目录

User Manual for Orange Pi 3G-IOT and Orange Pi 4G-IOT to Flash Linux Image

一、Preparation-Make rootfs

①Please download the ubuntu-base-16.04-core-armhf.tar.gz on the following link and unzip it: http://cdimage.ubuntu.com/ubuntu-base/releases/16.04/release/

mkdir rootfs

sudo tar -xpf ubuntu-base-16.04-core-armhf.tar.gz -C rootfs

sudo cp -b /etc/resolv.conf rootfs/etc/resolv.conf

sudo cp /usr/bin/qemu-aarch64-static rootfs/usr/bin/

Enter the root file image.

sudo chroot rootfs /bin/bash

Update the software repository and install the software.

apt update

apt upgrade

Install functions that meet your needs.

apt install build-essential vim ping ssh and so on

If you are going to install the desktop version, keep the network running smoothly, it will take a long time.

If you don't need the desktop, don't execute it, it's the Server version.

apt install ubuntu-desktop

Adding users and setting passwords.

useradd -s '/bin/bash' -m -G adm,sudo orangepi

Set the password for the user orangepi.

passwd orangepi

Set a password for user root.

passwd root

exit Rootfs.

exit

二、Orange PI 3G-IOT-A Linux Image Booting

2.1 Mount the root file image (system partition) on EMMC

Make Root File Iamge

The format of the root file system of Orange Pi 3G-IOT-A is ubifs, so it is necessary to make UBIFS root file image.

1）mkfs.ubifs ubinize　Tool Installatioon

For your reference: https://blog.csdn.net/f413933206/article/details/6534685

Or you could directly apt-get install mtd-utils

2）Make ubifs

#sudo mkfs.ubifs -r rootfs/ -o ubifs.img -m 4096 -e 253952 -c 640 -v

Among them, the rootfs directory is the Ubuntu 16.04 system (that is, the rootfs made earlier)

-r, --Catalog of making ubifs file systems

-o, --output to FILE-Output file name

-m, --Minimum Input and Output Size

-e, --Logically erasable block size

-c, --Maximum number of logical erasable blocks

#sudo ubinize -o system.img -m 4096 -p 262144 -O 4096 -v ubi_android.ini

The configuration parameters of ubi_android.ini

[ubifs]

mode=ubi

image=ubifs.img(generated by mkfs.ubifs)

vol_id=0

vol_size=162529280 (Logical Erasable Block Size*Maximum Logical Erasable Block Number)

vol_type=dynamic

vol_alignment=1

vol_name=system

vol_flags=autoresize

The resulting system. img is the UBIFS root file system image.

Modify kernel configuration

① #cd out/target/product/hexing72_cwet_lca/obj/KERNEL_OBJ/

#TARGET_PRODUCT=hexing72_cwet_lca make menuconfig ARCH=arm （ Or modify the. config file directly）

Set these three to Y

CONFIG_DEVTMPFS=y

CONFIG_DEVTMPFS_MOUNT=y

CONFIG_FHANDLE=y

② In .config CONFIG_CMDLINE="", add rootwait=1 rw ubi.mtd=14 rootfstype=ubifs , modify root=ubi0:system

③ After modification， execute TARGET_PRODUCT=hexing72_cwet_lca make oldconfig，and then enter:

cp .config ../../../../../../mediatek/config/mt6572/autoconfig/kconfig/platform

Remove ramdisk

①Modify build/core/Makefile

Annotate --ramdisk $(INSTALLED_RAMDISK_TARGET) in INTERNAL_BOOTIMAGE_ARGS

② Modify system/core/mkbootimg/mkbootimg.c

Annotate the following in the main()

```
/*if(ramdisk_fn == 0) {
        fprintf(stderr,"error: no ramdisk image specified\n");
        return usage();
}*/
```

Modify if(!strcmp(ramdisk_fn,"NONE"))为 if(ramdisk_fn == 0)

Kernel configuration

You have to make the modification before Compilation：

① Change the module_init(ubi_init) in kernel/drivers/mtd/ubi/build.c to late_initcall(ubi_init); Otherwise you will fail to mount it.

