



Why is the capacity of my flash memory card or USB Flash drive different than the capacity listed on its label?

Many people ask this question.

With all Flash Memory technology the listed capacity does not appear to be what the Operating System reports! This can be explained by the way in which a Megabyte is calculated.

Definitions of a Megabyte:

- 1) Operating Systems commonly define a Megabyte (MB) as: 2 to the 20th power (1,024KB-- Kilobytes)
- 2) Flash Memory Manufacturers commonly define a MB as one million bytes (exactly 1,000,000 bytes).

Unformatted (Capacity)

This is also known as drive byte capacity **before** formatting. The Maximum capacity of disk drive before formatting equals:

$$[(\# \text{ Cylinders}) \times (\# \text{ Heads}) \times (\# \text{ Sectors}) \times (\# \text{ Bytes per Track})]$$

Example:

64MB Flash Memory consists of:

- 490 Cylinders
- 8 Heads
- 32 Sectors
- 512 Bytes per Track

This equates to: $[(490) \times (8) \times (32) \times (512)] = 64,225,280$

Unformatted Capacity: 64,225,280 bytes

Formatted Capacity: 63,934,464 bytes (User Data)

Cause:

Flash manufactures define 1 MEGABYTE as 1,000,000 BYTES.

Operating Systems define 1 MEGABYTE as 1,048,576 BYTES (1024K X 1024K or 2 to the 20th power).

Example:

A 64MB USB Flash Drive being read by Microsoft Operating System.

Formatted Capacity divided by 1 MB (as defined by the Operating System) equates to the following:

$63,934,464 \text{ BYTES} / 1,048,576 \text{ BYTES} = 60,972,656 \text{ BYTES}$. The operating system displays this as 60.9MB