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100 mbits to mbps

Unit of measurement Bit rates Name Symbol Multiple bit per second bit/s 1 1 Decimal prefixes (SI) kilobit per second kbit/s 103 10001 megabit per second Mbit/s 106 10002 gigabit per second Gbit/s 109 10003 terabit per second Tbit/s 1012 10004 Binary prefixes (IEC 80000-13) kibibit per second Kibit/s 210 10241 mebibit per second Mibit/s 220 10242 gibibit per second Gibit/s 230 10243 tebibit per second Tibit/s 240 10244 In telecommunications, data-transfer rate is the average number of bits (bitrate), characters or symbols (baudrate), or data blocks per unit time passing through a communication link in a data-transmission system. Common data rate units are multiples of bits per second (bit/s) and bytes per second (B/s). For example, the data rates of modern residential high-speed Internet connections are commonly expressed in megabits per second (Mbit/s). Standards for unit symbols and prefixes See also: Bit rate Unit symbol The ISQ symbols for the bit and byte are bit and B, respectively. In the context of data-rate units, one byte consists of 8 bits, and is synonymous with the unit octet. The abbreviation bps is often used to mean bits/s, so that when a 1 Mbps connection is advertised, it usually means that the maximum achievable bandwidth is 1 Mbit/s (one million bits per second), which is 0.125 MB/s (megabyte per second), or about 0.1192 MiB/s (mebibyte per second). The Institute of Electrical and Electronics Engineers (IEEE) uses the symbol b for bit. Unit prefixes In both the SI and ISQ, the prefix k stands for kilo, meaning 1,000, while Ki is the symbol for the binary prefix kibi-, meaning 1,024. The binary prefixes were introduced in 1998 by the International Electrotechnical Commission (IEC) and in IEEE 1541-2002 which was reaffirmed on 27 March 2008. The letter K is often used as a non-standard abbreviation for 1,024, especially in "KB" to mean KiB, the kilobyte in its binary sense. In the context of data rates, however, typically only decimal prefixes are used, and they have their standard SI interpretation. Variations In 1999, the IEC published Amendment 2 to "IEC 60027-2: Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics." This standard, approved in 1998, introduced the prefixes kibi-, mebi-, gibi-, tebi-, pebi-, and exbi- to be used in specifying binary multiples of a quantity. The name is derived from the first two letters of the original SI prefixes followed by bi (short for binary). It also clarifies that the SI prefixes are used only to mean powers of 10 and never powers of 2. Decimal multiples of bits These units are often used in a manner inconsistent with the IEC standard. Kilobit per second kilobit per second (symbol kbit/s or kb/s, often abbreviated "kbps") is a unit of data transfer rate equal to: 1,000 bits per second 125 bytes per second Megabit per second megabit per second (symbol Mbit/s or Mb/s, often abbreviated "Mbps") is a unit of data transfer rate equal to: 1,000 kilobits per second 1,000,000 bits per second 125,000 bytes per second 125 kilobytes per second Gigabit per second gigabit per second (symbol Gbit/s or Gb/s, often abbreviated "Gbps") is a unit of data transfer rate equal to: 1,000 megabits per second 1,000,000 kilobits per second 1,000,000,000 bits per second 125,000,000 bytes per second 125 gigabytes per second Decimal multiples of bytes These units are often not used in the suggested ways; see above section titled "variations". Kilobyte per