Size & Speed

IN THIS GUIDE

This guide provides a quick reference to data size (bits and bytes), as used when storing information, and speed, as used for referencing the speed of a processor for example. Also take a look at our guide 04_002 Data Storage Comparison Chart.

File: 01_003 Size and speed Rev: 4.0 For Beginners PDF version (28kb)

Size

Smallest value is a 'bit' and 8 bits equal a 'byte'. Bit is actually short for Binary digIT. It represents the smallest possible amount of information which can be stored. It can store just one of two values, 0 or 1. As technology has advanced storage capacities and file sizes have increased. It is therefore appropriate to append units of increasing measurement as follows:-

Term	Symbol	Value
bit	b	0 or 1 (smallest unit)
byte	B	8 bits
kilobit	Kb	1,024 bits
kilobyte	KB	1,024 bytes
megabit	Mb	1,048,576 bits
megabyte	MB	1,048,576 bytes
gigabit	Gb	1,073,741,824 bits
gigabyte	GB	1,073,741,824 bytes
terabit	Tb	1,099,511,627,776 bits
terabyte	TB	1,099,511,627,776 bytes

Note: Bytes are generally expressed with a capital 'B' whereas bits are lower case 'b'.

In the above table when referring to computers, the K (thousand) actually refers to 1,024 and not 1,000. Therefore, a document stored on the computer's hard drive that is listed as being 10 KB in size is actually 10,240 bytes (10 times 1,024) and not 10,000 bytes. If a computer contains 32 MB of memory, it actually contains 33,554,432 bytes (32 times 1,048,576) and not 32,000,000.

Looking at storage size another way:-

1 MB	Is equal to a 256 page book
1 GB	16 full 4 drawer filing cabinets
1 TB	Would store 32 words of information on each of the world's six billion population

Speed

Computers operate in electrical cycles. Whereas mains electricity is measure in tens of cycles per second a computer processors speed is measured in thousands and now millions. Giga means billion and hertz means times (cycles) per second, 1.0 GHz is 1 billion times per second. The speed of older processors was measured in megahertz (MHz). Since mega means million, 500 MHz is 500 million times per second. The prefixes are as follows:-

1 Hz	1 Cycle per second, where Hz = Hertz
1 KHz	1 thousand Cycles per second, where KHz = KiloHertz
1 MHz	1 million Cycles per second, where MHz = MegaHertz
1 GHz	1000 million Cycles per second, where GHz = GigaHertz

Note: In binary Kilo is 2 to the power 10 = 1,024 and Mega is 2 to the power 20 = 1,048,576