shall they be construed as to create any liability. Any new issue of this material invalidates previous issues. Product availability and delivery are exclusively subject to our respective order confirmation form; the same applies to orders based on development samples delivered. By this publication, Telechips, Inc. does not assume responsibility for patent infringements or other rights of third parties that may result from its use.

Further, Telechips, Inc. reserves the right to revise this publication and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes.
No part of this publication may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express written consent of Telechips, Inc.
This product is designed for general purpose, and accordingly customer be responsible for all or any of intellectual property licenses required for actual application. Telechips, Inc. does not provide any indemnification for any intellectual properties owned by third party.
Telechips, Inc. can not ensure that this application is the proper and sufficient one for any other purposes but the one explicitly expressed herein. Telechips, Inc. is not responsible for any special, indirect, incidental or consequential damage or loss whatsoever resulting from the use of this application for other purposes.

COPYRIGHT STATEMENT

Important Notice

For customers who use licensed Codec ICs and/or licensed codec firmware of mp3:
"Supply of this product does not convey a license nor imply any right to distribute content created with this product in revenue-generating broadcast systems (terrestrial. Satellite, cable and/or other distribution channels), streaming applications(via internet, intranets and/or other networks), other content distribution systems(pay-audio or audio-on-demand applications and the like) or on physical media(compact discs, digital versatile discs, semiconductor chips, hard drives, memory cards and the like). An independent license for such use is required. For details, please visit http://mp3licensing.com".

For customers who use other firmware of mp3:
"Supply of this product does not convey a license under the relevant intellectual property of Thomson and/or Fraunhofer Gesellschaft nor imply any right to use this product in any finished end user or ready-to-use final product. An independent license for such use is required. For details, please visit http://mp3licensing.com".

For customers who use Digital Wave DRA solution:
"Supply of this implementation of DRA technology does not convey a license nor imply any right to this implementation in any finished end-user or ready-to-use terminal product. An independent license for such use is required."

For customers who use DTS technology:
"This product made under license to certain U.S. patents and/or foreign counterparts."
"© 1996 – 2011 DTS, Inc. All rights reserved."

For customers who use Dolby technology:
"Supply of this Implementation of Dolby technology does not convey a license nor imply a right under any patent, or any other industrial or intellectual property right of Dolby Laboratories, to use this Implementation in any finished end-user or ready-to-use final product. It is hereby notified that a license for such use is required from Dolby Laboratories."

For customers who use MS technology:
"This product is subject to certain intellectual property rights of Microsoft and cannot be used or disctributed further without the appropriate license(s) from Microsoft."

Revision History

Date	Version	Description
2014-03-31	1.00	Initial Release

TABLE OF CONTENTS

Contents

Figures

1 Introduction

This document describes how to start applications. If you follow description, you can execute applications.

2 Music player

When the device normally boot up, you can see below screen from LCD.

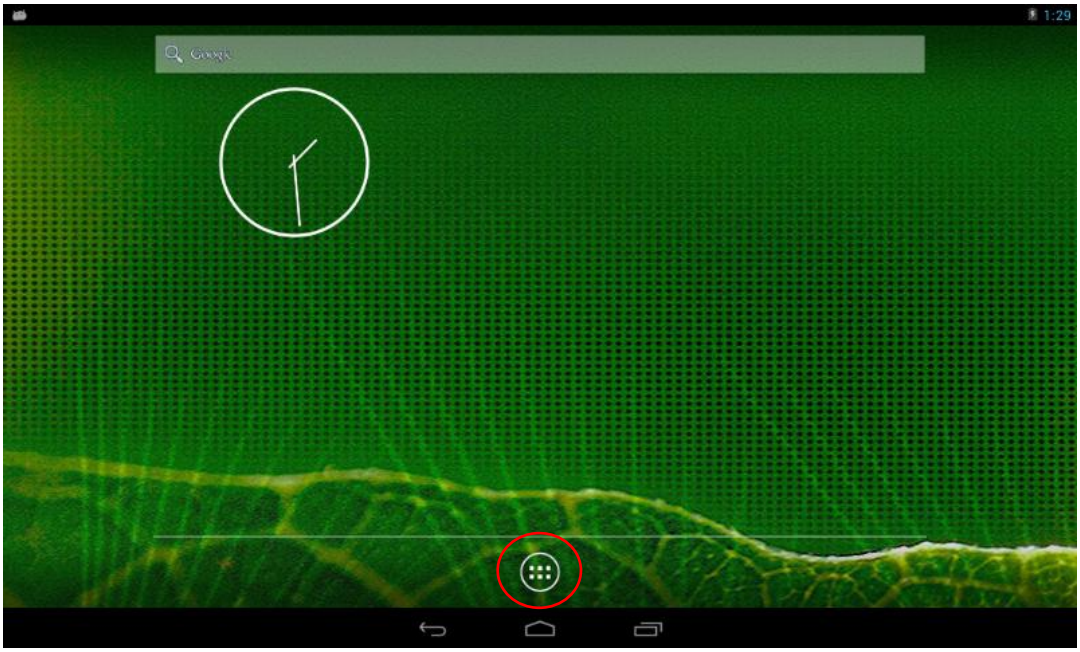


Figure 1. Screen after android is boot up

When you touch red circle area, then you can see below screen.

Figure 2. Applications which you can select

If you touch “Music” icon, you can see below screen.

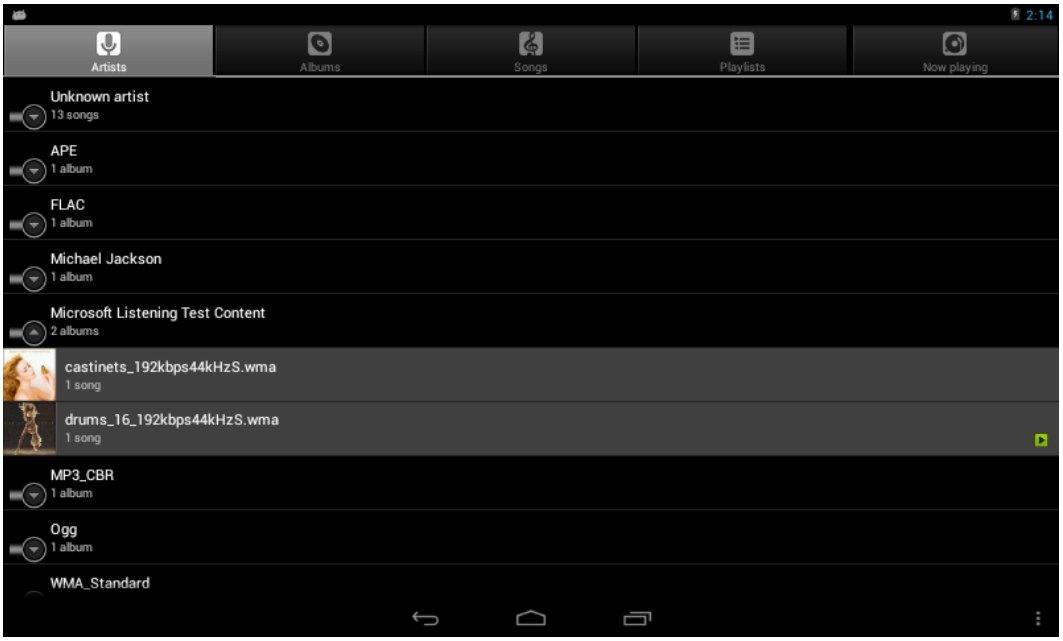


Figure 3. Music player

Select one of “Artists”, “Albums”, “Songs” or “Playlists”, then you can see list of songs. Select one of them. Then you can see below screen with playing music.

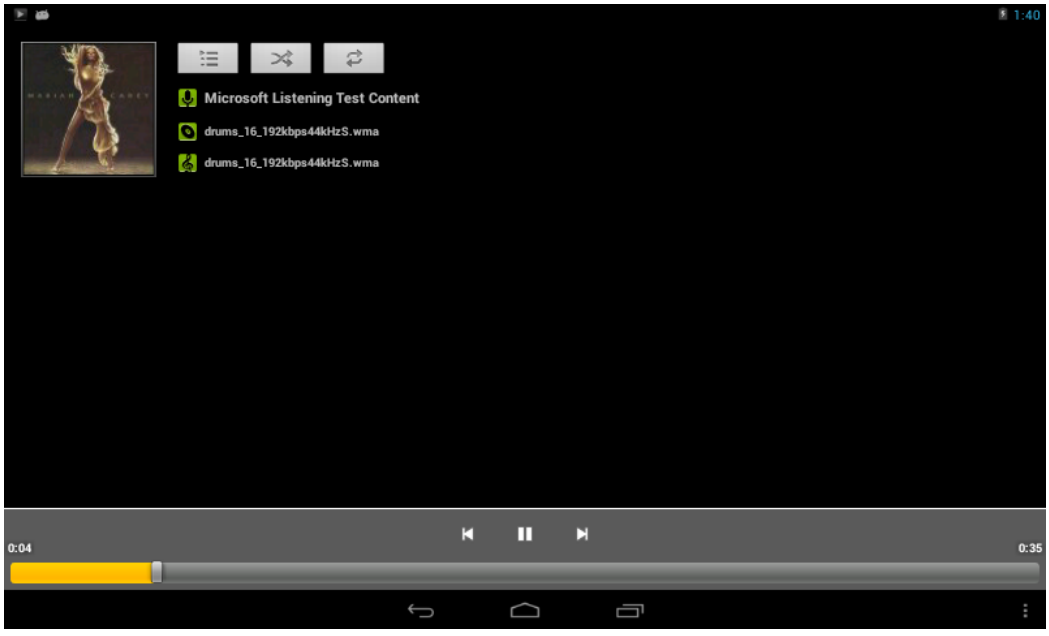


Figure 4. Play music

3 Video player

If you select “Gallery” from figure 2 screen, you can see below screen and this is video player.

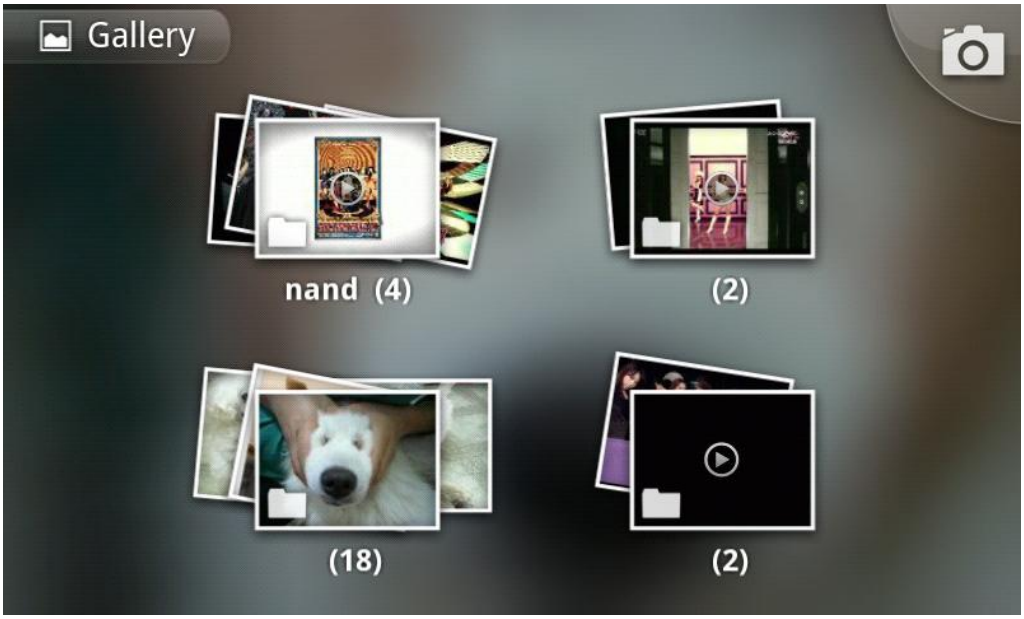


Figure 5. Video player

When you select one of “All pictures”, “All videos”, “Video”, “Still Image”, or “sdcard”, you can see thumbnail of videos.

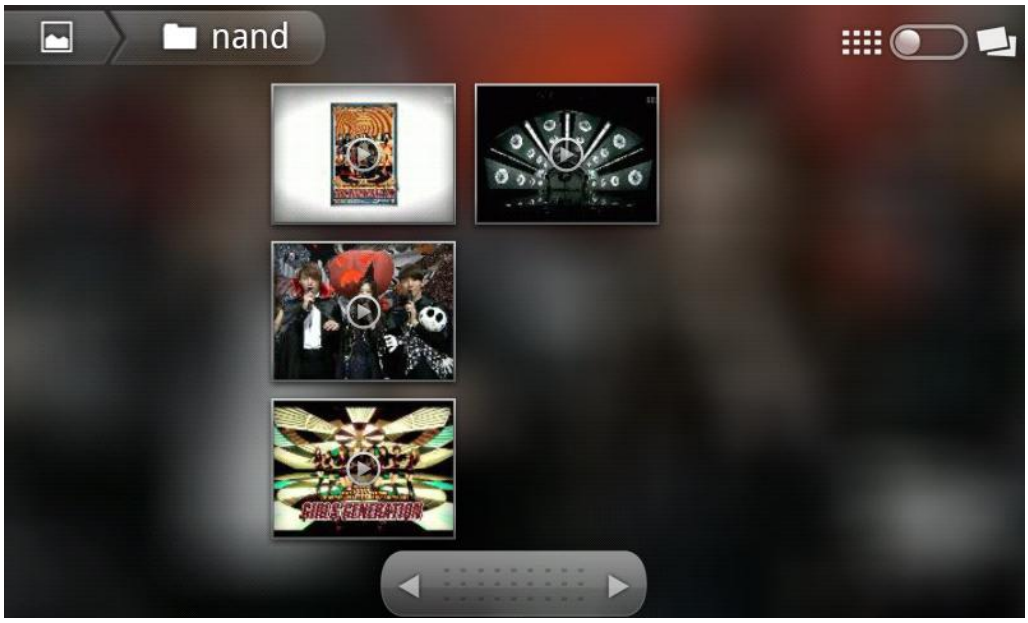


Figure 6. Thumbnail for video player

If you select one of videos, you can see video.

3.1 Support video out synchronized to H/W interrupt

It makes video out can be displayed more smoothly, but it use 16Mbytes memory more.
To use this function, You have to set as below.

1) Bootloader

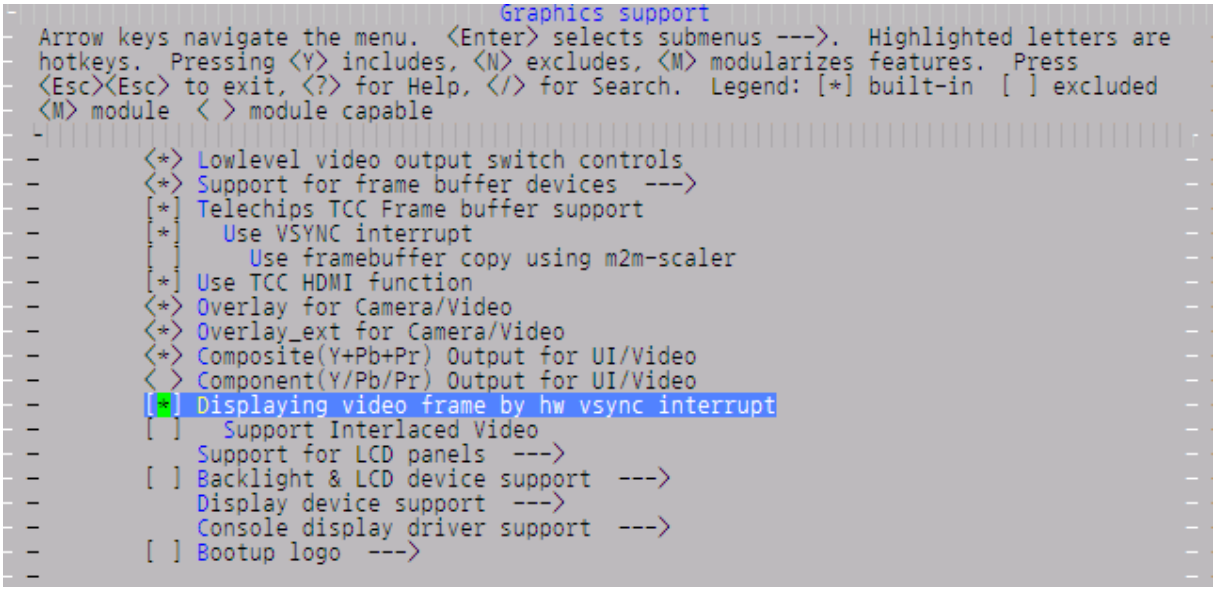
Change "TCC_VIDEO_DISPLAY_BY_VSYNC_INT" option from "false" to "true" in lk/target/tcc8800_evm/rules.mk file as below.
(*bootable/bootloader/lk/target/tcc8920_evm/rules.mk*)

```
#-----------------------------------------------------------------------
# Support video displaying by hw vsyn interrupt
#-----------------------------------------------------------------------
TCC_VIDEO_DISPLAY_BY_VSYNC_INT := true
```

2) Kernel

You must change kernel configuration.
Execute "make menuconfig" command from kernel folder and select configurations as below.

Select "Device Drivers → Graphics support → Displaying video frame by hw vsync interrupt"



3) System

Change "*device/telechips/tcc8920/BoardConfigBase.mk*".

```
BOARD_VIDEO_DISPLAY_BY_VSYNC_INT_FLAG := true
```

Change "*device/telechips/tcc8920/device_base.mk*".

```
setprop tcc.video.vsync.support    1
```

4 TDMB player

* To test TDMB player, you must have TCC3150 sub board.

If you select “Mobile TV” from figure 2 screen, you can see below screen and this is TDMB player.

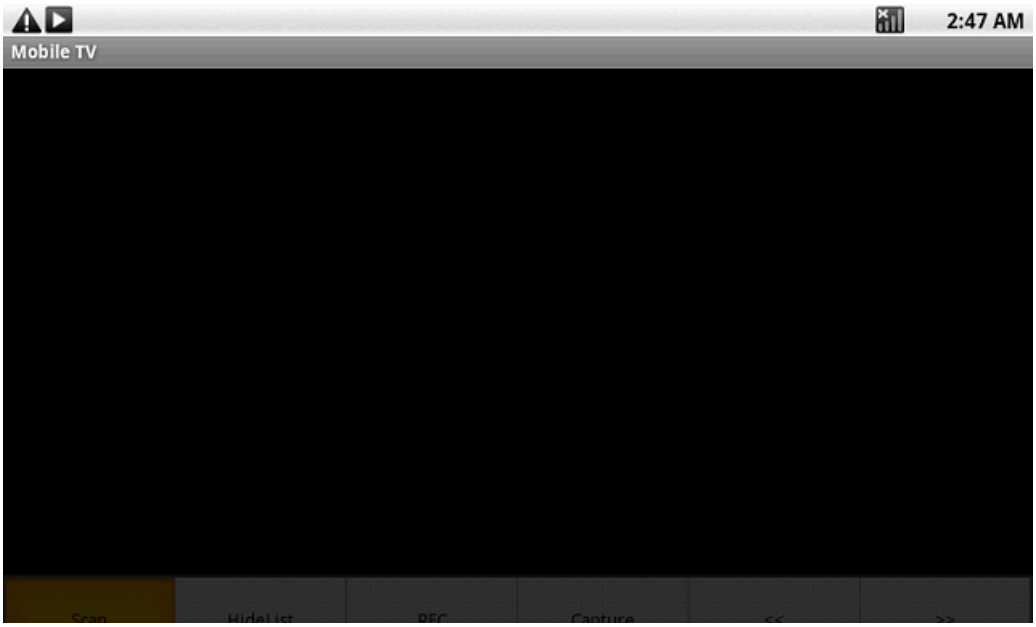


Figure 7. TDMB player

When you press “MENU” key, you can see menus. Select button which you want to do.

