

List of device bandwidths

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This is a list of device bandwidths: the channel capacity (or, more informally, bandwidth) of some computer devices employing methods of data transport is quantified in units of kilobits per second (kbit/s), megabits per second (Mbit/s), or gigabits per second (Gbit/s) as appropriate. They are grouped by similar functionality, and then listed in order from lowest bandwidth to highest.

In addition, a common scale is used in order to better convey the magnitude of change to a non-technical person (for example: a 1.2 kbit/s telephone modem versus a 10,000 kbit/s DSL modem). Whether to use bit/s or byte/s (B/s) is often a matter of convention. The most commonly cited unit (bit/s or byte/s) is bolded. In general, parallel interfaces are quoted in byte/s (B/s), serial in bit/s. On devices like modems, bytes may be more than 8 bits long because they may be individually padded out with additional start and stop bits; the figures below will reflect this. Where channels use line codes, such as Ethernet, Serial ATA and PCI Express, quoted speeds are for the decoded signal.

Many of these figures are theoretical maxima, and various real-world considerations will generally keep the actual effective throughput much lower. The actual throughput achievable on Ethernet networks, for example (especially when heavily loaded or when running over substandard media), is debatable. The figures are also simplex speeds, which may conflict with the duplex speeds vendors sometimes use in promotional materials.

Note: All of the figures listed here use metric (base-10) abbreviations:

- 1 kbit = 1,000 bits
- 1 kB = 1,000 Bytes
- 1 MB = 1,000,000 Bytes
- 1 GB = 1,000,000,000 Bytes
- 1 TB = 1,000,000,000,000 Bytes

and so on.

Telecommunications device for the deaf		
Connection	Bits	Bytes
TTY (V.18)	0.045 kbit/s	6.0 characters/sec
TTY (V.18)	0.050 kbit/s	6.6 characters/sec
NTSC Line 21 Closed Captioning	1 kbit/s	0.1 kB/s (~100 cps)

Modems/Home user connections

Note that the values given are maximum values, and actual values may be slower under certain conditions (for example, noisy phone lines). [2] Where two values are listed, the first value is the downstream rate and the second value is the upstream rate.

Connection	Bits	Bytes
Modem 110 baud	0.11 kbit/s	0.010 kB/s (~10 cps)[3]
Modem 300 (300 baud) (Bell 103 or V.21)	0.3 kbit/s	0.03 kB/s (~30 cps)[3]
Modem 1200 (600 baud) (Bell 212A or V.22)	1.2 kbit/s	0.12 kB/s (~120 cps)[3]
Modem 2400 (600 baud) (V.22bis)	2.4 kbit/s	0.24 kB/s[3]
Modem 4800 (1600 baud) (V.27ter)	4.8 kbit/s	0.48 kB/s[3]
Modem 9600 (2400 baud) (V.32)	9.6 kbit/s	0.96 kB/s[3]
Modem 14.4 (2400 baud) (V.32bis)	14.4 kbit/s	1.44 kB/s[3]
Modem 28.8 (3200 baud) (V.34)	28.8 kbit/s	2.88 kB/s[3]
Modem 33.6 (3429 baud) (V.34)	33.8 kbit/s	3.38 kB/s[3]
Modem 56k (8000/3429 baud) (V.90)	56.0/33.6 kbit/s[4]	5.6/3.36 kB/s[3]
Modem 56k (8000/8000 baud) (V.92)	56.0/48.0 kbit/s[4]	5.6/4.8 kB/s[3]
ISDN Basic Rate Interface & Primary Rate Interface data	64 kbit/s[5]	8 kB/s
IDSL	144 kbit/s	18 kB/s
HDSL ITU G.991.1	1544 kbit/s	193kB/s
MSDSL	2000 kbit/s	250 kB/s
SDSL	2320 kbit/s	290 KB/s
ADSL (typical)[6]	3000/768 kbit/s	375/96 kB/s
SHDSL ITU G.991.2	5690 kbit/s	711 kB/s
ADSL	8192/1024 kbit/s	1024/128 kB/s
ADSL2	12,288/3584 kbit/s	1536/448 kB/
ADSL2Plus	24,576/3584 kbit/s	3072/448 kB/s
DOCSIS v1.0[7] (Cable modem)	38,000/10,000 kbit/s	4750/1250 kB/s
DOCSIS v2.0[8] (Cable modem)	40,000/30,000 kbit/s	5000/3750 kB/s
FiOS fiber optic service (typical)	50,000/10,000 kbit/s	6250/1250 kB/s
DOCSIS v3.0[9] (Cable modem)	160,000/120,000 kbit/s	20,000/15,000 kB/s
Uni-DSL	200,000 kbit/s	25,000 kB/s
VDSL ITU G.993.1	200,000 kbit/s	25,000 kB/s
VDSL2 ITU G.993.2	250,000 kbit/s	31,250 kB/s
FiOS fiber optic service	622,000/155,000 kbit/s	77,700/19,300 kB/s