② bootable/bootloader/lk/app/mt_boot/mt_boot.c

Annotate boot_linux_from_storage（）

```
/*    if (ret < 0) {
                msg_img_error("Android Boot Image");
            }*/
```

③ mediatek/platform/mt6572/lk/load_image.c +75

mediatek/platform/mt6572/lk/load_image.c +220

Annotate respectively return -1;

Then start compiling.

#./makeMtk hexing72_cwet_lca n lk

#./makeMtk hexing72_cwet_lca n kernel

#./makeMtk bootimage

Flash Image 3G_32g4g_linux_system_20181129.tar.gz

① We provide compiled and packaged image partition files for download on the official website： **3G_32g4g_linux_system_20181129.tar.gz**

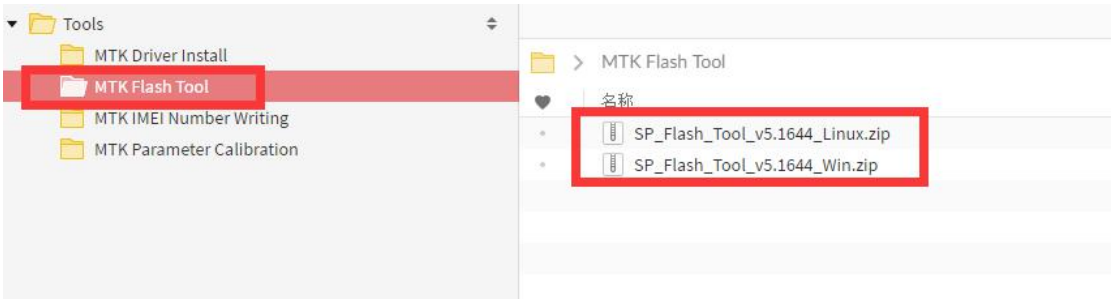
http://www.orangepi.org/downloadresources/orangepi3G-IOT/2018-12-03/c86e082a8b8bdc7a244d873cf3144356.html

Unzip it with the following command：

#tar -xvf 3G_32g4g_linux_system_20181129.tar.gz

Then start burning with tool of **Smart Phone Flash Tool**(pls download this tool on the official website). This tool has Windows and Linux version. Select the appropriate version according to your host:

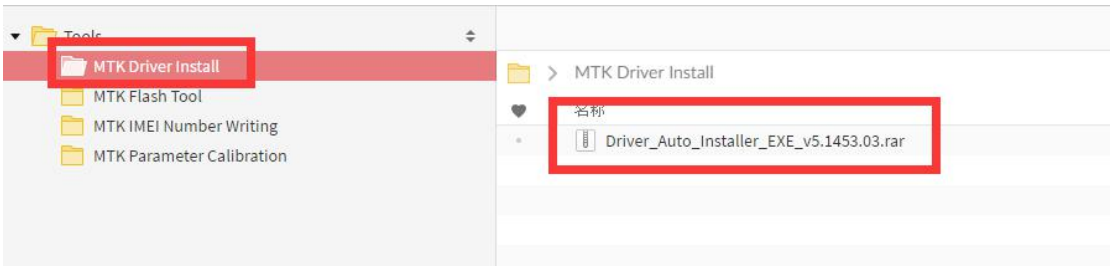
http://www.orangepi.org/downloadresources/orangepi3G-IOT/2018-07-05/c265448782bfb7ad3882938873599013.html



You have to install the **Driver_Auto_Installer_EXE_v5.1453.03.rar** in Windows.(It could be downloaded on the official website which support

xp/wind7/wind8 only)

http://www.orangepi.org/downloadresources/orangepi3G-IOT/2018-07-05/c26544878 2bfb7ad3882938873599013.html



It is the same method under Windows and Linux. Here i take the linux as an example for buring.

