



# GoDroid

## Application Notes System Configuration

v1.1



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# Preface

## Overview

This manual provides detailed guidance for GoDroid system configuration. Content of this manual are subject to serve R & D and system support engineers for customized development by using GoDroid Platform Development Kit. This manual is organized into the following chapters:

- **Chapter 1: Introduction**

This chapter gives insight on configuration related files for GoDroid.

- **Chapter 2: AOSP PDK Porting**

This chapter provides details on the configuration related items of device porting including TIGER Board, GPU and Audio.

- **Chapter 3: File System and Storage Device**

This chapter covers topics of GoDroid NAND Flash UBIFS file system; virtual SD card and external SD card configurations, and external portable storage device configurations.

- **Chapter 4: Input Configuration**

This chapter summarizes GoDroid Input subsystem, which is the configuration of IR and front panel key.

- **Chapter 5: Recovery Configuration**

This chapter gives general overview and procedure about GoDroid Recovery solution on the TIGER Board based on Android Recovery system.

- **Chapter 6: FAQ**

This chapter describes range of common questions and their corresponding solutions related to system configuration.

## Audience

This manual is primarily written to provide complete guidance for those who wants to exploit GoWarrior TIGER Board, such as makers, tinkers, innovators, students, etc.

## Applicable Products

This manual is applicable for the GoWarrior TIGER Board.

## Reference Documents

- GoWarrior\_GoDroid\_Developer Guide
- Jelly Bean Device Porting Walkthrough

## Conventions

### Typographical Conventions

Item	Format
codes, keyboard input commands, file names, equations, and math	<code>Courier New, Size 10.5</code>
Variables, code variables, and code comments	<i>Courier New, Size, Italic</i>
Menu item, buttons, tool names	Ebrima, Size 10.5, Bold e.g. Select USB Debugging
Screens, windows, dialog boxes, and tabs	<b>Ebrima, Size 10.5, Bold</b> <b>Enclosed in double quotation marks</b> e.g. Open the "Debug Configuration" dialog box

Table 1. Typographical Conventions

### Symbol Conventions

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codes, keyboard input commands, file names, equations, and math	<code>Courier New, Size 10.5</code>

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Table 2. Symbol Conventions

## How to Contact Us

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For questions regarding GoWarrior, contact our support team at the email listed below:

[support@gowarriorosh.com](mailto:support@gowarriorosh.com)



# 1 Introduction

The main configuration files of GoDroid are listed as below:

File	Description
<code>tigerboard_init.sh</code>	GoDroid customized configuration script after booting Android, including DVFS configurations.
<code>tigerboard_ir.conf</code> , <code>tigerboard_panel.kl</code> , <code>tigerboard_remote.idc</code> , <code>tigerboard_remote.kl</code>	Configuration files of remote control and front panel keys.
<code>BoardConfig.mk</code>	One of the main configuration file of platform, which defines parameters related with board for compiling, such as IC type, supported instruction set, and some board definitions.
<code>device.mk</code>	<code>device.mk</code> is very important, the variable definition in which defines many contents related with board. The item settings are almost all in this file.
<code>fstab. tigerboard.ubifs</code> , <code>fstab. tigerboard.recovery</code>	Mount parameters list of file system, including the partition of NAND Flash UBIFS file system and mount parameters of USB portable storage device, in which *.recovery is the parameters list used by Recovery.
<code>init. tigerboard.rc</code> , <code>init. tigerboard.recovery.rc</code> , <code>init. tigerboard.usb.rc</code>	Boot script based on Android native <code>init.rc</code> customized by device manufacturers, in which *.recovery.rc is the script used by Recovery, and *.usb.rc is the script related with USB configurations.
<code>system.prop</code>	System priority configurations

File	Description
ueventd. tigerboard.rc	For setting access permission of GoDroid private devices

**Table 3. GoDroid Configuration File**

The following chapters will respectively provide the details on main configuration items of Kernel Porting, file system and storage device, input subsystem and recovery system.

## 2 AOSP PDK Porting

U-Boot and Kernel are both independent of AOSP (Android Open Source Project) building and configuration, therefore this chapter will only introduces the configuration items of device porting related with AOSP building, including CPU, Board, GPU and Audio subsystem.

This chapter mainly introduces the options for porting AOSP to TIGER Board.

### 2.1 Dalvik Configuration and Optimization

Configuration related to `device.mk`:

```
PRODUCT_TAGS += dalvik.gc.type-precise  
  
include frameworks/native/build/tablet-7in-hdpi-1024-dalvik-heap.mk
```

### 2.2 Board Configuration

`BoardConfig.mk` has several configuration items. User can refer to `build/core/product.mk` and the options listed in other relevant files.

