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Rockchip_Android_AB 系统使用说明文档

Rockchip_Android_AB_System_Usage_Introduction

（第二系统产品部）

(Technical Department, R & D Dept. II）

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目 录 Contents

1 概述 Overview

本文档描述了 Rockchip A/B 系统的使用说明，可以在 Rockchip Android >= 9.0 平台上使用。

This document describes the usage of Rockchip A/B system which can be used on Rockchip Android platforms with Android 9.0 and higher versions.

使用该升级方法，所有待升级的分区都有 a 和 b 两份，相比传统的 Recovery 升级方式会大幅增加存储空间需求。其优点是 A/B 升级是无缝升级，可以在 Android 系统运行过程中，根据客户定制的客户端和服务器之间的交互策略与协议来完成升级。

Using this upgrading method, all the partitions to be upgraded have a and b, and it will dramatically increase the requirement of memory space comparing with traditional Recovery upgrading method. Its advantage is A/B upgrading is seamless upgrading, which can be completed according to the customized interactive strategy and protocol between the client and the server during Android system running process.

2 系统配置说明 System configuration instruction

在 Rockchip Android 平台上，AB 系统功能默认关闭，要使用 AB 系统，需要从 Android 系统、U-BOOT 和 kernel dts 三个方面进行配置。以下对此进行详细说明。

On Rockchip Android platforms, AB system function is disabled by default. If want to use AB system, need to do the configuration in Android system, U-BOOT and kernel dts. The details are described as below.

2.1 Android 系统配置说明 Android system configuration

Android 系统的配置分 Android 9.0 和 Android 10 分开说明，客户需要根据自己的实际情况，按照对应章节的指导进行操作。

Android system configuration includes Android9.0 and Android10.0. Customers need to operate according to the instruction in the corresponding chapter based on the actual situation.

2.1.1 Android 9.0 系统配置说明 Android9.0 system configuration instruction

Android 9.0 系统的配置包括：

Android9.0 system configuration includes:

1.在 device\rockchip\common\BoardConfig.mk 中打开 AB 升级配置项。

Open the configuration item for AB upgrading in **device\rockchip\common\BoardConfig.mk**

将 BOARD_USES_AB_IMAGE 配置设置为 true，默认为 false.

Set BOARD_USES_AB_IMAGE configuration as true, which default value is false.

```
BOARD_USES_AB_IMAGE := false
```

2.在对应的 device\rockchip\rkxxx 目录下，确认是否已经有 parameter_ab.txt 分区表文件，如果已有，则直接跳过这一步；如果没有 parameter_ab.txt 文件，则按如下步骤执行：

In the corresponding directory of device\rockchip\rkxxx, confirm whether there is parameter_ab.txt partition table or not, if yes, directly skip this step. If there is no parameter_ab.txt file, execute as the following steps:

（1）新建 parameter_ab.txt 分区表文件

Create parameter_ab.txt partition table file

该文件从对应 parameter.txt 拷贝一份，然后在此基础上，进行修改，核心是针对每个要升级的分区划分两个分区 a 和 b，最后删除 recovery 分区并且将 boot 分区的大小改为 64MB。

Copy a file from the corresponding parameter.txt, and then modify based on this file. The key point is to divide two partitons a and b for each partition to be upgraded, and finally delete recovery partition and modify the boot partition size to 64MB.

一个参考 parameter_ab.txt 如下：

An example of parameter_ab.txt is shown as below:

FIRMWARE_VER:9.0
MACHINE_MODEL:RK3326
MACHINE_ID:007
MANUFACTURER: RK3326
MAGIC: 0x5041524B
ATAG: 0x00200800
MACHINE: 3326
CHECK_MASK: 0x80
PWR_HLD: 0,0,A,0,1
TYPE: GPT
CMDLINE:mtdparts=rk29xxnand:0x00002000@0x00004000(uboot_a),0x00002000@0x00006000(uboot_b),0x00002000@0x00008000(trust_a),0x00002000@0x0000a000(trust_b),0x00002000@0x0000c000(misc),0x00008000@0x0000e000(resource),0x00010000@0x00016000(kernel),0x00002000@0x00026000(dtb),0x00002000@0x00028000(dtbo_a),0x00002000@0x0002a000(dtbo_b),0x00000800@0x0002c000(vbmeta_a),0x00000800@0x0002c800(vbmeta_b),0x00020000@0x0002d000(boot_a),0x00020000@0x0004d000(boot_b),0x00038000@0x0006d000(backup),0x00002000@0x000a5000(security),0x000c0000@0x000a7000(cache),0x00300000@0x00167000(system_a),0x00300000@0x00467000(system_b),0x00008000@0x00767000(metadata),0x000c0000@0x0076F000(vendor_a),0x000c0000@0x0082F000(vendor_b),0x00040000@0x008EF000(oem_a),0x00040000@0x0092F000(oem_b),0x00000400@0x0096F000(frp),-@0x0096F400(userdata:grow)
uuid:system=af01642c-9b84-11e8-9b2a-234eb5e198a0

