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3.5 Disks: Unformatted and Formatted Capacity (2/95)

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TOPIC -----

Some 3.5' floppy disks are marked as 1MB and 2MB. Why are the disks marked as such when the formatted capacity is 800K and 1.44MB respectively?

DISCUSSION -----

The 1MB and 2MB ratings are unformatted capacities. Regardless of what computer you initialize these disks with, you do not get a data capacity of the full 1MB or 2MB. This is due to the way information is stored on floppy disks. Depending on what operating system is used, more information than 800K or 1.44MB can be placed on a floppy disk. This is because they use additional sectors per disk.

Macintosh Disk Capacities

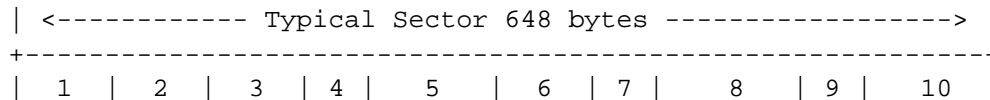
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	Double Density	High Density
	1 MB Unformatted	2 MB Unformatted
	800K Formatted	1.44MB Formatted
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Bytes/Sector	512	512
Sectors/Tracks	8-12 (variable)	18
Track Density tpi	135	135
Tracks/Side	80	80
Sectors/Disk	1600	2880
Bytes/Side	409,600	737,280
Bytes/Disk	819,200	1,474,560

Typical Disk Sector

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A typical disk sector consists of 648 bytes of information. Here is how this information is encoded on the disk:



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1 - Sector Gap	12 bytes
2 - ID Mark	4 bytes
3 - Track and Sector Address	4 bytes
4 - CRC	2 bytes
5 - ID Gap	22 bytes
6 - Date Block Gap	12 bytes
7 - Data Mark	4 bytes
8 - Data Field	512 bytes
9 - CRC	2 bytes
10 - Data Block Gap	84 bytes

How Disk Space is Calculated

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When formatted disk space is calculated, most of the sector information is not included. The only information used is the data field. Here is the formula used to determine the amount of information on a floppy disk.

Sides x Tracks x Sectors x Bytes/Sector = amount of information a disk can store

For a High Density disk this would be:

2 x 80 x 18 x 512 = 1,474,560 bytes

The Macintosh double density disk gets a bit more difficult because it uses 5 different speeds. When the speed changes, so does the sectors in per track. Here is a table with the track information and our formula:

Tracks	Sectors
-----	-----
00 - 15	12
16 - 31	11
32 - 47	10
48 - 63	09
64 - 79	08

Formula

Sides x Tracks x Sectors x Bytes/Sector = Information

Double Density Disk

- 2 x 16 x 12 x 512 = 196,608
- 2 x 16 x 11 x 512 = 180,224
- 2 x 16 x 10 x 512 = 163,840
- 2 x 16 x 09 x 512 = 147,456
- 2 x 16 x 08 x 512 = 131,072
- .
- .Total disk space = 819,200 bytes

Article Change History:

08 Feb 1995 - Added keyword; made several technical updates.

Support Information Services

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