Chipsee

Industrial PC

Buildroot Linux Qt 5.14 OS on RK3399 User Manual

For RK3399 Products

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Buildroot Linux Qt 5.14 OS

Buildroot Linux Qt 5.14 OS on RK3399 User Manual

This is the software manual for RK3399 Chipsee industrial PC. If you've never developed on this hardware with a Buildroot Linux Qt 5.14 OS, this manual can get you started quickly.

Backup Your OS Image For Bulk Installation

If you have finished developing your software, and plan to “copy” the whole system to many other Chipsee industrial PCs, you can backup the OS to an image file, just like the **.img** file you downloaded from Chipsee, or the OS we installed in the factory for you before shipping. And then you can flash it to many more devices.

Prepare for backup

We will use **SDDiskTool** to flash a bootable SD card, let your Chipsee PC boot from this SD card, then use this system to backup your OS image (the whole content on eMMC rootfs partition). You will need:

- SDDiskTool (Click to download).
- 16GB or larger micro SD card.
- SD card reader (to be used on your HOST PC).
- A Windows PC to run the SDDiskTool.
- A (X86 or X86_64) Linux HOST PC or virtual machine to make a new img file (make sure there is 25GB or more free space on the disk for the following process).
- Two Chipsee prebuilt image, one is the image that you are developing your software on, the other is a prebuilt-xxx-sd-xx.img, if you cannot find the prebuilt-xxx-sd-xx.img of your device, you can use just the prebuilt-xxx-emmc-xx.img temporarily, we will release the sd image later.

Note

More on the prebuilt image: the core idea of backup is to “swap” your data and the prebuilt data. So we will need to download a prebuilt image that you’re developing your software on (the OS image that you’re currently using on the Chipsee PC), unpack that image, swap the data, then repack the image.

Note

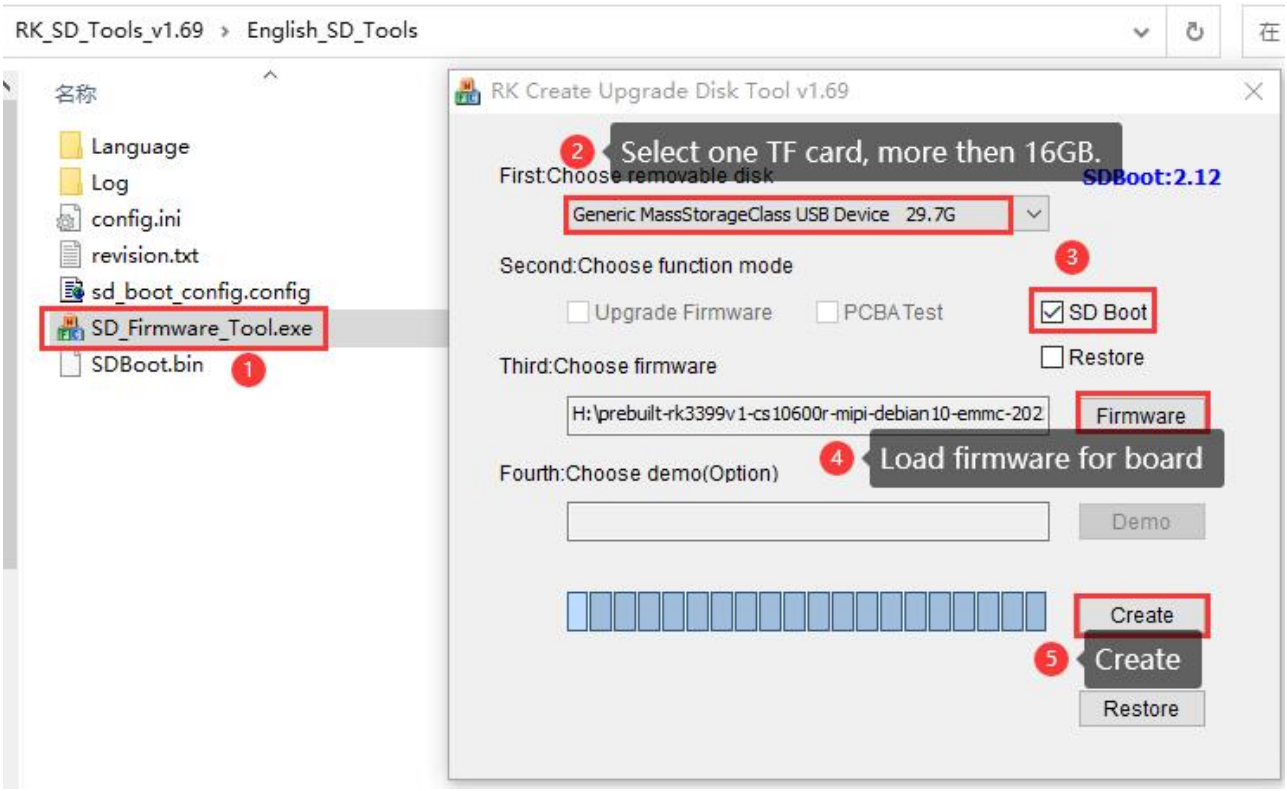
We will use the prebuilt-xxx-emmc-xx.img (eMMC firmware) to boot the device from an SD card (imagine the old time people use a WinPE USB stick to boot and backup Windows!), but the image for eMMC has one known bug: it will need reboot a few times to get the SD partition to be mounted on “/”. We will release one new image for SD called prebuilt-xxx-sd-xx.img in the future. But at the moment we can still get by with the eMMC image in an SD card. (For *7 inch RK3399(EPC/PPC-A72-070-C)* user, you can select prebuilt-xxx-sd-xx.img now.)

