

Android Quick Start Guide

TCC892x-Android-ICS-V3.00E-Quick Start Guide

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TeleChips

Preliminary

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Revision History

Date	Version	Description
2012-01-27	0.00	IcecreamSandwich Alpha Release
2012-02-20	0.01	IcecreamSandwich Beta Release
2012-03-02	1.00	IcecreamSandwich v12.03_r1-tcc-android 4.0.3 release
2012-04-20	2.00	IcecreamSandwich v12.04_r1-tcc-android 4.0.4 release
2012-06-25	3.00	IcecreamSandwich v12.06_r1-tcc-android 4.0.4 release

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1 Introduction

This document provides guideline for users to start Android platform v4.0.4 (IceCreamSandwich) for TCC892x quickly.

2 Features

Telechips Android v4.0.4 (IcecreamSandwich) platform supports following features

- **Upgraded to kernel 3.0.8**
- **Applications on NAND storage*.**
- **Improvement 2D/3D Graphic engine**
- **Maximum resolution of video playback is Full-HD**

Note1> Telechips Android platform supports 2 types of flash memory

- **Internal Flash Memory**
This memory has two separate areas – System area and NAND storage.
System area is used to store Android system image and NAND storage is used to store various data including multimedia data.
- **SD Card – Removable area to store various data**
Telechips Android platform makes an application to be installed on the NAND storage.

Note2> Following functions will be supported in the near future.

- Application backup API (it needs GMS)
- Potable Hotspot(It needs 3G modem)

3 Download the SDK

Download SDK from `ics` branch of Telechips Android GIT server

```
$ mkdir mydroid
$ cd mydroid

$ repo init -u ssh://android.telechips.com/androidce/android/platform/manifest.git
-b ics

$ repo sync
```

You must to use "-b ics" option.

And also you can download SDK using TAG or XML information.

For example,

```
$repo init -u ssh://android.telechips.com/androidce/android/platform/manifest.git -b ics
-m "XML NAME.xml"
```

or

```
$repo forall -c git checkout "TAG_NAME"
```

4 Compile and build Android framework

4.1 Setup compile environment

Before compile operation, TARGET_PRODUCT must be set for the proper board configuration. Execute below commands. There is space between `dot(.)` and `'build/envsetup.sh'` to execute shell scripter. When you execute "lunch" command, you can see lists.

```
$ cd ~/mydroid/android
$ . build/envsetup.sh
including device/moto/stingray/vendorsetup.sh
including device/moto/wingray/vendorsetup.sh
including device/samsung/crespo4g/vendorsetup.sh
including device/samsung/crespo/vendorsetup.sh
including device/samsung/maguro/vendorsetup.sh
including device/samsung/torospr/vendorsetup.sh
including device/samsung/toro/vendorsetup.sh
including device/samsung/tuna/vendorsetup.sh
including device/telechips/m805_880x/vendorsetup.sh
including device/telechips/m805_892x/vendorsetup.sh
including device/telechips/tcc8800/vendorsetup.sh
including device/telechips/tcc8920st/vendorsetup.sh
including device/telechips/tcc8920/vendorsetup.sh
including device/ti/panda/vendorsetup.sh
including sdk/bash_completion/adb.bash
$ lunch
```

```
You're building on Linux
Lunch menu... pick a combo:
 1. full-eng
 2. full_x86-eng
 3. vbox_x86-eng
 4. full_stingray-userdebug
 5. full_wingray-userdebug
 6. full_crespo4g-userdebug
 7. full_crespo-userdebug
 8. full_maguro-userdebug
 9. full_torospr-userdebug
10. full_toro-userdebug
11. full_tuna-userdebug
12. full_m805_880x-eng
13. full_m805_880xv8-eng
14. full_m805_892x-eng
15. full_m805_892xv8-eng
16. full_m805_892x_emmc-eng
17. full_tcc8800-eng
18. full_tcc8800v8-eng
19. full_tcc8800emmc-eng
20. full_tcc8920st_evm-eng
21. full_tcc8920stv8-eng
22. full_tcc8920st_emmc-eng
23. full_tcc8920-eng
24. full_tcc8920v8-eng
25. full_tcc8920emmc-eng
26. full_panda-eng
Which would you like? [full-eng]
```

If you want to use TCC892x, please select `'full_tcc8920-eng'` with input 23. Or if you

want to use M805S_892x, please select '*full_m805_892x-eng*' with input 14.

※ How to use user mode

If you want to use user mode, you should use "**choosecombo**" command.