（2）新增针对 AB 的 fstab 文件 fstab.rk30board_AB

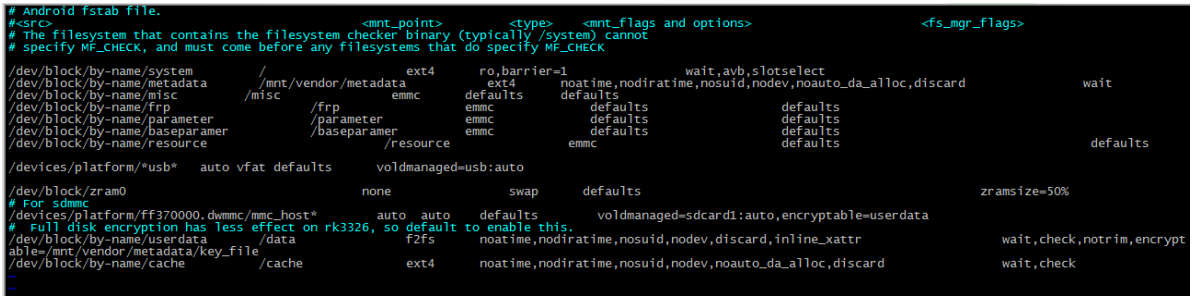
Create fstab file fstab.rk30board_AB for AB

AB 分区增加 slotselect 挂载参数（system 分区增加 slotselect 参数，删除 oem 分区项），同时将 frp, parameter, baseparameter, resource 的分区节点添加进去。

AB partition adds slotselect loading parameter (system partition adds slotselect parameter, and deletes oem partition item), and adds the partition nodes of frp, parameter, baseparameter and resource in parallel.

一个参考文件如下：

A reference file is shown as below:



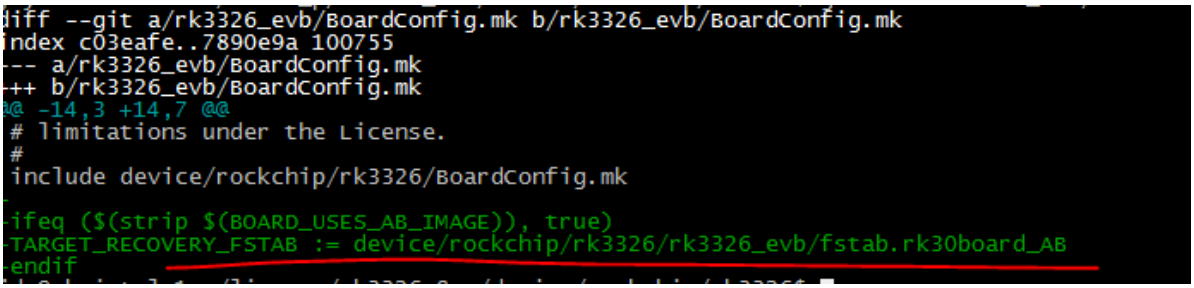
（3）device\rockchip\rkxxx 下的 BoardConfig 配置 TARGET_RECOVERY_FSTAB，使其指向刚刚创建的 fstab.rk30board_AB 文件。

Configure TARGET_RECOVERY_FSTAB for BoardConfig in device\rockchip\rkxxx to make it point to the newly created fstab.rk30board_AB file.

```
+
+ifeq ($(strip $(BOARD_USES_AB_IMAGE)), true)
+TARGET_RECOVERY_FSTAB := device/rockchip/rk3326/rk3326_evb/fstab.rk30board_AB
+endif
```

如下截图：

See the screenshot below:



2.1.2 Android 10 系统配置 Android10.0 system configuration

Android 10 系统的配置包括：

Android10.0 system configuration includes:

1.在 device\rockchip\rkxxx\BoardConfig.mk 中打开 AB 升级配置项。

Open the configuration item for AB upgrading in **device\rockchip\rkxxx\BoardConfig.mk**

将 BOARD_USES_AB_IMAGE 配置设置为 true，默认为 false.

Set BOARD_USES_AB_IMAGE configuration as true, which default value is false.

以 rk3326 为例：

Take RK3326 as example:

vim device/rockchip/rk3326_qt/BoardConfig.mk

#AB image definition

-BOARD_USES_AB_IMAGE := false

+BOARD_USES_AB_IMAGE := true

2.在对应的 device\rockchip\rkxxx 目录下，确认是否已经有 parameter_ab.txt 分区表文件，如果已有，则直接跳过这一步；如果没有 parameter_ab.txt 文件，则按如下步骤执行：

In the corresponding directory of device\rockchip\rkxxx, confirm whether there is parameter_ab.txt partition table or not, if yes, directly skip this step. If there is no parameter_ab.txt file, execute as the following steps:

（1）新建 parameter_ab.txt 分区表文件

Create parameter_ab.txt partition table file

该文件从对应 parameter.txt 拷贝一份，然后在此基础上，进行修改，核心是针对每个要升级的分区划分两个分区 a 和 b，最后删除 recovery 分区并且将 boot 分区的大小改为 64MB。

Copy a file from the corresponding parameter.txt, and then modify based on this file. The key point is to divide two partitons a and b for each partition to be upgraded, and finally delete recovery partition and modify the boot partition size to 64MB.

