

Storage Units

I fear that most of the technical articles on the Internet misinterpret some of the common storage units.

THERE'S BEEN A LOT OF CONFUSION OVER 1024 vs 1000,
KBYTE vs KBIT, AND THE CAPITALIZATION FOR EACH.

HERE, AT LAST, IS A SINGLE, DEFINITIVE STANDARD:

| SYMBOL | NAME | SIZE | NOTES |
|--------|-------------------------------|--|---|
| kB | KILOBYTE | 1024 BYTES <small>OR</small> 1000 BYTES | 1000 BYTES DURING LEAP YEARS, 1024 OTHERWISE |
| KB | KELLY-BOOTLE STANDARD UNIT | 1012 BYTES | COMPROMISE BETWEEN 1000 AND 1024 BYTES |
| KiB | IMAGINARY KILOBYTE | 1024 $\sqrt{\pi}$ BYTES | USED IN QUANTUM COMPUTING |
| kb | INTEL KILOBYTE | 1023.937528 BYTES | CALCULATED ON PENTIUM FPU. |
| Kb | DRIVEMAKER'S KILOBYTE | CURRENTLY 908 BYTES | SHRINKS BY 4 BYTES EACH YEAR FOR MARKETING REASONS |
| KBa | BAKER'S KILOBYTE | 1152 BYTES | 9 BITS TO THE BYTE SINCE YOU'RE SUCH A GOOD CUSTOMER |

[This article](#) does a good job at clearly providing the relevant information:

“ A **kilobyte** is made up of either 1,000 or 1,024 bytes. This distinction can be a little tricky and has to do with the difference between binary math (which computers rely on) and base-10 math (which most humans use in daily life). In practical terms, both definitions of

kilobyte are used. In some cases, a distinction will be made between a kilobyte (1,000 bytes) and a kibibyte (1,024 bytes), though this is less common.

The Real Story

Apart from the funny picture above (Baker's Kilobyte?), the real story can be uncovered by referencing the picture below. Thanks to [this original article](#) that does a great job at providing the valuable information.

| Decimal Prefix (SI) | Value | Value (1000) | Binary Prefix (IEC) | Value | Value (1024) |
|------------------------|-----------|-----------------|------------------------|----------|-----------------|
| kilo (k) | 10^3 | 1000 | kibi (ki) | 2^{10} | 1024 |
| mega (M) | 10^6 | 1000^2 | mebi (Mi) | 2^{20} | 1024^2 |
| giga (G) | 10^9 | 1000^3 | gibi (Gi) | 2^{30} | 1024^3 |
| tera (T) | 10^{12} | 1000^4 | tebi (Ti) | 2^{40} | 1024^4 |
| peta (P) | 10^{15} | 1000^5 | pebi (Pi) | 2^{50} | 1024^5 |
| exa (E) | 10^{18} | 1000^6 | exbi (Ei) | 2^{60} | 1024^6 |
| zetta (Z) | 10^{21} | 1000^7 | zebi (Zi) | 2^{70} | 1024^7 |
| yotta (Y) | 10^{24} | 1000^8 | yobi (Yi) | 2^{80} | 1024^8 |

So while most people might misinterpret "kilo" as 1024 when it comes to storage units, the right way is thus "kibibytes". It would be an interesting conversation to discuss kibibytes as most people may not be aware, and this would make you look incredibly smart (and correct) :)

Here is another great image for reference:

| Multiples of bytes | | | | | | V•T•E |
|-----------------------------|----|-----------|-------------------|--------------|-------|----------|
| Decimal | | | Binary | | | |
| Value | | Metric | Value | IEC | JEDEC | |
| 1000 | kB | kilobyte | 1024 | KiB kibibyte | KB | kilobyte |
| 1000 ² | MB | megabyte | 1024 ² | MiB mebibyte | MB | megabyte |
| 1000 ³ | GB | gigabyte | 1024 ³ | GiB gibibyte | GB | gigabyte |
| 1000 ⁴ | TB | terabyte | 1024 ⁴ | TiB tebibyte | — | |
| 1000 ⁵ | PB | petabyte | 1024 ⁵ | PiB pebibyte | — | |
| 1000 ⁶ | EB | exabyte | 1024 ⁶ | EiB exbibyte | — | |
| 1000 ⁷ | ZB | zettabyte | 1024 ⁷ | ZiB zebibyte | — | |
| 1000 ⁸ | YB | yottabyte | 1024 ⁸ | YiB yobibyte | — | |
| Orders of magnitude of data | | | | | | |

Based on the image above, the following should be used using capital letter first, then lowercase i and then finally capital B for bytes.

- KiB
- MiB
- GiB
- TiB
- PiB
- etc.

Reference Articles

- <https://danielmiessler.com/blog/the-difference-between-kilobytes-and-kibibytes/>
- <https://study.com/learn/lesson/data-storage-units-kb-mb-gb-tb.html>

- <https://ozanerhansha.medium.com/kilobytes-vs-kibibytes-d77eb2ff6c2a>

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