※ **This selection should be done before compiling kernel because it affects the kernel configuration of architecture.**

4.2 Compile bootloader

You must **compile bootloader, kernel and frameworks respectively** and compile bootloader and kernel firstly.
"bootable/bootloader/lk".

4.2.1 TCC892x

To compile for TCC892x, "*make tcc8920_evm*" must be executed.

```
$ cd ~/mydroid/android/bootable/bootloader/lk
$ make tcc8920_evm
```

Then "*lk.rom*" is created at "*bootable/bootloader/lk/build-tcc8920_evm/lk.rom*"

In addition,
 you have to select H/W Revision of EVB Board that you are using.

Change "*bootable/bootloader/lk/target/tcc8920_evm/rules.mk*" for H/W Revision

```
# Define board revision

#HW_REV=0x1000
#HW_REV=0x1001
#HW_REV=0x1002
#HW_REV=0x1003
#HW_REV=0x1004
#HW_REV=0x1005
#HW_REV=0x1006
HW_REV=0x1007
#HW_REV=0x1008
```

For more information, refer to the table below.

HW Revision	Demo Board
HW_REV=0x1000	TCC8920 D2 08X4 SV01 - DDR2 512MB (32Bit)
HW_REV=0x1001	TCC8920 D2 08X4 SV01 - DDR2 1024MB (32Bit)
HW_REV=0x1002	TCC8920 D3 08X4 SV01 - DDR3 512MB (32Bit)
HW_REV=0x1003	TCC8920 D3 08X4 SV01 - DDR3 1024MB (32Bit)
HW_REV=0x1004	TCC8920 D3 08X4 SV01 - DDR3 512MB (16Bit)
HW_REV=0x1005	TCC8920 D3 16X4 2CS SV01 - DDR3 1024MB (32Bit)

HW_REV=0x1006	TCC8925 D3 08X4 2CS SV01 - DDR3 1024MB (16Bit)
HW_REV=0x1007	TCC8920 D3 08X4 SV6.0 - DDR3 1024MB (32Bit)
HW_REV=0x1008	TCC8923 D3 08X4 SV01 - DDR3 1024MB (32Bit)

1) With

TCC8925_D3_08X4_2CS Board

You have to change WIFI option as follows.

- In "*device/telechips/tcc8920/BoardConfigBase.mk*" file.

```
# Wi-Fi defines
BOARD_USES_ATH_WIFI := false
BOARD_WIFI_MODULE := ar6002 # you can chose ar6002, ar6102, ar6003, ar6103, ar630

BOARD_USES_REALTEK_WIFI = true
ifeq ($(BOARD_USES_REALTEK_WIFI), true)
    WPA_SUPPLICANT_VERSION := VER_0_8_X
    BOARD_WPA_SUPPLICANT_DRIVER := WEXT
    .....
endif
```

- In "*device/telechips/tcc8920/device_base.mk*" file.

```
# Atheros Wi-Fi module
$(call inherit-product, device/telechips/tcc892x-common/wifi/ar6002.mk)
$(call inherit-product, device/telechips/tcc892x-common/wifi/ar6003.mk)

# Realtek Wi-Fi module
$(call inherit-product, device/telechips/tcc892x-common/wifi/realtek.mk)
```

4.2.2 M805S

To compile for M805S, "`make m805_892x_evm`" must be executed.

```
$ cd ~/mydroid/android/bootable/bootloader/lk
$ make m805_892x_evm
```

"`lk.rom`" is created at "`bootable/bootloader/lk/build-m805_892x_evm/`" folder.

In addition,

You have to select H/W Revision of M805S Board that you use.

Change "`bootable/bootloader/lk/target/m805_892x_evm/rules.mk`" for H/W Revision

```
# Define board revision
# 0x2000 = TCC8803_M805S_D3_08x4_V0.1(Change to TCC89 - DDR3_512MB (32Bit)
# 0x2001 = TCC8803/8923_M805S_D3_08x4_V1.1 - DDR3_1024MB (32Bit)
# 0x2002 = TCC8925_M805S_D3_08x4_2CS_V0.1 - DDR3_1024MB (16Bit)
# 0x2003 = TCC8925_M805S_D3_08x4_2CS_V1.2 2012.03.15 - DDR3_1024MB (16Bit)
# 0x2004 = TCC8925_M805S_D3_08x2_4L_V0.1A - DDR3_512MB (16Bit)
# 0x2005 = TCC8925_M805S_D3_08x4_2CS_V1.4A 2012.05.08 - DDR3_1024MB (16Bit)
#HW_REV=0x2000
#HW_REV=0x2001
#HW_REV=0x2002
#HW_REV=0x2003
#HW_REV=0x2004
HW_REV=0x2005
```

*** If HW_REV is 0x2000 or 0x2001, chip revision should be selected as below.**

1) With M805S_TCC8923-0XX Chipset

You have to change option in `rules.mk`.

