PREFIX MULTIPLIERS

KILO, MEGA AND GIGA ARE AMONG THE LIST OF PREFIXES THAT ARE USED TO DENOTE THE QUANTITY OF SOMETHING (FOR EXAMPLE KM, KJ, KWH, MW, GJ, ETC), SUCH AS, IN COMPUTING AND TELECOMMUNICATIONS, A BYTE OR A BIT.

SOMETIMES CALLED **PREFIX MULTIPLIERS**, THESE PREFIXES ARE ALSO USED IN ELECTRONICS AND PHYSICS.

EACH MULTIPLIER CONSISTS OF A ONE LETTER ABBREVIATION AND THE PREFIX THAT IT STANDS FOR.

IN COMMUNICATIONS, ELECTRONICS, AND PHYSICS, MULTIPLIERS ARE DEFINED IN POWERS OF 10 FROM 10^{-24} TO 10^{24}, PROCEEDING IN INCREMENTS OF THREE ORDERS OF MAGNITUDE (10^3 OR 1'000).

IN IT AND DATA STORAGE, MULTIPLIERS ARE DEFINED IN POWERS OF 2 FROM 2^{10} TO 2^{80}, PROCEEDING IN INCREMENTS OF TEN ORDERS OF MAGNITUDE (2^{10} OR 1'024). THESE MULTIPLIERS ARE DENOTED IN THE FOLLOWING TABLE.

Prefix	Symbol	Power of 10	Power of 2
yocto-	y	10^{-24} *	--
zepto-	z	10^{-21} *	--
atto-	a	10^{-18} *	--
femto-	f	10^{-15} *	--
pico-	p	10^{-12} *	--
nano-	n	10^{-9} *	--
micro-		10^{-6} *	--
milli-	m	10^{-3} *	--
centi-	c	10^{-2} *	--
deci-	d	10^{-1} *	--
(none)	--	10^{0}	2^{0}

Prefix	Symbol	Power of 10	Power of 2
deka-	D	10^{1} *	--
hecto-	h	10^{2} *	--
kilo-	k or K **	10^{3}	2^{10}
mega-	M	10^{6}	2^{20}
giga-	G	10^{9}	2^{30}
tera-	T	10^{12}	2^{40}
peta-	P	10^{15}	2^{50}
exa-	E	10^{18} *	2^{60}
zetta-	Z	10^{21} *	2^{70}
yotta-	Y	10^{24} *	2^{80}
* Not generally used to express data speed			
** $k = 10^{3}$ and $K = 2^{10}$			

EXAMPLES OF QUANTITIES OR PHENOMENA IN WHICH POWER-OF-10 PREFIX MULTIPLIERS APPLY INCLUDE FREQUENCY (INCLUDING COMPUTER CLOCK SPEEDS), PHYSICAL MASS, POWER, ENERGY, ELECTRICAL VOLTAGE, AND ELECTRICAL CURRENT.

POWER-OF-10 MULTIPIERS ARE ALSO USED TO DEFINE BINARY DATA SPEEDS.

THUS, FOR EXAMPLE, 1 KBPS (ONE KILOBIT PER SECOND) IS EQUAL TO 10^{3}, OR 1'000, BPS (BITS PER SECOND); 1 MBPS (ONE MEGABIT PER SECOND) IS EQUAL TO 10^{6}, OR 1'000'000, BPS.

WHEN BINARY DATA IS STORED IN MEMORY OR FIXED MEDIA SUCH AS A HARD DRIVE, DISKETTE, ZIP DISK, TAPE, OR CD-ROM, POWER-OF-2 MULTIPLIERS ARE USED.

TECHNICALLY, THE UPPERCASE K SHOULD BE USED FOR KILO- WHEN IT REPRESENTS 2^{10}.

THEREFORE 1 KB (ONE KILOBYTE) IS 2^{10}, OR 1'024, BYTES; 1 MB (ONE MEGABYTE) IS 2^{20}, OR 1'048'576 BYTES.

THE CHOICE OF POWER-OF-10 VERSUS POWER-OF-2 PREFIX MULTIPLIERS CAN APPEAR ARBITRARY.

IT HELPS TO REMEMBER THAT IN COMMON USAGE, MULTIPLES OF BITS ARE ALMOST ALWAYS EXPRESSED IN POWERS OF 10, WHILE MULTIPLES OF BYTES ARE ALMOST ALWAYS EXPRESSED IN POWERS OF 2.

RARELY IS DATA SPEED EXPRESSED IN BYTES PER SECOND, AND RARELY IS DATA STORAGE OR MEMORY EXPRESSED IN BITS.

SUCH USAGES ARE CONSIDERED IMPROPER. CONFUSION IS NOT LIKELY, THEREFORE, PROVIDED ONE ADHERES STRICTLY TO THE STANDARD USAGES OF THE TERMS BIT AND BYTE.