- Compiler options related configuration:

```
TARGET_CPU_ABI := armeabi-v7a  
  
TARGET_CPU_ABI2 := armeabi  
  
TARGET_CPU_SMP := true  
  
TARGET_CPU_VARIANT := cortex-a9  
  
TARGET_ARCH := arm
```

- Configuration related to NEON function of ARM CPU:

```
TARGET_ARCH_VARIANT := armv7-a-neon
```

```
ARCH_ARM_HAVE_TLS_REGISTER := true  
ARCH_ARM_USE_NON_NEON_MEMCPY := true
```

➤ System related configuration:

```
TARGET_NO_BOOTLOADER := true  
TARGET_USE_UBOOT := false  
TARGET_NO_RADIOIMAGE := true  
#No Bluetooth  
BOARD_HAVE_BLUETOOTH := false  
BOARD_HAVE_BLUETOOTH_BCM := false  
#No hardware Camera  
USE_CAMERA_STUB := true  
#No MotionTracking sensor  
BOARD_USES_GENERIC_INVENSENSE := false
```

## 2.3 Defining Flash File System and Partition Size

NAND Flash uses UBIFS (Unsorted Block Image File System) file system, whose relevant configuration items settings are as below:

➤ Configuration related to BoardConfig.mk:

```
TARGET_USERIMAGES_USE_UBIFS := true  
BOARD_FLASH_BLOCK_SIZE := 4096
```

➤ Configuration related to partsize.mk, mainly used for Recovery system:

```
BOARD_KERNELIMAGE_PARTITION_SIZE := 16777216
```

```
BOARD_SEEIMAGE_PARTITION_SIZE := 8388608  
  
BOARD_AEIMAGE_PARTITION_SIZE := 8388608  
  
BOARD_RECOVERYIMAGE_PARTITION_SIZE := 134217728  
  
BOARD_BOOTMEDIAIMAGE_PARTITION_SIZE := 8388608  
  
BOARD_CACHEIMAGE_PARTITION_SIZE := 536870912  
  
BOARD_USERDATAIMAGE_PARTITION_SIZE := 2147483648  
  
BOARD_SYSTEMIMAGE_PARTITION_SIZE := 536870912  
  
BOARD_ROOTFSIMAGE_PARTITION_SIZE := 134217728  
  
BOARD_BOOTLOGOIMAGE_PARTITION_SIZE := 8388608
```

## 2.4 GPU Configuration

- Configuration related to BoardConfig.mk:

```
BOARD_EGL_CFG := device/gowarrior/tigerboard/mali/egl.cfg  
  
USE_OPENGL_RENDERER := true
```

- Configuration related to device.mk:

```
# Makes AngryBirds happy ... and so are we !  
  
PRODUCT_PROPERTY_OVERRIDES += \  
    ro.opengles.version=131072  
  
PRODUCT_PROPERTY_OVERRIDES += \  
    hwui.render_dirty_regions=false  
  
# Not support HW Vsync  
  
PRODUCT_PROPERTY_OVERRIDES += \  
    debug.sf.no_hw_vsync = 1
```

GoDroid does not support hardware Vsync, so Kernel needs to add a pure software sync module, and hardware composer also needs to make some corresponding modification.

## 1. Mali Driver, Gralloc and OpenGL Dynamic Depot

Configuration of `device.mk`: Copy the driver and dynamic depot to the relevant system directory:

```
PRODUCT_COPY_FILES += \
device/gowarrior/tigerboard/mali/mali.ko:system/modules/mali.ko \
\
device/gowarrior/tigerboard/mali/ump.ko:system/modules/ump.ko \
\
device/gowarrior/tigerboard/mali/libMali.so:system/lib/libMali.so \
\
device/gowarrior/tigerboard/mali/libUMP.so:system/lib/libUMP.so \
\
device/gowarrior/tigerboard/mali/libEGL_mali.so:system/lib/egl/libEGL_mali.so \
\
device/gowarrior/tigerboard/mali/libGLESv1_CM_mali.so:system/lib/egl/libGLESv1_CM_mali.so \
\
device/gowarrior/tigerboard/mali/libGLESv2_mali.so:system/lib/egl/libGLESv2_mali.so \
\
device/gowarrior/tigerboard/mali/gralloc.default.so:system/lib/hw/gralloc.default.so \
\
```

## 2.5 Audio Configuration

Configuration related to `BoardConfig.mk`:

```
BOARD_USES_GENERIC_AUDIO := true
BOARD_USES_ALSA_AUDIO := false
```

Configuration related to `device.mk`:

```
PRODUCT_PACKAGES := \
audio.primary.tigerboard\
```

```
audio_policy. tigerboard \  
audio.a2dp.default \  
libaudioutils
```

The source code of GoDroid Audio HAL (Hardware Abstraction Layer) is located in `/device/gowarrior/tigerboard/audio`, which will be compiled into the whole AOSP.

## 2.6 Configuring Supported Media Formats

Configuration related to `device.mk`:

```
#>> media & stagefright  
  
PRODUCT_COPY_FILES += \  
    device/gowarrior/tigerboard/media_codecs.xml:system/etc/media_cod  
ecs.xml \  
  
    device/gowarrior/tigerboard/media_profiles.xml:system/etc/media_p  
rofiles.xml
```

`media_codecs.xml` and `media_profiles.xml` includes the media format GoDroid supported.