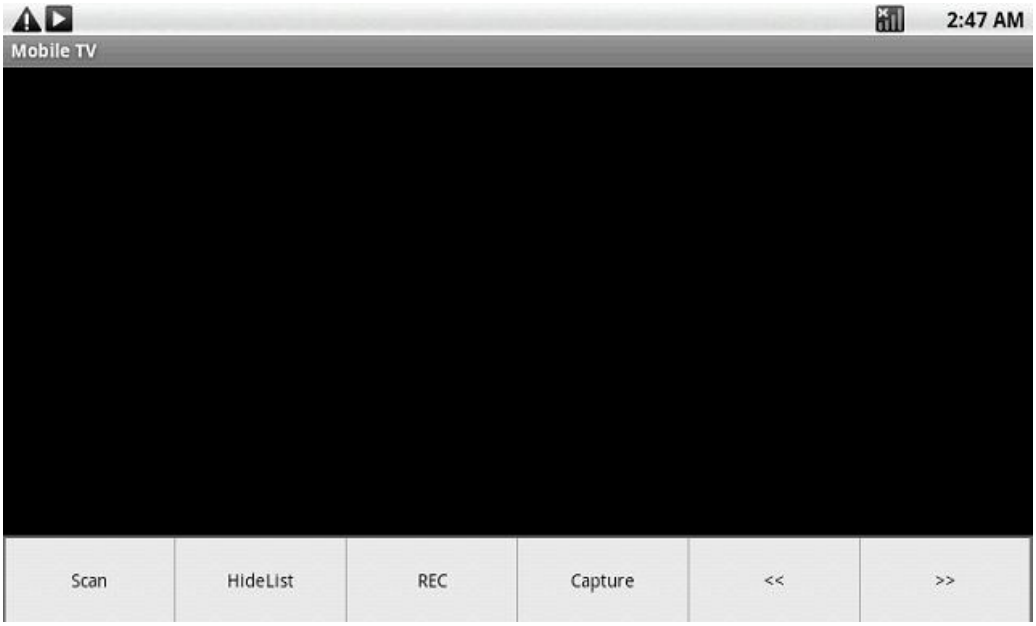
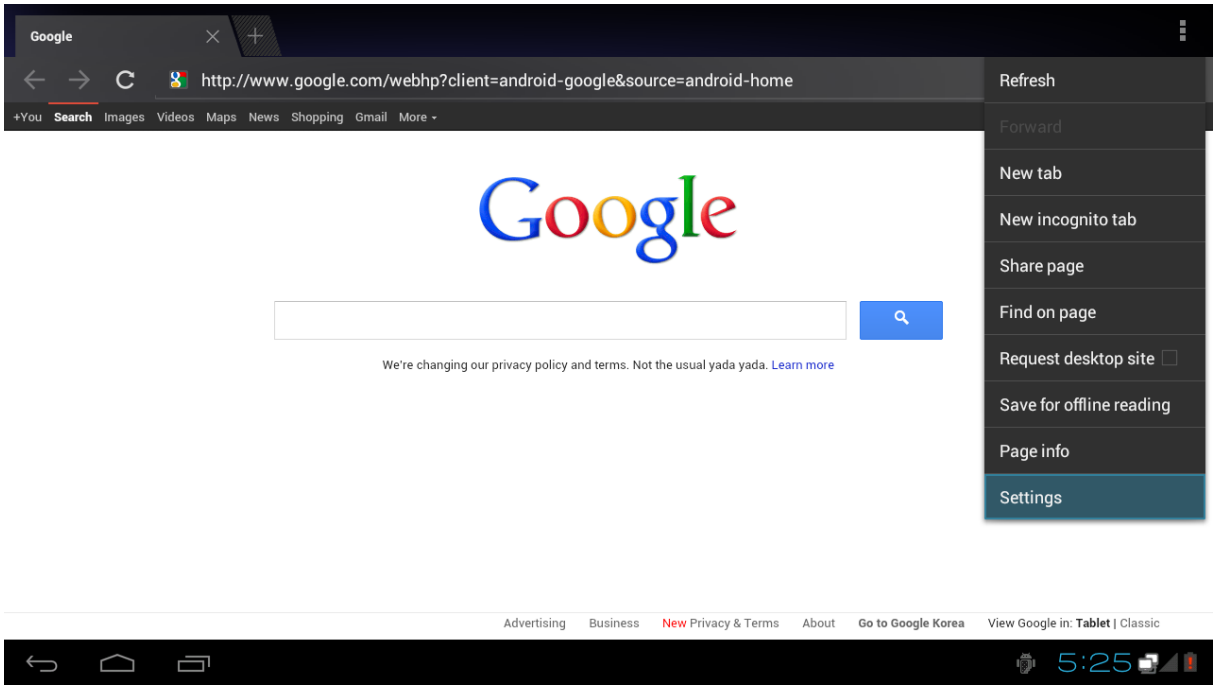


Figure 8. Menus for TDMB player

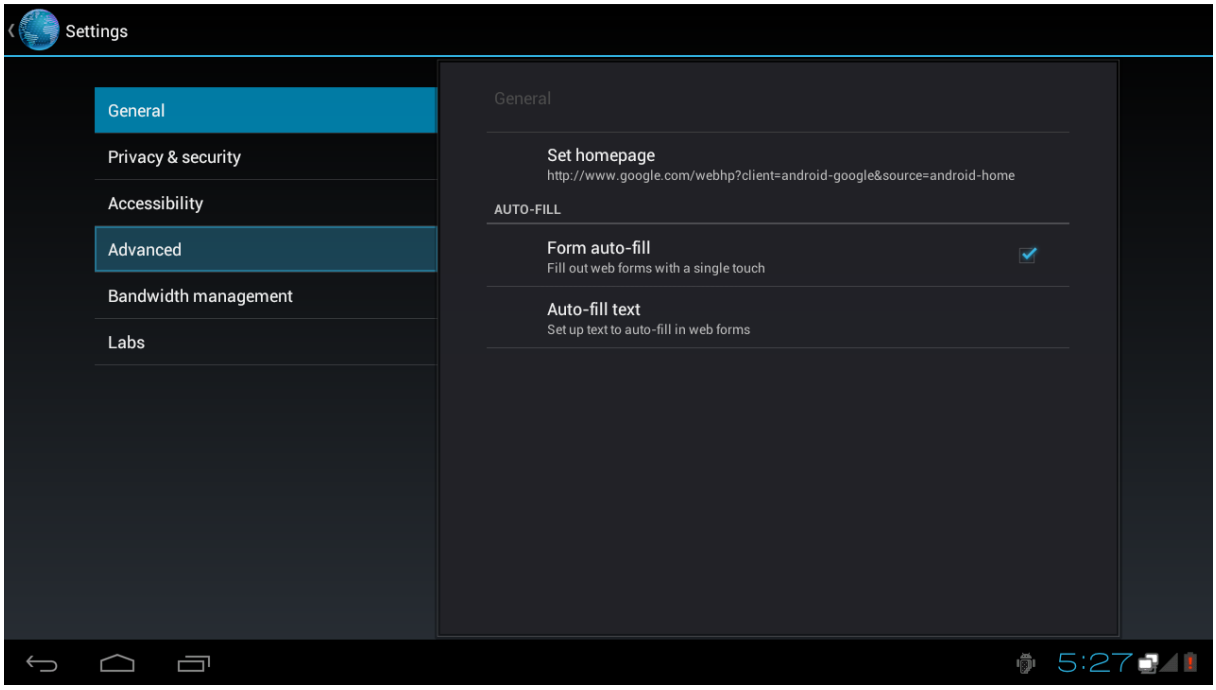
5 How to support HTML5 video playback

You might want to play a video clip on a web site without any installation of the browser plug-in (i.e. flash player). By changing the default user agent of Android web browser as below, http live streaming playback could be supported :

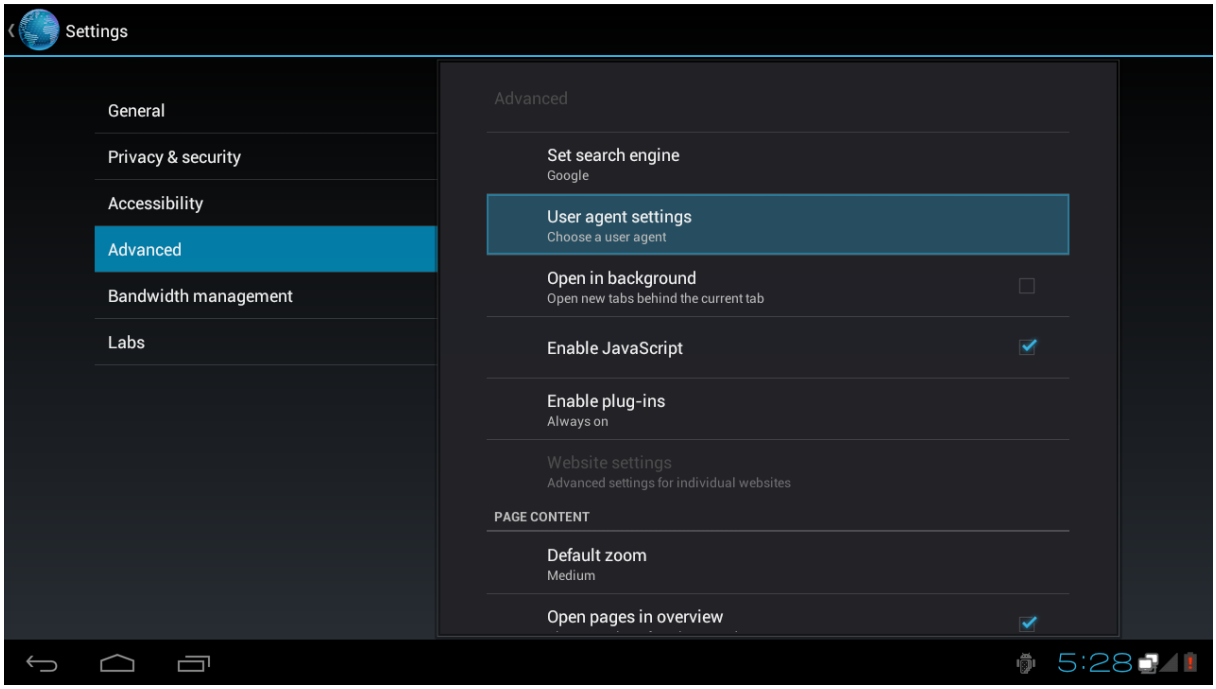
Step 1> Run 'Browser', click the right-top icon and select 'Settings' .



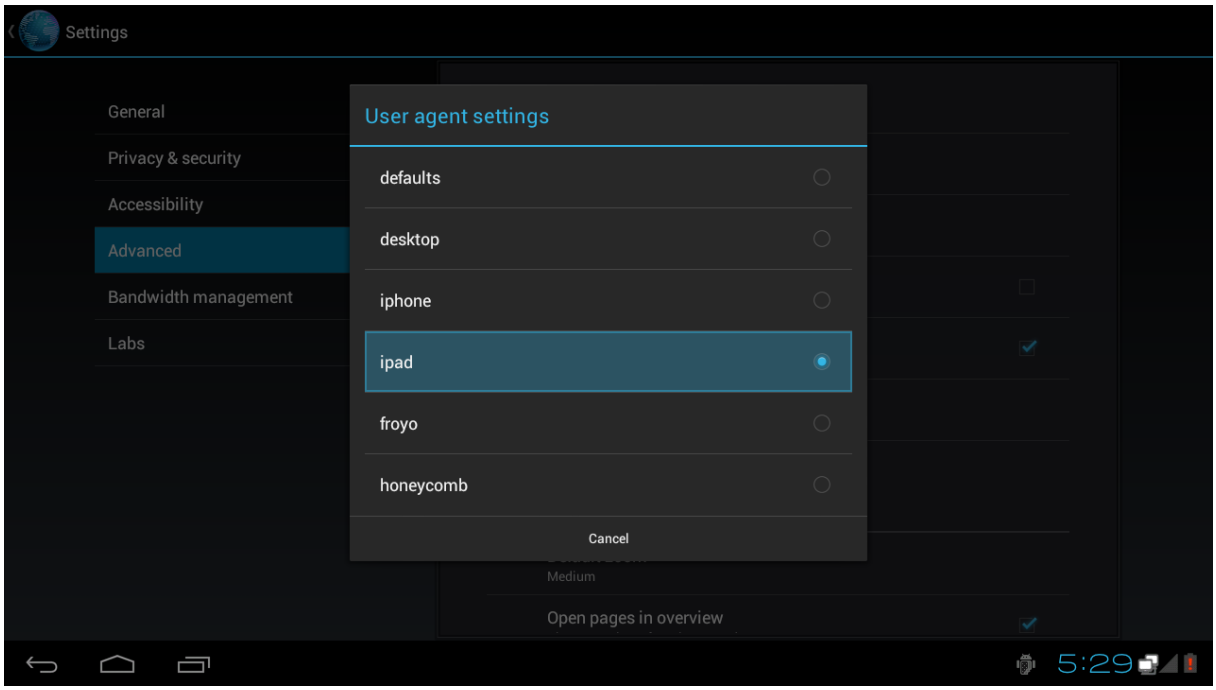
Step 2> Select 'Advanced'.



Step 3> Select 'User agent settings' .



Step 4> Select 'iPad' .



6 Change LCD driver

To change LCD driver, you have to set as below.

1) Bootloader

Change “bootable/bootloader/lk/target/tcc893x_evm/rules.mk” for LCD driver type.

```
$ cd ~/mydroid/android/bootable/bootloader/lk
$ vi target/tcc893x_evm/rules.mk
```

Then select “DEFINES += AT070TN93” and “DEFINES += FLD0800” should be unselected.

```
# Defines LCD panel
#DEFINES += DX08D11VM0AAA # 480x800
#DEFINES += LMS350DF01    # 320x480
DEFINES += AT070TN93      # 800x480
#DEFINES += ED090NA       # 1280x800 COBY
#DEFINES += KR080PA2S     # 1024x768 EMDOOR
#DEFINES += LMS480KF      # 800x480
#DEFINES += CLAA070NP01   # 1024_600
#DEFINES += HV070WSA      # 1024_600
#DEFINES += FLD0800       # 1024x600
#DEFINES += CLAA070WP03   # 800x1280 YECON MIT700
#DEFINES += LMS700KF23
```

And then, to compile for TCC893x, “make tcc893x_evm” must be executed.

2) kernel.

To change LCD driver, you must change kernel configuration.
Please execute “make menuconfig” command from kernel folder and select configurations

```
$ cd ~/mydroid/android/kernel
$ make tcc893x_defconfig
```

Select “Device Driver --> Input device support --> Touchscreens”. You can see below Touch sensor modules.
Then select “Telechips ADC touchscreen driver” and “GT813 Touch Controller for 1024x600 LCD” should be unselected.

```
      -*-   Telechips touchscreen core
      < >   GT813 Touch Controller for 1024x600 LCD
      < >   GT827 Touch Controller for 800x1280 LCD
      <*>   Telechips ADC touchscreen driver
```

And then , to compile Linux kernel, just execute “make”.

7 HDMI

To use HDMI, just connect the HDMI cable. It will be automatically changed to use HDMI. Do not need any other setting.

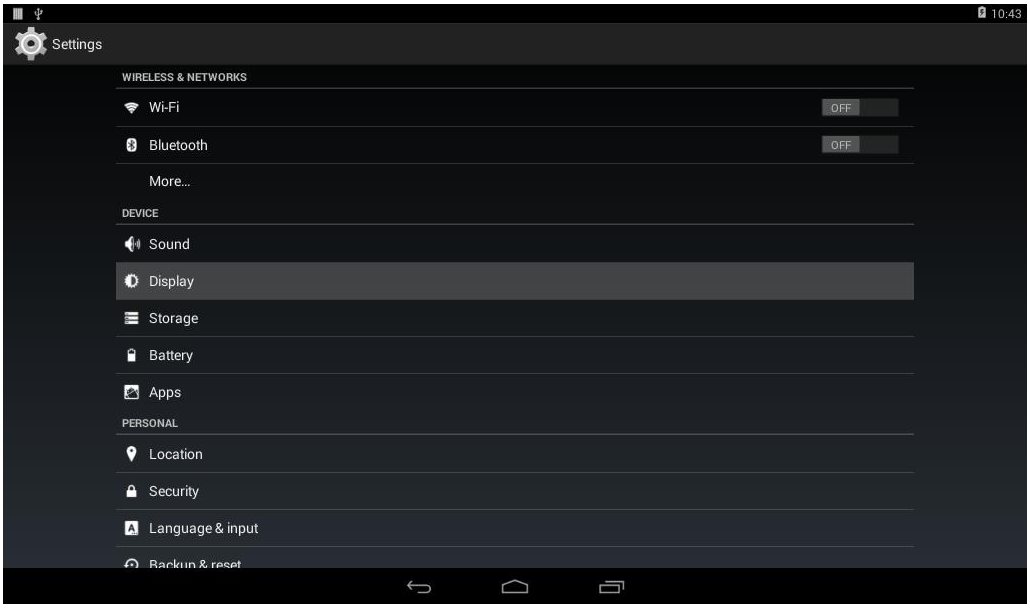


Figure 9. Display setting menu

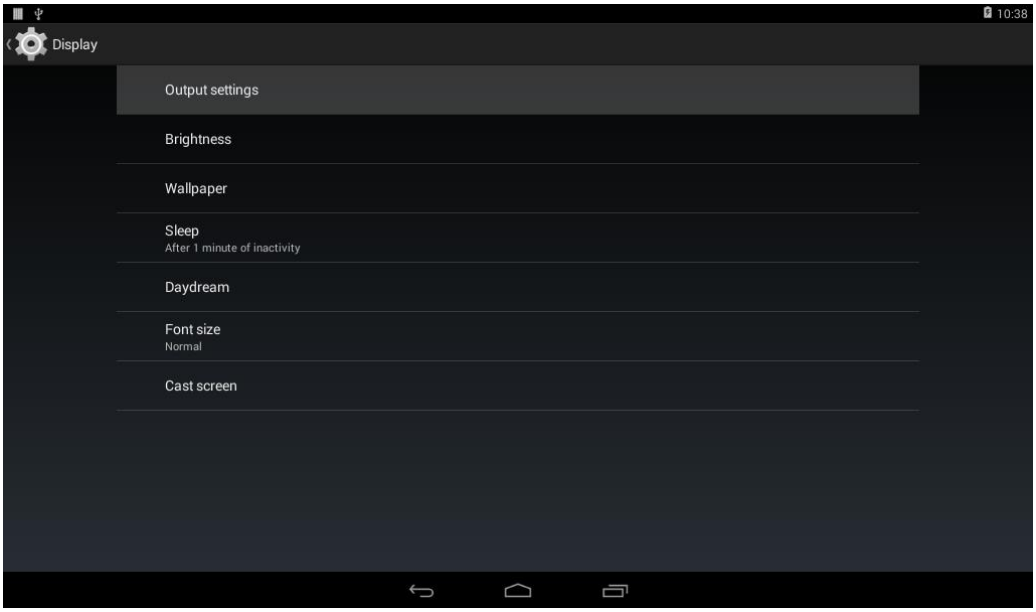


Figure 10. Output settings menu

HDMI is operated with hot-plug. In other word, when you plug-in HDMI, you can see UI and VIDEO screen from HDMI device.

If you want to change HDMI resolution, select Resolution menu in “HDMI settings” menu. So you can see HDMI resolution setting popup window. And select the resolution.
HDMI resolution menu is 1080p , 720p
If you want to add other HDMI resolution, change the source code.
Sorce file: device/telechips/tcc893x/device.mk
PRODUCT_PROPERTY_OVERRIDES += ro.system.hdmi_portable = **false**

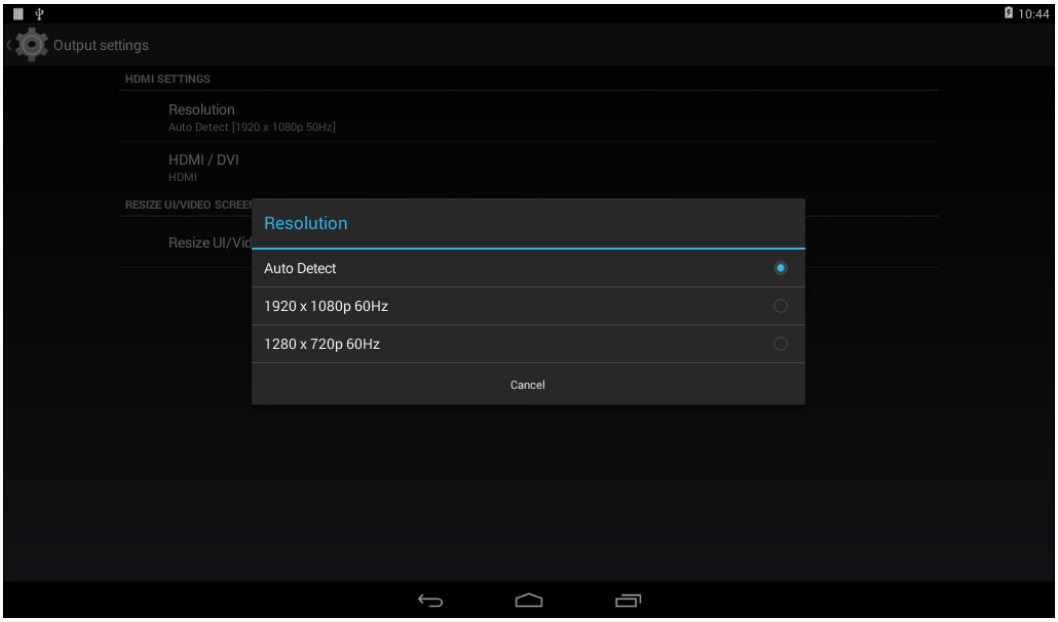


Figure 11. Change HDMI resolution

If you want to use DVI monitor, push the HDMI/DVI menu and choose DVI.