② Start burning

If you can't connect to a computer, you need to do the following:

$sudo apt-get remove modemmanager

$sudo /etc/init.d/udev retstart

Then restart the computer.

Unzip and open the burning tool:

$ unzip SP_Flash_Tool_v5.1644_Linux.zip

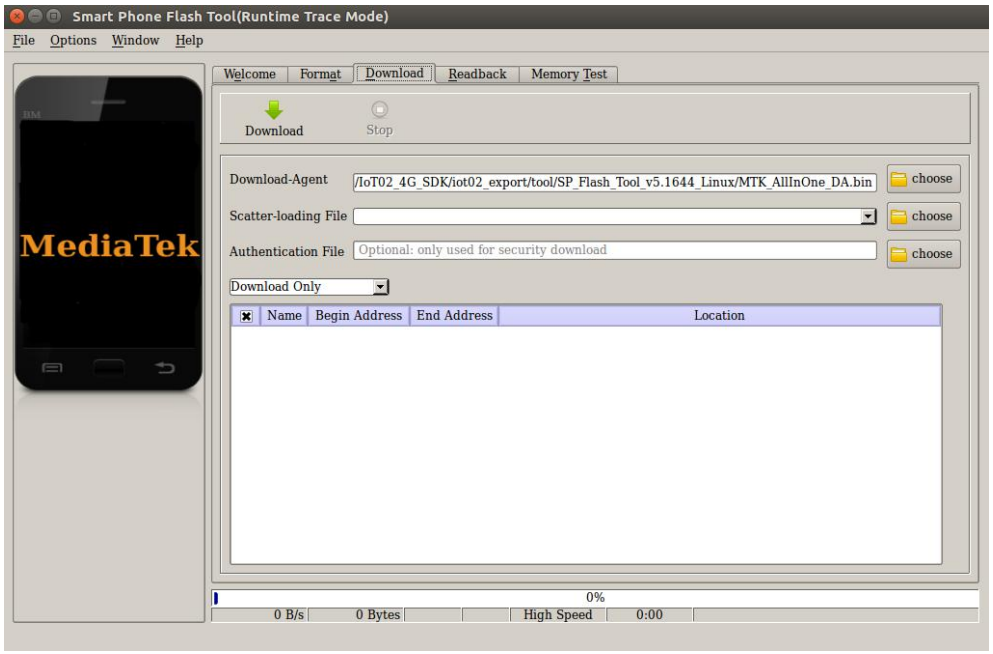
$ cd SP_Flash_Tool_v5.1644_Linux

$ sudo ./flash_tool.sh

If you open the software for the first time, a warning may appear that the scatter file cannot found :

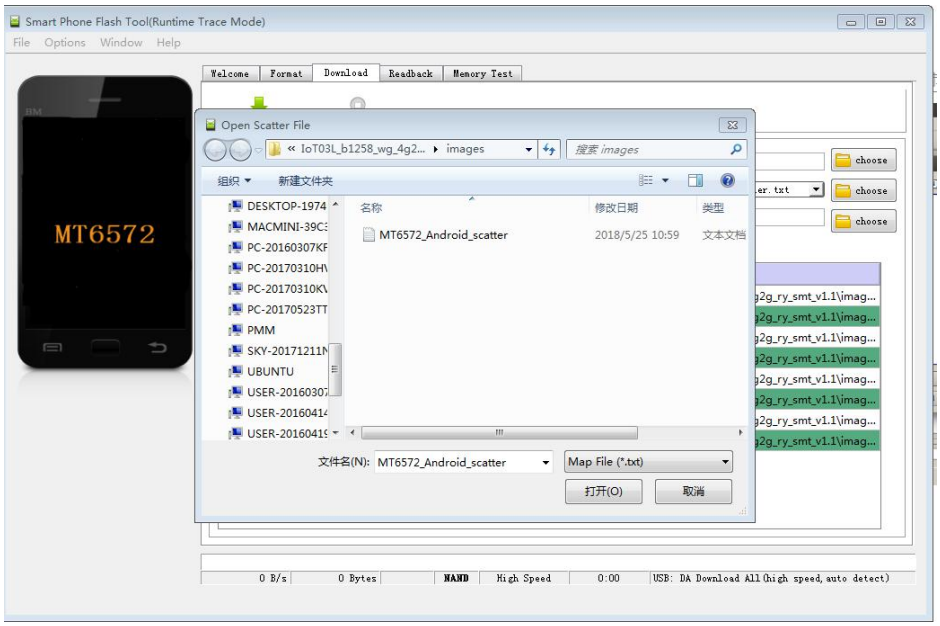
This is normal. Later we will manually specify the path of Scatter File. After clicking OK, we enter the software。