需要注意 super 分区不需要区分 a 和 b，只需要有一个 super 分区，其大小设置为非 AB 时 super 的 2 倍。

Need to notice that super partition doesn’t need to separate a and b, it only needs one super partition, and its size should be set to 2 times of the super partition with non-AB.

一个参考 parameter_ab.txt 如下：

An example of parameter_ab.txt is shown as below:

device\rockchip\rk3326\rk3326_qt：

FIRMWARE_VER:10.0

MACHINE_MODEL:RK3326

MACHINE_ID:007

MANUFACTURER: RK3326

MAGIC: 0x5041524B

ATAG: 0x00200800

MACHINE: 3326

CHECK_MASK: 0x80

PWR_HLD: 0,0,A,0,1

TYPE: GPT

CMDLINE:mtdparts=rk29xxnand:0x00002000@0x00004000(uboot_a),0x00002000@0x00006000(uboot_b),0x00002000@0x00008000(trust_a),0x00002000@0x0000a000(trust_b),0x00002000@0x0000c000(misc),0x00002000@0x0000e000(dtb),0x00002000@0x00010000(dtbo_a),0x00002000@0x00012000(dtbo_b),0x00000800@0x00014000(vbmeta_a),0x00000800@0x00014800(vbmeta_b),0x00030000@0x00015000(boot_a),0x00030000@0x00045000(boot_b),0x00038000@0x00075000(backup),0x00002000@0x000ad000(security),0x000c0000@0x000af000(cache),0x00008000@0x0016f000(metadata),0x000004

00@0x00177000(frp),0x00c28000@0x00177400(super),-@0x00d9f400(userdata:grow)

（2）新增针对 AB 的 recovery fstab 文件 recovery.fstab_AB

Create recovery fstab file recovery.fstab_AB for AB

与对应的 fstab.rk30board 的主要区别在于 AB 分区增加 slotselect 挂载参数（system/vendor/odm/product 增加 slotselect 参数），同时将 frp, parameter, baseparameter, resource 的分区节点添加进去，并更改 data 区的挂载方式选项。

The main difference from the corresponding fstab.rk30boar is that AB partition adds slotselect loading parameter (system/vendor/odm/product adds slotselect parameter), in parallel, adds the partition nodes of frp, parameter, baseparameter and resource, and modifies the loading method of data partition.

一个参考文件如下：

A reference file is as below:

device\rockchip\rk3326\rk3326_qt\recovery.fstab_AB：

```
# Android fstab file.
#<src>                                          <mnt_point>         <type>    <mnt_flags and options>                       <fs_mgr_flags>
# The filesystem that contains the filesystem checker binary (typically /system) cannot
# specify MF_CHECK, and must come before any filesystems that do specify MF_CHECK
system /system ext4 ro,barrier=1 wait,slotselect,logical,first_stage_mount
vendor /vendor ext4 ro,barrier=1 wait,slotselect,logical,first_stage_mount
odm    /odm    ext4 ro,barrier=1 wait,slotselect,logical,first_stage_mount
product    /product    ext4 ro,barrier=1 wait,slotselect,logical,first_stage_mount
/dev/block/by-name/metadata /metadata ext4 nodev,noatime,nosuid,discard,sync wait,formattable,first_stage_mount
/dev/block/by-name/misc         /misc               emmc      defaults     defaults
/dev/block/by-name/cache          /cache              ext4      noatime,nodiratime,nosuid,nodev,noauto_da_alloc,discard               wait,check

/dev/block/mmcblk0p1                                        /mnt/external_sd     vfat            /dev/block/mmcblk0                  defaults
/dev/block/by-name/frp                  /frp                emmc             defaults                defaults
/dev/block/by-name/baseparamer          /baseparamer        emmc             defaults                defaults
/dev/block/by-name/backup               /backup             emmc             defaults                defaults

/dev/block/zram0                              none              swap      defaults                                                zramsize=50%

/dev/block/by-name/userdata             /data               f2fs             defaults                defaults
```

（3）device\rockchip\rkxxx 下的 BoardConfig 中导入 AB 配置，包括 TARGET_RECOVERY_FSTAB，使其指向刚刚创建的 recovery.fstab_AB 文件。

Load AB configuration including TARGET_RECOVERY_FSTAB to BoardConfig in device\rockchip\rkxxx to make it point to the newly created recovery.fstab_AB file.