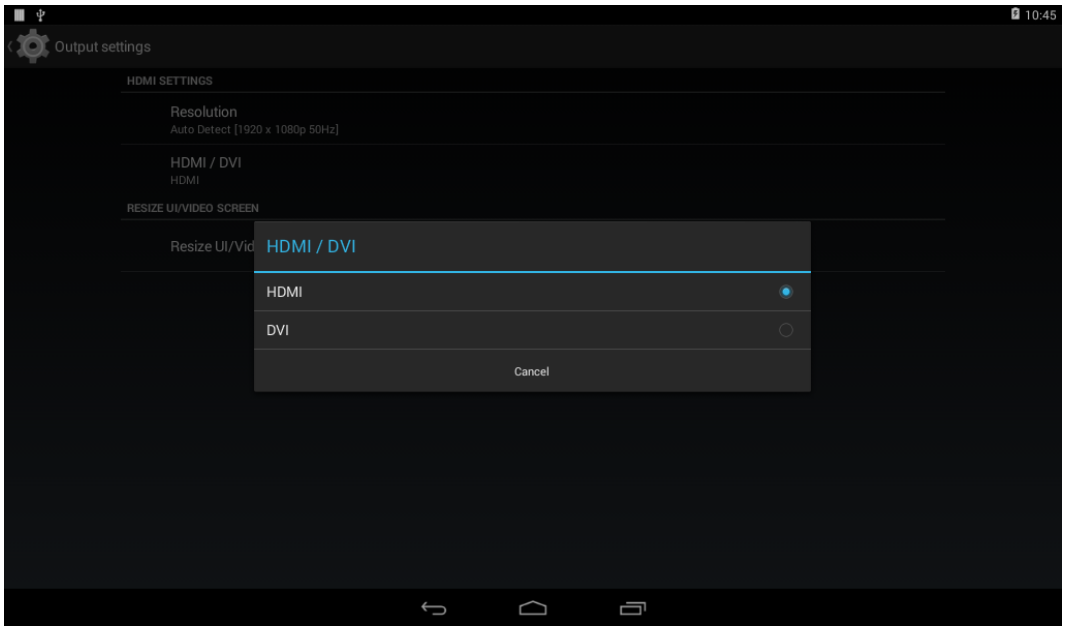


Figure 12. HDMI/DVI auto select mode

8 Bluetooth

* To test Bluetooth, a Bluetooth sub-board is needed.

Set define of Bluetooth power control driver to use Bluetooth.
- in kernel, make menuconfig
  "Device drivers --> Charater device --> <*>TCC Bluetooth dev Control power"

Enable Bluetooth in the Settings menu to use Bluetooth. Please select "`Bluetooth`" menu in "`Settings`" (figure 13).

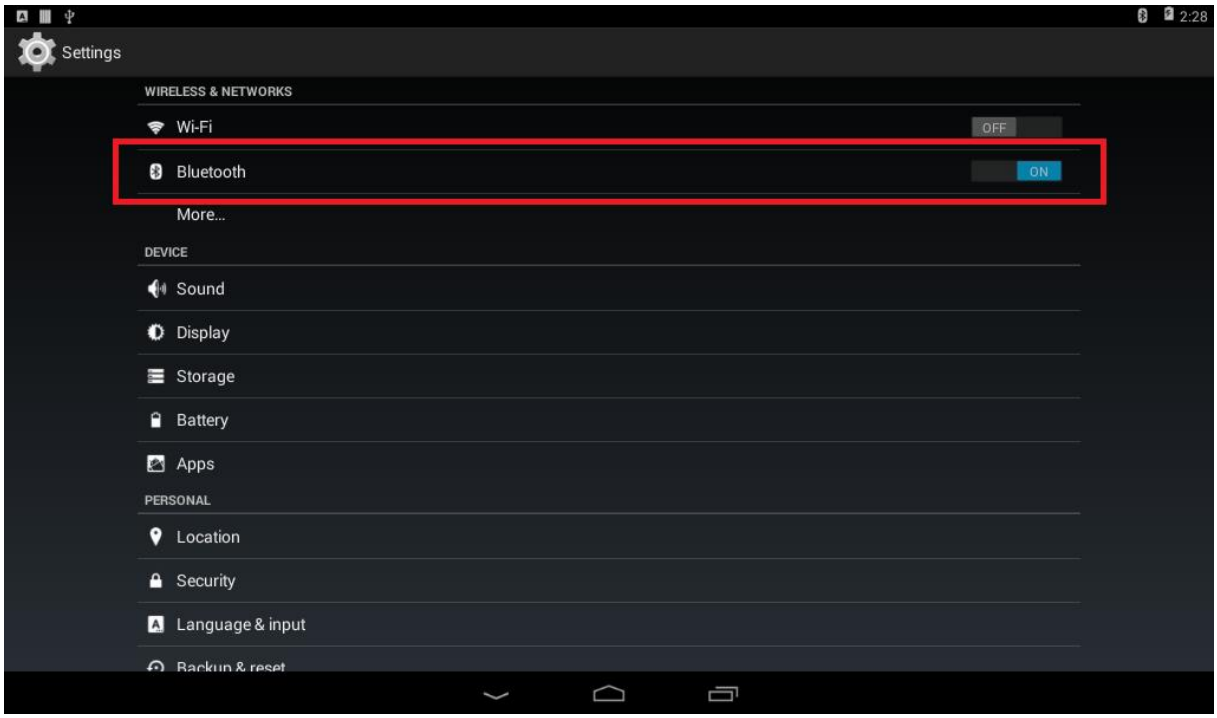


Figure 13. Setting menu for Bluetooth

After enable Bluetooth, searching device operation will be executed. After this operation, you can see available device list (Figure 14). Select the device you want to connect to.

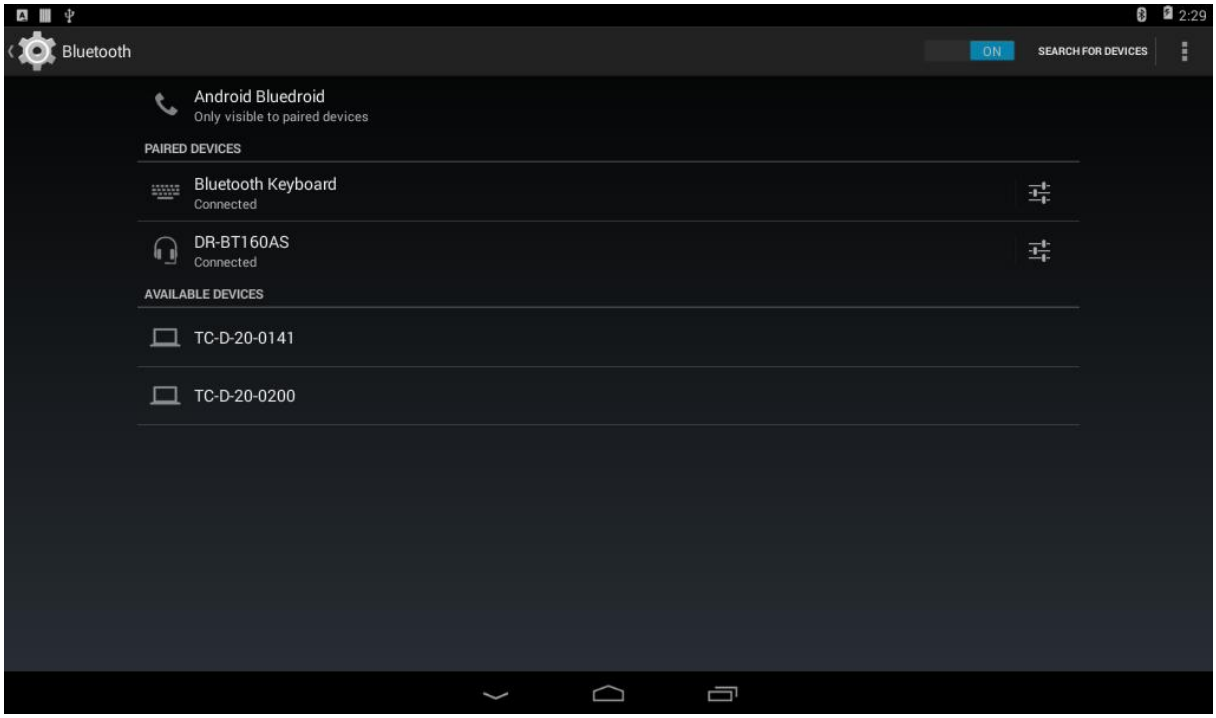


Figure 14. Bluetooth Settings menu

If you want to use your specific Bluetooth module, below files/folders should be checked.

1) Files in `device/telechips/tcc893x-common/bluetooth` folder.

This folder includes HCD files.
HCD file must be changed for your own purpose. Please contact with Bluetooth module provider.

2) `device/telechips/tcc893x-common/device_tcc893x-common.mk` file.

Below codes include files in `device/telechips/tcc893x-common/bluetooth` folder.

```
PRODUCT_COPY_FILES += \
       device/telechips/tcc893x-common/bluetooth/bcm4330.hcd:
       system/vendor/firmware/bcm4330.hcd
PRODUCT_COPY_FILES += \
       device/telechips/tcc893x-common/bluetooth/BCM4334B0.hcd:
       system/vendor/firmware/bcm4334.hcd
PRODUCT_COPY_FILES += \
       device/telechips/tcc893x-common/bluetooth/BCM4335B0.hcd:
       system/vendor/firmware/bcm4335.hcd
```

9 Wi-Fi / Portable Wi-Fi Hot Spot / Wi-Fi Direct / Wi-Fi Display

Telechips Android SDK supports many Wi-Fi modules. The default Wi-Fi module is Realtek RT8188CU(USB type). Please refer to "TCCxxxx-Android-ALL-V1.3E-Wi-Fi Guide.pdf" and "TCCxxxx-Android-ALL-V1.6E-Wi-Fi_Display_Guide.pdf"
There are four functions related with Wi-Fi module as below pictures.

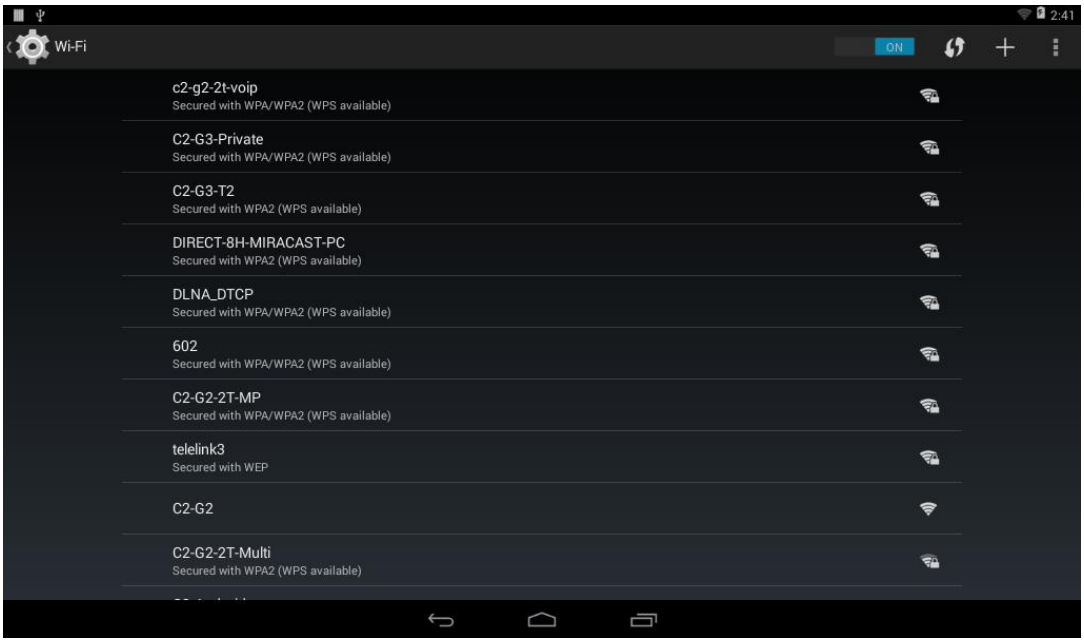


Figure 15. Wi-Fi Setting Menu

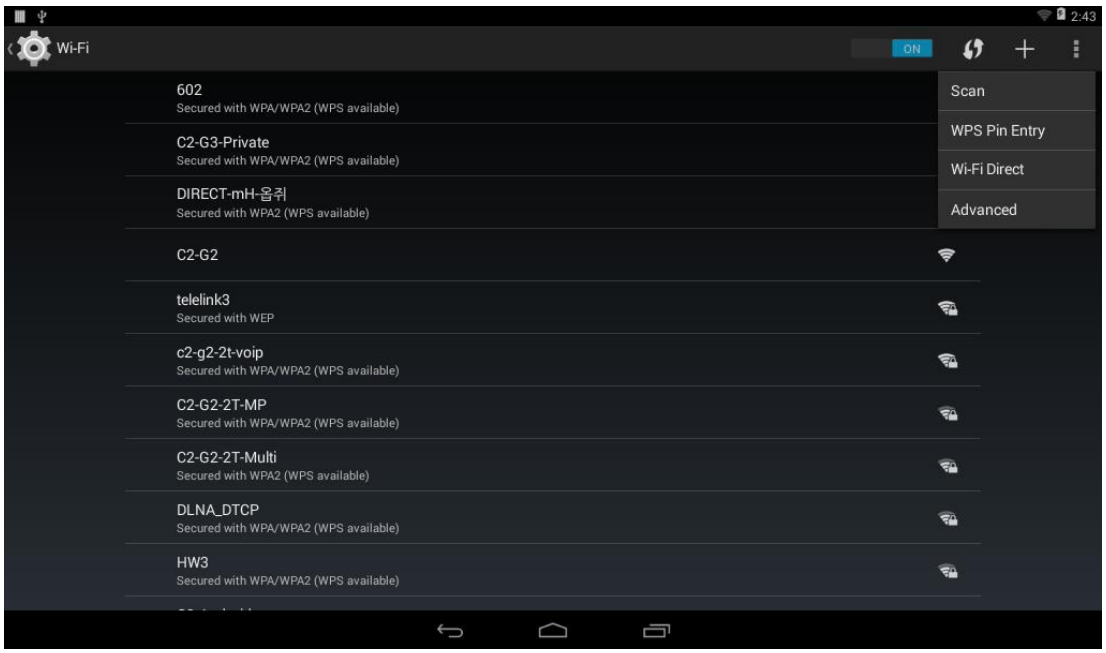


Figure 16. WI-Fi Direct Menu

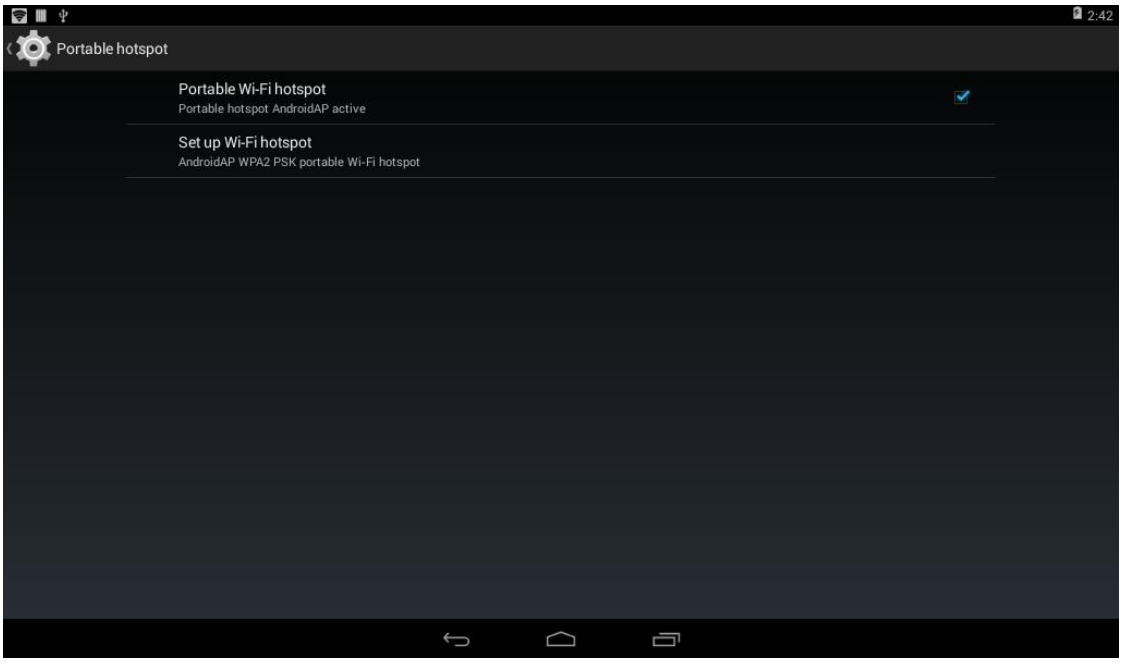


Figure 17. Portable Wi-Fi hotspot

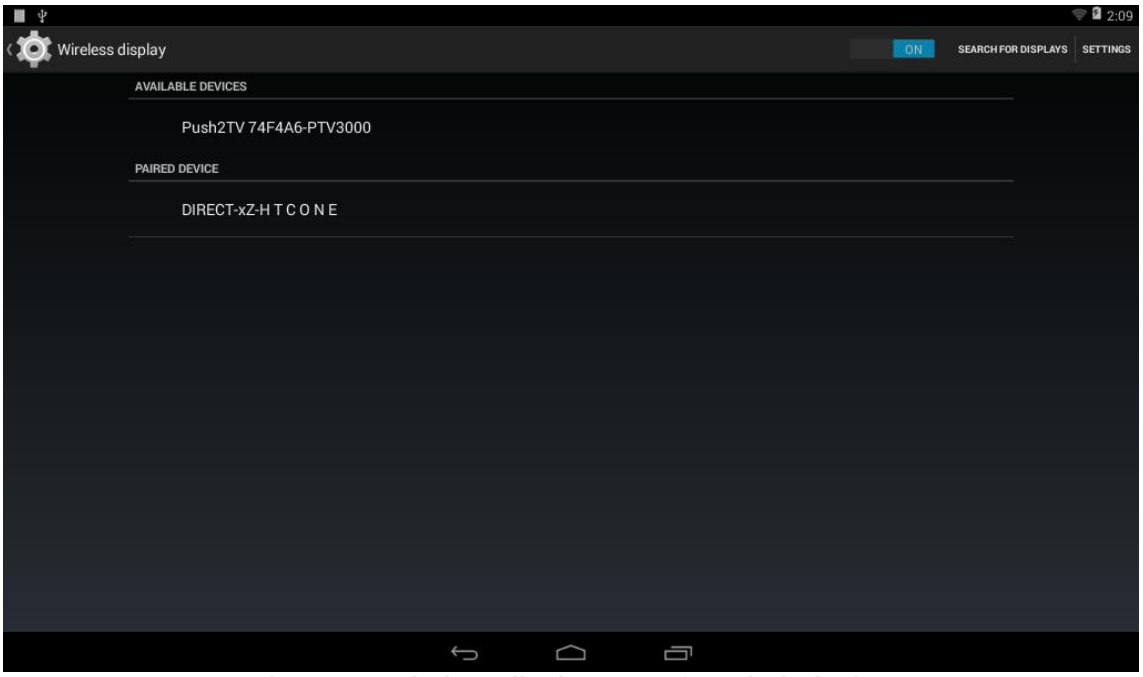


Figure 18. Wireless display Menu for Wi-Fi Display

10 Ethernet

[kernel Configuration]

To use Ethernet and if **below setting is not set as default**, you must change kernel configuration.

