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Lab Title: SD Card Partition

Lab Purpose:

Learn how to customize the detail of your embedded system (Using command **"fdisk"** to modify the partition of the root filesystem in the SD card.)

Lab Procedure:

1. Insert SD card into your laptop (Ubuntu 16.04)
2. Check which device is your SD card (check via disk utility)
3. Clear all the data in the SD card
    a. sudo -s
    b. fdisk /dev/sdb
    c. d
    d. 1
    e. d
    f. 2
4. Partition arrangement
    a. Create partition FAT32: n -> p -> 1 -> +64M -> a -> 1 (mark partition 1 bootable) -> t -> 1 -> c (change partition type of the partition 1 to W95 FAT32)
    b. Create partition Linux ext4: n -> p ->2
    c. Write partion table: w -> partprobe
5. Format partition
    a. mkfs.vfat -n BOOT /dev/sdb1
    b. mkfs.ext4 -L filesystem /dev/sdb2
6. Copy files for the partition BOOT
    a. Mount partition: mkdir /mnt/mmc1 -> mount /dev/sdb1 /mnt/mmc1
    b. cd ~/buildroot/output/images
    c. cp *.dtb /mnt/mmc1
    d. cp zImage /mnt/mmc1
    e. cp -rf rpi-firmwate/* /mnt/mmc1
7. Copy files for the partition filesystem
    a. cd ~/buildroot/output/images
    b. dd if=rootfs.ext2 of=/dev/sdb2
8. Unmount the SD card and plug it into Raspbery Pi
9. Power on Raspberry Pi to check if the system install properly

Problems and Discussion

In the lab explanation video, the professor did say **“dd if=rootfs.ext2 of=/dev/sdb2”** can either be rootfs.ext2 or rootfs.ext4 if you have rootfs.ext4 in your buildroot. I have both files. At first, I’m confused about which file should I copy to my SD card. Then I type ls -l to check all the properties of all the files in the directory. And I found that rootfs.ext4 is linked to rootfs.ext2, so I decided to copy rootfs.ext2 to my SD card. I don’t quite know what will happen if I choose to copy rootfs.ext4 to the SD card instead.

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root@joycenerd-virtual-machine:~/buildroot/output/images# ls -l
total 364844
-rw-r--r-- 1 joycenerd joycenerd      26500 四   6 19:21 bcm2710-rpi-3-b.dtb
-rw-r--r-- 1 joycenerd joycenerd      27119 四   6 19:21 bcm2710-rpi-3-b-plus.dtb
-rw-r--r-- 1 joycenerd joycenerd      25314 四   6 19:21 bcm2710-rpi-cm3.dtb
-rw-r--r-- 1 joycenerd joycenerd   33554432 四   6 20:39 boot.vfat
-rw-r--r-- 1 joycenerd joycenerd 4294967296 四   6 20:38 rootfs.ext2
lrwxrwxrwx 1 joycenerd joycenerd         11 四   6 20:38 rootfs.ext4 -> rootfs.ext2
-rw-r--r-- 1 joycenerd joycenerd   63191040 四   6 20:38 rootfs.tar
-rw-r--r-- 1 joycenerd joycenerd   20423026 四   6 20:39 rootfs.tar.gz
drwxr-xr-x 3 joycenerd joycenerd       4096 四   6 18:50 rpi-firmware
-rw-r--r-- 1 joycenerd joycenerd 4328522240 四   6 20:39 sdcard.img
-rw-r--r-- 1 joycenerd joycenerd    5436328 四   6 19:21 zImage
root@joycenerd-virtual-machine:~/buildroot/output/images#
```

When writing the new partition table after typing “w” in fdisk isn’t enough. I still need to type **“partprobe”** after exiting fdisk and also unplug and re-plug the SD card to get my changes working. But I heard not all the people need to do this after partitioning the SD card. Although I don’t know the reason but I think what I do is safer cause it double-checks if I want to do the changes or not.