device\rockchip\rk3326\rk3326_qt：

```
diff --git a/rk3326_qt/BoardConfig.mk b/rk3326_qt/BoardConfig.mk
index 1e78940..159a3b6 100755
--- a/rk3326_qt/BoardConfig.mk
+++ b/rk3326_qt/BoardConfig.mk
+# AB image definition
+BOARD_USES_AB_IMAGE := true
+
+ifeq ($(strip $(BOARD_USES_AB_IMAGE)), true)
+       include device/rockchip/common/BoardConfig_AB.mk
+       TARGET_RECOVERY_FSTAB := device/rockchip/rk3326/rk3326_qt/recovery.fstab_AB
+endif
```

2.2 kernel dts 配置 kernel dts configuration

对于 Android 10.0 来说，kernel 不需要任何配置。

For Android10.0, kernel doesn't need to do any configuration.

对于 Android 9.0 来说，kernel dts 需要按如下配置。包括添加 oem 项，同时将 slotselect 标记添加到 vendor 的 fsmgr_flags，参考配置如下：

For Android9.0, kernel dts needs to configure as below. Add oem item, and add slotselect symbol to fsmgr_flags of vendor in parallel. The reference configuration is shown as below:

```
--- a/arch/arm64/boot/dts/rockchip/rk3326-863-lp3-v10-avb.dts
+++ b/arch/arm64/boot/dts/rockchip/rk3326-863-lp3-v10-avb.dts
@@ -24,7 +24,14 @@
                        dev = "/dev/block/platform/ff390000.dwmmc/by-name/vendor";
                        type = "ext4";
                        mnt_flags = "ro,barrier=1,inode_readahead_blks=8";
-                       fsmgr_flags = "wait,avb";
+                       fsmgr_flags = "wait,avb,slotselect";
+               };
+               oem {
+                       compatible = "android,oem";
+                       dev = "/dev/block/platform/ff390000.dwmmc/by-name/oem";
+                       type = "ext4";
+                       mnt_flags = "ro,barrier=1,inode_readahead_blks=8";
+                       fsmgr_flags = "wait,slotselect";
                };
        };
```

2.3 uboot 配置 uboot configuration

在 uboot 中，针对具体芯片的配置文件，添加 CONFIG_ANDROID_AB=y 配置项，参考配置如下截图所示：

In uboot, add CONFIG_ANDROID_AB=y configuration item in the configuration file of the specific chipset. The reference configuration is shown as below:

```
diff --git a/configs/rk3326_defconfig b/configs/rk3326_defconfig
old mode 100644
new mode 100755
index 0465f23..d64648c
--- a/configs/rk3326_defconfig
+++ b/configs/rk3326_defconfig
@@ -114,3 +114,4 @@ CONFIG_OPTEE_CLIENT=y
 CONFIG_OPTEE_V2=y
 CONFIG_OPTEE_ALWAYS_USE_SECURITY_PARTITION=y
 CONFIG_TEST_ROCKCHIP=y
+CONFIG_ANDROID_AB=y
```

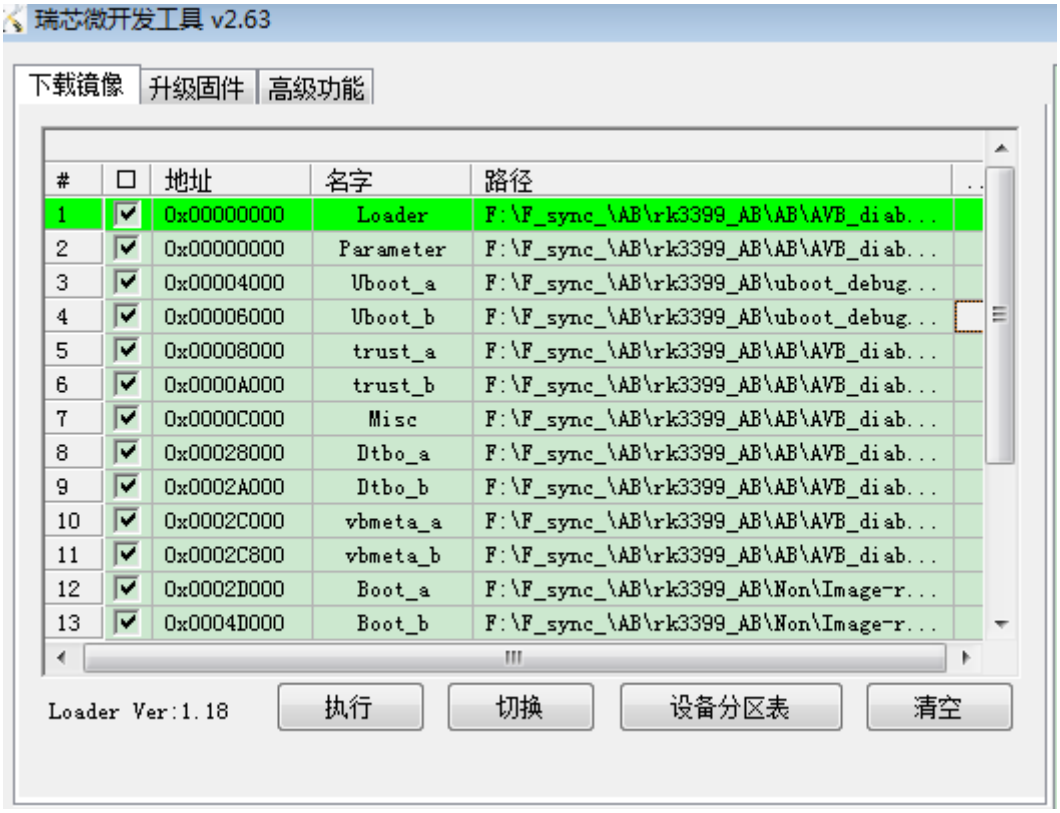
2.4 烧写工具 AndroidTool 增加分区 Add partition for flash tool AndroidTool

