Master Boot Record (MBR)

Offset	Size (bytes)	Description
0	436	MBR **Bootstrap** (flat binary executable code)
436	10	Optional "unique" disk ID[1]
446	64	MBR **Partition Table**, with 4 entries (below)
446	16	First partition table entry
462	16	Second partition table entry
478	16	Third partition table entry
494	16	Fourth partition table entry
510	2	(0x55, 0xAA) "Valid bootsector" signature bytes

Partition Entry

Offset	Size	Description
0	1 byte	Boot indicator bit flag: 0 = no, 0x80 = bootable (or "active")
1	1 byte	Starting head
2	6 bits	Starting sector (Bits 6-7 are the upper two bits for the Starting Cylinder field.)
3	10 bits	Starting Cylinder
4	1 byte	Partition Type (`0xB` or `0xC` for FAT32).
5	1 byte	Ending Head
6	6 bits	Ending Sector (Bits 6-7 are the upper two bits for the ending cylinder field)
7	10 bits	Ending Cylinder
8	4 bytes	Relative Sector (offset, in sectors, from start of disk to start of the partition)
12	4 bytes	Total Sectors in partition

BIOS Parameter Block (BPB)

Offset (bytes)	Size (bytes)	Meaning
0	3	The first three bytes EB XX 90 disassemble to JMP SHORT XX NOP.
3	8	OEM identifier.
11	2	The number of Bytes per sector (all numbers are in the little-endian format).
13	1	Number of sectors per cluster.
14	2	Number of reserved sectors. The boot record sectors are included in this value.
16	1	Number of File Allocation Tables (FAT's) on the storage media. Often 2.
17	2	Max # of directory entries (0 for FAT32 which stores directories in data region).
19	2	Total logical sectors (if zero, use 4 byte value at offset 32)
21	1	Indicates the media descriptor type (FAT ID).
22	2	Number of sectors per FAT. 0 for FAT32; use 32-bit value at 36 instead).
24	2	Number of sectors per track.
26	2	Number of heads or sides on the storage media.
28	4	Number of hidden sectors. (i.e. the LBA of the beginning of the partition.)
32	4	Total logical sectors (if greater than 65535; otherwise, see offset 19).

Extended BPB (EBPB)

Offset (bytes)	Size (bytes)	Meaning
36	4	Sectors per FAT. The size of the FAT in sectors.
40	2	Flags.
42	2	FAT version number. The high byte is the major version and the low byte is the minor version. FAT drivers should respect this field.
44	4	The cluster number of the root directory. Often this field is set to 2.
48	2	The sector number of the FSInfo structure.
50	2	The sector number of the backup boot sector.
52	12	Reserved. When the volume is formated these bytes should be zero.
64	1	Drive number. The values here are identical to the values returned by the BIOS interrupt 0x13. 0x00 for a floppy disk and 0x80 for hard disks.
65	1	Flags in Windows NT. Reserved otherwise.
66	1	Signature (should be 0x28 or 0x29).
67	4	VolumeID 'Serial' number. Used for tracking volumes between computers. You can ignore this if you want.
71	11	Volume label string. This field is padded with spaces.
82	8	System identifier string. Always "FAT32 ". The spec says never to trust the contents of this string for any use.
90	420	Boot code.
510	2	0xAA55 bootable partition signature.

FAT Entry (28 bits)

Entry 0: 0xFFFFFFFN. It is an ID**.**
Entry 1: end-of-cluster-chain marker (typically 0x0FFFFFFF or 0x0FFFFFF8 on FAT32)

FAT32 Entry Value	Description
0x?0000000	Free Cluster
0x?0000001	Reserved for internal purposes
0x?0000002 -0x?FFFFFEF	Used as data clusters; value points to next cluster in chain.
0x?FFFFFF0 -0x?FFFFFF5	Reserved in some contexts,[43] or also used[5][6][7][9][44] as data clusters in some non-standard systems.
0x?FFFFFF6	Reserved; do not use.[5][6][7][9][26][44]
0x?FFFFFF7	Bad sector in cluster or reserved cluster (since DOS 2.0).
0x?FFFFFF8 -0x?FFFFFFF	Last cluster in chain (EOC: end of chain). Should be EOC marker.

Regular Directory Entry

The first byte of an entry (whether regular or LFN) is also known as the ID.
ID of 0x00. Indicates the end of the directory**.**
ID of 0xE5: Marks an unused/deleted entry.
All other IDs make up part of the file's name or LFN sequence number.

The byte at offset 11 determines whether the entry is a regular entry or an LFN entry.
Value of 0x0F: entry is an LFN entry.
All other values: entry is a regular entry.

Offset (bytes)	Length (bytes)	Meaning
0	8	File name: 8 ASCII characters. A file name may be terminated early using `0x00` or `0x20` characters. If the file name starts with `0x00`, the previous entry was the last entry. If the file name starts with `0xE5`, this is a *deleted/unused* entry.
8	3	File extension: 3 ASCII characters. A file extension may be terminated early using `0x00` or `0x20` characters.

11	1	Attributes of the file. The possible attributes are:
		`READ_ONLY=0x01 HIDDEN=0x02 SYSTEM=0x04 VOLUME_ID=0x08`
		`DIRECTORY=0x10 ARCHIVE=0x20`
		`LFN=READ_ONLY|HIDDEN|SYSTEM|VOLUME_ID`
		(LFN means that this entry is a long file name entry)

12	1	Reserved for use by Windows NT.
13	1	Creation time in tenths of a second. Range 0-199 inclusive. Ubuntu uses 0-100.
14	2	The time that the file was created. Multiply Seconds by 2. Bits 15 - 11: hours. Bits 10 -5: minutes. Bits 4 - 0: seconds/2.
16	2	The date on which the file was created. Bits 15 - 9: Year (0 = 1980). Bits 8 - 5: Month. Bits 4 - 0: Day.
18	2	Last accessed date. Same format as the creation date.
20	2	The high 16 bits of this entry's first cluster number. For FAT 12 and FAT 16 this is always zero.
22	2	Last modification time. Same format as the creation time.
24	2	Last modification date. Same format as the creation date.
26	2	The low 16 bits of this entry's first cluster number.
28	4	The size of the file in bytes.

Long File Name (LFN) Entry

Offset (bytes)	Size (bytes)	Description
0	1	Sequence Number Bit 6 set: last logical LFN entry. Bit 5 clear: first physical LFN entry Bits 4-0: from `0x01`..`0x14` (`0x1F`): position of entry If the sequence number is `0x00`, the previous entry was the last entry. If the sequence number is `0xE5`, this is a *deleted/unused* entry.
1	10	Name characters (five UCS-2 (subset of UTF-16) characters) A file name may be terminated early using `0x00` or `0xFF` characters.
11	1	Attributes (always `0x0F`). Used to determine if a directory entry is an LFN entry.
12	1	Type (always `0x00` for VFAT LFN, other values reserved for future use; for special usage of bits 4 and 3 in SFNs see further up)
13	1	Checksum of DOS file name.
14	12	Second set of name characters (six UCS-2 characters). Same early termination conditions apply.
26	2	Always `0x0000` for an LFN.
28	4	Third set of name characters (two UCS-2 characters). Same early termination conditions apply.