Please execute "`make menuconfig`" command from kernel folder and select configurations.

1. Select "`Networking support ---> Networking options ---> TCP/IP networking`". Then you can see more configurations
2. Select "`IP: multicasting`" and "`IP: kernel level autoconfiguration`". Then also, you can see more configurations.
3. Select "`IP: DHCP support , IP: BOOTP support and IP: RARP support`".

You have to set Ethernet driver. **Check which Phy chip is used for Ethernet device**.

4. Select "`Device Drivers ---> Network device support`"

   You have to check below two settings.

If **Realtek 8211 is used**,

5. Select "`Ethernet (1000Mbit) ---> Telechips 10/100/1000 Ethernet Driver ---> Rx has priority over Tx (NEW) ---> Phy Interface (RGMII)`"
6. And select "`PHY Device support and infrastructure (NEW) ---> Drivers for RTL8211 PHY Telechips support`" to make Ethernet device driver.

,else if **Realtek 8201 is used**,

5. Select "`Device Drivers ---> Network device support ---> Ethernet (1000Mbit) ---> Telechips 10/100/1000 Ethernet Driver ---> Rx has priority over Tx (NEW) ---> Phy Interface (MII)`"
6. And select "`PHY Device support and infrastructure (NEW) ---> Drivers for RTL8201 PHY Telechips support`" to make Ethernet device driver.

After booting, you can see "`eth0`" with below command.

```
# busybox ifconfig –a
```

[Android Menu]

You can use Ethernet Menu to set IP,DNS,Gateway.. etc.
Please select "Settings" and enter "Wireless & network settings", you can see "Ethernet Settings".

[MAC address Setting]

There are two methods to set Mac address of Ethernet device, One is setting through FWDN, another is reading Chip ID.
In case of setting through FWDN, if you need to set softMAC of Ethernet device, you can use WIFI MAC address as Ethernet MAC address by sharing it. Refer to WIFI MAC address setting.
In case of reading Chip ID, if you contract something about Mac address with Telechips, you can set Mac address by reading Chip ID which includes Mac address bits.
Select "`Ethernet (1000Mbit) ---> Telechips 10/100/1000 Ethernet Driver ---> Mac address is set by reading TCC Chip ID`"

11 NTP(Network Time Protocol) – Date & Time

This is related to "Settings" -> "Date & Time".
If there is no connection of Mobile Network (3G or GSM), The 'Automatic date & time' setting menu is not working. NTP makes the 'Automatic date & time' menu be useful although no connection of Mobile Network.

NTP is protocol to set Date & Time automatically with connecting to NTP server.

To connect NTP server, there must be internet connection through Ethernet or WIFI.

[Android Menu]

You can use NTP through "Settings" -> "Date & Time"

To enable NTP, you must make 'Automatic date & time' set to 'enable'.

And you have to select time zone which is your local time in the list of the 'Select time zone' menu.

If you want to set default local time zone, use property like below.
'tcc.default.timezone' property is used and defined in device\telechips\tccXXXX\device_base.mk,
ex) tcc.default.timezone = Asia/Seoul or tcc.default.timezone = Asia/Shanghai

Also, you can change 'NTP Server'. (if you need)

Default settings related to NTP are like below.

-. 'Automatic date & time' is 'enable' as default..
-. 'NTP Server' is set to 'pool.ntp.org' as default.

If above menus are set right and network connection works, you will see date and time changed.

12 Camera/TV Decoder

- To test Camera, you have to only need Menuconfig configuration settings.
- In TCC893x, both single camera and dual camera support.

To use Camera, you must change kernel configuration.
Please execute "`make menuconfig`" command from kernel folder and select configurations.
Select "`Device Driver --> Multimedia devices --> Video capture --> V4L platform devices`". You can see below Camera modules.

```
<*>   Telechips TCCXXX Camera support (EXPERIMENTAL)
< >     Enable Camera with max-clock
<*>     CAMERA sensor support
< >       Enable Telechips Dual-Camera
<*>       Enable Telechips Single-Camera
<*>         MT9D112 2MP-sensor support
< >         OV3640 3MP-sensor support
< >         S5K4BAFB 2MP-sensor support
< >         MV9317 3MP-sensor support
< >         MT9P111 5MP-sensor support
```

Figure 19. Single camera modules which can be used in EVM

```
<*>   Telechips TCCXXX Camera support (EXPERIMENTAL)
< >     Enable Camera with max-clock
<*>     CAMERA sensor support
<*>       Enable Telechips Dual-Camera
<*>         Select Telechips Back-Camera
<*>           MT9P111 5MP-sensor support
<*>         Select Telechips Front-Camera
<*>           MT9M113 1.3MP-sensor support
< >       Enable Telechips Single-Camera
```

Figure 20. Dual camera modules which can be used in EVM

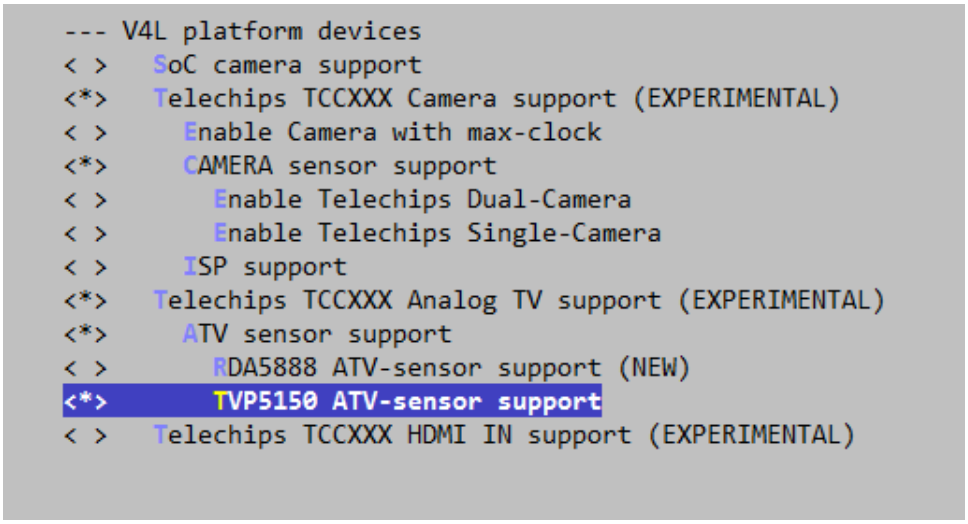


Figure 16. TV Decoder(TVP5150) modules which can be used in EVM

Select Camera module which you are used.
In single camera case "`MT9D112 2MP-sensor support`" is selected.
In dual camera case "`MT9P111 5MP-sensor support & MT9M113 1.3MP-sensor support`" is selected.

Next, you have to select the save position in the between NAND and SD.

Please note that the available camcording Size is
NAND(until CIF(640x480)), SD(until HD(1280x720)).

If you want to use NAND, the save position, Use default setting. But, if you want to use SD or USB, the save position, below must be changed from packages/apps/Camera2/src/com/android/camera/Storage.java

```
public class Storage {
    private static final String TAG = "CameraStorage";

    public static final String DCIM =

Environment.getExternalStoragePublicDirectory(Environment.DIRECTORY_DCIM).toString();

    public static final String DIRECTORY = DCIM + "/Camera";
    public static final String JPEG_POSTFIX = ".jpg";
```

Finally, you have to adjust encoding size by camera sensor resolution.

The source position about Camera encoding size is
device/Telechips/tcc893x-common/media_profiles.xml
In now, Encoding default sizes are High(1280x720) and Low(176x144).

```
        <CamcorderProfiles cameraId="0"> // for Back camera of Dual
camera and Single camera

        <EncoderProfile quality="high" fileFormat="3gp" duration="60">
            <Video codec="h264"
                   bitRate="8000000"
                   width="1280"
                   height="720"
```

```
                frameRate="20" />

        <Audio codec="amrnb"
               bitRate="48000"
               sampleRate="8000"
               channels="1" />
    </EncoderProfile>

    <EncoderProfile quality="low" fileFormat="3gp" duration="60">
        <Video codec="h264"
               bitRate="192000"
               width="176"
               height="144"
               frameRate="20" />

        <Audio codec="amrnb"
               bitRate="48000"
               sampleRate="8000"
               channels="1" />

    </EncoderProfile>

    <ImageEncoding quality="90" />
    <ImageEncoding quality="80" />
    <ImageEncoding quality="70" />
    <ImageDecoding memCap="20000000" />

    <Camera previewFrameRate="0" />

</CamcorderProfiles>

<CamcorderProfiles cameraId="1"> // for Front camera of Dual camera

    <EncoderProfile quality="high" fileFormat="3gp" duration="60">
        <Video codec="h264"
               bitRate="8000000"
               width="1280"
               height="720"
               frameRate="20" />

        <Audio codec="amrnb"
               bitRate="48000"
               sampleRate="8000"
               channels="1" />
    </EncoderProfile>

    <EncoderProfile quality="low" fileFormat="3gp" duration="60">
        <Video codec="h264"
               bitRate="192000"
               width="176"
               height="144"
               frameRate="20" />

        <Audio codec="amrnb"
               bitRate="48000"
               sampleRate="8000"
               channels="1" />

    </EncoderProfile>
```

```
        <ImageEncoding quality="90" />
        <ImageEncoding quality="80" />
        <ImageEncoding quality="70" />
        <ImageDecoding memCap="20000000" />

        <Camera previewFrameRate="0" />

    </CamcorderProfiles>
```

If Camera module is more than 2M resolution sensor, Use default size.
But, if Camera module is less than 2M resolution sensor, it has to modify default size, especially High Encoding size.

For example, M805S Camera sensor is XGA(800x600) resolution sensor.
Because of sensor performance, in M805S Camera module, is has to fix High Encoding size from 1280x720 to 800x600.

If you want to use USB camera or UVC Camera, kernel configuration must be changed.

```
Device Drivers --->
        Multimedia devices --->
                <*> Video capture adapters
                        <*> V4L USB devices
                                <*> USB Video Class (UVC)
                                [*] UVC input events device support
                                < > GSPCA based webcams
```

In EVM, if you want to use USB Camera, it must be connected to mini-5pin connector with host-gender.

13 UMS

Select "`Device Drivers --> USB support --> USB Gadget Support --> USB Gadget Drivers`". In this menu, you can select "`Android Gadget`" to use ADB and UMS, or "`File-backed Storage Gadget`" to use only UMS.

To use NAND UMS, you must partition NAND driver. Please refer "Quick Start Guide" document.

After boot up, please connect USB cable. After USB connection, you can see icon which indicates that USB is connected.

Figure 21. Icon which indicates that USB is connected

To select USB connect menu, scroll status bar. Then you can see below USB connect menu.

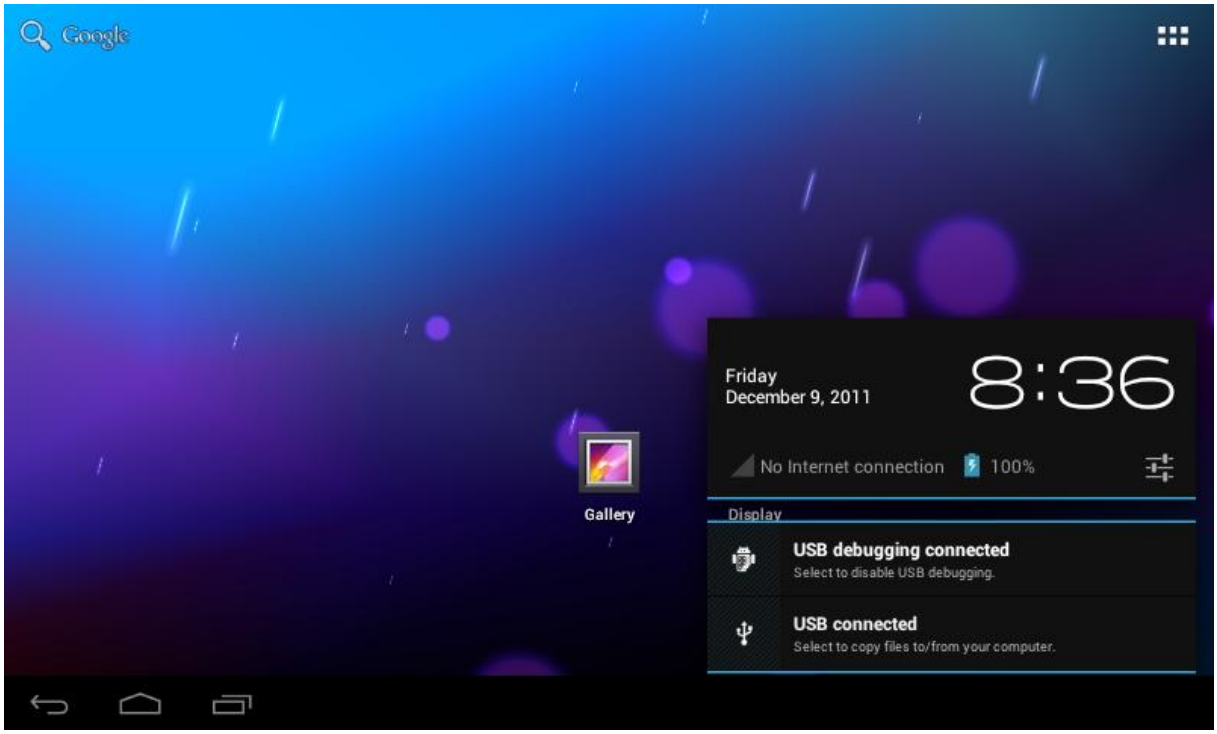
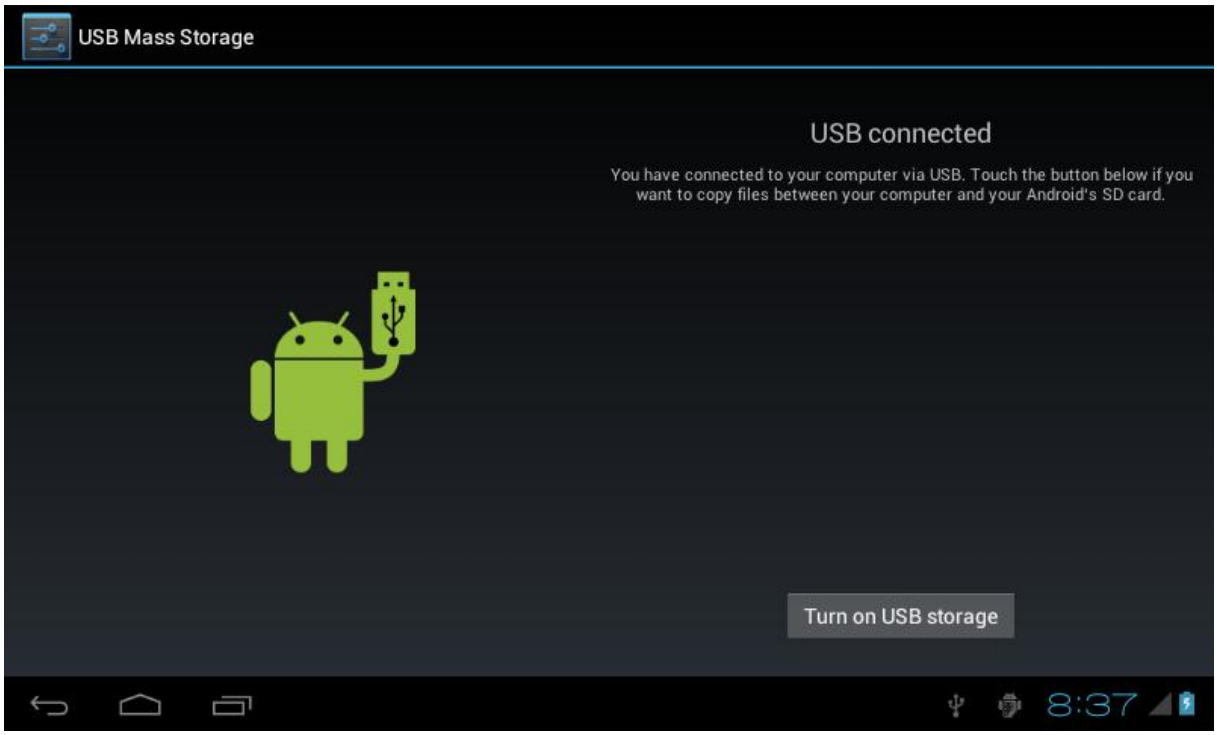


Figure 22. USB connect menu

Recently, these were changed. You can see "`USB connected`", and "`USB debugging connected`". If you wan to connect NAND or SD card, you must select "`USB connected`". Then "`USB connected`" menu will be popped up. Select "`Turn on USB storage`". Then you can see NAND or SD card with UMS.



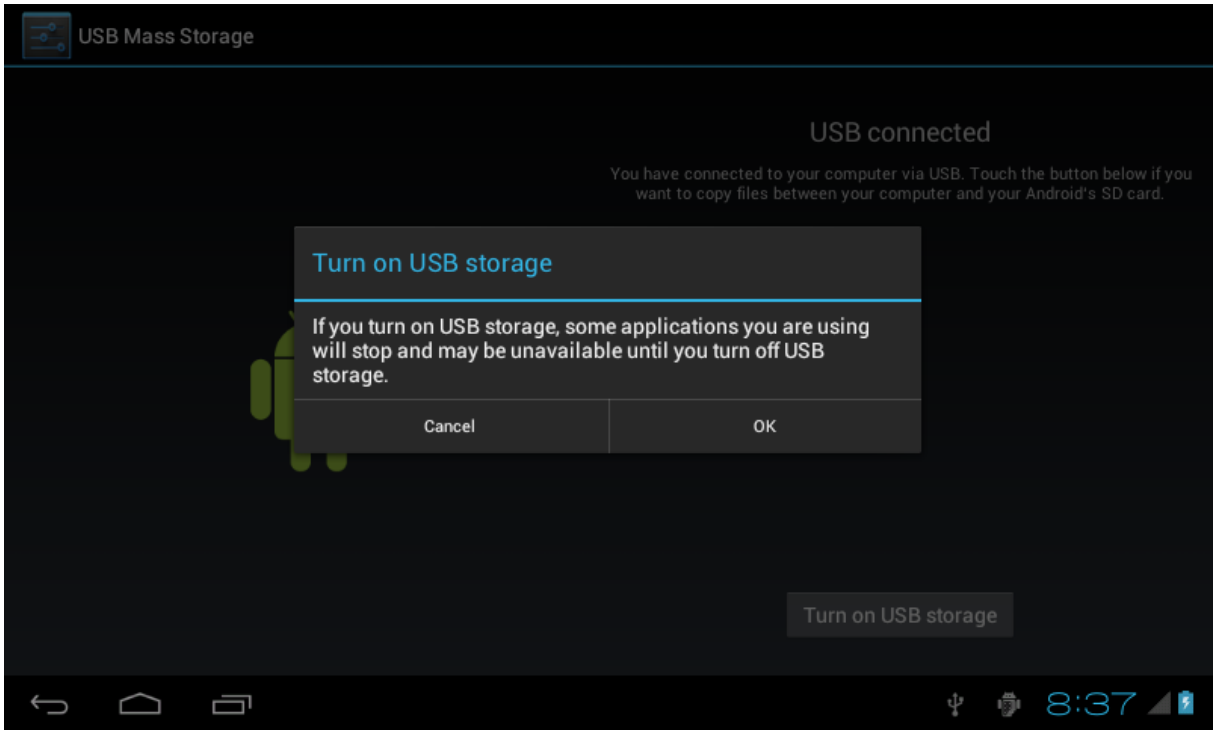
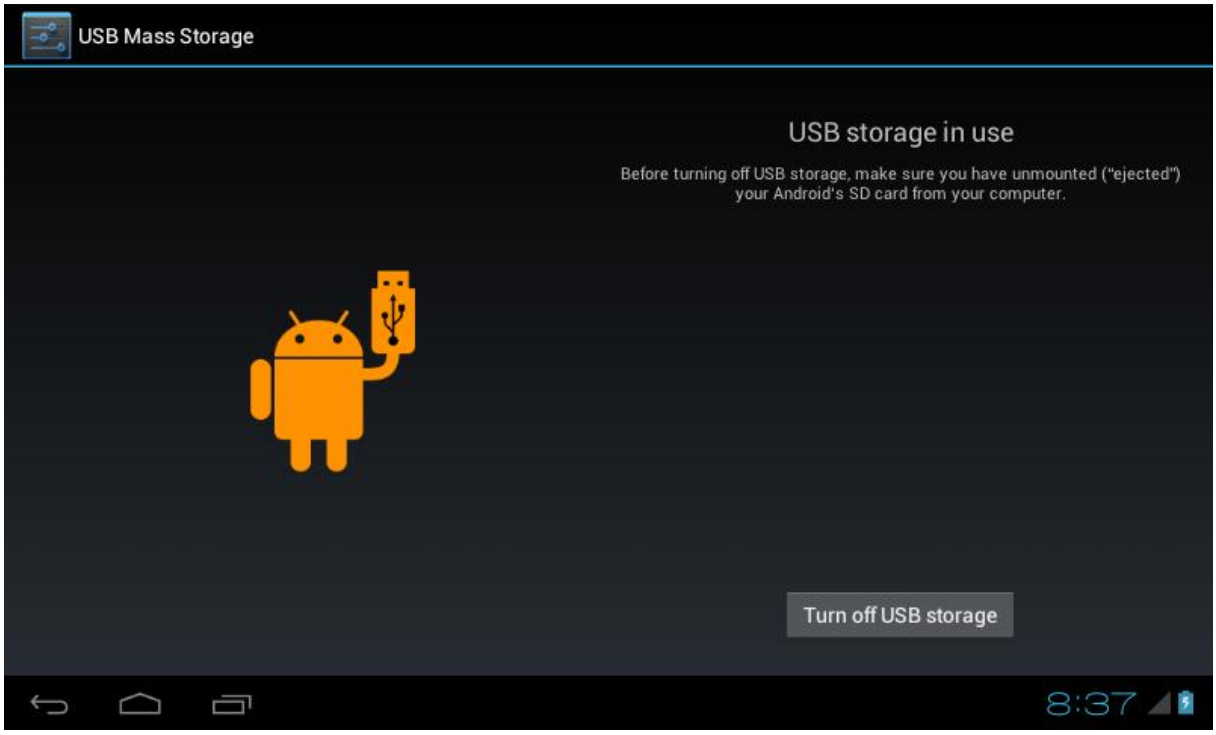


Figure 23. USB connected and mount menu

You can disconnect UMS with below.