## 2.7 ueventd. tigerboard.rc

Set the access permission of hardware node in `/dev`, used for setting the access permission of GoDroid private device.

```
# System  
  
/dev/ali_ir          0666  system  system  
/dev/pan_ch455       0666  system  system  
/dev/ali_soc         0666  system  system  
/dev/ali_uart_io     0666  system  system  
/dev/ali_pm          0660  system  system
```

```
/dev/ali_pmu      0660  system  system
```

## 2.8 Panel Mode Configuration

For the Android mode of GoDroid on TIGER Board, we follow the Table mode, without battery or built-in SD card.

Configuration related to `device.mk`:

```
PRODUCT_AAPT_CONFIG := normal large tvdpi hdpi
PRODUCT_AAPT_PREF_CONFIG := tvdpi
PRODUCT_PROPERTY_OVERRIDES += hw.nobattery=true
PRODUCT_PROPERTY_OVERRIDES += ro.sf.lcd_density=160
PRODUCT_PROPERTY_OVERRIDES += sys.device.type=tablet
PRODUCT_CHARACTERISTICS := tablet,nosdcard
```

## 2.9 Booting Configuration File `init.tigerboard*.rc`

### 2.9.1 `init.tigerboard.rc`

When booting GoDroid, besides executing native `init.rc`, it also executes GoDroid customized boot script `init.tigerboard.rc` in `/device/gowarrior/tigerboard`.

#### Procedure:

1. Add a line in `device.mk`, and copy it into root directory.

```
PRODUCT_COPY_FILES += \
device/gowarrior/tigerboard/init.tigerboard.rc:root/init.tigerboard.rc
```

2. Modify `init.tigerboard.rc`, and configure boot loading.

`init.tigerboard.rc` mainly includes the following contents:



- a). Set MicroSD card (refer to the introduction in [Chapter 3 File System and Storage Device](#)).
- b). Create mount point for USB Disk.

```
# create directory for mounting usb drives
mkdir /storage/ext/usb1 0666 system system
symlink /storage/ext/usb1 /usbdrive
symlink /storage/ext/usb1 /mnt/usb1
```

- c). Mount all file system partitions on NAND Flash, such as data, system, cache, etc. (Refer to the introduction in [3.2 NAND Flash UBIFS File System](#)).

```
mount_all /fstab. tigerboard
```

- d). Load OpenGL driver modules.

```
# for openGL
insmod /system/modules/ump.ko ump_debug_level=0
chmod 0666 /dev/ump
chown system graphics /dev/ump
insmod /system/modules/mali.ko mali_debug_level=0
chmod 0666 /dev/mali
chown system graphics /dev/mali
```

- e). Set device priority. Due to access permission of underlying device, here set all access permission of GoDroid devices as read-write.

```
chmod 0666 /dev/ali_avsync0
chmod 0666 /dev/ali_ce_0
chmod 0666 /dev/ali_csa_0
```

```
chmod 0666 /dev/ali_des_0
chmod 0666 /dev/ali_dsc_0
chmod 0666 /dev/ali_hdmi_device
chmod 0666 /dev/ali_hwdmx0_output
chmod 0666 /dev/ali_hwdmx1_output
chmod 0666 /dev/ali_hwdmx2_output
chmod 0666 /dev/ali_hwdmx3_output
chmod 0666 /dev/ali_image0
chmod 0666 /dev/ali_ir_g2
chmod 0666 /dev/ali_m3200_nim0
chmod 0666 /dev/ali_m3501_nim0
chmod 0666 /dev/ali_m3501_nim1
chmod 0666 /dev/ali_m3501_nim2
chmod 0666 /dev/ali_m3501_nim3
chmod 0666 /dev/ali_m36_audio0
chmod 0666 /dev/ali_m36_dmx_see_0
chmod 0666 /dev/ali_m36_tsi_0
chmod 0666 /dev/ali_pe0
chmod 0666 /dev/ali_pm
chmod 0666 /dev/ali_pmu
chmod 0666 /dev/ali_sbm0
chmod 0666 /dev/ali_sbm1
chmod 0666 /dev/ali_sbm10
chmod 0666 /dev/ali_sbm11
chmod 0666 /dev/ali_sbm2
chmod 0666 /dev/ali_sbm3
chmod 0666 /dev/ali_sbm4
chmod 0666 /dev/ali_sbm5
```

```
chmod 0666 /dev/ali_sbm6
chmod 0666 /dev/ali_sbm7
chmod 0666 /dev/ali_sbm8
chmod 0666 /dev/ali_sbm9
chmod 0666 /dev/ali_sha_0
chmod 0666 /dev/ali_soc
chmod 0666 /dev/ali_swdmx0_input
chmod 0666 /dev/ali_swdmx0_output
chmod 0666 /dev/ali_trng_0
chmod 0666 /dev/ali_uart_io
chmod 0666 /dev/ali_video0
chmod 0666 /dev/graphics/fb1
chmod 0666 /dev/graphics/fb2
chmod 0666 /dev/graphics/fb0
chmod 0666 /dev/mtd/mtd3
```

f). Set Wi-Fi (refer to the following document for information: ["GoWarrior GoDroid Developer Guide"](#)).