Define "`_TCC8923_0XA_`" option as follows.

```
DEFINES += _M805_8923_
#DEFINES += _TCC8923_0XA_
```

2) With M805S_TCC8923-0XA Chipset

You have to change option in `rules.mk`. (This is "default option".)

Define "`_TCC8923_0XA_`" option as follows.

```
DEFINES += _M805_8923_
DEFINES += _TCC8923_0XA_
```

4.3 Compile Linux Kernel

Kernel must be compiled firstly. After compile kernel, you must compile boot.img and system.img. If you change Kernel, boot.img and system.img must be compiled again.

4.3.1 Set Linux kernel default setting

Lunch menu must be selected before setting linux kernel configuration, because lunch menu affect the kernel configuration of architecture in ics release.

4.3.1.1 For TCC892x

Enter Linux kernel folder and execute below command to set TCC892x default setting. `.config` file is created at kernel folder.

```
$ cd ~/mydroid/android/kernel
$ make tcc892x_defconfig
```

4.3.1.2 For M805S

```
$ cd ~/mydroid/android/kernel
$ make m805_892x_defconfig
```

1) How to use TCC892x Chipset

- If using M805S_TCC8923-0XX chipset, you have to select "TCC8923_0XA Chipset" option in kernel menuconfig as below.
- If using M805S_TCC8923-0XA chipset, you have to select "TCC8923_0XA Chipset" option in kernel menuconfig as below.
- If using M805S_TCC8925-0XX chipset, you have to select "TCC8925_0XX Chipset" option in kernel menuconfig as below.

Select "*System Type* → *M805S_TCC892x Chipset Type*".
And then, select chipset type which you use on board as follow.

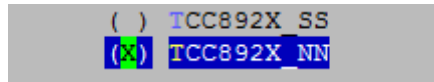
```
----- M805S_TCC892x Chipset Type -----
Use the arrow keys to navigate this window or press the hotkey of
the item you wish to select followed by the <SPACE BAR>. Press
<?> for additional information about this option.

( ) TCC8923_0XX Chipset
(X) TCC8923_0XA Chipset
( ) TCC8925_0XX Chipset
```

2) In case of using TCC892x-NN chipset

If you use TCC892x-NN chipset, you should change option in menuconfig.

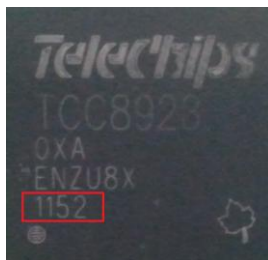
: "System Type → TCC892x Chipset Wafer Type → TCC892X_NN"



* How to distinguish TCC892X_NN chipset

You have only to check production day and it is marked on Chipset.

TCC892X_NN chipset was produced from 10th weeks, 2012 (example, 1210)



[TCC892X_SS]



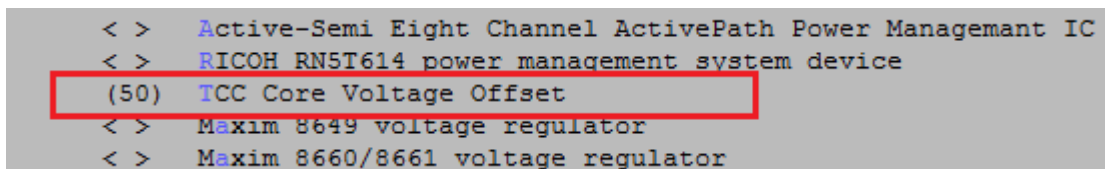
[TCC892X_NN]

* 1152 → 2011, 52th weeks

* 1210 → 2012, 10th weeks

If you use **TCC892X_SS**, you should change offset voltage in menuconfig.

: "Device Drivers → Voltage and Current Regulator Support → TCC Core Voltage Offset → 50"



And if you use **TCC892X_NN**, TCC Core Voltage offset is 0.

For reference, the default core voltage offset is 0mV.

3) How to select DDR

DDR option can be changed by "menuconfig" and the way is as follows.

"System Type → DRAM Settings"

DDR option of each board should be selected as follows.

