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

Flash Linux Image

-, Preparation-Make rootfs

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

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

 #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
 In .config CONFIG_CMDLINE="", add rootwait=1 rw ubi.mtd=14 rootfstype=ubifs, modify root=ubi0:system
 After modification , execute TARGET_PRODUCT=hexing72_cwet_lca make oldconfig, and then enter:

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 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

Orange Pi User Manual Annotate boot linux from storage ()

Shenzhen Xunlong Software Co., Ltd

iniotate boot_inidx_itoin_s

/* 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/c86e082a8 b8bdc7a244d873cf3144356.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/c26544878 2bfb7ad3882938873599013.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:

8 🗐 🗊 Smart Phone Flash To File Options Window Help	ol(Runtime Trace M	Mode)	
	Welcome Format	Download Readback Memory Test	
BM	Download	© Stop	
	Download-Agent	[/loT02_4G_SDK/iot02_export/tool/SP_Flash_Tool_v5.1644_Linux/MTK_AllInOne_DA.bin]	choose
N.C	Scatter-loading File		choose
MediaTek	Authentication File	Optional: only used for security download	choose
	Download Only	×	
	🗙 Name Begin	n Address End Address Location	
		0%	
	0 B/s	0 Bytes High Speed 0:00	

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:

	Welcome Format	Download	Readback	Memory Test					
—		0							
	🗧 Open Scatter Fil	e					83		
		oT03L_b1258	_wg_4g2 🕨	images	▼ 4 9 搜索	images	Q		- choose
	组织 ▼ 新建	文件夹				⊞ ▼		L	
	P DESKTOP-	.974 ^ 名科	弥	~	1	多改日期	类型	.er. txt	Choose
MT6572	I MACMINI-	39C:	MT6572 And	droid scatter	2	018/5/25 10:59	文本文档		📄 choose
M10012	[₩ PC-201603	D7KF							
	PC-201703	10H\							
	PC-201703	10K1						2g_ry_smt	_v1.1\imag
	PMM	2311						g2g_ry_smt	_v1.1\imag
	I. SKY-20171	2111						2g_ry_smt	_v1.1\imag
	I UBUNTU	=						2g ry smt	v1.1\imag
	1 USER-2016	0307						2g_ry_smt	_v1.1\imag
	1 USER-2016	0414						2g_ry_smt	_v1.1\imag
	1 USER-2016	0419 * * 🔚	_				,	2g_ry_smt	_v1.1\imag
		文件名(N):	MT6572_And	lroid_scatter	▼ Map F	ile (*.txt)	•		
					1J.	F(O)	取消		
							,ii		
	Ľ								

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.

Welcome Format Download Readback Memory Test Download Stop Download-Agent mgePi/MT6737/Tools/MTK%#TEI/SP_Flash_Tool_v5.1644_Linux/MTK_AllInOne_DA.bin Scatter-loading File [xspace/OrangePi/MT6572/3G/iot03_export/code/3G_32g4g_linux_system/images/MT(~)] Authentication File Optional: only used for security download Download Only	choose choose
Download Stop Download-Agent ingePi/MT6737/Tools/MTK&T_IA/SP_Flash_Tool_v5.1644_Linux/MTK_AllInOne_DA.bin Scatter-loading File /xspace/OrangePi/MT6572/3G/iot03_export/code/3G_32g4g_linux_system/images/MTC Authentication File Optional: only used for security download Download Only Image: Stop Image: Stop	choose choose choose
Download-Agent ingePi/MT6737/Tools/MTK&RIA/SP_Flash_Tool_v5.1644_Linux/MTK_AllInOne_DA.bin Scatter-loading File /xspace/OrangePi/MT6572/3G/iot03_export/code/3G_32g4g_linux_system/images/MT€ Authentication File Optional: only used for security download Download Only Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the security download Image: Comparison of the	choose choose choose
Authentication File Optional: only used for security download Download Only Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download Image: Control of the security download	choose
Download Only Image: Control of the second sec	
B Name Begin Address End Address Location PRELOADER 0x00000000000000 0x00000000018deb /xspace/OrangePi/MT6572/3G/iot03 export/cc	
PRELOADER 0x00000000000000000000000000000000000	
	ode/
MBR 0x000000001400000 0x00000000140011ff /xspace/OrangePi/MT6572/3G/iot03_export/co	bde/
EBR1 0x000000001480000 0x000000014801ff /xspace/OrangePi/MT6572/3G/iot03_export/co	ode/
UBOOT 0x000000003120000 0x00000000316253f /xspace/OrangePi/MT6572/3G/iot03_export/co	ode/
nfo BOOTIMG 0x00000003180000 0x0000000351c7ff /xspace/OrangePi/MT6572/3G/iot03_export/co	ode/
RECOVERY 0x00000003780000 0x00000003c577ff /xspace/OrangePi/MT6572/3G/iot03_export/co	ode/
ae: 6572 SEC_RO 0x00000003d80000 0x00000003da0fff /xspace/OrangePi/MT6572/3G/iot03_export/co)de/
ion: 0ca00 🔣 K LOGO 0x00000003e40000 0x00000003e7dc49 /xspace/OrangePi/MT6572/3G/iot03_export/co	ode/
SYSTEM 0x000000004b40000 0x00000001bdfdfff /xspace/OrangePi/MT6572/3G/iot03 export/cc	

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

100

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.

3G_linux_v01.img 🚢

```
3G_4g2g_linux_sd_v01_20181130.tar.gz 44
```

✓ 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.
- \checkmark 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"

格式化选项设置	×
取消设置	快速格式化 ▼
逻辑大小调整	开启 (ON) ▼
ОК	取消



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

Orange Pi User Manual

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

Image File		- 24	Device
G:/orange pi/p	i.8GB/pi.8GB		[G:\] •
MD5 Hash:			
Progress			

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



Compilation

You have to make the modification before compilation:

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

Annotate boot_linux_from_storage ()
/* if (ret < 0) {</p>
msg_img_error("Android Boot Image");
}*/
@ 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



Ξ 、 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

 #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
 In .config CONFIG_CMDLINE="" , add rootwait=1 rw , modify root=/dev/mmcblk0p4
 Execute TARGET_PRODUCT=hexing72_cwet_kk make oldconfig, copy .config and replace with mediatek/config/mt6572/autoconfig/kconfig/platform:
 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:

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

Annotate boot_linux_from_storage ()
/* if (ret < 0) {</p>
msg_img_error("Android Boot Image");
}*/
@ 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 the 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 oldconfig make 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

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
 (2) Modify the COMMANDLINE_TO_KERNEL in vendor/mediatek/proprietary/bootable/bootloader/lk/platform/mt6735/include/platfor m/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

 #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
 Modify the COMMANDLINE_TO_KERNEL in
 vendor/mediatek/proprietary/bootable/bootloader/lk/platform/mt6735/include/platfor
 m/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