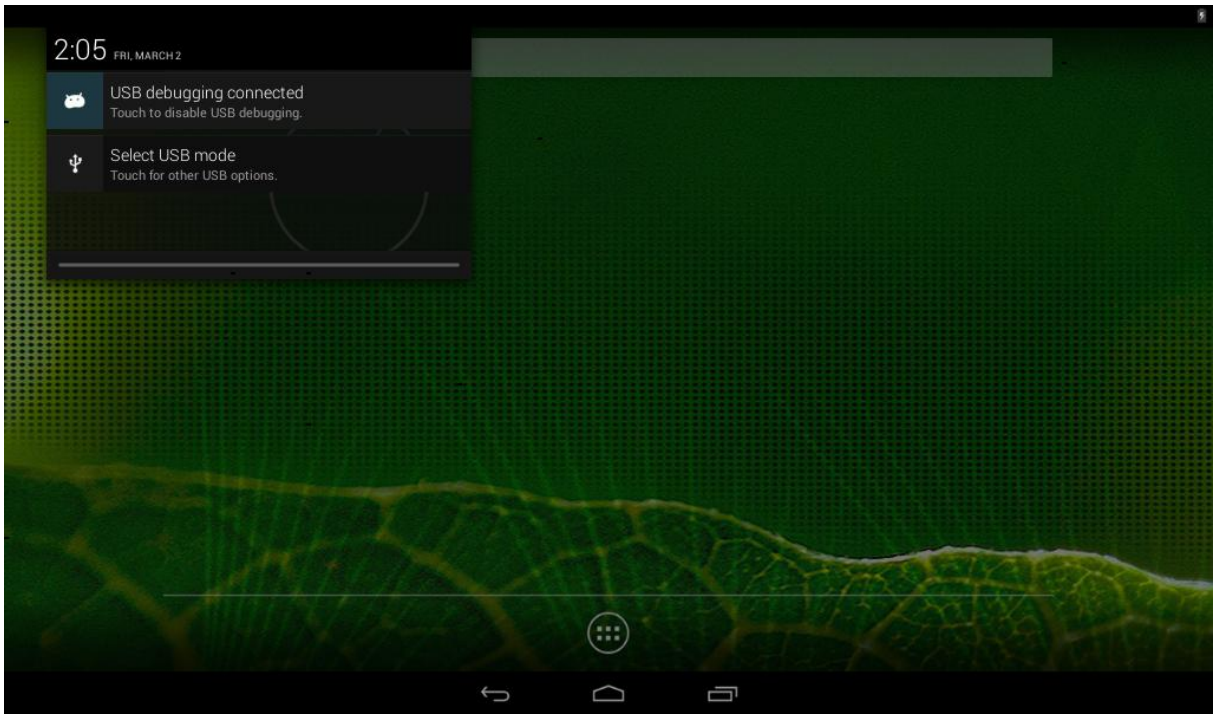
-. Disconnect USB cable
-. Scroll title bar, then you can see "`Turn off USB storage`". Select one of then, and select "`Turn off USB storage`" pop-up menu.



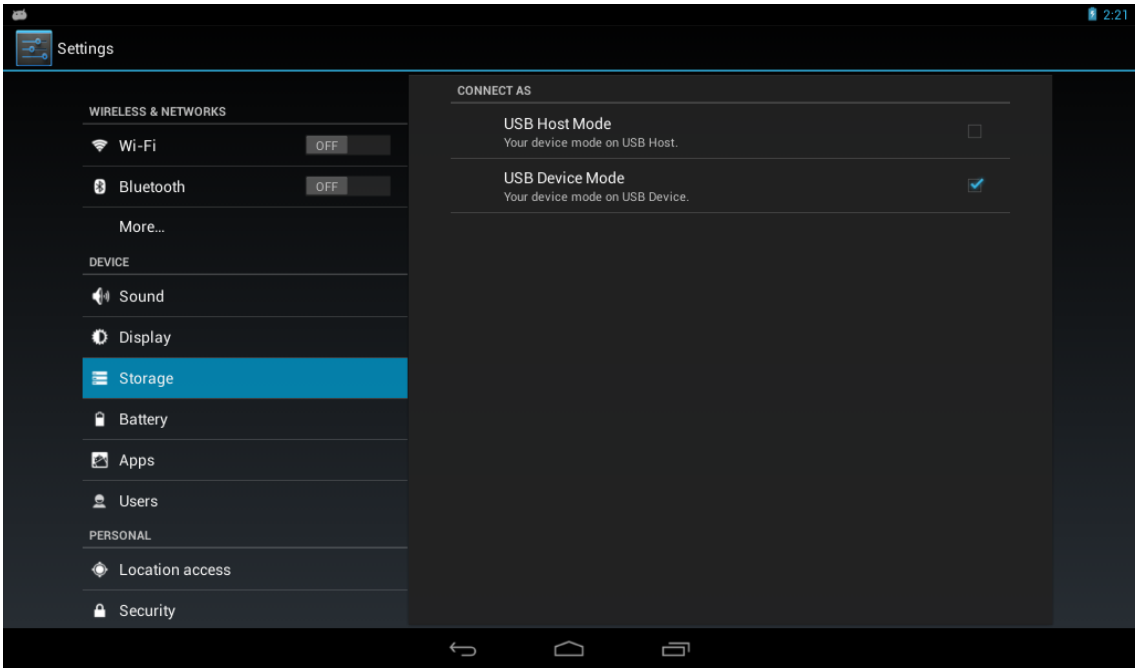
14 OTG Switching Mode (Device/Host)

After boot up, you can see icon which indicates that USB is connected.

To select USB connect menu, scroll status bar. Then you can see below "`Select USB mode`" menu.

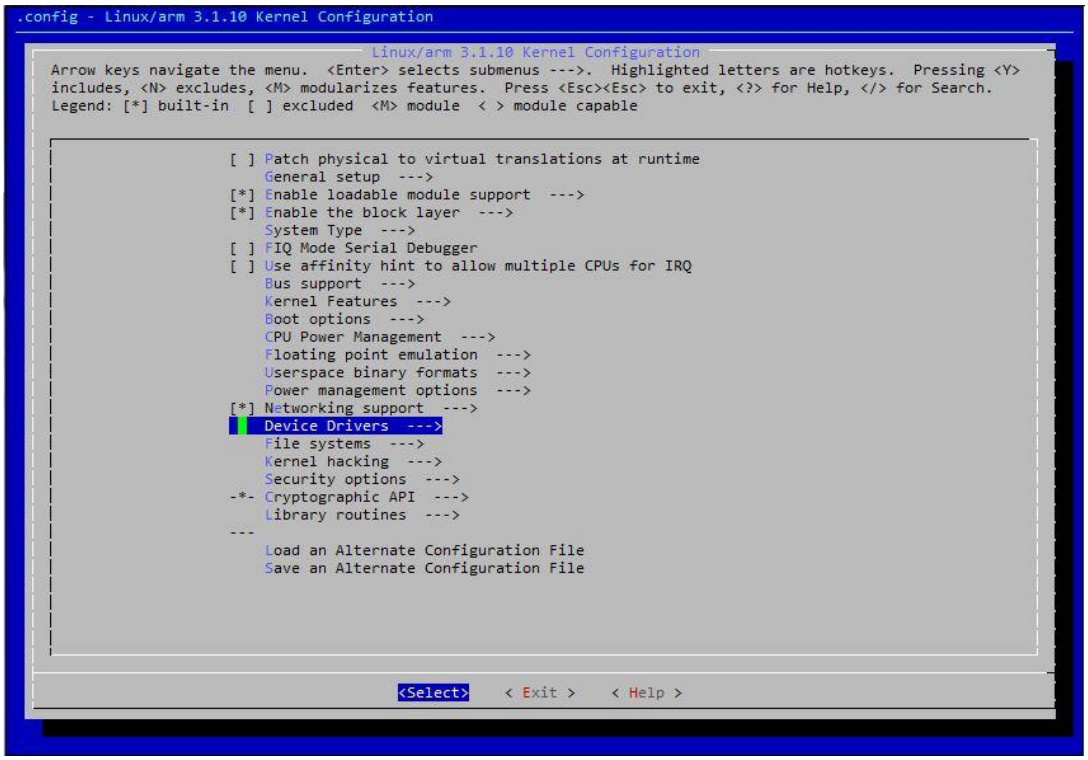


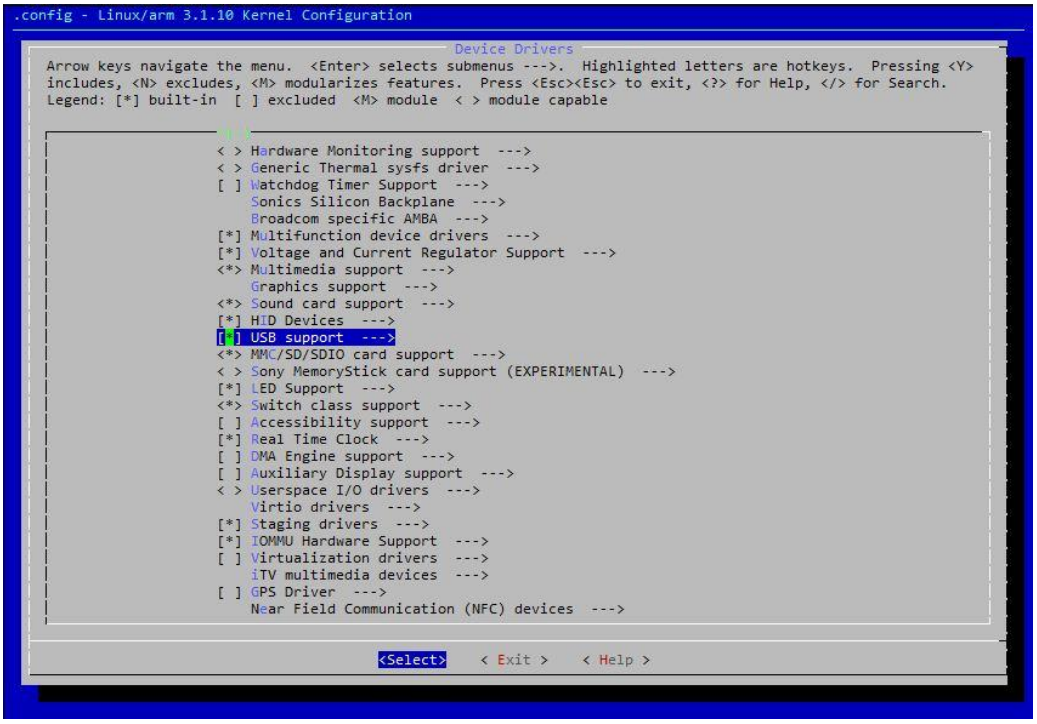
Select "`Select USB Mode`". In this menu, you can select "`USB Host`" or "`USB Device`" to use USB Function like that MTP/ADB.

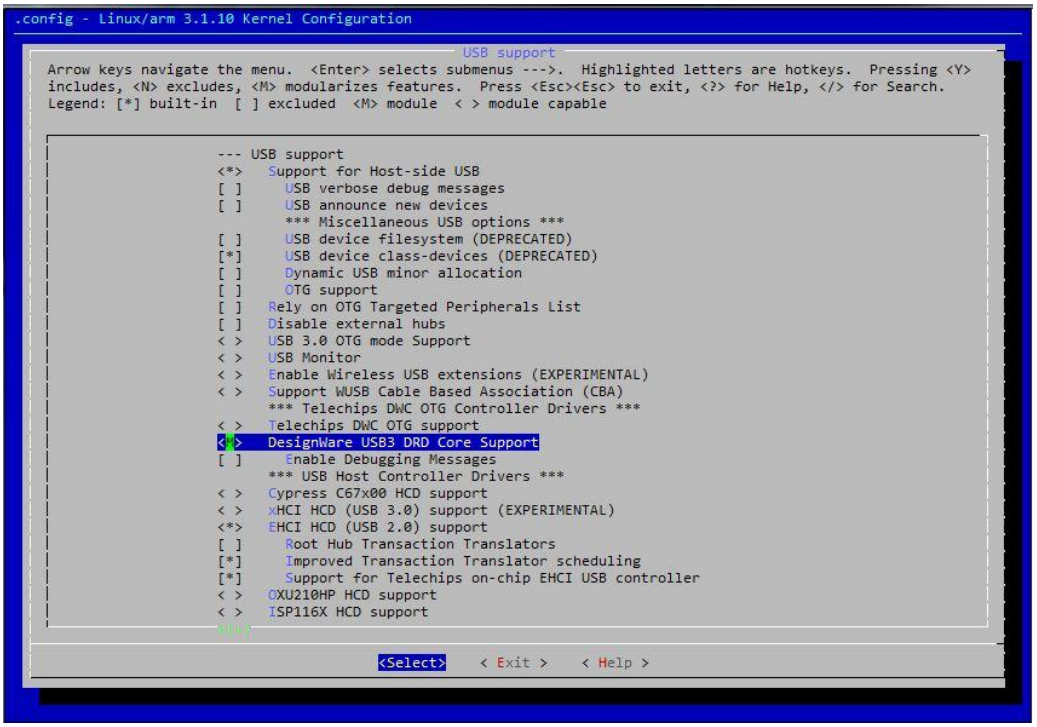


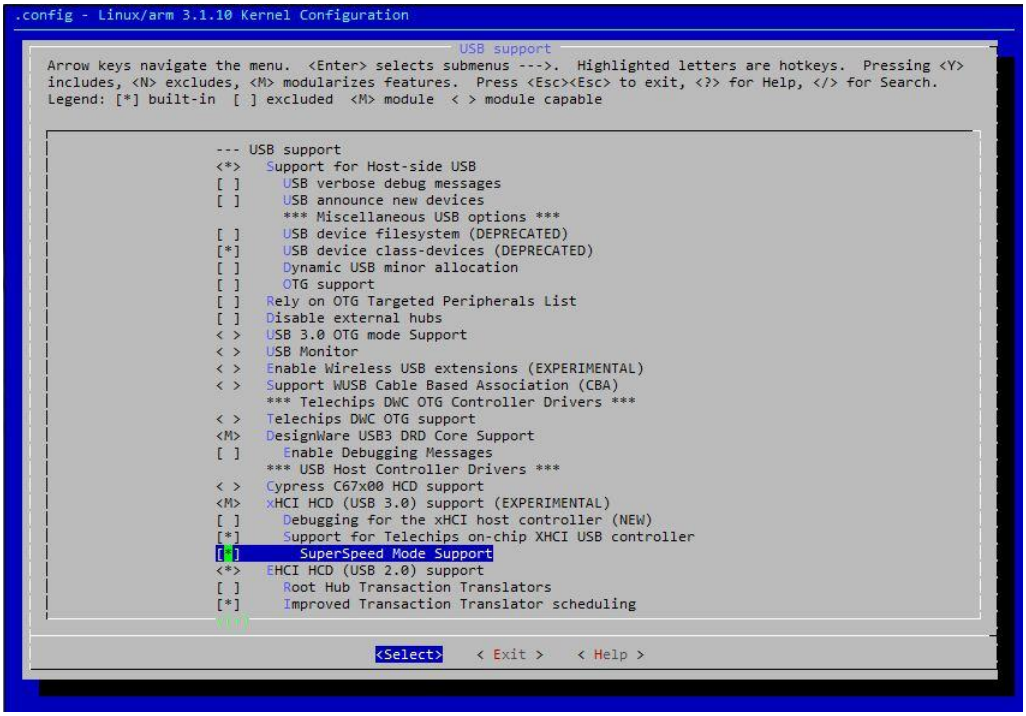
But, This OTG switching mode is default disable. This mode is experimental function yet.

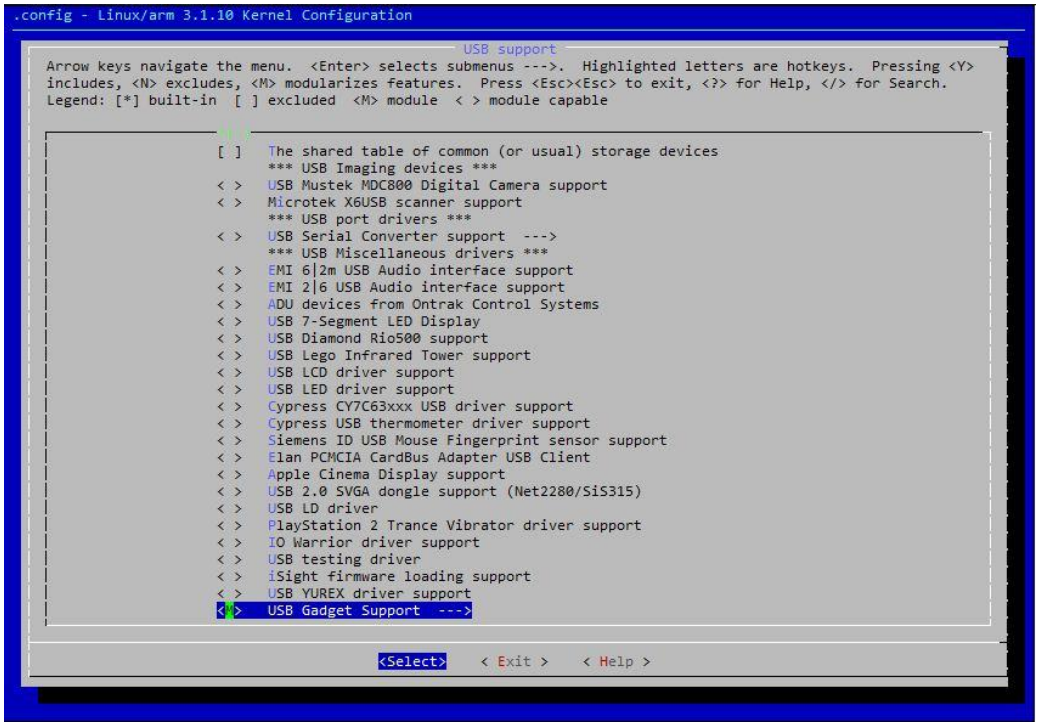
To use OTG switching mode, you must change kernel and android configuration.
Please execute "make menuconfig" command from kernel folder and select configurations below.