g). Set the default ADB and stop ADBD, so it will not auto start.

```
# Let's also start adb based on persist.service.adb.enable
on property:persist.service.adb.enable=1
    start adbd
on property:persist.service.adb.enable=0
    stop adbd
```

h). Configure DHCP Service of Wi-Fi and Ethernet.

```
service dhcpcd_wlan0 /system/bin/dhcpcd -ABKL
    class main
```

```
disabled
oneshot

service iprenew_wlan0 /system/bin/dhpcpd -n
    class main
    disabled
    oneshot

# Used for DHCP on Ethernet

service dhcpcd_eth0 /system/bin/dhcpcd -dABKL
    class main
    group dhcp
    disabled
    oneshot

service iprenew_eth0 /system/bin/dhpcpd -n
    disabled
    oneshot
```

i). Configure Services of DLNA and Miracast.

```
service dnsmasq_p2p /system/bin/dnsmasq -C /data/local/tmp/dnsmasq.conf
user root

group root

disabled
oneshot

service dhcpcd_p2p /system/bin/dhcpcd p2p0
user root

group root

disabled
oneshot

service wfd_dm /system/bin/wfd_daemon
```

```
usr root

group root

disabled

oneshot

on property:sys.boot_completed=1

start wfd_dm

service dbus /system/bin/dbus-daemon --system --nofork

class main

socket dbus stream 0666 root root
```

- j). Set the IR/Panel key daemon process: `irconfigd` (Please refer to 4 Input Configuration).

```
service irconfigd /system/bin/irconfigd /system/etc/tigerboard_ir.conf
-repeat 500 50 -display ---- -speed 30

class main

oneshot
```

- k). Set GoDroid customized boot script `tigerboard_init.sh`.

```
service          tigerboardinit          /system/xbin/busybox          sh
/system/bin/tigerboard_init.sh

user root

group root

disabled

oneshot

on property:sys.boot_completed=1

start tigerboardinit
```

`tigerboard_init.sh` auto executes once after booting Android, which

mainly set DVFS.

```
cd /sys/devices/system/cpu/cpu0/cpufreq
echo "1000000">scaling_min_freq
echo "1200000">scaling_max_freq
echo "ondemand">scaling_governor
```

For Android non-native script that requires auto execution after booting, it can be added into this file.

## 2.9.2 **init. tigerboard.recovery.rc**

Please refer to [5 Recovery Configuration](#).

## 2.9.3 **init. tigerboard.usb.rc**

For setting USB boot configuration, please refer to the file listed below:

```
on init

    write /sys/class/android_usb/android0/iSerial ${ro.serialno}

on boot

    write /sys/class/android_usb/android0/iManufacturer
    ${ro.product.manufacturer}

    write /sys/class/android_usb/android0/iProduct ${ro.product.model}

# set usb device mode

service usb_device_en /system/xbin/busybox sh
/system/bin/set_usb_mode.sh 1

class main

    disabled

    oneshot
```

```
# set usb host mode

service          usb_device_un          /system/xbin/busybox          sh
/system/bin/set_usb_mode.sh 0

    class main

    disabled

    oneshot
```

## 2.10 Other Configuration Items

### 1. Configuration related to BoardConfig.mk:

```
# Set /system/bin/sh to ash, not mksh, to make sure we can switch back.
TARGET_SHELL := ash

#Optimize DEX when compiling, so that there is no need to optimize it
in the first booting, which can accelerate boot speed, but may cost longer
compiling time.

WITH_DEXPLOPT := true
```

### 2. Configuration related to device.mk:

```
#Copy boot Logo and animation

PRODUCT_COPY_FILES                                     +=
    device/gowarrior/tigerboard/initlogo_tigerboard.rle:root/initlogo
    .rle.bak

    device/tigerboard/tigerboard/system/media/bootanimation.zip:/syst
    em/media/bootanimation.zip \

    ##Set time format

PRODUCT_PROPERTY_OVERRIDES += ro.com.android.dateformat=yyyy-MM-dd

    #Set Chinese as local defaultlt language

    PRODUCT_PROPERTY_OVERRIDES += ro.product.locale.language=zh

    PRODUCT_PROPERTY_OVERRIDES += ro.product.locale.region=CN
```

```

PRODUCT_PROPERTY_OVERRIDES += persist.sys.language=zh

PRODUCT_PROPERTY_OVERRIDES += persist.sys.country=CN

PRODUCT_LOCALES := zh_CN zh_TW en_US

#Set overlay path

DEVICE_PACKAGE_OVERLAYS := \

    device/tigerboard/tigerboard/overlay

#Pre-install apk

PRODUCT_PACKAGES += \

    ESFileExplorer_120.apk \

    sougou_input_TV_1.1.0.apk

```



### Note

*The prebuilt apk is located in /device/gowarrior/tigerboard/apps. When compiling, Android.mk in this directory copies it into /data/app or /system/vendor/app. When firstly boot the system, these apk will be auto prebuilt (so the first boot time will be much longer).*

### 3. Configuration related to system.prop:

```

rild.libpath=/system/lib/libreference-ril.so

rild.libargs=-d /dev/ttyS0

# Set time zone

persist.sys.timezone=Asia/Shanghai

# Set screen scaling

persist.sys.scaleratio=98

# Set TV output mode

persist.sys.resolution=12

# Fastboot patch