A.First switch to the Download tab, as shown below：



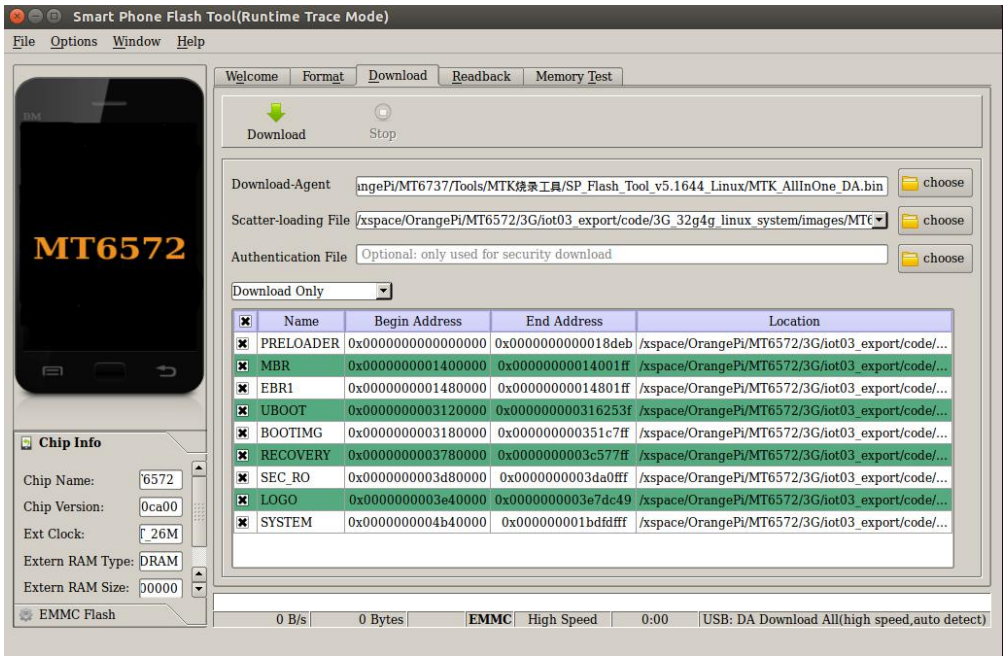
B.Click choose on the right side of the tool on the Scatter-loading File line

Choose the path of the Scatter File as follows:



C. Chose this file, and it will show as follow:

The paths of partition files and their absolute starting addresses to be burned will be automatically filled in.



D. There is a drop-down menu in the upper left corner of the partition information display section. There are three options:

Format All + Download //Erase all partition information in the machine and re-download the selected partition

Firmware Upgrade //Update the differentiated parts of the selection

Download Only //Re-download regardless of differences

Press Power button for 5 seconds and release it. It will boot and enter the system

You have to download the SP_Flash_Tool_v5.1644_Win.zip on Window and then unzip for installation, then do the image flashing as linux.