Mobile telephone interfaces

Note that the values given are maximum values, and actual values may be slower under certain conditions (for example, noise). Where two values are listed, the first value is the downstream rate and the second value is the upstream rate.

Connection	Bits	Bytes
GSM CSD	14.4 kbit/s	1.8 kB/s
HSCSD	43.2/14.4 kbit/s	5.4/1.8 kB/s
GPRS	57.6/28.8 kbit/s	7.2/3.6 kB/s
WiDEN	100 kbit/s	12.5 kB/s
CDMA2000 1xRTT	153 kbit/s	18 kB/s
EDGE (type 1 MS)	236.8 kbit/s	29.6 kB/s
UMTS	384 kbit/s	48 kB/s
EDGE (type 2 MS)	473.6 kbit/s	59.2 kB/s
EDGE Evolution (type 1 MS)	1184/474 kbit/s	148/59 kB/s
EDGE Evolution (type 2 MS) downstream	1894/947 kbit/s	237/118 kB/s
1xEV-DO Rev. 0	2457/153 kbit/s	307.2/19 kB/s
1xEV-DO Rev. A	3100/1800 kbit/s	397/230 kB/s
HSDPA	14,400/5760 kbit/s	1800/720 kB/s
1xEV-DO Rev. B	73,500/14,700 kbit/s	9200/1800 kB/s
HSOPA	100,000 kbit/s	12,500 kB/s
UMB (2X2 MIMO)	140,000/34,000 kbit/s	17,500/4250 kB/s
LTE (2X2 MIMO)	173,000/58,000 kbit/s	21,625/7,250 kB/s
UMB (4X4 MIMO)	280,000/35,000 kbit/s	35,000/8,500 kB/s
1xEV-DO Rev. C	280,000/75,000 kbit/s	35,000/9000 kB/s
LTE (4X4 MIMO)	326,000/86,000 kbit/s	40,750/10,750 kB/s

Wide area network

Note that the values given are maximum values, and actual values may be slower under certain conditions (for example, noise). Where two values are listed, the first value is the downstream rate and the second value is the upstream rate.

DS0	0.064 Mbit/s	0.008 MB/s
G.Lite (aka ADSL Lite)	1.536/0.512 Mbit/s	0.192/0.064 MB/s
DS1/T1	1.544 Mbit/s	0.192 MB/s
Frame Relay[10]	2 Mbit/s	0.25 MB/s
E1	2.048 Mbit/s	0.256 MB/s
G.SHDSL	2.304 Mbit/s	0.288 MB/s
LR-VDSL2 (4 to 5 km [long-]range) (symmetry optional)	4 Mbit/s	0.512 MB/s
SDSL[11]	2.32 Mbit/s	0.29 MB/s
T2	6.312 Mbit/s	0.789 MB/s
ADSL[12]	8.0/1.024 Mbit/s	1/0.128 MB/s
E2	8.448 Mbit/s	1.056 MB/s
ADSL2	12/3.5 Mbit/s	1.5/0.448 Mbit/s
Satellite Internet[13]	16/1 Mbit/s	2.0/0.128 MB/s
ADSL2Plus	24/3.5 Mbit/s	3.0/0.448 Mbit/s