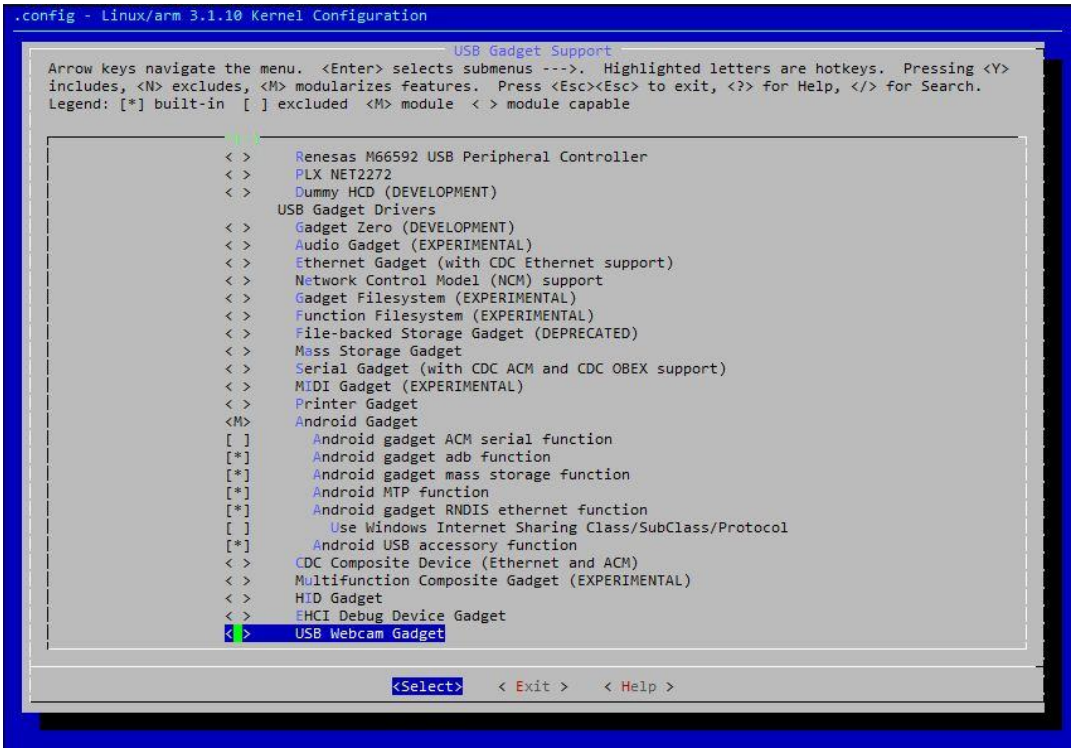



.config - Linux/arm 3.1.10 Kernel Configuration
Device Drivers
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search.
Legend: [*] built-in [ ] excluded <M> module < > module capable
< > Hardware Monitoring support --->
< > Generic Thermal sysfs driver --->
[ ] Watchdog Timer Support --->
Sonics Silicon Backplane --->
Broadcom specific AMBA --->
[*] Multifunction device drivers --->
[*] Voltage and Current Regulator Support --->
<*> Multimedia support --->
Graphics support --->
<*> Sound card support --->
[*] HID Devices --->
[*] USB support --->
<*> MMC/SD/SDIO card support --->
< > Sony MemoryStick card support (EXPERIMENTAL) --->
[*] LED Support --->
<*> Switch class support --->
[ ] Accessibility support --->
[*] Real Time Clock --->
[ ] DMA Engine support --->
[ ] Auxiliary Display support --->
< > Userspace I/O drivers --->
Virtio drivers --->
[*] Staging drivers --->
[*] IOMMU Hardware Support --->
[ ] Virtualization drivers --->
iTV multimedia devices --->
[ ] GPS Driver --->
Near Field Communication (NFC) devices --->
<Select> < Exit > < Help >


.config - Linux/arm 3.1.10 Kernel Configuration
USB support
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search.
Legend: [*] built-in [ ] excluded <M> module < > module capable
--- USB support
<*> Support for Host-side USB
[ ] USB verbose debug messages
[ ] USB announce new devices
*** Miscellaneous USB options ***
[ ] USB device filesystem (DEPRECATED)
[*] USB device class-devices (DEPRECATED)
[ ] Dynamic USB minor allocation
[ ] OTG support
[ ] Rely on OTG Targeted Peripherals List
[ ] Disable external hubs
< > USB 3.0 OTG mode Support
< > USB Monitor
< > Enable Wireless USB extensions (EXPERIMENTAL)
< > Support WUSB Cable Based Association (CBA)
*** Telechips DWC OTG Controller Drivers ***
< > Telechips DWC OTG support
<*> DesignWare USB3 DRD Core Support
[ ] Enable Debugging Messages
*** USB Host Controller Drivers ***
< > Cypress C67x00 HCD support
< > xHCI HCD (USB 3.0) support (EXPERIMENTAL)
<*> EHCI HCD (USB 2.0) support
[ ] Root Hub Transaction Translators
[*] Improved Transaction Translator scheduling
[*] Support for Telechips on-chip EHCI USB controller
< > OXU210HP HCD support
< > ISP116X HCD support
<Select> < Exit > < Help >


.config - Linux/arm 3.1.10 Kernel Configuration
USB support
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search.
Legend: [*] built-in [ ] excluded <M> module < > module capable
--- USB support
<*> Support for Host-side USB
[ ] USB verbose debug messages
[ ] USB announce new devices
*** Miscellaneous USB options ***
[ ] USB device filesystem (DEPRECATED)
[*] USB device class-devices (DEPRECATED)
[ ] Dynamic USB minor allocation
[ ] OTG support
[ ] Rely on OTG Targeted Peripherals List
[ ] Disable external hubs
< > USB 3.0 OTG mode Support
< > USB Monitor
< > Enable Wireless USB extensions (EXPERIMENTAL)
< > Support WUSB Cable Based Association (CBA)
*** Telechips DWC OTG Controller Drivers ***
< > Telechips DWC OTG support
<M> DesignWare USB3 DRD Core Support
[ ] Enable Debugging Messages
*** USB Host Controller Drivers ***
< > Cypress C67x00 HCD support
<M> xHCI HCD (USB 3.0) support (EXPERIMENTAL)
[ ] Debugging for the xHCI host controller (NEW)
[*] Support for Telechips on-chip XHCI USB controller
[*] SuperSpeed Mode Support
<*> EHCI HCD (USB 2.0) support
[ ] Root Hub Transaction Translators
[*] Improved Transaction Translator scheduling
<Select> < Exit > < Help >


.config - Linux/arm 3.1.10 Kernel Configuration
USB support
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search.
Legend: [*] built-in [ ] excluded <M> module < > module capable
[ ] The shared table of common (or usual) storage devices
*** USB Imaging devices ***
< > USB Mustek MDC800 Digital Camera support
< > Microtek X6USB scanner support
*** USB port drivers ***
< > USB Serial Converter support --->
*** USB Miscellaneous drivers ***
< > EMI 6|2m USB Audio interface support
< > EMI 2|6 USB Audio interface support
< > ADU devices from Ontrak Control Systems
< > USB 7-Segment LED Display
< > USB Diamond Rio500 support
< > USB Lego Infrared Tower support
< > USB LCD driver support
< > USB LED driver support
< > Cypress CY7C63xxx USB driver support
< > Cypress USB thermometer driver support
< > Siemens ID USB Mouse Fingerprint sensor support
< > Elan PCMCIA CardBus Adapter USB Client
< > Apple Cinema Display support
< > USB 2.0 SVGA dongle support (Net2280/SiS315)
< > USB LD driver
< > PlayStation 2 Trance Vibrator driver support
< > IO Warrior driver support
< > USB testing driver
< > iSight firmware loading support
< > USB YUREX driver support
<M> USB Gadget Support --->
<Select> < Exit > < Help >


.config - Linux/arm 3.1.10 Kernel Configuration
USB Gadget Support
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search.
Legend: [*] built-in [ ] excluded <M> module < > module capable
< > Renesas M66592 USB Peripheral Controller
< > PLX NET2272
< > Dummy HCD (DEVELOPMENT)
USB Gadget Drivers
< > Gadget Zero (DEVELOPMENT)
< > Audio Gadget (EXPERIMENTAL)
< > Ethernet Gadget (with CDC Ethernet support)
< > Network Control Model (NCM) support
< > Gadget Filesystem (EXPERIMENTAL)
< > Function Filesystem (EXPERIMENTAL)
< > File-backed Storage Gadget (DEPRECATED)
< > Mass Storage Gadget
< > Serial Gadget (with CDC ACM and CDC OBEX support)
< > MIDI Gadget (EXPERIMENTAL)
< > Printer Gadget
<M> Android Gadget
[ ] Android gadget ACM serial function
[*] Android gadget adb function
[*] Android gadget mass storage function
[*] Android MTP function
[*] Android gadget RNDIS ethernet function
[ ] Use Windows Internet Sharing Class/SubClass/Protocol
[*] Android USB accessory function
< > CDC Composite Device (Ethernet and ACM)
< > Multifunction Composite Gadget (EXPERIMENTAL)
< > HID Gadget
< > EHCI Debug Device Gadget
< > USB Webcam Gadget
<Select> < Exit > < Help >

Please edit "device.mk" , "init.tcc893x.rc" and "storage_list.xml" like below

```
#
# Copyright (C) 2012 Telechips, Inc.
#
# Licensed under the Apache License, Version 2.0 (the "License");
# you may not use this file except in compliance with the License.
# You may obtain a copy of the License at
#
#      http://www.apache.org/licenses/LICENSE-2.0
#
# Unless required by applicable law or agreed to in writing, software
# distributed under the License is distributed on an "AS IS" BASIS,
# WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
# See the License for the specific language governing permissions and
# limitations under the License.
#

ifeq ($(TARGET_PREBUILT_KERNEL),)
LOCAL_KERNEL := kernel/arch/arm/boot/Image
else
LOCAL_KERNEL := $(TARGET_PREBUILT_KERNEL)
endif

USE_MASS_STORAGE := false

DEVICE_PACKAGE_OVERLAYS := device/telechips/tcc893x/overlay

PRODUCT_AAPT_CONFIG := normal large mdpi

PRODUCT_PROPERTY_OVERRIDES += \
    wifi.interface=wlan0 \
    wifi.supplicant_scan_interval=15 \
    ro.carrier=wifi-only

#PRODUCT_PROPERTY_OVERRIDES += ro.QB.enable=1

PRODUCT_PROPERTY_OVERRIDES += \
    ro.system.hdmi_max_resolution = fullhd \
    persist.sys.hdmi_resize_x = 0 \
    persist.sys.hdmi_resize_y = 0 \
    persist.sys.renderer_onthefly = true

```

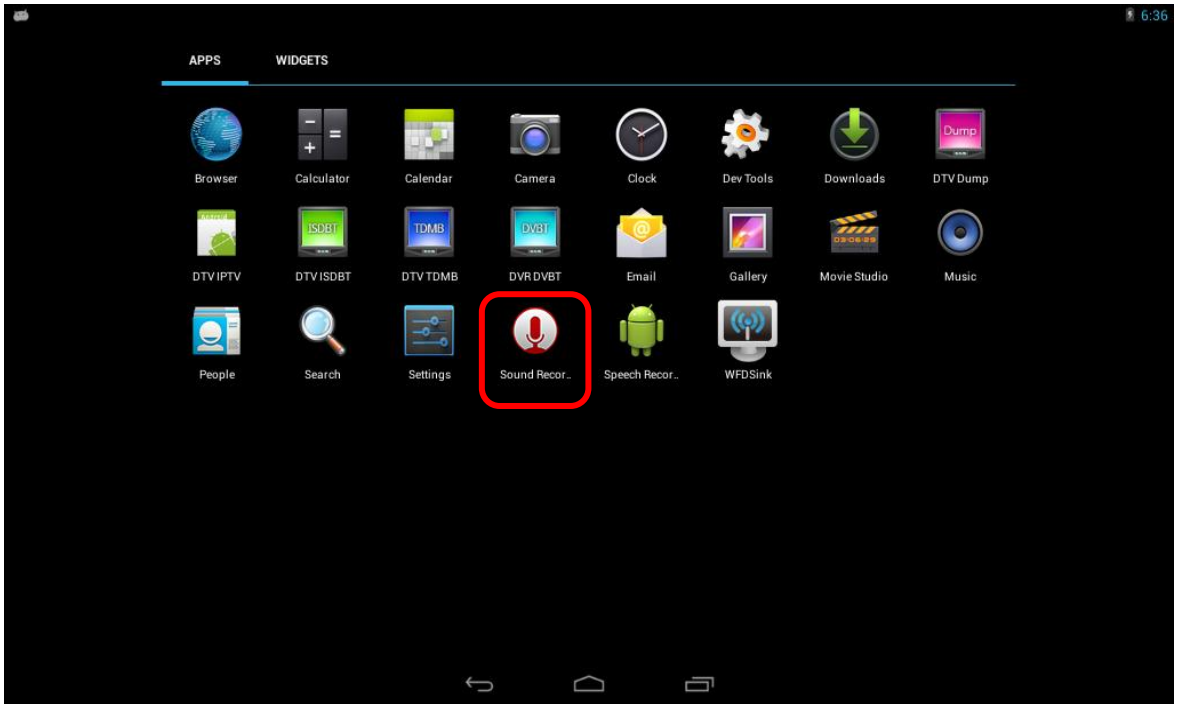
```
    mkdir /mnt/shell/emulated 0700 shell shell
    mkdir /storage/emulated 0555 root root

    ############################################
    # MTP Storage Settings
    ############################################
export EXTERNAL_STORAGE /storage/emulated/legacy
export EMULATED_STORAGE_SOURCE /mnt/shell/emulated
export EMULATED_STORAGE_TARGET /storage/emulated
    # Support legacy paths
symlink /storage/emulated/legacy /sdcard
symlink /storage/emulated/legacy /mnt/sdcard
symlink /storage/emulated/legacy /storage/sdcard0
symlink /mnt/shell/emulated/0 /storage/emulated/legacy
    ############################################

    ############################################
    # Mass Storage Settings
    ############################################
#export EXTERNAL_STORAGE /mnt/sdcard

#mkdir /mnt/ext_sd 0000 system system
#mkdir /mnt/sdcard 0000 system system
#symlink /mnt/sdcard /sdcard
    ############################################

    mkdir /storage/sdcard1 0000 system system
    mkdir /storage/usb0 0000 system system
    mkdir /storage/usb1 0000 system system
    chmod 0777 /system/bin/ba_svc

    ############################################
    # MTP Storage Settings
    ############################################
on quickboot_fs
    mount_all /fstab.quickboot.tcc893x
    load_persist_props
    setprop tcc.hibernate.property reloaded

on fs
    mount_all /fstab.tcc893x
setprop ro.crypto.fuse_sdcard true
setprop ro.usb.switch otg
    ############################################
    # Mass Storage Settings
    ############################################
#setprop ro.crypto.fuse_sdcard false
#setprop ro.usb.switch ums
```

```
    oneshot

service dhcpcd_bnep0 /system/bin/dhcpcd -ABKL
    disabled
    oneshot

service iprenew_bnep0 /system/bin/dhcpcd -n
        class main
        disabled
        oneshot

    ############################################
    # MTP Storage Settings
    ############################################
# virtual sdcard daemon running as media_rw (1023)
service sdcard /system/bin/sdcard /data/media /mnt/shell/emulated 1023 1023
class late_start

# create filesystems if necessary
service setup_fs /system/bin/setup_fs /dev/block/platform/bdm/by-num/p3 /dev/block/platform/bdm/by-num/p5
    class core
    user root
    group root
    oneshot
```

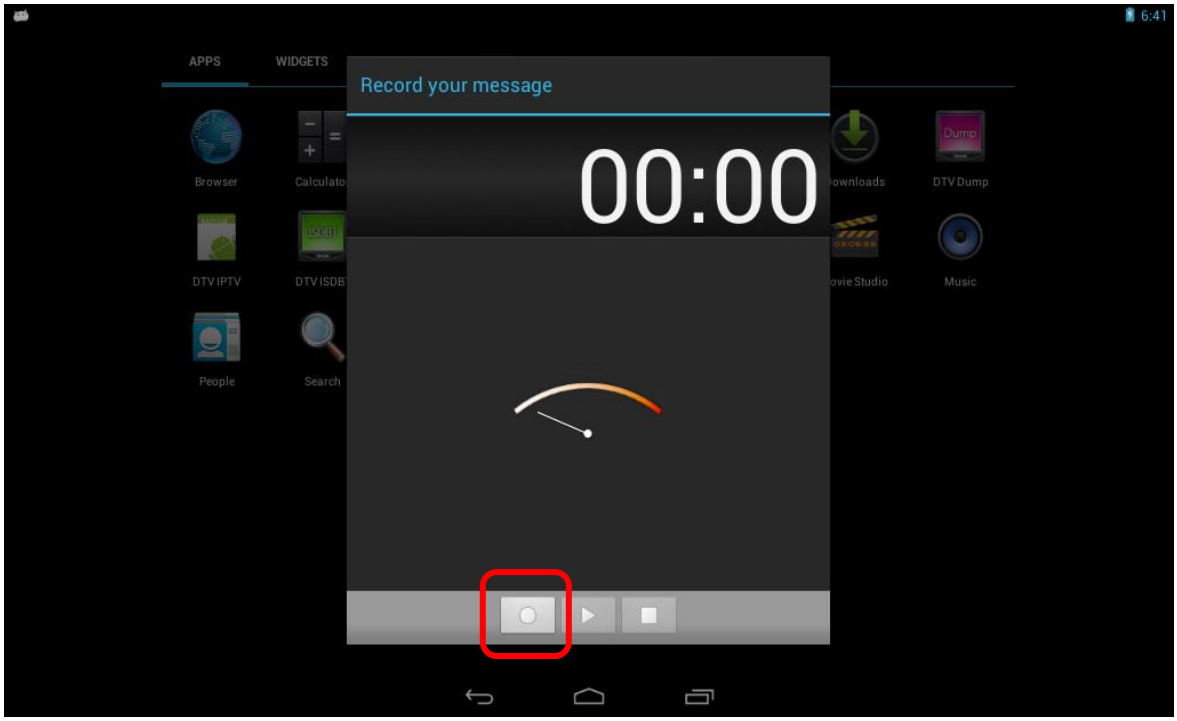
```
32        A storage should not have both emulated and removable set to true
33
34      ////////////////////////////////////////////////////////
35      // MTP Storage mode config
36      ////////////////////////////////////////////////////////
37      <storage android:mountPoint="/storage/sdcard0"
38               android:storageDescription="@string/storage_internal"
39               android:primary="true"
40               android:emulated="true"
41               android:removable="false"
42               android:mtpReserve="100" />
43      <storage android:mountPoint="/storage/sdcard1"
44               android:storageDescription="@string/storage_sd_card"
45               android:primary="false"
46               android:emulated="false"
47               android:allowMassStorage="true"
48               android:removable="true" />
49      ////////////////////////////////////////////////////////
50      // Mass Storage mode config
51      ////////////////////////////////////////////////////////
52      <storage android:mountPoint="/mnt/sdcard"
53               android:storageDescription="@string/storage_internal"
54               android:primary="true"
55               android:emulated="false"
56               android:allowMassStorage="true"
57               android:removable="true"
58               android:mtpReserve="100" />
59      <storage android:mountPoint="/mnt/ext_sd"
60               android:storageDescription="@string/storage_sd_card"
61               android:primary="false"
62               android:emulated="false"
63               android:allowMassStorage="true"
64               android:removable="true" />
65  -->
66
67  <StorageList xmlns:android="http://schemas.android.com/apk/res/android">
68      <storage android:mountPoint="/storage/sdcard0"
69               android:storageDescription="@string/storage_internal"
70               android:primary="true"
71               android:emulated="true"
72               android:removable="false"
73               android:mtpReserve="100" />
74      <storage android:mountPoint="/storage/sdcard1"
75               android:storageDescription="@string/storage_sd_card"
76               android:primary="false"
77               android:emulated="false"
78               android:allowMassStorage="true"
79               android:removable="true" />
80      <storage android:mountPoint="/storage/usb0"
```

15 Recording

You can test recording with below procedures.