Prepare a Bootable SD Card

On your Windows PC, we open SD_Firmware_Tool.exe to process 1,2,3,4,5 steps to create a bootable SD card.

You need to download the Chipsee prebuilt image as we mentioned earlier. Find the one that fits your screen size in Chipsee prebuilt image page.

Once the SD card is flashed, Windows will show a warning to let you format the unrecognized partition, **ignore or cancel** it because the SDDiskTool creates some partitions that Windows doesn't recognize.



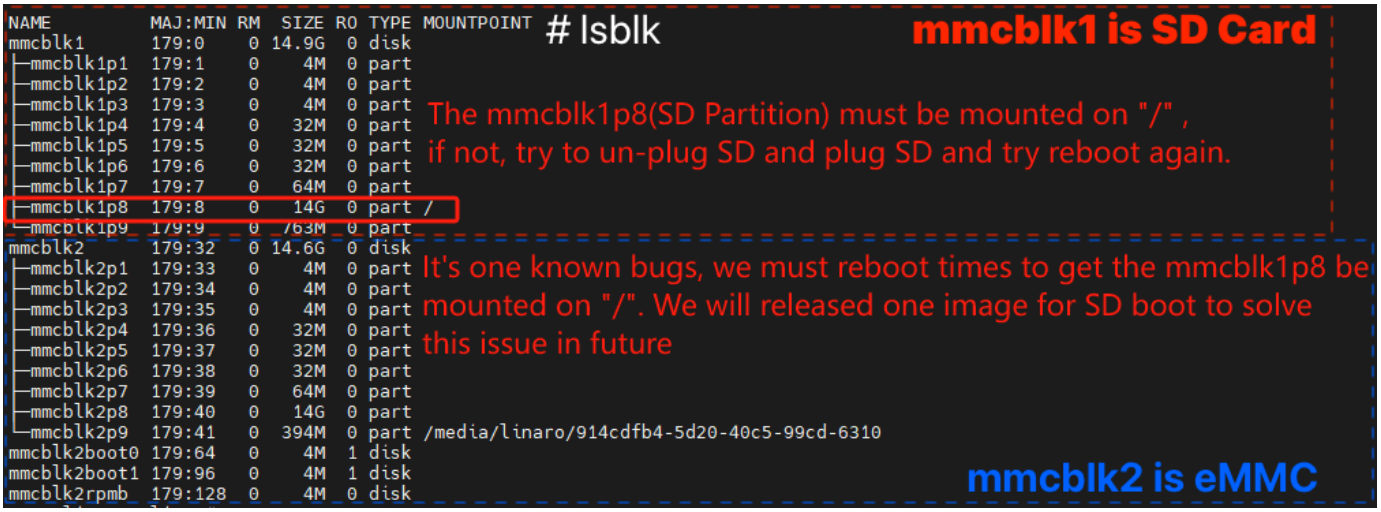
Follow the 5 steps on SDDisktool

Backup Your eMMC

Insert this SD card into the SD slot of the Chipsee PC and power it on, the Chipsee PC will boot into the system on the SD card (may need to reboot multiple times to boot from SD card, because of a known bug in the eMMC firmware, we will release a firmware for SD card in the future), we can use this system to backup the whole contents on eMMC rootfs partitions.