Connection	Bits	Bytes
E3	34.368 Mbit/s	4.296 MB/s
DOCSIS v1.0 (Cable modem)[7]	38.0/10.0 Mbit/s	4.75/1.25 MB/s
DOCSIS v2.0 (Cable modem)[8]	40/30 Mbit/s	5.0/3.75 MB/s
STS-1/EC-1/OC-1/STM-0	51.84 Mbit/s	6.48 MB/s
OC-1	51.84 Mbit/s	6.48 MB/s
VDSL (symmetry optional)	100 Mbit/s	12.5 MB/s
DOCSIS v3.0 (Cable modem)[9]	160/120 Mbit/s	20/15 MB/s
OC-3/STM-1	155.52 Mbit/s	19.44 MB/s
VDSL2 (symmetry optional)	250 Mbit/s	31.25 MB/s
T4	274.176 Mbit/s	34.272 MB/s
T5	400.352 Mbit/s	50.044 MB/s
OC-9	466.56 Mbit/s	58.32 MB/s
OC-12/STM-4	622.08 Mbit/s	77.76 MB/s
OC-18	933.12 Mbit/s	116.64 MB/s
OC-24	1244 Mbit/s	155.5 MB/s
OC-36	1900 Mbit/s	237.5 MB/s
OC-48/STM-16	2488 Mbit/s	311.04 MB/s
OC-96	4976 Mbit/s	622 MB/s
OC-192/STM-64	9953 Mbit/s	1244 MB/s
10 Gigabit Ethernet WAN PHY	9953 Mbit/s	1244 MB/s
10 Gigabit Ethernet LAN PHY	10,000 Mbit/s	1250 MB/s
OC-256	13,271 Mbit/s	1659 MB/s
OC-768/STM-256	39,813 Mbit/s	4976 MB/s
OC-1536/STM-512	79,626 Mbit/s	9953 MB/s
OC-3072/STM-1024	159,252 Mbit/s	19,907 MB/s

Local area network

Note: Actual data throughput is much less than bandwidth of the data transmitted due to overhead and other factors, so do not mistake its speed as actual data transfer rate. "Typically one can expect about 1/3-2/3 of the actual speed based on several factors such as traffic. Also, if there are problems in your physical layer causing retransmissions, your throughput will suffer as well." [14]

Connection	Bits	Bytes
LocalTalk	0.230 Mbit/s	0.0288 MB/s
Econet	0.800 Mbit/s	0.1 MB/s
PC-Network	2 Mbit/s	0.25 MB/s
ARCNET (Standard)	2.5 Mbit/s	0.3125 MB/s
Ethernet Experimental	3 Mbit/s	0.375 MB/s
Token Ring (Original)	4 Mbit/s	0.5 MB/s
Ethernet (10base-X)	10 Mbit/s	1.25 MB/s

Connection	Bits	Bytes
Token Ring (Later)	16 Mbit/s	2 MB/s
ARCnet Plus	20 Mbit/s	2.5 MB/s
Token Ring IEEE 802.5t	100 Mbit/s	12.5 MB/s
Fast Ethernet (100base-X)	100 Mbit/s	12.5 MB/s
FDDI	100 Mbit/s	12.5 MB/s
HIPPI	800 Mbit/s	100 MB/s
Token Ring IEEE 802.5v (no known implementations)	1000 Mbit/s	125 MB/s
FireWire (IEEE 1394) 400 [15] [16]	393.216 Mbit/s	49.152 MB/s
Gigabit Ethernet (1000base-X)	1000 Mbit/s	125 MB/s
Myrinet 2000	2000 Mbit/s	250 MB/s
Infiniband SDR 1X[17]	2,000 Mbit/s	250 MB/s
Infiniband QDR 1X[17]	8,000 Mbit/s	1,000 MB/s
Infiniband SDR 4X[17]	8,000 Mbit/s	1,000 MB/s
10 gigabit Ethernet (10Gbase-X)	10,000 Mbit/s	1250 MB/s
Myri 10G	10,000 Mbit/s	1250 MB/s
Scalable Coherent Interconnect (SCI) Dual Channel SCI, x8 PCIe	20,000 Mbit/s	2500 MB/s
Infiniband SDR 12X[17]	24,000 Mbit/s	3,000 MB/s
Infiniband QDR 4X[17]	32,000 Mbit/s	4,000 MB/s
Infiniband QDR 12X[17]	96,000 Mbit/s	12,000 MB/s
100 gigabit Ethernet (100Gbase-X)	100,000 Mbit/s	12,500 MB/s

Wireless networking

Note: 802.11 networks are half-duplex; all stations share the medium. In access point mode, all traffic has to pass through the AP (Access Point). Two stations on the same AP which are communicating with each other will have all traffic pass the medium twice: once sent by the sender to the AP, then from AP to receiver, thus approximately halving the effective bandwidth.