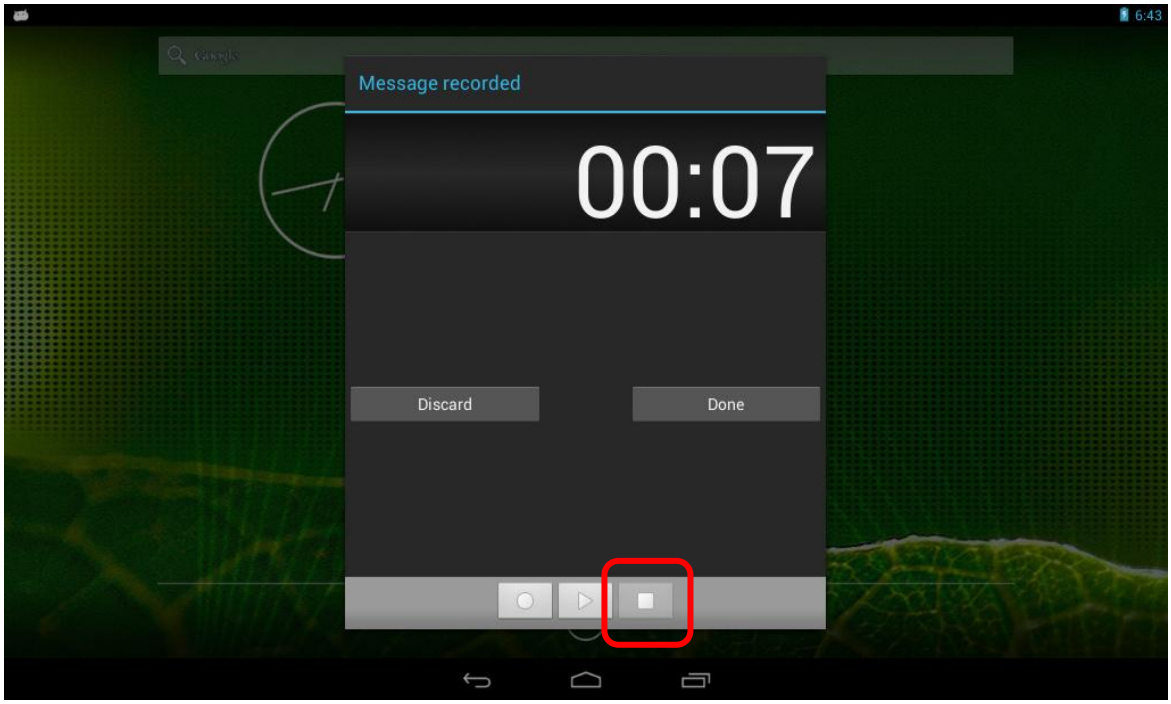


If you touch "Sound Recorder" icon, you can see below screen.

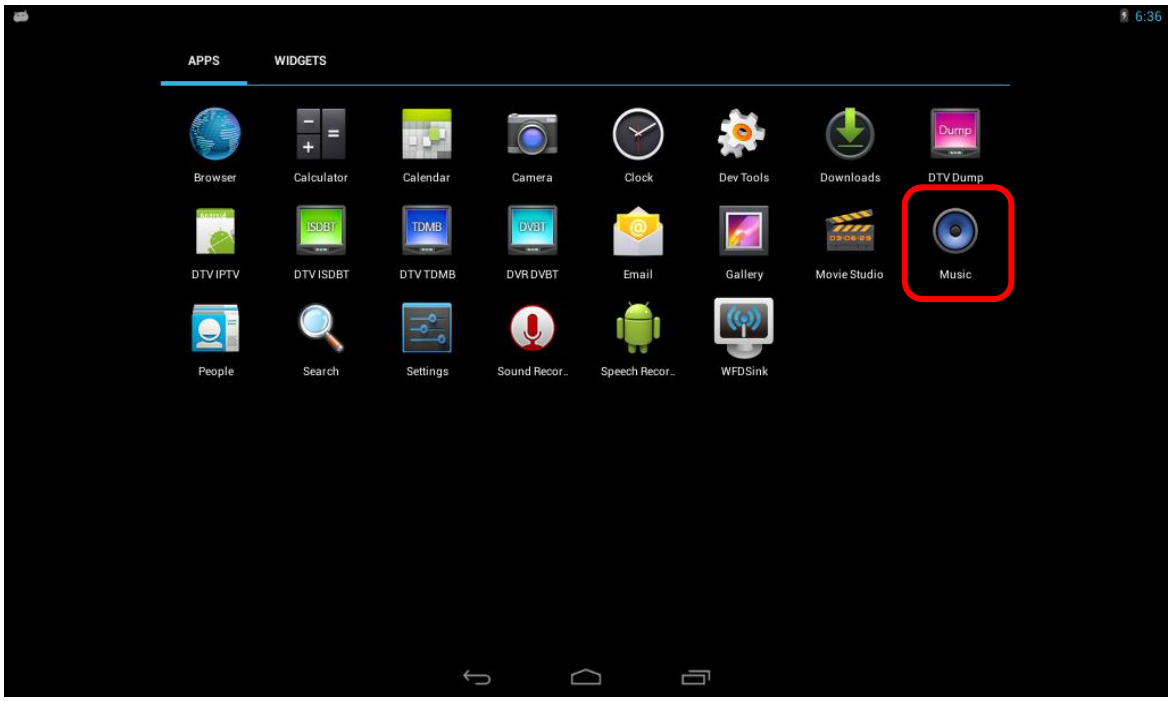


If you want to start recording, press circle button(record button). Then, recording is started. The default mode is AMR-MIC.

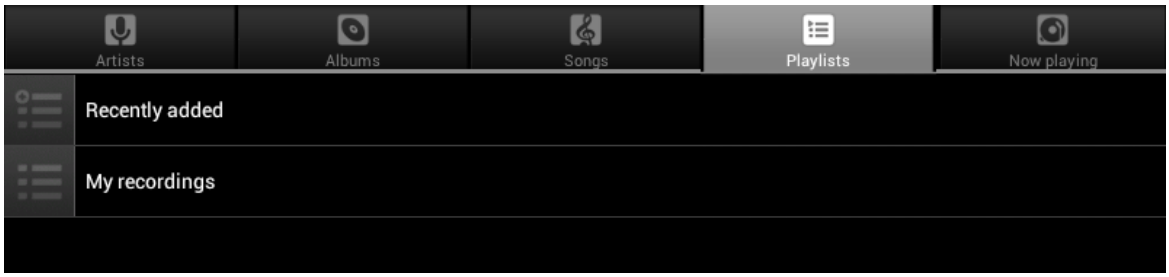
If you want to stop test recording, press the rectangle button(stop button).
Then, you can see two buttons. One is "Discard" button, the other is "Done" button.
Before pressing two buttons, you can check your recording. Touch the triangle button(play button).
If you touch "Discard" button, it returns to the menu screen without saving the recorded file.



On the other hand, you touch "Done" button, the recorded file is saved. If you need to play the saved file, select "Music" application.



Then, touch “Playlists” tab.

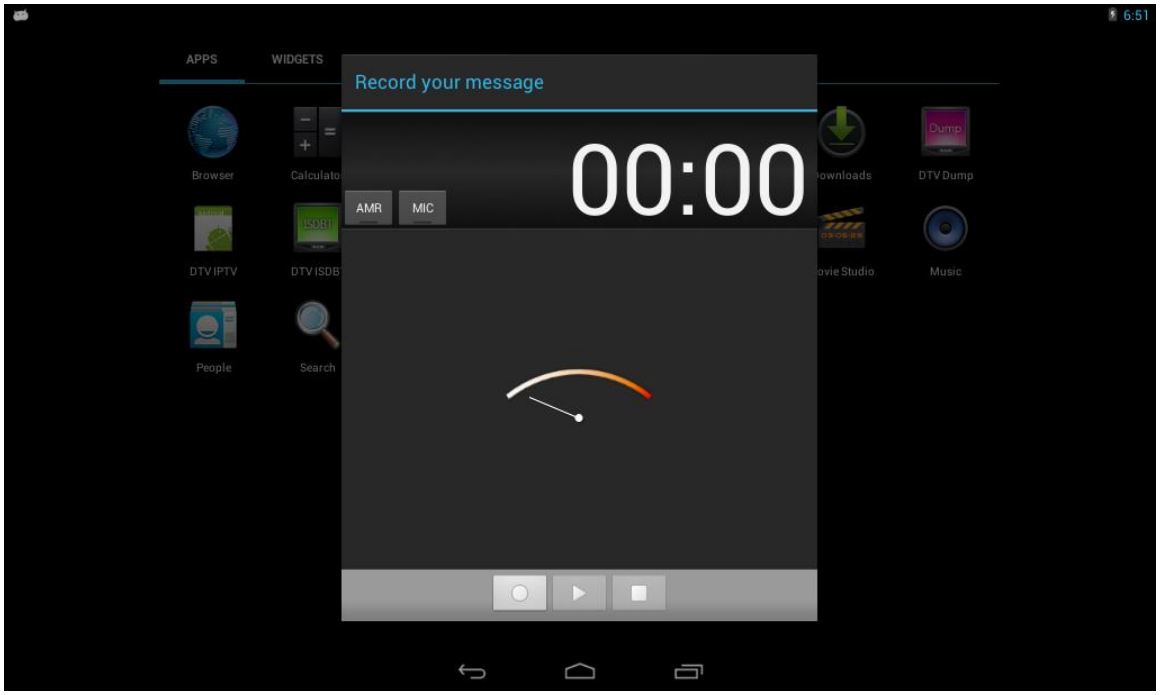


If you select “My recordings”, you can see the saved file. If there are many files on the list, you can search the file by date and time.

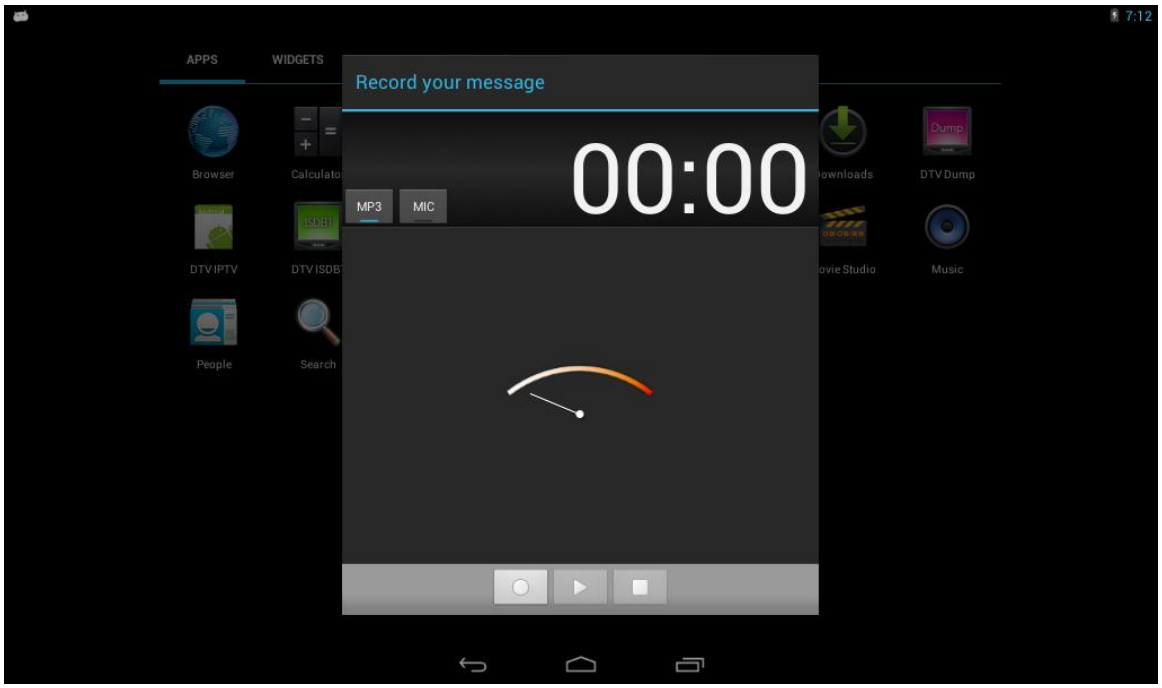
If you want to change recording mode, execute “command prompt” program.
Type this commands.

```
>adb shell
root@android:/ # setprop ro.audiobutton.enable 1
```

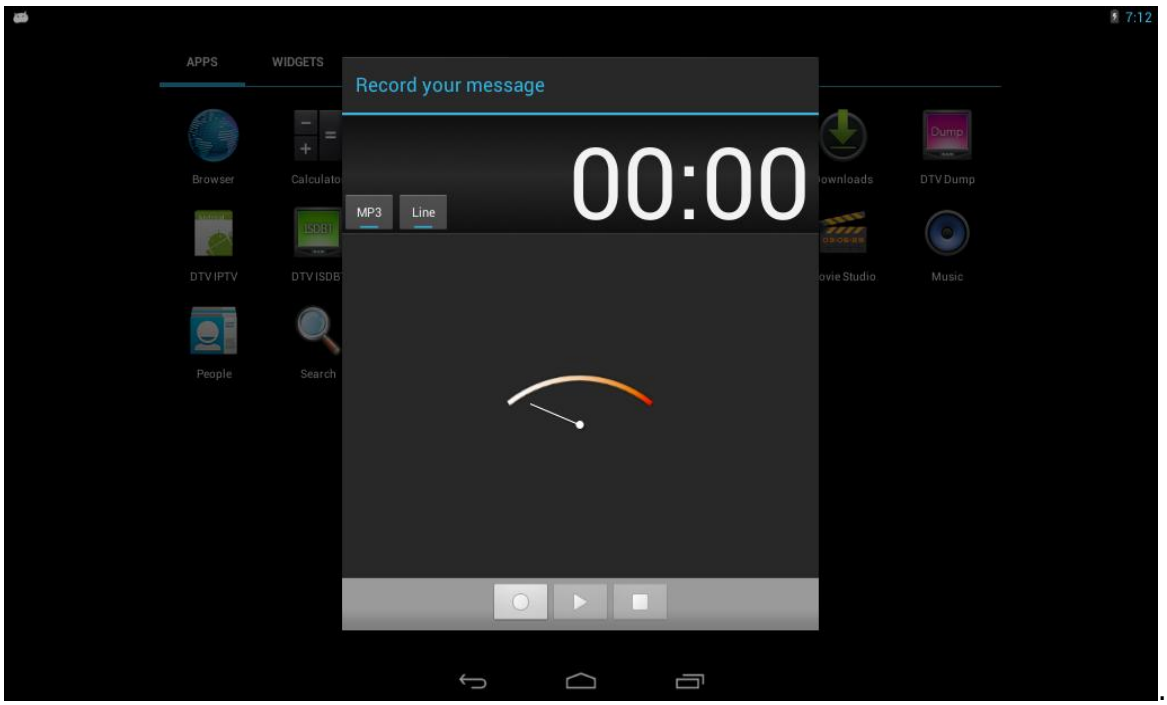
Touch “Sound Recorder” icon. You can see two buttons. One button is selecting button which is AMR or MP3, the other button is selecting input path which is MIC or Line-in.



If you touch AMR button, the button is changed from AMR to MP3.



If you touch AMR button and MIC button, you can start recording as MP3-LineIn mode.



16 SATA

To use SATA driver, you must change kernel configuration.
Please execute "`make menuconfig`" command from kernel folder and select configurations
Select "`Device Drivers --> Serial ATA and Parallel ATA drivers`".
Then select "Telechips AHCI SATA support' and choice "PHY_1" and "External 100MHz like below.
And Others should be unselected.

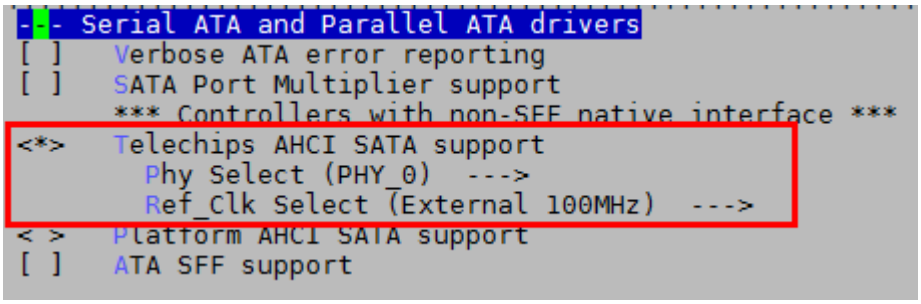


Figure 24. Select configurations for SATA operation

17 USB OTG Host

To use USB OTG Host, you must change kernel configuration.

Please execute "make menuconfig" command from kernel folder and select configurations.

Select "`Device Driver --> SCSI device support --> SCSI device support`". Then menus will be expanded. Then Select "`SCSI disk support (NEW)`", "`SCSI generic support`", "`Probe all LUNs on each SCSI device (NEW)`". Please refer below figure.

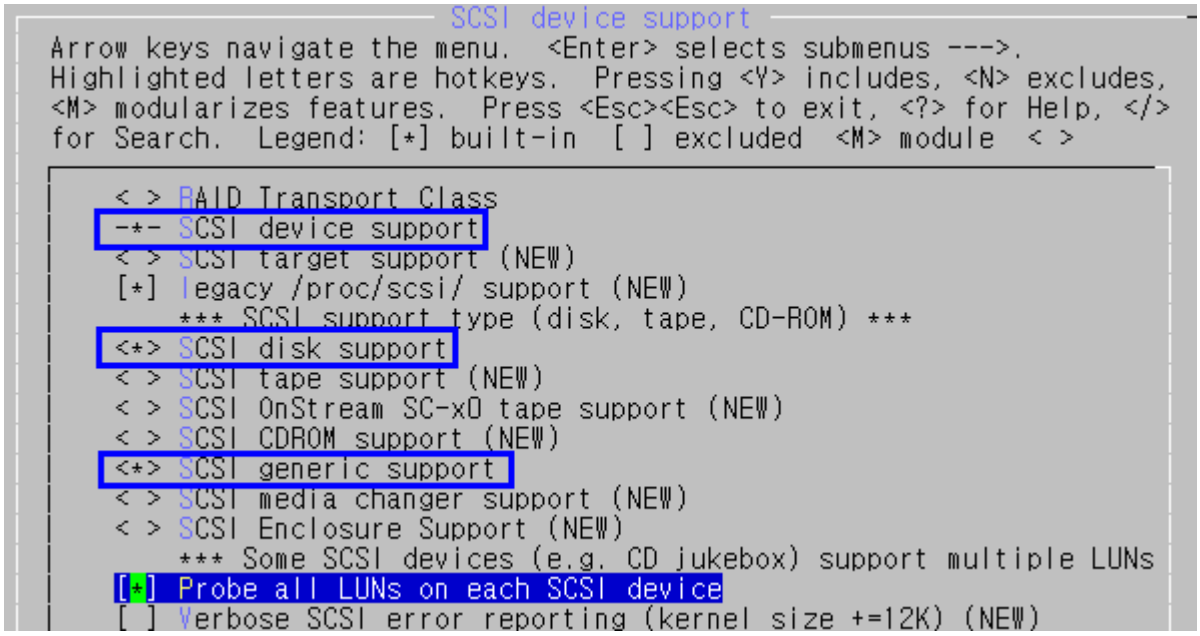


Figure 25. Select configurations for USB OTG Host operation.

Select "`Device Driver --> USB support --> Telechips DWC OTG support --> Telechips DWC OTG mode (OTG Device only mode) --> OTG Dual-role mode`".

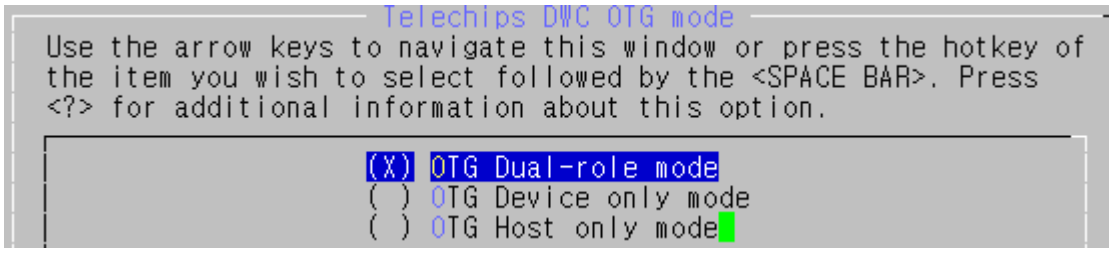


Figure 26. Select OTG Dual-roll mode for USB OTG Host operation.

Select "`Device Driver --> USB support --> USB Mass Storage support`".