增加 B 分区的下载项，同时所有 AB 分区都烧写相同的固件。具体增加方法请参考《Rockchip Parameter File Format Ver1.3》。

Add the download item for B partition, and make all AB partitions flash the same images. Please refer to 《Rockchip Parameter File Format Ver1.3》 for the detailed method.

一个烧写工具截图如下：

A flash tool screenshot is shown as below:



3 AB 系统与 OTA 包编译 AB system and OTA package compiling

编译 AB 系统固件步骤（务必按如下步骤执行）：

The steps to compile AB system image (please strictly follow below steps):

lunch xxx

make installclean –j32 OR make clean

make –j32

make otapackage –j32

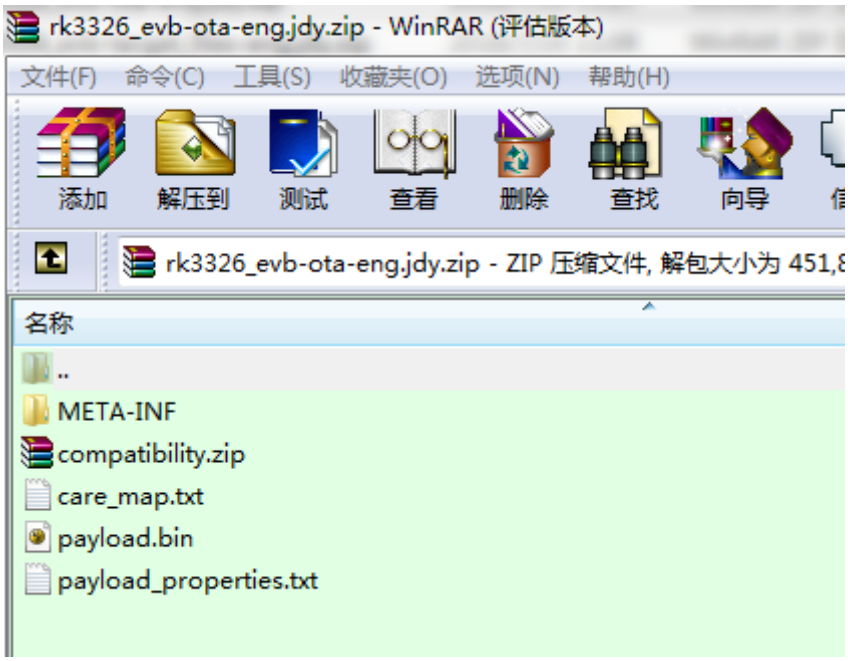
mkimage_ab.sh ota

注意：mkimage_ab.sh 文件从 device/rockchip/common 目录拷贝到 Android 根目录。

Note: copy mkimage_ab.sh file from the directory of device/rockchip/common to the root directory of Android.

编译后的升级包组成参考如下：

Refer to below for the contents of the upgrade package after compiled.



4 验证方法（客户端与服务器）Validation method (client and server)

Rockchip AB 系统支持正常系统下的无缝升级（一边下载升级包，一边升级）。

Rockchip AB system supports the seamless upgrading in normal system (upgrading is on-going, while downloading the upgrade package).

4.1 无缝升级验证 Seamless upgrading validation

在无缝升级过程中，升级包可以一边下载，一边升级。这时候需要有一个 HTTP 服务器和一个升级客户端。

During seamless upgrading process, the package can be downloaded and upgraded in parallel. Here we need a HTTP server and an upgrading client.