Board revision	DRAM type	size	Band Width	DDR3 settings
TCC8803_M805S_D3_08x4_V0.1	DRAM_DDR3	512MB	32Bit	H5TQ1G83BFR_H9C
TCC8803/8923_M805S_D3_08x4_V1.1	DRAM_DDR3	1024MB	32Bit	H5TQ2G83BFR_PBC
TCC8925_M805S_D3_08x4_2CS_V0.1	DRAM_DDR3	1024MB	16Bit	H5TQ2G83BFR_PBC
TCC8925_M805S_D3_08x4_2CS_V1.2	DRAM_DDR3	1024MB	16Bit	H5TQ2G83BFR_PBC
TCC8925_M805S_D3_08x2_4L_V0.1A	DRAM_DDR3	512MB	16Bit	H5TQ2G83BFR_PBC
TCC8925_M805S_D3_08x4_2CS_V1.4A	DRAM_DDR3	1024MB	16Bit	H5TQ2G83BFR_PBC

4) How to select PMIC

PMIC can be changed by "menuconfig" and the way is as follows.

"Device Drivers → Voltage and Current Regulator Support"

PMIC of each board should be select as follows.

Board revision	PMIC
TCC8803_M805S_D3_08x4_V0.1	KrossPower AXP192
TCC8803/8923_M805S_D3_08x4_V1.1	KrossPower AXP192
TCC8925_M805S_D3_08x4_2CS_V0.1	RICOH RN5T614
TCC8925_M805S_D3_08x4_2CS_V1.2	RICOH RN5T614
TCC8925_M805S_D3_08x2_4L_V0.1A	RICOH RN5T617
TCC8925_M805S_D3_08x4_2CS_V1.4A	RICOH RN5T617

Both RN5T614 and RN5T617 are driven by same device driver.
If RN5T617 is mounted on your board, select "RICOH RN5T614".

5) How to select audio codec chipset

Audio codec chipset can be changed by "menuconfig" and the way is as follows.

"Device Drivers → Sound card support → Advanced Linux sound architecture → ALSA for SoC Audio support → SoC Audio for the Telechips TCC chip"

Audio codec chipset of each board should be select as follows.

Board revision	Audio codec chipset
TCC8803_M805S_D3_08x4_V0.1	ES8388
TCC8803/8923_M805S_D3_08x4_V1.1	ES8388
TCC8925_M805S_D3_08x4_2CS_V0.1	ES8388
TCC8925_M805S_D3_08x4_2CS_V1.2	RT5633
TCC8925_M805S_D3_08x2_4L_V0.1A	RT5633
TCC8925_M805S_D3_08x4_2CS_V1.4A	RT5633

*** If the configuration for audio codec in "menuconfig" was changed, "BoardConfig.mk" file should be changed too.**

The file location is as follows.

Device\telechips\m805_892x\BoardConfig.mk

The below codec name in "BoardConfig.mk" should be modified as follows.

- In case of using rt5633 (default option)

```
# Audio Codec Chip  
TARGET_BOARD_AUDIO_CODEC := rt5633
```

- In case of using es8388

```
# Audio Codec Chip  
TARGET_BOARD_AUDIO_CODEC := es8388
```

4.3.1.3 In case of board that used TCC8803

If you use device board that used TCC8803, maybe it has two core power like CoreA and CoreB.

But, TCC8923 has one core power(CoreA). So in case of using TCC8923 on device board that used TCC8803, the existing CoreB power should be controlled with CoreA power at the same time.

- How to control CoreA and CoreB at the same time

If using AXP192 PMIC, select option in kernel manuconfig as follows.

Select "Device Drivers → Voltage and Current Regulator Support → AXP192 DCDC1/2 controlling together"

```
<*>  KrossPower AXP192 Power System Management IC  
<*>  AXP192 PMIC PEK Power Key USE  
<*>  AXP192 DCDC1/2 controlling together  
< >  Active-Semi Eight Channel ActivePath Power Managemant IC
```

- If using Discrete type power, the existing CoreB power should be fixed to 1.35V.

For more information, Please refer to H/W guide.

4.3.2 Set Linux kernel's configurations

The above config file locates in *kernel/arch/arm/configs/*

For TCC892x EVM, kernel configuration will be set by *tcc892x_defconfig*. And in addition, you must set correct module with *menuconfig*.

And for M805S, kernel configuration will be set by *m805_892x_defconfig*.

4.3.2.1 Compile Linux kernel

To compile Linux kernel, just execute "*make*".