second kilobyte per second (kB/s) (can be abbreviated as kBps) is a unit of data transfer rate equal to: 8,000 bits per second 1,000 bytes per second 8 kilobits per second Megabyte per second megabyte per second (MB/s) (can be abbreviated as MBps) is a unit of data transfer rate equal to: 8,000,000 bits per second 1,000,000 bytes per second 1,000 kilobytes per second 8 megabits per second Gigabyte per second gigabyte per second (GB/s) (can be abbreviated as GBps) is a unit of data transfer rate equal to: 8,000,000,000 bits per second 1,000,000,000 bytes per second 1,000,000 kilobytes per second 1,000 megabytes per second 8 gigabits per second 8 gigabits per second Terabyte per second (TB/s) (can be abbreviated as TBps) is a unit of data transfer rate equal to: 8,000,000,000,000 bits per second 1,000,000,000,000 bytes per second 1,000,000 kilobytes per second 1,000,000 megabytes per second 8 terabits per second Conversion table Name Symbol bit per second byte per second bit per second (formula) byte per second (formula) bit per second bit/s 1 0.125 1 1/8 byte per second B/s 8 1 8 1 kilobit per second kbit/s 1,000 125 103 1/8 × 103 kibibit per second Kibit/s 1,024 128 210 27 kilobyte per second kB/s 8,000 1,000 8 × 103 103 kibibyte per second KiB/s 8,192 1,024 213 210 megabit per second Mbit/s 1,000,000 125,000 106 1/8 × 106 mebibit per second Mibit/s 1,048,576 131,072 220 217 megabyte per second MB/s 8,000,000 1,000,000 8 × 106 106 mebibyte per second MiB/s 8,388,608 1,048,576 223 220 gigabit per second Gbit/s 1,000,000,000 109 1/8 × 109 gibibit per second Gibit/s 1,073,741,824 134,217,728 230 227 gigabyte per second GB/s 8,000,000,000 1,000,000,000 8 × 109 109 gibibyte per second GiB/s 8,589,934,592 1,073,741,824 233 230 terabit per second Tbit/s 1,000,000,000,000 125,000,000,000 1012 1/8 × 1012 tebibit per second Tibit/s 1,099,511,627,776 137,438,953,472 240 237 terabyte per second TB/s 8,000,000,000,000 1,000,000,000,000 8 × 1012 1012 tebibyte per second TiB/s 8,796,093,022,208 1,099,511,627,776 243 240 Examples of bit rates Main article: List of interface bit rates Quantity Unit bits per second bytes per second Field Description 56 kbit/s 56,000 7,000 Networking 56kbit modem - 56 kbit/s - 56,000 bit/s 64 kbit/s 64,000 8,000 Networking 64 kbit/s in an ISDN B channel or best quality, uncompressed telephone line. 1,536 kbit/s 1,536,000 192,000 Networking 24 channels of telephone in the US, or a good VTC T1. 10 Mbit/s 10,000,000 1,250,000 Networking 107 bit/s is the speed of classic Ethernet. 10BASE2, 10BASE5, 10BASE-T 10 Mbit/s 10,000,000 1,250,000 Biology Research suggests that the human retina transmits data to the brain at the rate of ca. 107 bits/s[1][2][dubious – discuss] 54 Mbit/s 54,000,000 6,750,000 Networking 802.11g, Wireless G LAN 100 Mbit/s 100,000,000 12,500,000 Networking Fast Ethernet 600 Mbit/s 600,000,000 75,000,000 Networking 802.11n, Wireless N LAN 1 Gbit/s 1,000,000,000 125,000,000 Networking 1 Gigabit Ethernet 10 Gbit/s 10,000,000,000 1,250,000,000 Networking 10 Gigabit Ethernet 100 Gbit/s 100,000,000,000 12,500,000,000 Networking 100 Gigabit Ethernet 1 Tbit/s 1,000,000,000,000 125,000,000,000 Networking SEA-ME-WE 4 submarine communications cable - 1.28 terabits per second[3] 4 kbit/s 4,000 500 Audio data minimum achieved for encoding recognizable speech (using special-purpose speech codecs) 8 kbit/s 8,000 1,000 Audio data low bit rate telephone quality 32 kbit/s 32,000 4,000 Audio data MW quality and ADPCM voice in telephony, doubling the