2.2 Mount the root file system on the SD card

Make Ubuntu 16.04 Root File Iamge

First of all, you need the rootfs you made before

```
# Generate blank image files
dd if=/dev/zero of=ubuntu-desktop.img bs=1M count=2048
# Format image file to ext4 format
sudo mkfs.ext4 ubuntu-desktop.img
# Mount image file to ubuntu-desktop folder
mkdir ubuntu-desktop
sudo mount ubuntu-desktop.img ubuntu-desktop/
# Copy the contents of the rootfs just made to the folder mounted by image
sudo cp -rfp rootfs/* ubuntu-desktop/
```

```
# unmount
sudo umount ubuntu-desktop/
# Check the correctness of the file system
e2fsck -p -f ubuntu-desktop.img
# Dynamic adjustment of partition size
resize2fs -M ubuntu-desktop.img
```

Image partition（tar_image.sh and ubuntu-desktop.img are in the same directory）

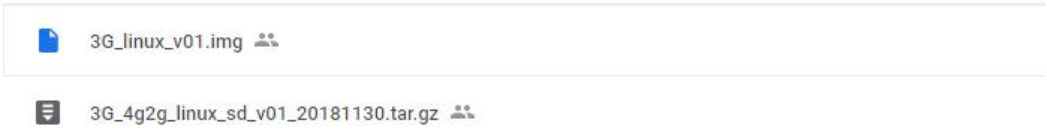
sudo ./tar_image.sh(The script can be downloaded in the 3G-IOT/4G-IOT section of the official website)

Generating the image of 3G_Linux_v01.img can be burned onto the SD card by using the tool.

Flash the image 3G_Linux_V01.img to SD Card

There are three steps for booting images from SD card, take the image we have compiled and published on the website as example:

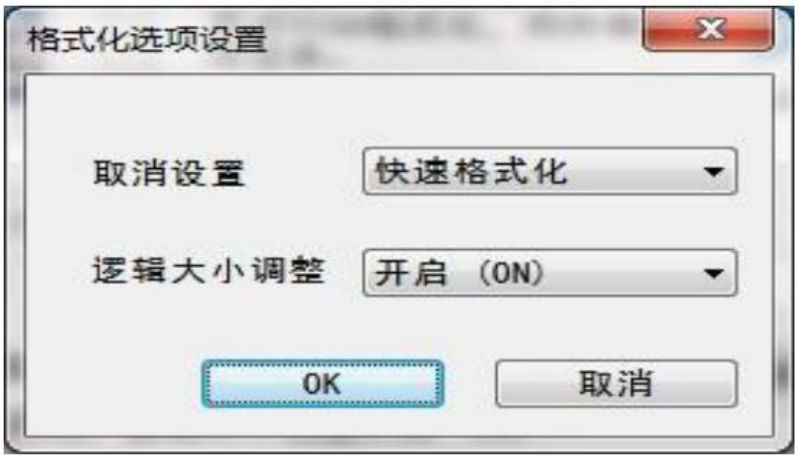
There two files on the directory of 'flashing into sd card', both of them have to be donwloaded for successful booting from sd card.



- ✓ Flash the '3G_Linux_V01.img' into sd card with win32.
- ✓ Flash the '3G_4g2g_linux_sd_V01_20181130' into emmc with Smart Phone Flash Tool.
- ✓ Plug the sd card into the board for booting

a.Format SD Card

i Download TF card formatting tools, such as TF Formatter
https://www.sdcard.org/downloads/formatter_4/eula_windows/
ii Unzip the downloaded file and run setup.exe
iii On the Options Settings option, set the Format Type to "Fast Format". The "Logic size adjustment" option is "ON"



iv Verify that the inserted TF Card chuck is identical to the selected chuck

v Click on the Format button

b.Download the root file system image in the 3G-IOT section of the official website：