```



```
debug.sf.nobootanimation=1  
service.adb.tcp.port=5555  
#pm.userapp.defer=1  
#pm.userapp.scanonbootcomp=1  
  
# usb adb disabled default  
persist.sys.usb.config=adb  
persist.service.adb.enable=1
```

#### 4. Configuration related to DLNA and Miracast:

device.mk needs to copy DLNA and Miracast configuration files:

```
#>> ALi D.M.A  
  
PRODUCT_COPY_FILES += \  
device/gowarrior/tigerboard/alidma/miracast/wfd.config:system/etc/mi  
racast/wfd.config \  

```

#### 5. Configuration related to PPPOE:

device.mk needs to copy PPPOE configuration file:

```
#>> PPPOE  
  
PRODUCT_COPY_FILES += \  
    device/gowarrior/tigerboard/ppp/ppp.connect:system/etc/ppp/ppp.connect  
    \  
    device/gowarrior/tigerboard/ppp/ppp.conf:system/etc/ppp/ppp.conf \  
device/gowarrior/tigerboard/ppp/ppp.disconnect:system/etc/ppp/ppp.disconnect
```

## 3 File System and Storage Device

GoDroid files system and Storage setting mainly involves:

- NAND Flash partition and UBIFS file system support;
- Virtual SD card support;
- And the support for USB external portable storage device FAT/NTFS file systems.

### 3.1 Virtual SD Card and External SD Card

Many APK application programs of Android rely on SD card, however GoDroid has no built-in SD card, so it requires a removable SD card to work as an external storage for booting process.

For SD card configuration, please refer to the document provided by the Android as the following link:

<http://source.android.com/devices/tech/storage/config-example.html>

GoDroid solution sets virtual SD card as main device and external SD card as slave device.

Its configuration files and items are as below:

1. init.tigerboard.rc

```
on init

    mkdir /mnt/shell/emulated 0700 shell shell

    mkdir /storage/emulated 0555 root root

    export EXTERNAL_STORAGE /storage/emulated/legacy

    export EMULATED_STORAGE_SOURCE /mnt/shell/emulated
```

```
export EMULATED_STORAGE_TARGET /storage/emulated
export SECONDARY_STORAGE /storage/ext/sdcard1

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
symlink /data/local/tmp /tmp

on post-fs-data
mkdir /data/media 0770 media_rw media_rw
chown media_rw media_rw /data/media

on fs
setprop ro.crypto.fuse_sdcard true

service sdcard /system/bin/sdcard /data/media /mnt/shell/emulated 1023
1023

class late_start
service fuse_sdcard1 /system/bin/sdcard -u 1023 -g 1023 -w 1023 -d
/mnt/media_rw/sdcard1 /storage/sdcard1

class late_start
disabled
```

## 2. storage\_list.xml

```
<storage
android:storageDescription="@string/storage_internal"
    android:emulated="true"
        android:mtpReserve="100" />
<storage
android:mountPoint="/storage/sdcard1"
android:storageDescription="@string/storage_sd_card"
android:removable="true"
android:maxFileSize="4096" />
```

### 3. fstab.tigerboard

```
/devices/platform/ali-mci/mmc_host/mmc0 /storage/sdcard1 auto defaults
voldmanaged=sdcard1:auto
```

## 3.2 NAND Flash UBIFS File System

### 1. init.tigerboard.rc

In boot script `init.tigerboard.rc`, when on `fs` initializing file system, the following commands mount all partitions with file system on NAND Flash.

```
on fs
    mount_all /fstab.tigerboard
```

The command `mount_all` implement features by the function `s_mgr_mount_all()` in `/system/core/fs_mgr/fs_mgr.c` file. Because Android native code does not support UBIFS, it needs to patch the function for supporting UBIFS.

The definition of NAND Flash partition and its UBIFS file system type is in `fstab.tigerboard`.

### 2. fstab.tigerboard

```
ubi@system /system ubifs defaults wait
ubi@cache /cache ubifs noatime,nosuid,nodev wait
ubi@data /data ubifs noatime,nosuid,nodev wait
```

For the rules of `fstab.tigerboard`, please refer to the Android official website: <http://source.android.com/devices/tech/storage/config.html>.

Likewise, `fstab.tigerboard` also needs to be copied into the system root directory in `device.mk` configuration.

```
PRODUCT_COPY_FILES += \

device/gowarrior/tigerboard/fstab.tigerboard:root/fstab.tigerboard
```

### 3.3 USB Portable Storage Device

Android supports external portable storage device, which is implemented by MountService and vold, with the following configuration files:

- `fstab.tigerboard`

This file will not list each mount point. The mount of USB device will be auto completed by vold.

- `init.tigerboard.rc`

Create mount directory for USB storage device:

```
# create directory for mounting usb drives
mkdir /storage/ext/usb1 0666 system system
symlink /storage/ext/usb1 /usbdrive
symlink /storage/ext/usb1 /mnt/usb1

mkdir /storage/ext/usb2 0666 system system
symlink /storage/ext/usb2 /mnt/usb2
```

```
mkdir /storage/ext/usb3 0666 system system  
symlink /storage/ext/usb3 /mnt/usb3  
  
mkdir /storage/ext/usb4 0666 system system  
symlink /storage/ext/usb4 /mnt/usb4
```

Similarly, if you want to mount an ISO file, it also requires to modify MountService, vold and fstab.az

## 4 Input Configuration

STB input device mainly includes remote control and front panel, which are both similar with keyboard. Please refer to the Android official website for introduction: <http://source.android.com/devices/tech/input/index.html>.

