# SD Card Partitioning & Formating

Every storage device will have one or more logical partitions and default mount points. The partition contains information about disk partitions. When you are connecting a device the partitions will show in /dev like /dev/sda,sdb......etc. This information is available through Linux disk partitioning command fdisk.

**Disk partitioning**

Linux has many tools for disk partitioning. The widely used tool is fdisk. The following steps will give information about disk partition.

➢ Connect your sd card to system then use fdisk -l command to get the information about the sd card.

➢ This command will show all disks connected to system information.

```
root@veda:/home/documents# fdisk -l

Disk /dev/sda: 500.1 GB, 500107862016 bytes
255 heads, 63 sectors/track, 60801 cylinders, total 976773168 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disk identifier: 0x0004f5d6

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048   968718335   484358144   83  Linux
/dev/sda2         968720382   976771071     4025345    5  Extended
Partition 2 does not start on physical sector boundary.
/dev/sda5         968720384   976771071     4025344   82  Linux swap / Solaris

Disk /dev/sdb: 7948 MB, 7948206080 bytes
245 heads, 62 sectors/track, 1021 cylinders, total 15523840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0004c942

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1   *        2048     1050623      524288    b  W95 FAT32
/dev/sdb2         1050624    15523839     7236608   83  Linux
root@veda:/home/documents#
```

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➢ Here our device is sdb and it's having two partitions sdb1 and sdb2

➢ Now use fdisk /dev/sdb this will give one menu

```
root@veda:/home/documents# fdisk /dev/sdb

Command (m for help): m
Command action
   a   toggle a bootable flag
   b   edit bsd disklabel
   c   toggle the dos compatibility flag
   d   delete a partition
   l   list known partition types
   m   print this menu
   n   add a new partition
   o   create a new empty DOS partition table
   p   print the partition table
   q   quit without saving changes
   s   create a new empty Sun disklabel
   t   change a partition's system id
   u   change display/entry units
   v   verify the partition table
   w   write table to disk and exit
   x   extra functionality (experts only)

Command (m for help): █
```

➢ First we delete all partitions and create fresh partition table

➢ press "d" for deletion of partition

```
Command (m for help): d
Partition number (1-4): 1

Command (m for help): d
Selected partition 2

Command (m for help): p

Disk /dev/sdb: 7948 MB, 7948206080 bytes
245 heads, 62 sectors/track, 1021 cylinders, total 15523840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0004c942

   Device Boot      Start         End      Blocks   Id  System

Command (m for help):
```

➢ Here we deleted existing partitions, and "p" is the command to print all existing partitions, so here there is no partitions

➢ Now create partitions using "n" command

```
Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p): p
Partition number (1-4, default 1):
Using default value 1
First sector (2048-15523839, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-15523839, default 15523839): +512M

Command (m for help): n
Partition type:
   p   primary (1 primary, 0 extended, 3 free)
   e   extended
Select (default p): p
Partition number (1-4, default 2):
Using default value 2
First sector (1050624-15523839, default 1050624):
Using default value 1050624
Last sector, +sectors or +size{K,M,G} (1050624-15523839, default 15523839):
Using default value 15523839

Command (m for help): p

Disk /dev/sdb: 7948 MB, 7948206080 bytes
245 heads, 62 sectors/track, 1021 cylinders, total 15523840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0004c942

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1            2048     1050623      524288   83  Linux
/dev/sdb2         1050624    15523839     7236608   83  Linux

Command (m for help):
```

➢ Here we created two primary partitions, the first partition is assigned 512MB and rest of the memory is assigned to partition two

➢ In embedded boards u-boot is compatible with FAT file system and in two partitions one is used for loadable files and another is used for root filesystem.

➢ If you want to boot your board from sd card you need to create one boot partition and one root partition.

➢ Now change the system id of partition 1 using "t"

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```
Command (m for help): t
Partition number (1-4): 1
Hex code (type L to list codes): L