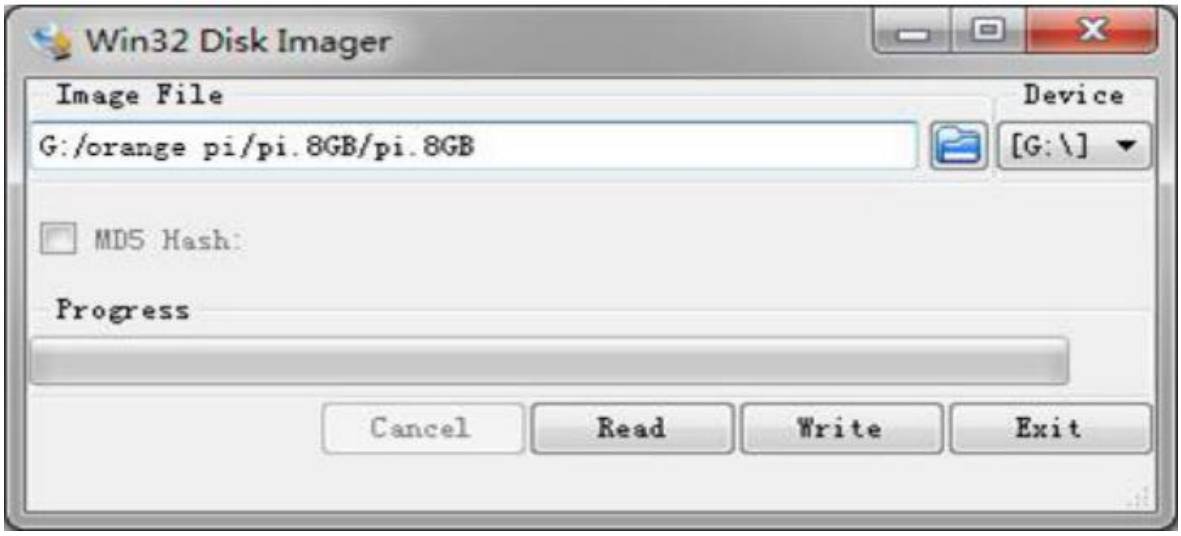
3G_linux_v01.img

c.Right-click the downloaded file and select "Unzip File" to write the image to the TF card.

i Download iamge writing tools, such as Win32Diskimager：

http://sourceforge.net/projects/win32diskimager/files/Archive/

ii Select the path of the decompressed image



iii click “Write” and wait

iv after burn endm, click“Exit”

Kernel configuration

①#cd out/target/product/hexing72_cwet_lca/obj/KERNEL_OBJ/

#TARGET_PRODUCT=hexing72_cwet_lca make menuconfig ARCH=arm （Or modify the. config file directly）

Set these three to Y

CONFIG_DEVTMPFS=y

CONFIG_DEVTMPFS_MOUNT=y

CONFIG_FHANDLE=y

②The command line of 3G is a patchwork of command line parameters and. config, so add rootwait=1 rw rootfstype=ext4 directly in. Config of CONFIG_CMDLINE="" and modify root=/dev/mmcblk0p2.

③Execute TARGET_PRODUCT=hexing72_cwet_lca make oldconfig，copy .config and replace the mediatek/config/mt6572/autoconfig/kconfig/platform:

cp .config ../../../../../../mediatek/config/mt6572/autoconfig/kconfig/platform

Remove ramdisk

① Modify build/core/Makefile

Annotate the --ramdisk $(INSTALLED_RAMDISK_TARGET) in INTERNAL_BOOTIMAGE_ARGS

② Modify system/core/mkbootimg/mkbootimg.c

Annotate the following in main()

```
/*if(ramdisk_fn == 0) {
        fprintf(stderr,"error: no ramdisk image specified\n");
        return usage();
}*/
```

Modify if(!strcmp(ramdisk_fn,"NONE"))为 if(ramdisk_fn == 0)

Compilation

You have to make the modification before compilation：

① bootable/bootloader/lk/app/mt_boot/mt_boot.c

Annotate boot_linux_from_storage（）

```
 /*   if (ret < 0) {
                msg_img_error("Android Boot Image");
            }*/
```

② mediatek/platform/mt6572/lk/load_image.c +75

mediatek/platform/mt6572/lk/load_image.c +220

Annotate respectively return -1;