GoDroid implements a native daemon process for configuring IR/Panel key: `irconfigd`. In the process of booting Android, `init` boots this daemon process to register the supported key code to Kernel (including physical key value and logic key value).

### 4.1 `irconfigd` Daemon Process

`irconfigd` code locates:

```
/external/alidroid-hld/tools/irconfigd.c
```

```
/external/alidroid-hld/tools/ali_key.h
```

`ali_key.h` is a default key code file. If there is no configuration file, just use the key code of compiling.

`Irconfigd` is configured in `/device/gowarrior/tigerboard/init. tigerboard.rc`.

```
service irconfigd /system/bin/irconfigd /system/etc/tigerboard_ir.conf
-repeat 500 50 -display ---- -speed 30

class main
oneshot
```

The main parameters are as below:

- `tigerboard_ir.conf`: Mapping table configuration file of IR and front panel physical key value;
- `-repeat 500 50`: Set interval time of repeat key pressing for driver;
- `-display ----`: Four characters "----" displayed on panel when booting `irconfigd`;

- `-i2c 0x104`: The address of front panel I2C;
- `-speed 30`: Set the movement speed of simulated mouse, with the maximum value of 50.

## 4.2 Configuration Files and Format

Configuration files are located in `/device/gowarrior/tigerboard/input/`, including:

```
tigerboard_ir.conf,
tigerboard_panel.kl,
tigerboard_remote.idc,
tigerboard_remote.kl
```

Copy `device.mk` into the relevant system directory for configuration:

```
PRODUCT_COPY_FILES +=
device/gowarrior/tigerboard/tigerboard_ir.conf:system/etc/tigerboard_
ir.conf \
device/gowarrior/tigerboard/tigerboard_remote.kl:system/usr/keylayout
/tigerboard_ir.kl \

device/gowarrior/tigerboard/tigerboard_remote.idc:system/usr/idc/tige
rboard_ir.idc \

device/gowarrior/tigerboard/tigerboard_panel.kl:system/usr/keylayout/
pan_ch455.kl
```

Hereinto, `ali_ir` and `pan_ch455` are the device names of GoDroid IR and front panel in `/dev`.

- The format of `tigerboard_ir.conf` is very simple, that is the corresponding relation of physical key and logic key as below:

```
IR_ALI01_HKEY_0  0x60df926d KEY_0  11
IR_ALI01_HKEY_1  0x60dfc837 KEY_1   2
IR_ALI01_HKEY_2  0x60df08f7 KEY_2   3
IR_ALI01_HKEY_3  0x60df8877 KEY_3   4
```



```

IR_ALI01_HKEY_4    0x60dff00f KEY_4    5
IR_ALI01_HKEY_5    0x60df30cf KEY_5    6
IR_ALI01_HKEY_6    0x60dfb04f KEY_6    7
IR_ALI01_HKEY_7    0x60dfd02f KEY_7    8
IR_ALI01_HKEY_8    0x60df10ef KEY_8    9
IR_ALI01_HKEY_9    0x60df906f KEY_9   10
IR_ALI01_HKEY_EXIT  0x60df42bd KEY_HOMEPAGE 172
IR_ALI01_HKEY_MENU  0x60df2ad5 KEY_MENU   139
IR_ALI01_HKEY_ENTER 0x60df3ac5 KEY_SELECT 353
IR_ALI01_HKEY_DOWN  0x60dfb847 KEY_DOWN   108
IR_ALI01_HKEY_UP    0x60df22dd KEY_UP    103
IR_ALI01_HKEY_LEFT  0x60df38c7 KEY_LEFT   105
IR_ALI01_HKEY_RIGHT 0x60df12ed KEY_RIGHT  106
IR_ALI01_HKEY_RECALL 0x60dfc03f KEY_BACK   158
IR_ALI01_HKEY_USBREMOVE 0x60df1ae5 KEY_BACKSPACE 14
IR_ALI01_HKEY_SWAP  0x60df5aa5 KEY_TAB    15
IR_ALI01_HKEY_V_UP   0x60df48b7 KEY_VOLUMEUP  115
IR_ALI01_HKEY_V_DOWN 0x60df01fe KEY_VOLUMEDOWN 114
IR_ALI01_HKEY_MUTE   0x60dfa05f KEY_MUTE    113
IR_ALI01_HKEY_POWER  0x60df708f KEY_POWER   116
IR_ALI01_HKEY_PLAY   0x60df18e7 KEY_PLAY    207
IR_ALI01_HKEY_STOP   0x60dfe817 KEY_STOP    128
IR_ALI01_HKEY_PAUSE  0x60df7a85 KEY_PLAYPAUSE 164
IR_ALI01_HKEY_INFO   0x60df6897 KEY_F12     88
IR_ALI01_HKEY_RED    0x60df609f KEY_F11    87
IR_ALI01_HKEY_NULL   0xffffffff BTN_MOUSE  272
IR_ALI01_HKEY_RECORD 0x60dfa857 KEY_RECORD 167
IR_ALI01_HKEY_FF     0x60dfd827 KEY_FASTFORWARD 208
IR_ALI01_HKEY_FB     0x60df58a7 KEY_REWIND 168
#IR_ALI01_HKEY_C_DOWN 0x60df0af5 KEY_NEXTSONG 163
#IR_ALI01_HKEY_C_UP  0x60df20df KEY_PREVIOUSSONG 165