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

4.4 Compile frameworks

Just execute “*make*” command, you can build Android frameworks. It takes time.

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

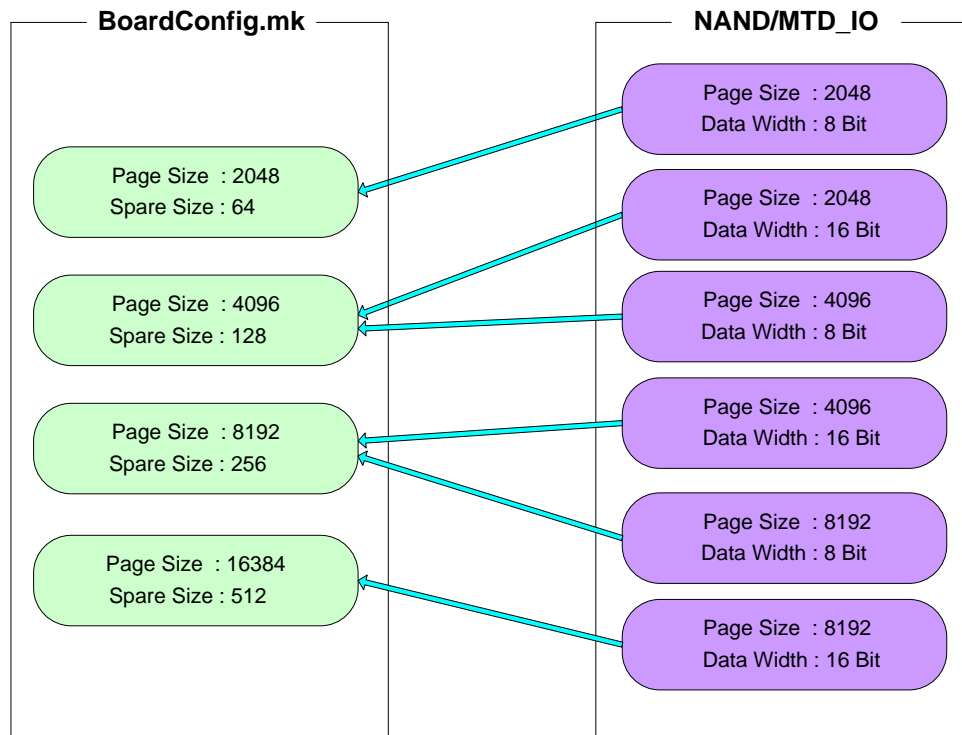
If you select proper *TARGET_PRODUCT* with “*Setup compile environment*” chapter, you can check it with below log. This log can be seen when you select “*full_tcc8920-eng*”.

```
=====
PLATFORM_VERSION_CODENAME=REL
PLATFORM_VERSION=4.0.4
TARGET_PRODUCT=full_tcc8920
TARGET_BUILD_VARIANT=eng
TARGET_BUILD_TYPE=release
TARGET_BUILD_APPS=
TARGET_ARCH=arm
TARGET_ARCH_VARIANT=armv7-a-neon
HOST_ARCH=x86
HOST_OS=linux
HOST_BUILD_TYPE=release
BUILD_ID=IMM76D
=====
```


5 Setting NAND page & spare size

Open BoardConfig.mk file for setting nand flash type.

Nand flash type is able to check in available list or nand datasheet.



```
$ cd ~/mydroid/android
$ vi device/telechips/tcc8920/BoardConfig.mk
```

```
BOARD_NAND_PAGE_SIZE := 4096 -s 128
BOARD_KERNEL_PAGESIZE := 4096
BOARD_FLASH_BLOCK_SIZE := 4096
```

6 How to set DPI for using Tablet UI

Basically, In order to use Tablet UI, DP value should be over 600 DP.

1) 800x480 LCD

In this case, LCD density value should be set to 120 density.

How to calculate as follows.

$$\text{Density} = (\text{Small size of LCD} * 160) / 600 \approx 120$$

For reference,

The default setting of SDK is 800x480 LCD.

And the density value is 120. So there is no need to change.

2) Over 800x600 LCD

- Remove "config.xml" file.

File location : `device\telechips\"DEVICE_NAME"\overlay\packages\apps
\Launcher2\res\values\`

- Change DPI value

In this case, LCD density value can be set as 160 normally.

If you want to change the density value, you can change it.

For example,

In case of 1024x768 LCD,

Density value is 204 (Density = (768*160)/600).

So you can set to less value than 204.

In this case, you can use 160 DPI.