请使用以下 update_device.py 验证。至于产品化的升级客户端和升级服务器需要客户自行搭建，升级客户端可以参考 Android 默认提供的 update_engine_client。关于 update_engine_client 的使用方法请参考如下验证方法 update_device.py，该脚本就是通过 adb 最终调用 update_engine_client 来实现升级的。

As for verification, please use update_device.py that described below. Customers need to setup their own upgrading client and upgrading server for the product and the upgrading client can refer to the default update_engine_client provided by Android. For the use of update_engine_client, please refer to the following verification method update_device.py, the script is finally upgraded by calling update_engine_client through adb.

验证方法：update_device.py

Validation Method: update_device.py

update_device.py 脚本通过 adb 方式，将 Linux 主机变成 HTTP 服务器，然后调用 update_engine_client 来实现无缝升级。

update_device.py script changes Linux host to be HTTP server through adb, and then invokes update_engine_client to achieve the seamless upgrading.

使用方法如下：在 Linux 主机中执行如下命令（要使用 Linux 主机,Windows 主机会有问题，同时确保该 Linux 主机 adb 功能正常）：

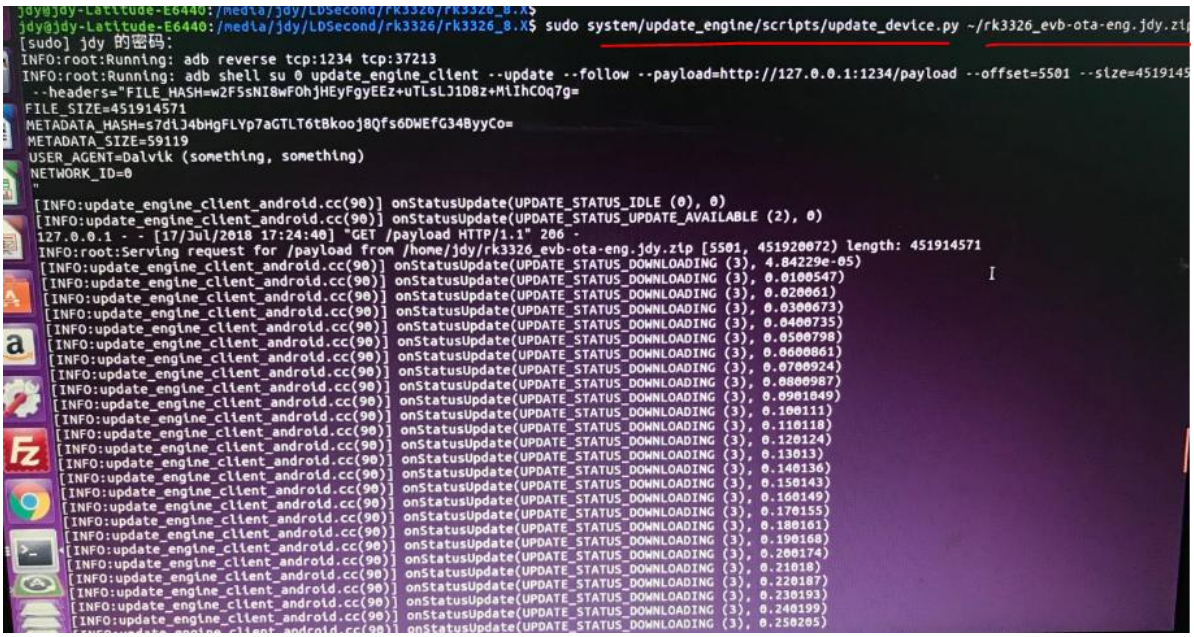
The usage is as below: execute the following command in Linux host (must use Linux host but not Windows host, and make sure the Linux host adb function works normally):