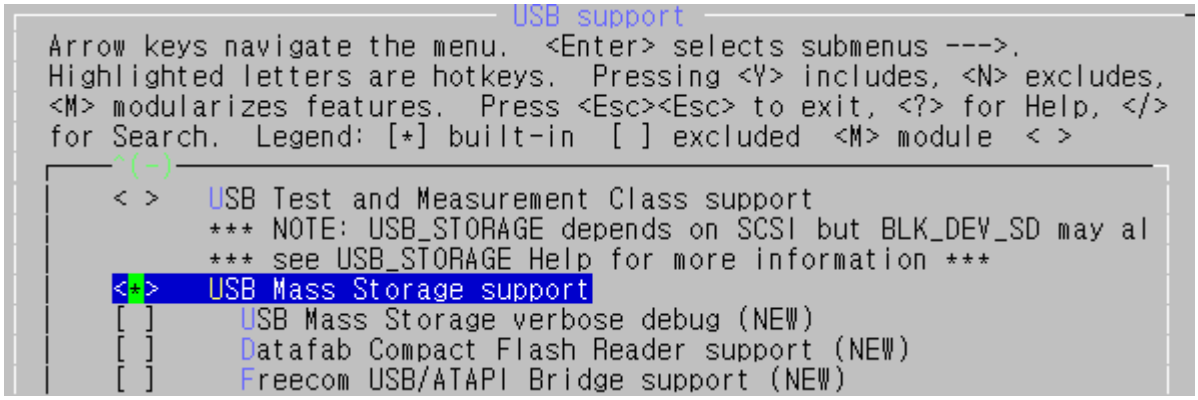


Figure 27. Select USB Mass Storage support for USB OTG Host operation.

18 USB Host 2.0

To use USB Host 2.0(EHCI&OHCI), you must change kernel configuration.

Please execute "`make menuconfig`" command from kernel folder and select configurations.

Select "Device Driver --> USB support -> EHCI HCD (USB 2.0) support" as 'M'odule
Then select 'Root Hub Transaction Translators & Support for Telechips on-chip EHCI USB controller'
And select "Device Driver --> USB support -> OHCI HCD support" as 'M'odule.

After kernel compile finished, You can find 'ehci-hcd.ko' and 'ohci-hcd.ko' modules in $project_root/kernel/drivers/usb/host directory.
If you want to update those modules, You should copy it to $project_root /device/telechips/tcc88xx-common directory.

```
<M>   EHCI HCD (USB 2.0) support
[*]     Root Hub Transaction Translators
[ ]     Improved Transaction Translator scheduling (EXPERIMENTAL)
[*]     Support for Telechips on-chip EHCI USB controller
< >   OXU210HP HCD support
< >   ISP116X HCD support
< >   ISP 1760 HCD support
< >   ISP1362 HCD support
<M>   OHCI HCD support
```

Figure 28. Select configurations for USB HOST 2.0.

19 USB Host 1.1

To use USB Host 1.1(OHCI), you must change kernel configuration.

Please execute "`make menuconfig`" command from kernel folder and select configurations.
And select "Device Driver --> USB support -> OHCI HCD support" as 'M'odule.

After kernel compile finished, You can find 'ohci-hcd.ko' modules in $project_root/kernel/drivers/usb/host directory.
If you want to update this module, You should copy it to $project_root /device/telechips/tcc88xx-common directory

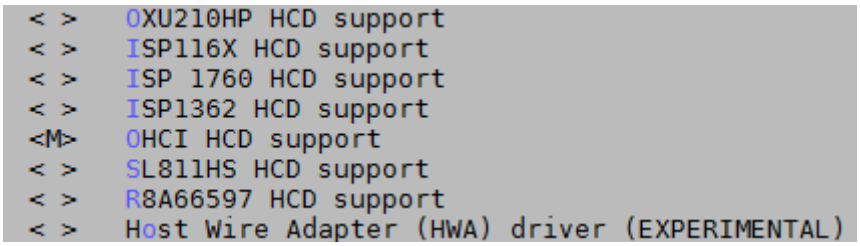


Figure 29. Select configurations for USB HOST 1.1

20 Remote Control

To use Remote Control, you must change kernel configuration.

Please execute "make menuconfig" command from kernel folder and select configurations

Select "`Device Drivers --> Input device support --> Miscellaneous devices --> Telechips Remote Controller`".

1. Remocon Controller Select

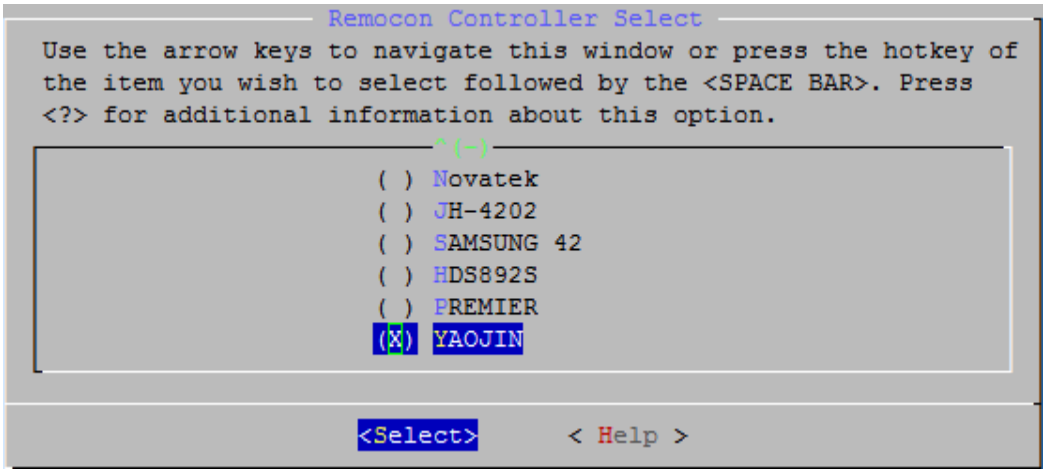


Figure 30. Select Remocon Controller

2. Remocon Core Clock Select

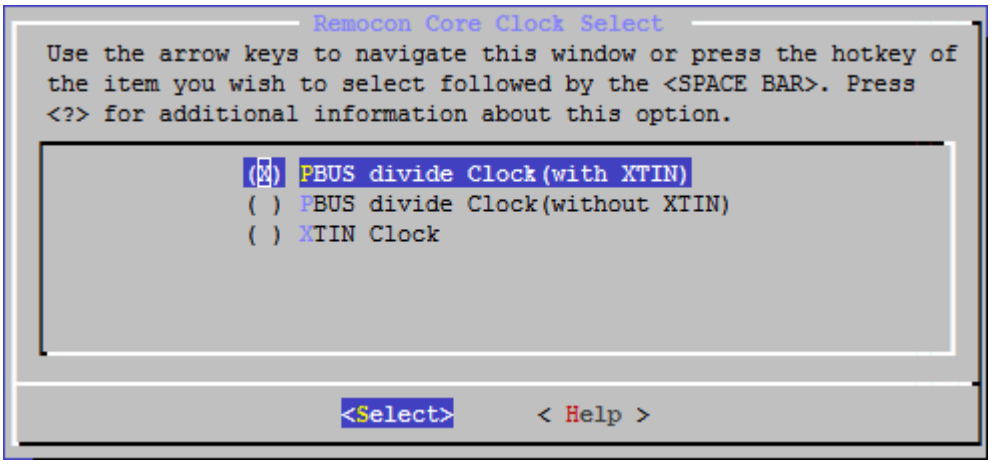


Figure 25. Select Remocon Core Clock

21 Sensors

* To test Sensors, you must have Sensors module.

To use only g-sensor, you must change as follows.

1. Please execute "`make menuconfig`" command from kernel folder and select configurations.
   Select "`Device Driver --> Character devices --> TCC Sensor Driver --> Tcc Sensor Driver(BMA150)`". You can see below Sensor modules.

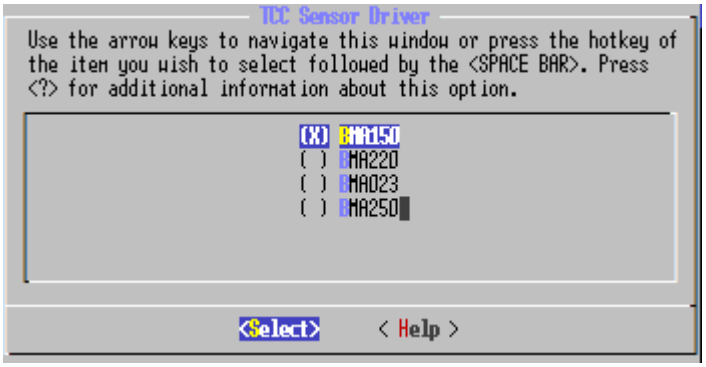


Figure 26. Select G-sensor

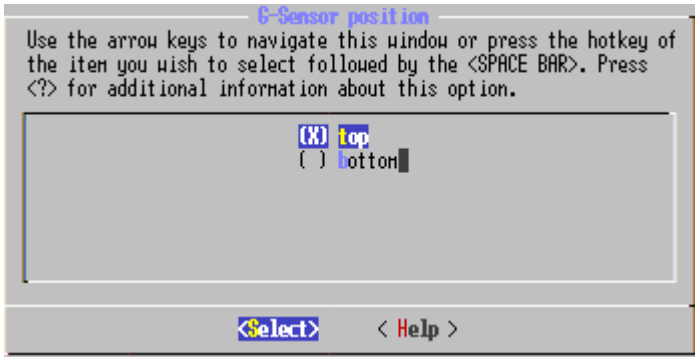


Figure 27. Select top(front) or bottom(rear)

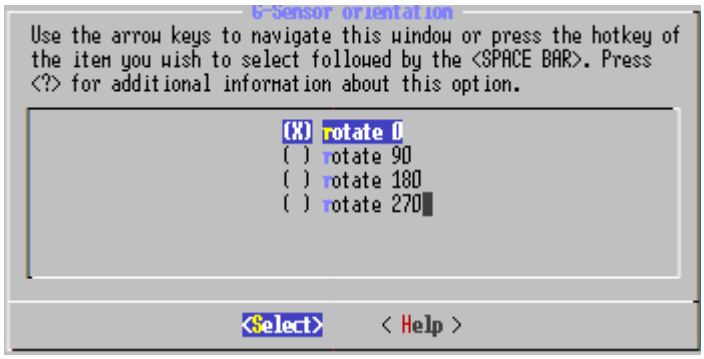
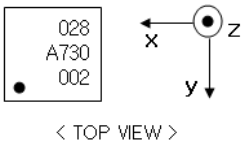


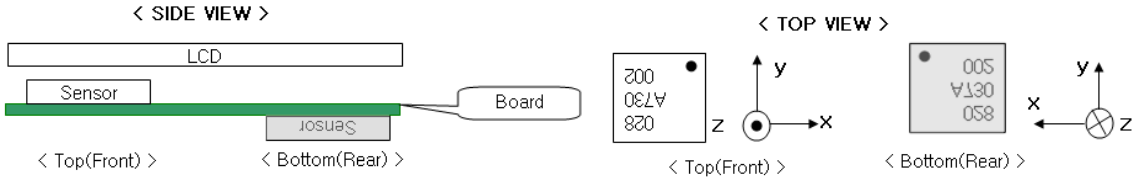
Figure 28. Select orientation

The orientation of sensor can differ with the first pin. It must check the datasheet.
Ex) Orientation of BMA150 (G-sensor)



< TOP VIEW >

In each case, the orientation marks are as below. (Ex : BMA150)



Representative eight layout are indicated below. (TOP VIEW)

Figure 29. rotate 0 -> 90 -> 180 -> 270 (top)

Figure 30. rotate 0 -> 90 -> 180 -> 270 (bottom)

To use g-sensor and compass, you must change as follows.

1. Please execute "`make menuconfig`" command from kernel folder and select configurations.
   Select "`Device Driver --> Character devices --> TCC Sensor Driver --> Tcc Sensor Driver(BMA150)`". You can see below Sensor modules.

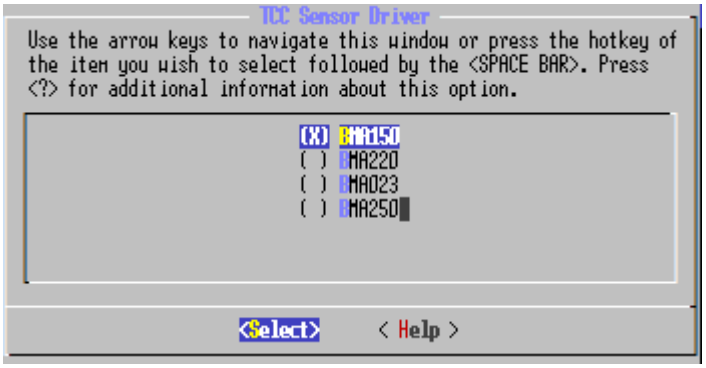
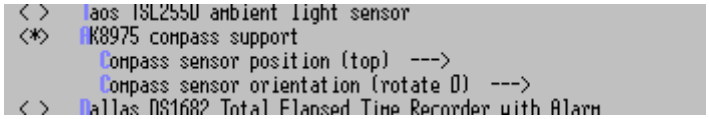


Figure 31. select g-sensor

And, **enable** "`Device Driver --> Misc devices --> AK8975 compass support`".
If not support g-sensor and compass, disable.



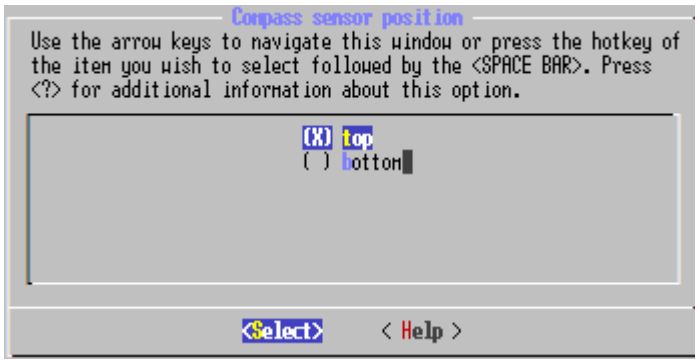


Figure 32. Select top(front) or bottom(rear)

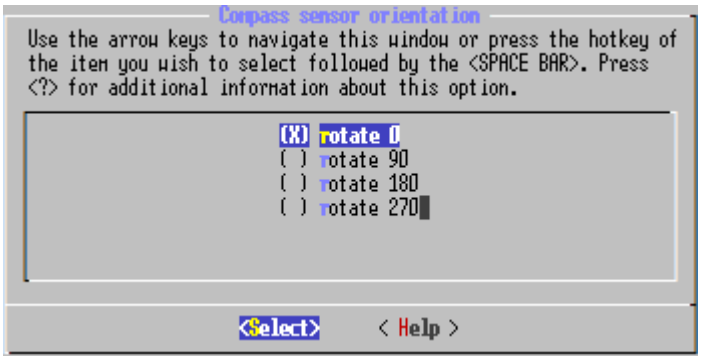
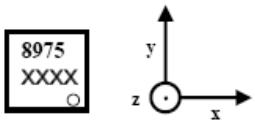


Figure 33. Select orientation

The orientation of sensor can differ with the first pin. It must check the datasheet.
Ex) Orientation of AK8975C (eCompass)



Representative eight layout are indicated below. (TOP VIEW)

Figure 34. rotate 0 -> 90 -> 180 -> 270 (top)

Figure 35. rotate 0 -> 90 -> 180 -> 270 (bottom)

22 GPS

* To test GPS, you must have GPS module.

To use hardware GPS (SIRF, JGR-SC3-S), you must change as follows.

1. Please execute "`make menuconfig`" command from kernel folder and select configurations.
   Select "`Device Driver --> GPS Driver`"
   Continously, select "`Device Driver --> [*]GPS Driver --> [*] GPS JGR SC3 S Module (NEW)`"
   If not support GPS(SIRF), disable.
   Ex) `Device Driver --> [ ]GPS Driver`

2. Open "`Android_root/device/telechips/tcc892x(or target board name) / BoardConfigBase.mk`"
   And then, check below setting.

```
# GPS define
BOARD_GPS_LIBRARIES := libgps
#BOARD_GPS_MAKER := tcc_gps
BOARD_GPS_MAKER := surf_gps
```

   This setting is default.

3. Open "`Android_root/device/telechips/tcc892x (or target board name) /init.m801.rc`"
   And then, check below setting.

```
# change permissions for gps uart, to use SURF
setprop ro.kernel.android.gps ttytCC3
     chmod 0666 /dev/ttyTCC3
     chmod 0666 /dev/gps_gpio
```

   cf) "init.tcc8920.rc", tcc8920 is target board name.

** To clear current issue in GPS SiRF,
the GPS driver of Telechips's Android 2.3 is in control of GPS_PWREN pin (GPIO).
Please check GPS sector on H/W schematics and refer Telechips H/W guide document.

23 UAC (USB Audio Class)

To use UAC, you must change kernel configuration.

Please execute "`make menuconfig`" command from kernel folder and select configurations.

Select "`Device Drivers` → `Sound card support` → `Advanced Linux Sound Architecture`"
And you must enable USB OTG Host.
Please refer to USB OTG Host chapter.

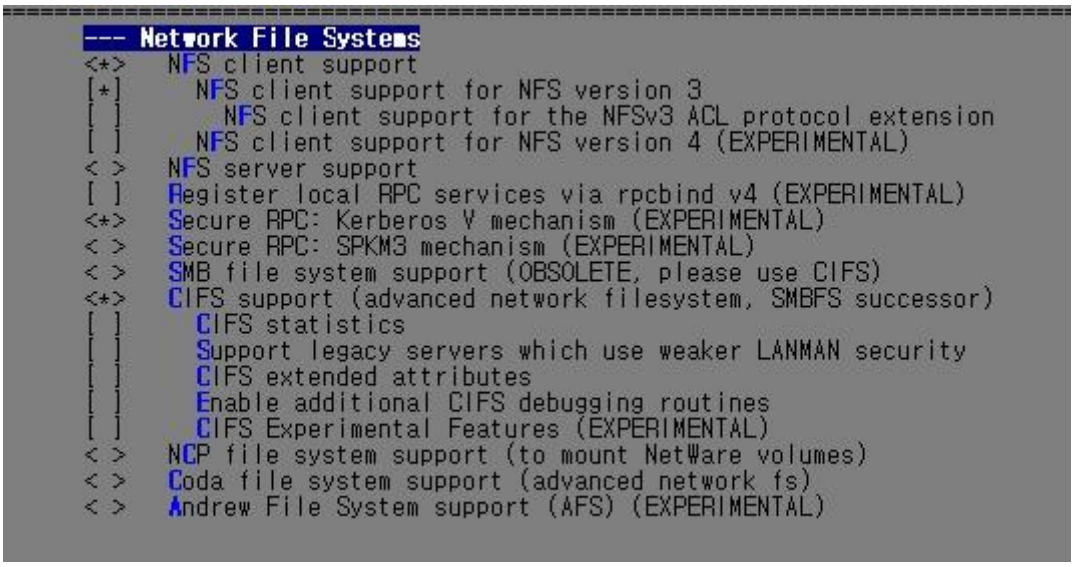
```
Device Drivers --->
       [*]Sound card support  --->
          [*] Advanced Linux Sound Architecture  --->
             [*] USB sound devices  --->
                <*> USB Audio/MIDI driver
                <*> Native Instruments USB audio devices
                 [*]  enable input devices for controllers
```

24 Network File System

To use Network File System and if **below setting is not set as default**, you must change kernel configuration and some files.

Please execute "`make menuconfig`" command from kernel folder and select configurations.

Select "`File systems` → `Network File systems`" and select like below.



Check and Change "*device/telechips/tcc8800/BoardConfig.mk*".

```
BOARD_NFS_SUPPORT := true
```

Check and Change "*device/telechips/tcc8800/init.tcc8800.rc*".

```
setprop tcc.networkfilesystem.mount enable
```

[Android Menu]
After above changing and compiling, You can use Network File System Menu to set connection mode(nfs or cifs), server IP and directory(folder) name which you are going to connect.
Please select "Settings" and enter "Wireless & network settings", you can see "Network File System Settings

25 NFC

To use NFC with a pn544 from NXP, you must change kernel configuration.

Please execute "`make menuconfig`" command from kernel folder and select configurations.

Select "`Device Drivers → Near Field Communication (NFC) device → PN544 NFC driver`"

```
Device Drivers --->
      [*]Near Field Communication (NFC) device --->
         [*] PN544 NFC driver
```