7 How to use Bluetooth

If you want to use Bluetooth, you should check following.

1) Kernel

A. Make menuconfig

Device Drivers -> Character devices -> TCC Bluetooth dev Control power->

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

```
--- TCC Bluetooth dev Control power
<Y> CSR Module BC04 and BC06 Support
< > Broadcom Module BCM4325D0 Support (TCC9200S only) (NEW)
```

You should choose vendor of Bluetooth.

2) Android

A. BoardConfigBase.mk

This file is in “device/telechips/tcc8920/” or “device/telechips/m805_892x/” folder.

You should check bluetooth option in it.

```
# Bluetooth defines
#
BOARD_HAVE_BLUETOOTH := true
BOARD_HAVE_BT_MODULE := true
CUSTOM_BLUETOOTH_VENDOR := csr
```

“BOARD_HAVE_BT_MODULE := true” is not default option.

You should change from false to true to use Bluetooth and touch following.

“touch system/bluetooth/bluedroid/”

If you open it, you can find this.

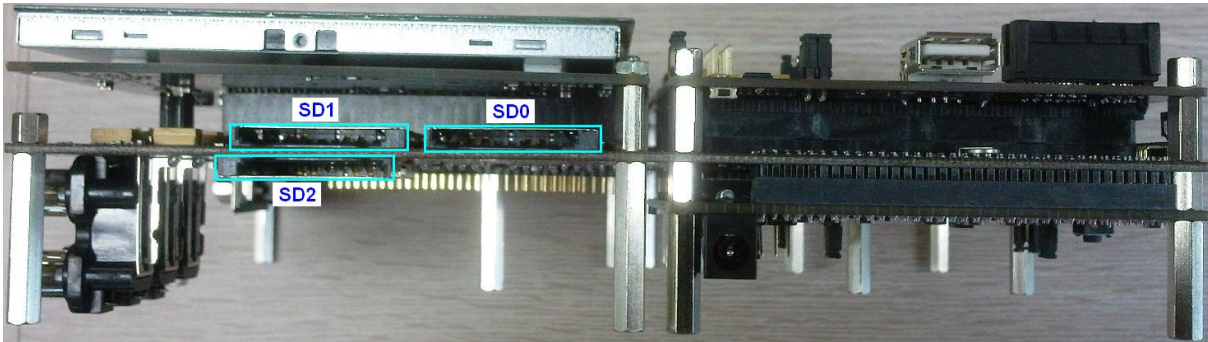
You should check that “CUSTOM_BLUETOOTH_VENDOR := csr” is opened.

(this is default option)

8 SD Slot Usage

8.1 Location of the SD slot at each EVM board

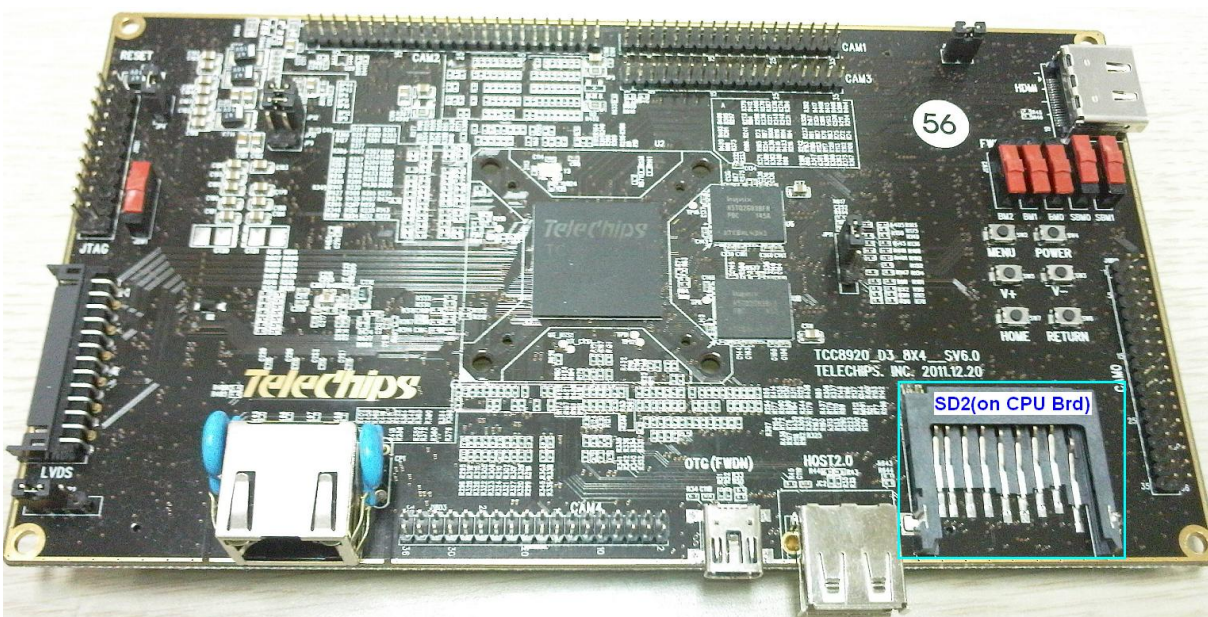
In the TCC892x EVM Board is not using the SD2 slot of Main Board.



