

THE COMPUTER CORNER

No. 105. The Numbers Game, Revisited

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Back in May 1998 (#54, The Numbers Game), the column covered the disparity in reporting numbers by hard drive manufacturers who were trying to make their products look good. For example, if they made a drive that held exactly 40,000,000 bytes after formatting, they would call it a 40 Mb drive, when in fact it needed to hold 41,943,040 bytes to be called that. This stems from the fact that a kilobyte is 1,024 bytes, not 1,000, because in the computer world, binary notation is the standard, and $2^{10} = 1,024$.

Well, in an effort to clear up terminology, an international committee (the International Electrochemical Commission) set a new series of standard abbreviations and meanings. They actually did this way back at the end of 1998, and the standards should have become uniformly used and widespread by now. Change is slow; and they have not. Nevertheless, you will see these standards used more and more as time goes on, and they do help clear up the mess that existed before it was clear whether a notation was in decimal or binary.

Basically, the scheme is to add a lowercase letter "i" to any prefix to indicate it is in binary notation, while absence of the letter "i" indicates the old decimal system we are all familiar with. Thus, 1K = 1,000 (just like resistors), while 1Ki = 1,024 bytes. The new binary term is called kibibyte, while the old decimal is kilobyte. Look at the table below to see how this plays out.

NAME	ABBREVIATION	VALUE	POWER
Kilo	K	1,000	10^3
Kibi	Ki	1,024	2^{10}
Mega	M	1,000,000	10^6
Mebi	Mi	1,048,576	2^{20}
Giga	G	1,000,000,000	10^9
Gibi	Gi	1,073,741,824	2^{30}
Tera	T	1,000,000,000,000	10^{12}
Tebi	Ti	1,099,511,627,776	2^{40}
Peta	P	1,000,000,000,000,000	10^{15}
Pebi	Pi	1,125,899,906,842,624	2^{50}

Before this new standard, some folks called 1,048,576 bytes a "binary megabyte". Now, just "mebibyte" is the correct term. Before the standard, 1,000,000 bytes was sometimes called a "decimal megabyte", while now, just "megabyte" is correct.

So, is that new drive you are about to buy 40 gigabytes (40G), or is it 40 gibibytes (40Gi)? There is no way to tell, because the standards shown in the table are not yet used on an industry-wide basis. You can probably assume that the drive holds the lesser number, because 40 sounds bigger than 37.2G. Yes, there is a big difference - almost 7%, or 2,949,672,960 bytes! Deceptive marketing practices still rule; \$999.99 still sounds a lot less than \$1,000, even though the actual difference is only a penny.

Nevertheless, the new standards will take hold gradually, and you may have already seen that “i” or “bi” notation somewhere. Now you know what it means. Happy computing!