capacity of a 30 chan link to 60 ch. 128 kbit/s 128,000 16,000 Audio data 128 kbit/s MP3 - 128,000 bit/s 192 kbit/s 192,000 24,000 Audio data 192 kbit/s MP3 - 192,000 bit/s 1,411.2 kbit/s 1,411,200 176,400 Audio data CD audio (uncompressed, 16 bit samples × 44.1 kHz × 2 channels) 2 Mbit/s 2,000,000 250,000 Video data 30 channels of telephone audio or a Video Tele-Conference at VHS quality 8 Mbit/s 8,000,000 1,000,000 Video data DVD quality 27 Mbit/s 27,000,000 3,375,000 Video data HDTV quality 1.244 Gbit/s 1,244,000,000 155,500,000 Networking OC-24, a 1.244 Gbit/s SONET data channel 9.953 Gbit/s 9,953,000,000 1,244,125,000 Networking OC-192, a 9.953 Gbit/s SONET data channel 39.813 Gbit/s 39,813,000,000 4,976,625,000 Networking OC-768, a 39.813 Gbit/s SONET data channel, the fastest in current use 60 MB/s 480,000,000 60,000,000 Computer data interfaces USB 2.0 High-Speed 98.3 MB/s 786,432,000 98,304,000 Computer data interfaces FireWire IEEE 1394b-2002 5800 120 MB/s 960,000,000 120,000,000 Computer data interfaces Harddrive read, Samsung SpinPoint F1 HD103UJ[4] 133 MB/s 1,064,000,000 133,000,000 Computer data interfaces Parallel ATA UDMA 6 133 MB/s 1,064,000,000 133,000,000 Computer data interfaces PCI 32-bit at 33 MHz (standard configuration) 188 MB/s 1,504,000,000 188,000,000 Computer data interfaces SATA 1 1.5 Gbit/s - First generation 375 MB/s 3,000,000,000 375,000,000 Computer data interfaces SATA II 3Gbit/s - Second generation 500 MB/s 4,000,000,000 500,000,000 Computer data interfaces PCI Express x1 v2.0 5.0 Gbit/s 5,000,000,000 625,000,000 Computer data interfaces USB 3.0 SuperSpeed - a.k.a. USB 3.1 Gen1 750 MB/s 6,000,000,000 750,000,000 Computer data interfaces SATA III 6 Gbit/s - Third generation 1067 MB/s 8,533,333,333 1,066,666,667 Computer data interfaces PCI-X 64 bit 133 MHz 10 Gbit/s 10,000,000,000 1,250,000,000 Computer data interfaces USB 3.1 SuperSpeed+ - a.k.a. USB 3.1 Gen2 1250 MB/s 10,000,000,000 1,250,000,000 Computer data interfaces Thunderbolt 2500 MB/s 20,000,000,000 2,500,000,000 Computer data interfaces Thunderbolt 2 5000 MB/s 40,000,000,000 5,000,000,000 Computer data interfaces Thunderbolt 3 8000 MB/s 64,000,000,000 8,000,000,000 Computer data interfaces PCI Express x16 v2.0 12000 MB/s 96,000,000,000 12,000,000,000 Computer data interfaces InfiniBand 12X QDR 16000 MB/s 128,000,000,000 16,000,000,000 Computer data interfaces PCI Express x16 v3.0 See also Binary prefix Bit rate List of device bandwidths Orders of magnitude (bit rate) Orders of magnitude (data) SI prefix Instructions per second Notes ^ "Penn Researchers Calculate How Much the Eye Tells the Brain". 26 July 2006. ^ Koch K, J McLean, R Segev, MA Freed, MJ Berry II, V Balasubramanian, P Sterling. 2006. How much the eye tells the brain. Current Biology 16:1428-1434. 26 July 2006 ^ "Fujitsu Completes Construction of SEA-ME-WE 4 Submarine Cable Network". Fujitsu Press Releases. Fujitsu. 2005-12-13. Archived from the original on 2007-03-17. Retrieved 2008-01-31. ^ "Samsung overtakes". References International Electrotechnical Commission (2007). "Prefixes for binary multiples" (archived). Retrieved on 2007-05-06. - updated page lacks table but now references IEC 80000-13:2008 rather than IEC 60027-2, IEC 60027-2 "Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics+ Donald Knuth. "What is a kilobyte?" External links Vali48 Data Rate Calculator Retrieved from " Multiple of the unit bit This article is about the unit of 106 bits. For the unit of 220 bits, see mebibit. Multiple-bit