[Figure 8.1 Telechips EVM Main Board – Left Side]

8.1.1 TCC8920 EVM Board

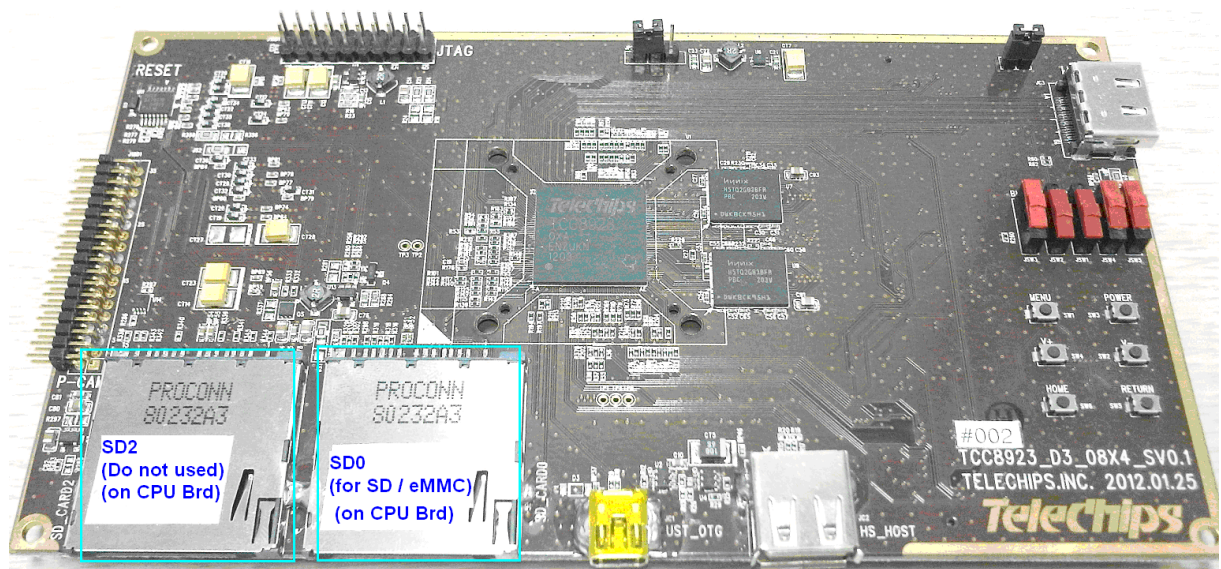
TCC8920 EVM	SD slot	SD + WiFi (Default Setting)	eMMC + SD + WiFi (Optional)
Main Board	SD0	–	eMMC
	SD1	WiFi	WiFi
	SD2	–	–
CPU Board	SD2	SD	SD



[Figure 8.2 TCC8920 D3 CPU Board]

8.1.2 TCC8923 D3 CPU Board

TCC8923 EVM	SD slot	SD + WiFi (Default Setting)	eMMC + SD + WiFi (Optional)
Main Board	SD0	—	—
	SD1	WiFi	SD or WiFi
	SD2	—	—
CPU Board	SD0	SD	eMMC
	SD2	—	—