```

```

IR_ALI01_HKEY_P_UP    0x60dfd22d KEY_PAGEUP 104
IR_ALI01_HKEY_P_DOWN 0x60dfe01f KEY_PAGEDOWN 109
PAN_ALI_HKEY_MENU 0xFFFF0006 KEY_BACK 158
PAN_ALI_HKEY_RIGHT    0xFFFF0005 KEY_RIGHT 106
PAN_ALI_HKEY_DOWN 0xFFFF0003 KEY_DOWN 108
PAN_ALI_HKEY_LEFT 0xFFFF0004 KEY_LEFT 105
PAN_ALI_HKEY_UP    0xFFFF0002 KEY_UP 103
PAN_ALI_HKEY_ENTER    0xFFFF0001 KEY_SELECT 353
PAN_ALI_HKEY_POWER    0xFFFF0018 KEY_POWER 116

```



### Note

1. It can support multiple remote controls simultaneously, but remotes must have different physical key value.
2. Distinguish IR key and front panel key with IR and PAN prefix.
3. Logic key also needs key value for directly read logic value from configuration file. Logic value should be consistent with linux/input.h.
4. It supports 384 IR key and 32 front panel key at most. The relevant macro definition of irconfigd.c can be viewed or modified.

```
#define MAX_IR_KEY_COUNT    384
```

```
#define MAX_PAN_KEY_COUNT 32
```

- For the format of kl file, please refer to /system/usr/keylayout/Generic.kl.

Taking tigerboard\_panel.kl as an example, it defines all supported key codes:

```

key 103 DPAD_UP
key 105 DPAD_LEFT
key 106 DPAD_RIGHT
key 108 DPAD_DOWN
key 116 POWER          WAKE

```

```
key 158    BACK
key 353    DPAD_CENTER
```



### Note

*Please try to keep key code consistent with `Generic.kl`. The actual functions can be implemented by APP or frameworks, such as F12 key is used as shift key of virtual mouse on GoDroid.*

*When adding, deleting, or modifying the key value of `tigerboard_ir.conf`, you need to modify `tigerboard_panel.kl` and/or `tigerboard_remote.kl` as well.*

*Briefly, `tigerboard_ir.conf` is a filter table of key value for Kernel, while `tigerboard_panel.kl` and `tigerboard_remote.kl` are the key value table for Android.*

- `tigerboard_remote.idc` is Android configuration file of IR control device, setting `ali_ir` as default built-in device.

```
device.internal = 1
keyboard.layout = ali_ir
keyboard.orientationAware = 1
keyboard.builtIn = 1
```

For idc file configuration items, please refer to the Android official website:  
<http://source.android.com/devices/tech/input/keyboard-devices.html>

# 5 Recovery Configuration

To use Recovery of Android, you need to modify trigger control, image building, Recovery codes and Flash partitions configuration. The major modifications are consists of three parts: Building, Recovery, and Main System.

## 5.1 Build and Flash Partitions

In Recovery configuration, the Build process mainly includes:

1. BoardConfig.mk:

```
TARGET_NO_KERNEL := false
TARGET_NO_RECOVERY := false
```

The building system will build the code in bootable/recovery only when the two configuration items are set to false.

2. Add `fstab.tigerboard.recovery` in the folder `device/gowarrior/tigerboard`, for mounting each part of Flash in booting Recovery.

- For the rules of `fstab.tigerboard.recovery`, please refer to the Android official website:

<http://source.android.com/devices/tech/storage/config.html>

- The file contents are as below:

```
ubi@system /system ubifs defaults
wait
ubi@cache /cache ubifs noatime,nosuid,nodev
wait
ubi@data /data ubifs noatime,nosuid,nodev
```

```
wait
misc          /misc          mtd          defaults
defaults

/devices/platform/ali-ehci.0/usb1/1-1/1-1:1.0          /storage/usb1
auto          defaults
voldmanaged=usbdisk:auto

/devices/platform/ali-ehci.0/usb1/1-2/1-2:1.0          /storage/usb2
auto          defaults
voldmanaged=usbdisk:auto

/devices/platform/ali-ehci.1/usb2/2-1/2-1:1.0          /storage/usb3
auto          defaults
voldmanaged=usbdisk:auto

/devices/platform/ali-ehci.1/usb2/2-2/2-2:1.0          /storage/usb4
auto defaults
voldmanaged=usbdisk:auto

boot          /boot          mtd          defaults
defaults

bootargs      /bootargs      mtd          defaults
defaults

recovery      /recovery      mtd          defaults
defaults

bootlogo      /bootlogo      mtd          defaults
defaults

bootmedia     /bootmedia     mtd          defaults
defaults

kernel        /kernel        mtd          defaults
defaults
```