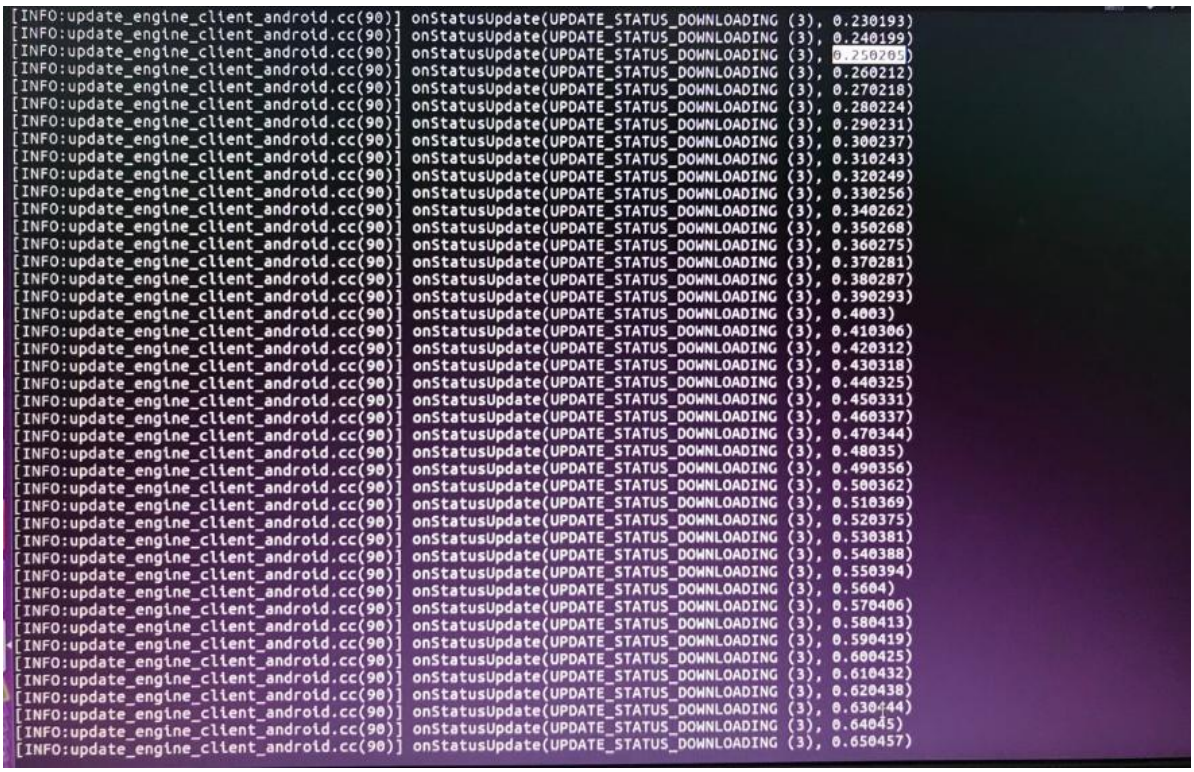
system/update_engine/scripts/update_device.py {升级包名字}

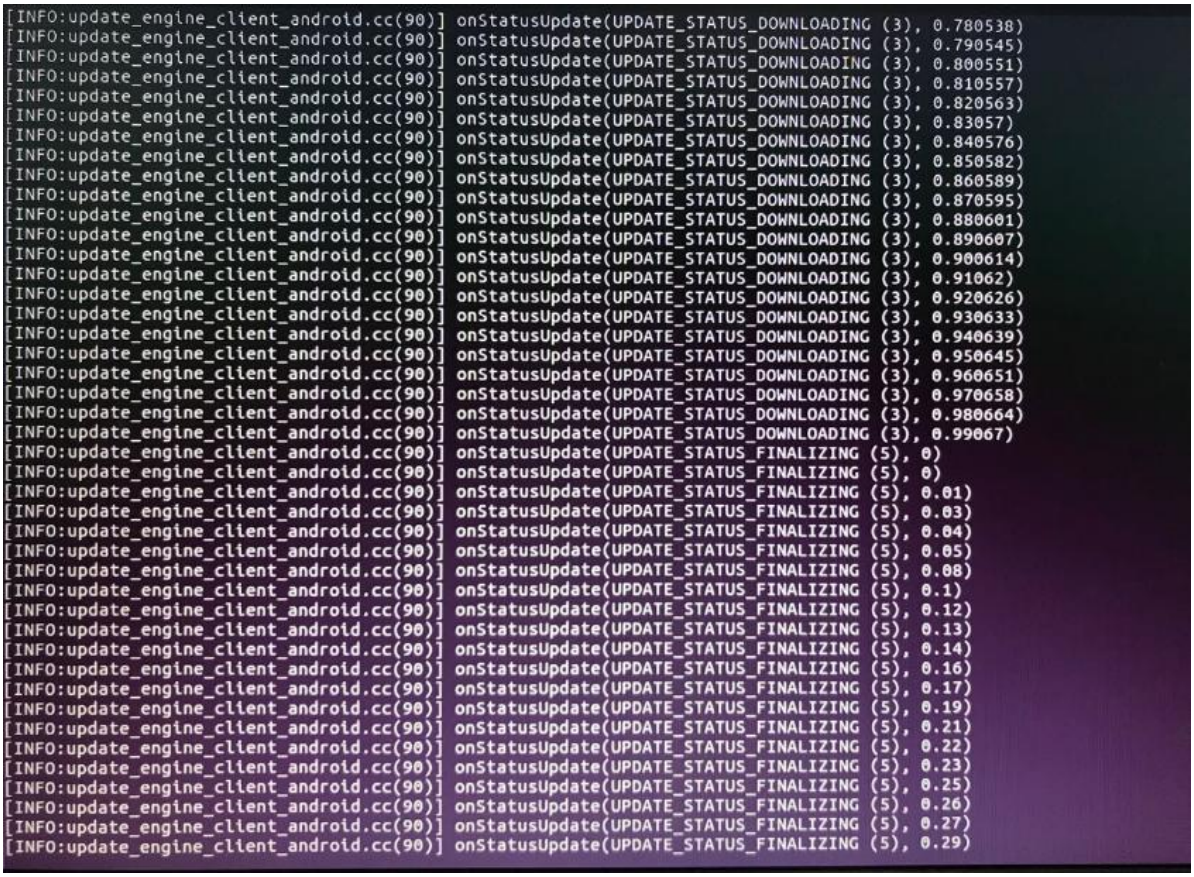
system/update_engine/scripts/update_device.py {upgrade package name}