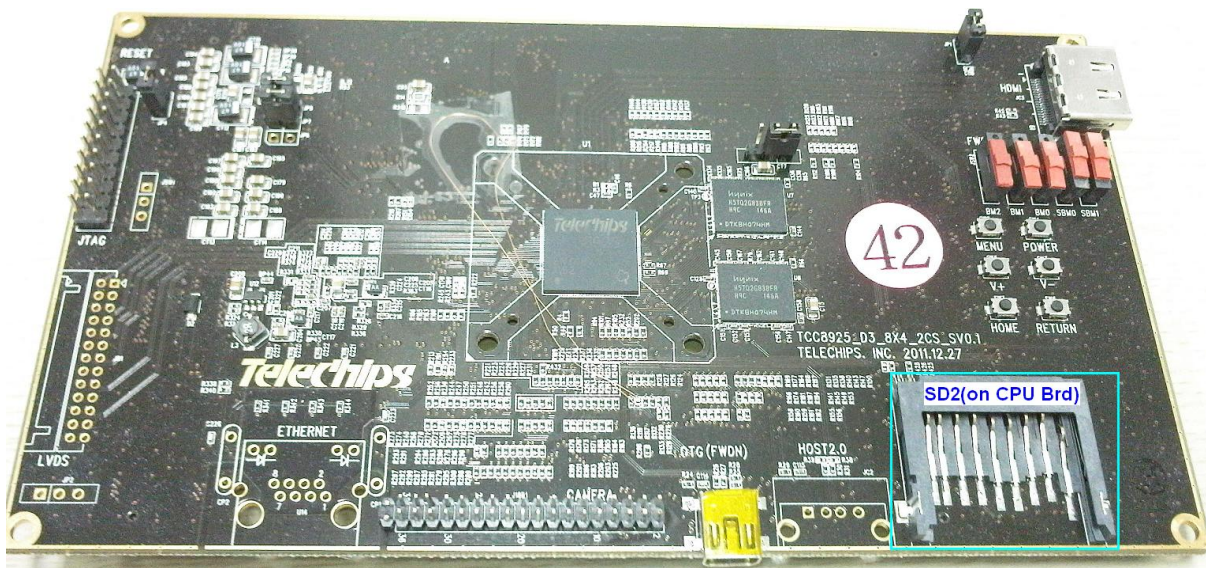


[Figure 8.3 TCC8923 D3 CPU Board]

8.1.3 TCC8925 D3 2CS CPU Board

TCC8925 EVM	SD slot	SD + WiFi (Default Setting)	eMMC + SD + WiFi (Optional)
Main Board	SD0	—	eMMC
	SD1	—	—
	SD2	—	—
CPU Board	SD2	SD	SD

(WiFi is using the USB Host Interface.)



[Figure 8.4 TCC8925 D3 2CS CPU Board]

8.2 Settings for eMMC boot mode

If you want to the eMMC boot mode support, that is following.

```
1) Kernel$ make menuconfig
   Device Drivers -> MMC/SD/SDIO card support ->
   [*]   Telechips SD/MMC Host Controller Driver
   [*]   Support an eMMC
   [*]   Enable TCC SDHC0
   [*]   Enable TCC SDHC1
   [*]   Enable TCC SDHC2
   [ ]   Enable TCC SDHC3
```

8.3 Settings for High Speed SDHC Card

Some SDHC Card is able to occur that access error for SD High-Speed operation. Access error is according to external factors (hardware pattern, passive element value, etc), also EVM board.

If you want to change the SD High-Speed mode support or not, that is following.

```
$ cd ~/mydroid/android
$ vi kernel/arch/arm/mach-tcc892x/board-tcc8920-mmc.c
```

tcc8920_mmc_platform_data[].caps in the Board-tcc8920-mmc.c file,

```
1) Support the SD High-Speed mode
.caps      = MMC_CAP_SDIO_IRQ | MMC_CAP_4_BIT_DATA
            | MMC_CAP_SD_HIGHSPEED | MMC_CAP_MMC_HIGHSPEED,

2) Not support the SD High-Speed mode
.caps      = MMC_CAP_SDIO_IRQ | MMC_CAP_4_BIT_DATA
            /*| MMC_CAP_SD_HIGHSPEED | MMC_CAP_MMC_HIGHSPEED*/,
```

8.4 How to connect SD Card to PC by the UMS

To set SDHC interface port, You have to change “vold.fstab” file and select option in kernel menuconfig as below.

8.4.1 In case of the NAND boot mode, Connect SD2 to PC by the UMS

```
$ cd ~/mydroid/android
$ vi device/telechips/tcc8920/vold.fstab

1) In the vold.fstab file,
   dev_mount ext_sd /mnt/ext_sd auto /devices/platform/tcc-sdhc
```

8.4.2 In case of the eMMC boot mode, Connect SD2 to PC by the UMS

```
$ cd ~/mydroid/android
$ vi device/telechips/tcc8920_emmc/vold.fstab

1) In the vold.fstab file,
   dev_mount sdcard /mnt/ext_sd auto /devices/platform/tcc-sdhc1
```