Then start compiling.

```
./makeMtk hexing72_cwet_lca n lk
#./makeMtk hexing72_cwet_lca n kernel
#./makeMtk bootimage
```

Flash image ‘3G_4g2g_linux_sd_V01_20181130’ into EMMC

Steps of flashing iamge ‘3G_4g2g_linux_sd_V01_20181130’ into EMMC is the same as flash image into emmc on Page5

三、Orange PI 3G-IOT-B Linux Image Booting

3.1 Mount the root file image (system partition) on EMMC

Make Ubuntu 16.04 Root File Iamge

we need to prepare the rootfswe made before
Generate blank image files
dd if=/dev/zero of=ubuntu-desktop.img bs=1M count=2048
# Format image file to ext4 format
sudo mkfs.ext4 ubuntu-desktop.img
# Mount image file to ubuntu-desktop folder
mkdir ubuntu-desktop
sudo mount ubuntu-desktop.img ubuntu-desktop/
# Copy the contents of the rootfs just made to the folder mounted by image
sudo cp -rfp rootfs/* ubuntu-desktop/
# unmount
sudo umount ubuntu-desktop/
# Check the correctness of the file system
e2fsck -p -f ubuntu-desktop.img
Automatically adjust partition size
resize2fs -M ubuntu-desktop.img

Kernel configuration

① #cd out/target/product/hexing72_cwet_kk/obj/KERNEL_OBJ/
#TARGET_PRODUCT=hexing72_cwet_kk make menuconfig ARCH=arm （Or modify the. config file directly）
Set these three as Y
CONFIG_DEVTMPFS=y
CONFIG_DEVTMPFS_MOUNT=y
CONFIG_FHANDLE=y
② In .config CONFIG_CMDLINE="" , add rootwait=1 rw , modify root=/dev/mmcblk0p4
③Execute TARGET_PRODUCT=hexing72_cwet_kk make oldconfig, copy .config and replace with
mediatek/config/mt6572/autoconfig/kconfig/platform:
cp .config ../../../../../../mediatek/config/mt6572/autoconfig/kconfig/platform

Remove ramdisk

① Modify build/core/Makefile
Annotate --ramdisk $(INSTALLED_RAMDISK_TARGET) in INTERNAL_BOOTIMAGE_ARGS
② Modify system/core/mkbootimg/mkbootimg.c
Annotate the following in main()

```
/*if(ramdisk_fn == 0) {
        fprintf(stderr,"error: no ramdisk image specified\n");
        return usage();
}*/
```

Modify if(!strcmp(ramdisk_fn,"NONE")) to if(ramdisk_fn == 0)

Compilation

We have to make the modification before Compilatio：
① bootable/bootloader/lk/app/mt_boot/mt_boot.c
Annotate boot_linux_from_storage（）

```
/*  if (ret < 0) {
            msg_img_error("Android Boot Image");
        }*/
```

② mediatek/platform/mt6572/lk/load_image.c +75
mediatek/platform/mt6572/lk/load_image.c +220
Annotate respectively return -1;
Then start compiling.

```
#./makeMtk hexing72_cwet_kk n lk
#./makeMtk hexing72_cwet_kk n kernel
#./makeMtk bootimage
```

Flash Image 3G_32g4g_linux_emmc_v01_20181129.tar

Image flashing is the same as previous on Page5

3.2 Mount the root file image on SD Card

Make Ubuntu 16.04 Root File Iamge

It is the same way as page8 2.2

Flash image 3G_linux_v01.img into SD card

It is t he same method show on Page9

Kernel configuration

① #cd out/target/product/hexing72_cwet_kk/obj/KERNEL_OBJ/
#TARGET_PRODUCT=hexing72_cwet_kk make menuconfig ARCH=arm （ Or modify the. config file directly）
Set these three to Y
CONFIG_DEVTMPFS=y
CONFIG_DEVTMPFS_MOUNT=y
CONFIG_FHANDLE=y
②In .config CONFIG_CMDLINE="" , add rootwait=1 rw rootfstype=ext4，Modify root=/dev/mmcblk1p2
③Execute TARGET_PRODUCT=hexing72_cwet_kk make oldconfig ，copy .configand then replace to
mediatek/config/mt6572/autoconfig/kconfig/platform:
cp .config ../../../../../../mediatek/config/mt6572/autoconfig/kconfig/platform