 0   Empty              24  NEC DOS          81  Minix / old Lin  bf  Solaris
 1   FAT12              27  Hidden NTFS Win  82  Linux swap / So  c1  DRDOS/sec (FAT-
 2   XENIX root         39  Plan 9           83  Linux            c4  DRDOS/sec (FAT-
 3   XENIX usr          3c  PartitionMagic   84  OS/2 hidden C:   c6  DRDOS/sec (FAT-
 4   FAT16 <32M         40  Venix 80286      85  Linux extended   c7  Syrinx
 5   Extended           41  PPC PReP Boot    86  NTFS volume set  da  Non-FS data
 6   FAT16              42  SFS              87  NTFS volume set  db  CP/M / CTOS / .
 7   HPFS/NTFS/exFAT    4d  QNX4.x           88  Linux plaintext  de  Dell Utility
 8   AIX                4e  QNX4.x 2nd part  8e  Linux LVM        df  BootIt
 9   AIX bootable       4f  QNX4.x 3rd part  93  Amoeba           e1  DOS access
 a   OS/2 Boot Manag    50  OnTrack DM       94  Amoeba BBT       e3  DOS R/O
 b   W95 FAT32          51  OnTrack DM6 Aux  9f  BSD/OS           e4  SpeedStor
 c   W95 FAT32 (LBA)    52  CP/M             a0  IBM Thinkpad hi  eb  BeOS fs
 e   W95 FAT16 (LBA)    53  OnTrack DM6 Aux  a5  FreeBSD          ee  GPT
 f   W95 Ext'd (LBA)    54  OnTrackDM6       a6  OpenBSD          ef  EFI (FAT-12/16/
10   OPUS               55  EZ-Drive         a7  NeXTSTEP         f0  Linux/PA-RISC b
11   Hidden FAT12       56  Golden Bow       a8  Darwin UFS       f1  SpeedStor
12   Compaq diagnost    5c  Priam Edisk      a9  NetBSD           f4  SpeedStor
14   Hidden FAT16 <3    61  SpeedStor        ab  Darwin boot      f2  DOS secondary
16   Hidden FAT16       63  GNU HURD or Sys  af  HFS / HFS+       fb  VMware VMFS
17   Hidden HPFS/NTF    64  Novell Netware   b7  BSDI fs          fc  VMware VMKCORE
18   AST SmartSleep     65  Novell Netware   b8  BSDI swap        fd  Linux raid auto
1b   Hidden W95 FAT3    70  DiskSecure Mult  bb  Boot Wizard hid  fe  LANstep
1c   Hidden W95 FAT3    75  PC/IX            be  Solaris boot     ff  BBT
1e   Hidden W95 FAT1    80  Old Minix
Hex code (type L to list codes): b
Changed system type of partition 1 to b (W95 FAT32)
```

➢ Here we changed the partition 1 id as W95 FAT32

```
Command (m for help): p

Disk /dev/sdb: 7948 MB, 7948206080 bytes
245 heads, 62 sectors/track, 1021 cylinders, total 15523840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
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Disk identifier: 0x0004c942

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1            2048     1050623      524288    b  W95 FAT32
/dev/sdb2         1050624    15523839     7236608   83  Linux

Command (m for help): ^[[B
```

➢ Enable the boot flag for partition 1 using " a" command

```
Command (m for help): a
Partition number (1-4): 1

Command (m for help): p

Disk /dev/sdb: 7948 MB, 7948206080 bytes
245 heads, 62 sectors/track, 1021 cylinders, total 15523840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
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Disk identifier: 0x0004c942

   Device Boot      Start         End      Blocks   Id  System
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/dev/sdb2          1050624    15523839     7236608   83  Linux

Command (m for help):
```

➢ Then alter the previous partition table with new partitions using "w" this will overwrite the partition table

```
Command (m for help):   w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: If you have created or modified any DOS 6.x
partitions, please see the fdisk manual page for additional
information.
Syncing disks.
root@veda:/home/documents#
```

**SD Card Formatting**

Formatting means creation of file system on the disk for accessing.

Till now we partitioned the card but it's not accessible without creating any file

system. Here we create Fat file system for boot partition and Linux Ext3 file system for

root partition.

➢ For formatting in Linux, widely used tool is mkfs.

➢ Before doing format unmount the partitions.

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➢ For Fat filesystem command as follows.

➢ mkfs.vfat -F 32 /dev/sdb1 -n BOOT

```
root@veda:/home/documents# mkfs.vfat -F 32 /dev/sdb1 -n BOOT
mkfs.fat 3.0.26 (2014-03-07)
root@veda:/home/documents#
```

➢ For ext3 Linux filesystem command is mkfs.ext3 /dev/sdb2 -L ROOT

```
root@veda:/home/documents# mkfs.ext3 /dev/sdb2 -L ROOT
mke2fs 1.42.9 (4-Feb-2014)
Filesystem label=ROOT
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
452480 inodes, 1809152 blocks
90457 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=1853882368
56 block groups
32768 blocks per group, 32768 fragments per group
8080 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

root@veda:/home/documents#
```