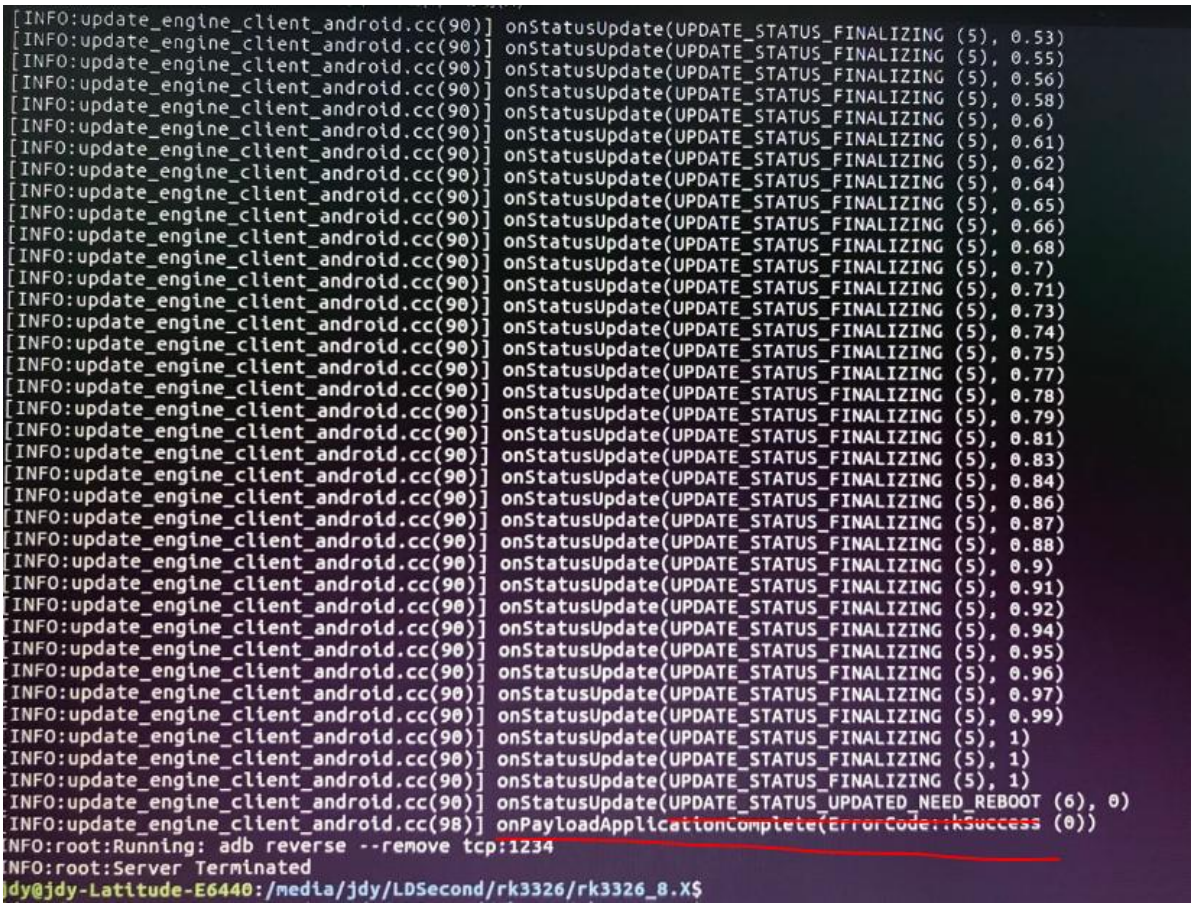
示例如下：

The example is shown as below:









上面的截图展示了完整的升级过程，升级成功后，会有 UPDATE_STATUS_UPDATED_NEED_REBOOT 地打印信息，如上截图所示。此时手动重启设备，就可以切换到新的升级后的系统。

The above screenshots show the complete upgrading process. After upgrading successfully, it will print information UPDATE_STATUS_UPDATED_NEED_REBOOT as shown above. Now manually reboot the device, and it will switch to the newly upgraded system.

5 注意事项 Notice

1.AB 需要 miniloader 支持，对于 rk3326 和 rk3399 来说，miniloader 版本要求 V1.18 版本及以上，其他芯片对应的 miniloader 版本号，请向对应的项目接口人确认。

AB needs miniloader support. For RK3326 and RK3399, miniloader version requires V1.18 and higher. For other chipsets, please check with the corresponding project contact to confirm the miniloader version.