Use the way you like to execute the following commands, for example, serial debug or ssh. You can connect a keyboard and mouse to the Chipsee device and run them in the command line as well.

The eMMC rootfs partition is **/dev/mmcblk2p8**. We will backup the contents in **/dev/mmcblk2p8**.




```
NAME         MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
mmcblk1      179:0    0 14.9G  0 disk
├─mmcblk1p1  179:1    0    4M  0 part
├─mmcblk1p2  179:2    0    4M  0 part
├─mmcblk1p3  179:3    0    4M  0 part
├─mmcblk1p4  179:4    0   32M  0 part
├─mmcblk1p5  179:5    0   32M  0 part
├─mmcblk1p6  179:6    0   32M  0 part
├─mmcblk1p7  179:7    0   64M  0 part
├─mmcblk1p8  179:8    0   14G  0 part /
└─mmcblk1p9  179:9    0  763M  0 part
mmcblk2      179:32   0 14.6G  0 disk
├─mmcblk2p1  179:33   0    4M  0 part
├─mmcblk2p2  179:34   0    4M  0 part
├─mmcblk2p3  179:35   0    4M  0 part
├─mmcblk2p4  179:36   0   32M  0 part
├─mmcblk2p5  179:37   0   32M  0 part
├─mmcblk2p6  179:38   0   32M  0 part
├─mmcblk2p7  179:39   0   64M  0 part
├─mmcblk2p8  179:40   0   14G  0 part
└─mmcblk2p9  179:41   0  394M  0 part /media/linaro/914cdfb4-5d20-40c5-99cd-6310
mmcblk2boot0 179:64   0    4M  1 disk
mmcblk2boot1 179:96   0    4M  1 disk
mmcblk2rpmb  179:128  0    4M  0 disk
```

eMMC rootfs partition is **/dev/mmcblk2p8**

```
$ sudo su
# export ROOTFS_DEV=/dev/mmcblk2p8
# mkdir /mnt/backuprootfs
# mount $ROOTFS_DEV /mnt/backuprootfs/
# cd /mnt/

// sync would take an hour or more depending on the files in your system
# tar --numeric-owner -jcvpf backuprootfs.tar.bz2 backuprootfs && sync
# umount /mnt/backuprootfs
```

Now we have obtained the backup rootfs **backuprootfs.tar.bz2** in the SD card partition

Generate New Image File

Poweroff the Chipsee PC. Put the SD card into your Linux HOST PC (or virtual machine).

You should find a **/dev/sdX** in your Linux system, for example **/dev/sdb**, which is this SD card, **you should use your actual /dev/sdX here**, if you don't know which sdX is it, check with *df -h* and see which one's size is most likely your SD card.

Now we mount /dev/sdb8 to find backuprootfs.tar.bz2

```
# mount /dev/sdb8 /mnt/
```

It will be in **/mnt/mnt/backuprootfs.tar.bz2**, we will copy it out to our Linux PC later.

Run the following command to generate a new *.img* file. Make sure you have at least 25GB free space on your Linux PC, the process produces a lot of intermediate files.

```
$ sudo su
# git clone https://gitee.com/chipsee_admin/rk_pack_tools.git
# cd rk_pack_tools
# git checkout master
```

```
// copy the Chipsee prebuilt img file to this directory
# cp prebuilt-xxx.img .
# ./cs-unpack.sh prebuilt-xxx.img

// copy your backup rootfs from SD card to this directory
# cp /mnt/mnt/backuprootfs.tar.bz2 .

// generate rootfs.img file from backuprootfs.tar.bz2
# ./cs-mkrootfs.sh

// generate new img file
# ./cs-pack.sh prebuilt-new-xxx.img
```

Warning

If you see *checksum miss match error* or *Error:<AddFile> write file failed,err=28*, check your harddisk and make sure you have enough free space.

Now you have obtained your new img file prebuilt-new-xxx.img in the current folder, use this img file to flash other devices.

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