Remove ramdisk

It is the same method show on Page12

Compilation

You have to make the modifcation before compilation：
① bootable/bootloader/lk/app/mt_boot/mt_boot.c
anaotage boot_linux_from_storage（）

```
/*    if (ret < 0) {
                        msg_img_error("Android Boot Image");
                }*/
```

②mediatek/platform/mt6572/lk/load_image.c +75
mediatek/platform/mt6572/lk/load_image.c +220
Annotate respectively return -1;
And start compiling.
#./makeMtk hexing72_cwet_kk n lk
#./makeMtk hexing72_cwet_kk n kernel
#./makeMtk bootimage

Flash Image 3G_32g4g_linux_sd_v01_20181129.tar

It is the same method mentioned on Page5.

四、Orange PI 4G-IOT Linux Image Booting

4.1 Mount the root file image (system partition) on EMMC）

Make Ubuntu 16.04 Root File Iamge

We need to prepare the rootfs made before
Generate blank image files
dd if=/dev/zero of=ubuntu-desktop.img bs=1M count=2048
# Format image file on ext4 format
sudo mkfs.ext4 ubuntu-desktop.img
# Mount image file to ubuntu-desktop foldermkdir ubuntu-desktop
sudo mount ubuntu-desktop.img ubuntu-desktop/
# Copy the contents of the rootfs just made to the folder mounted by image
sudo cp -rfp rootfs/* ubuntu-desktop/
# unmount
sudo umount ubuntu-desktop/
# Check the correctness of the file system
e2fsck -p -f ubuntu-desktop.img
Automatically adjust partition size
resize2fs -M ubuntu-desktop.img

Kernel configuration

① #cd out/target/product/bd6737m_35g_b_m0/obj/KERNEL_OBJ/
#make menuconfig ARCH=arm（Or modify the. config file directly）
Set these three to Y
CONFIG_DEVTMPFS=y
CONFIG_DEVTMPFS_MOUNT=y
CONFIG_FHANDLE=y
②Modify the COMMANDLINE_TO_KERNEL in vendor/mediatek/proprietary/bootable/bootloader/lk/platform/mt6735/include/platform/mt_reg_base.h，change the root to root=/dev/mmcblk0p20（system partition）
And then re-complie the lk:
#make lk

Remove ramdisk

Annotate INTERNAL_BOOTIMAGE_ARGS += --ramdisk $(INSTALLED_RAMDISK_TARGET)

Compilation

#make kernel
#make bootimage

Flash Image 4G_ubuntu_emmc.tar

Pls refer to Page5

4.2 Mount the root file image on SD Card

Make Ubuntu 16.04 Root File Iamge

Pls refer to Page8

Flash image 4G_linux_v01.img into SD Card

Pls refer to Page9

Kernel configuration

① #cd out/target/product/bd6737m_35g_b_m0/obj/KERNEL_OBJ/
#make menuconfig ARCH=arm（Or modify the. config file directly）
Set these three to Y
CONFIG_DEVTMPFS=y
CONFIG_DEVTMPFS_MOUNT=y
CONFIG_FHANDLE=y
②Modify the COMMANDLINE_TO_KERNEL in vendor/mediatek/proprietary/bootable/bootloader/lk/platform/mt6735/include/platform/mt_reg_base.h，change the root to root=/dev/mmcblk1p2，then recompile lk
#make lk

Remove ramdisk

Annotate INTERNAL_BOOTIMAGE_ARGS += --ramdisk $(INSTALLED_RAMDISK_TARGET)

Compilation

#make kernel
#make bootimage

Flash Image 4G_ubuntu_sd.tar

Pls refer to Page5