unitsite Decimal Value Metric 1000 kbit kilobit 10002 Mbit megabit 10003 Gbit gigabit 10004 Tbit terabit 10005 Pbit petabit 10006 Ebit exabit 10007 Zbit zettabit 10008 Ybit yottabit Binary Value IEC 1024 Kibit kibibit 10242 Mibit mebibit 10243 Gibit gibibit 10244 Tibit tebibit 10245 Pibit pebibit 10246 Eibit exhibit 10247 Zibit zibibit 10248 Yibit yobibit Orders of magnitude of data The megabit is a multiple of the unit bit for digital information. The prefix mega (symbol M) is defined in the International System of Units (SI) as a multiplier of 106 (1 million),[1] and therefore 1 megabit = 106bits = 1000000bits = 1000 kilobits. The megabit has the unit symbol Mbit. The megabit is closely related to the mebibit, a unit multiple derived from the binary prefix mebi (symbol Mi) of the same order of magnitude,[2] which is equal to 220bits = 1048576bits, or approximately 5% larger than the megabit. Despite the definitions of these new prefixes for binary-based quantities of storage by international standards organizations, memory semiconductor chips are still marketed using the metric prefix names to designate binary multiples. Using the common byte size of eight bits and the standardized metric definition of megabit and kilobyte, 1 megabit is equal to 125 kilobytes (kB) or approximately 122 kibibytes (KiB). The megabit is widely used when referring to data transfer rates of computer networks or telecommunications systems. Network transfer rates and download speeds often use the megabit as the amount transferred per time unit, e.g., a 100 Mbit/s (megabit per second) Fast-Ethernet connection, or a 10 Mbit/s Internet access service, whereas the sizes of data units (files) transferred over these networks are often measured in megabytes. To achieve a transfer rate of one megabyte per second one needs a network connection with a transfer rate of eight megabits per second. Usage In telecommunications, the use of the SI definition of the unit is the standard. In the semiconductor industry, it is still common practice to designate random-access memory (RAM), read-only memory (ROM) in a binary interpretation of the metric prefixes, such as the megabit, so that one megabit represents 220bits=1048576bits.[3][4][5] For example, a single discrete DDR3 chip specified at 512 Mb invariably contains 229 bits = 536870912bits = 512 Mibit of storage,[6] or 671088648-bit bytes, variously referred to as either 64 mebibytes or 64 (binary) megabytes. During the 16-bit game console era, the megabit was a commonly used measure of the size (computer data storage capacity) of game cartridges. This size represented one mebibit (Mibit). The vast majority of SNES and Mega Drive (Genesis) games were produced on 8 megabit cartridges, although other sizes such as 4, 12, 16, 24, 32, and 48 megabit cartridges appeared. This usage continued on the Nintendo 64, with cartridge sizes ranging between 32 and 512 megabits. References ^ The NIST Reference on Constants, Units, and Uncertainty. SI prefixes ^ The NIST Reference on Constants, Units, and Uncertainty: Prefixes for binary multiples ^ "DDR3 SDRAM Memory Product Guide" (PDF). Samsung Global. Retrieved 12 February 2015. ^ "S25FL128P Data Sheet" (PDF). Sansion Support. Retrieved 12 February 2015. ^ "1-Megabit (128k x 8) Paged Parallel EEPROMs" (PDF). Atmel Corporation. Retrieved 12 February 2015. ^ "JEDEC Standard DDR3 SDRAM Specification" (PDF. 8.8 MB). Retrieved 2008-07-10. Retrieved from

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