Add the following lines in BoardConfig.mk:

```
TARGET_RECOVERY_FSTAB = device/gowarrior/tigerboard/fstab.tigerboard
```

## 5.2 Recovery Code

1. `init.rc` of Recovery is in `bootable/recovery/etc`, which can be modified referring to `system/core/rootdir/init.rc`. Please note that it needs to delete useless service, such as:

```
service dnsmasq_p2p /system/bin/dnsmasq -C /data/local/tmp/dnsmasq.conf
user root

group root

disabled

oneshot

service dhcpcd_p2p /system/bin/dhcpcd p2p0
    user root
    group root
    disabled
    oneshot

service wfd_dm /system/bin/wfd_daemon
    usr root
    group root
    disabled
    oneshot

on property:sys.boot_completed=1
    start wfd_dm

....
```

The service of booting Recovery needs to be added.

```
service recovery /sbin/recovery
```

2. The source code of Recovery does not support UBIFS, so it needs to add relevant support in NAND Flash with UBIFS. For example, `bootable/recovery/mtdutils/mtdutils.c` and `bootable/recovery/roots.cpp` both need to add patches to support UBIFS.

3. It needs to add two partitions in Flash for Recovery system: recovery partition and MISC partition. Recovery partition is mainly used for storing Recovery code, Kernel and SEE backups. When other partitions have problems, as long as this partition is not damaged, the system can enter Recovery to retrieve the system. MISC partition is used for U-Boot to evaluate whether enter Recovery or Main System.

## 5.3 Main System

Main system needs to add an upgrade trigger method for noticing U-Boot to enter Recovery next booting. It mainly includes two parts of work:

1. Add an operation interface for MISC partition in Main System.

This part mainly needs to modify the following code:

```
Frameworks/native/libs/utlis/mtd_utils.cpp  
  
Frameworks/base/services/java/com/android/server/power/PowerManageMisc.java  
  
Frameworks/base/services/jni/com_android_server_power_PowerManagerMisc.cpp
```

At present, the operation of Recovery Reboot writing MISC partition has been added into reboot function in `com_android_server_power_PowerManagerService.cpp`.

When calling `nativeReboot` function, once `reason` parameter is passed, it will enter `recovery Reboot` flow, so the upper layer setting or app only need to call the functions in `RecoverySystem`, such as `rebootWipeCache`, `rebootWipeUserData` and `installPackage`, and then the system will enter `recovery reboot` flow.

Furthermore, we provide a class `PowerManageMisc.java` and relevant interface `setMiscCommandString` for upper. Calling this interface can write relevant character string in MISC partition, with the following method:

```
PowerManageMisc managemisc = new PowerManageMisc(); //reserve for  
java way to write MISC partition  
  
managemisc.setMiscCommandString("boot-recovery");
```

2. The corresponding interface or APP calls the operation for MISC partition, and reboot.

At present, this operation is implemented by APP calling. Only need to call `rebootWipeCache`, `rebootWipeUserData` and `installPackage` functions in native Android Recovery System, and then reboot to enter Recovery and complete corresponding operation.



## 6 FAQ

No.	Description	Solution
1	When modifying the key value of remote control, how to make it in effect without rebooting?	<p>Check irconfigd Process PID with the command ps;</p> <p>Run the command Kill to kill the process;</p> <p>Modify IR configuration file tigerboard_ir.conf;</p> <p>Reboot the process.</p> <p>For example:</p> <pre>#ps root          2210    1197    2400    424 ffffffff      b6eafbbc          S /system/bin/irconfigd  # kill 2210  #          /system/bin/irconfigd tigerboard_ir.conf -repeat 500 50  -display ---- &amp;</pre>
2	How to print out the received key value (hardware code and logic code)?	<p>Use the debug tool adrdbg to open the print in IR module:</p> <pre># adrdbg ir -l 3</pre>

Table 4. FAQ List

# Appendix: Glossary

Abbr.	Full Name
AOSP	Android Open Source Project
APK	Android Package
Dalvik	Dalvik is designed for Java virtual machine on Android platform by Google.
DHCP	Dynamic Host Configuration Protocol
DLNA	Digital Living Network Alliance
DVFS	Dynamic voltage and frequency scaling
GoDroid	GoWarrior Android Development Kit
GPU	Graphic Processing Unit
HAL	Hardware Abstraction Layer
IR	Infra-red ray, which is infra-red remote control or receiver
Mali	A kind of embedded graphic IP
NEON	Extended structure of ARM architecture processor
OpenGL	Open Graphics Library
PDK	Platform Development Kit
UBIFS	Unsorted Block Image File System
vold	Volume Daemon

**Table 5. List of Abbreviations**

# Revision History

## Document Change History

Revision	Changes	Date
v1.1	Updated document version to 1.1.	February 29, 2016
v1.0	Initial Release	September 07, 2015

**Table 6. Document Change History**

## Software Changes

Revision	Changes	Date
v1.1	Install and start GoDroid with a MicroSD card.	February 29, 2016
v1.0	Initial Release	September 07, 2015

**Table 7. Software Change History**



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