Connection	Bits	Bytes
802.11 legacy 0.125	2.0 Mbit/s	0.25 MB/s
RONJA free space optical wireless	10.0 Mbit/s	1.25 MB/s
802.11b DSSS 0.125	11.0 Mbit/s	1.375 MB/s
802.11b+ non-standard DSSS 0.125	44.0 Mbit/s	5.5 MB/s
802.11a 0.75	54.0 Mbit/s	6.75 MB/s
802.11g OFDM 0.125	54.0 Mbit/s	6.75 MB/s
802.16 (WiMAX)	70.0 Mbit/s	8.75 MB/s
802.11gt DSSS 0.125 (aka Super G)	108.0 Mbit/s	13.5 MB/s
802.11n	248.0 Mbit/s	31 MB/s

Wireless device connection

Connection	Bits	Bytes
IrDA-Control	72 kbit/s	9 kB/s
IrDA-SIR	115.2 kbit/s	14 kB/s
802.15.4 (2.4 GHz)	250 kbit/s	31.25 kB/s
Bluetooth 1.1	1000 kbit/s	125 kB/s
Bluetooth 2.0+EDR	3000 kbit/s	375 kB/s
IrDA-FIR	4000 kbit/s	510 kB/s
IrDA-VFIR	16,000 kbit/s	2000 kB/s
WUSB-UWB	480,000 kbit/s	60,000 kB/s

Computer buses

Connection	Bits	Bytes
ISA 8-Bit/4.77 MHz[18]	9.6 Mbit/s	1.2 MB/s
Zorro II 16-Bit/7.14 MHz[19]	28.56 Mbit/s	3.56 MB/s
ISA 16-Bit/8.33 MHz[18]	42.4 Mbit/s	5.3 MB/s
Low Pin Count	133.33 Mbit/s	16.67 MB/s
HP-Precision Bus	184 Mbit/s	23 MB/s
EISA 8-16-32bits/8.33 MHz	320 Mbit/s	32 MB/s
VME64 32-64bits	400 Mbit/s	40 MB/s
NuBus 10 MHz	400 Mbit/s	40 MB/s
DEC TURBOchannel 32-bit/12.5 MHz	400 Mbit/s	50 MB/s
MCA 16-32bits/10 MHz	660 Mbit/s	66 MB/s
NuBus90 20 MHz	800 Mbit/s	80 MB/s
Sbus 32-bit/25 MHz	800 Mbit/s	100 MB/s
DEC TURBOchannel 32-bit/25 MHz	800 Mbit/s	100 MB/s
VLB 32-bit/33 MHz	1067 Mbit/s	133.33 MB/s
PCI 32-bit/33 MHz	1067 Mbit/s	133.33 MB/s
HP GSC-1X	1136 Mbit/s	142 MB/s
Zorro III[20][21][22] 32-Bit/37.5 MHz	1200 Mbit/s	150 MB/s
Sbus 64-bit/25 MHz	1600 Mbit/s	200 MB/s
PCI Express (x1 link)[23]	2000 Mbit/s	250 MB/s
HP GSC-2X	2048 Mbit/s	256 MB/s
PCI 64-bit/33 MHz	2133 Mbit/s	266.7 MB/s
PCI 32-bit/66 MHz	2133 Mbit/s	266.7 MB/s
AGP 1x	2133 Mbit/s	266.7 MB/s
PCI Express (x2 link)[23]	4000 Mbit/s	500 MB/s
AGP 2x	4266 Mbit/s	533.3 MB/s
PCI 64-bit/66 MHz	4266 Mbit/s	533.3 MB/s

Connection	Bits	Bytes
PCI-X DDR 16-bit	4266 Mbit/s	533.3 MB/s
PCI 64-bit/100 MHz	6399 Mbit/s	800 MB/s
PCI Express (x4 link)[23]	8000 Mbit/s	1000 MB/s
AGP 4x	8533 Mbit/s	1067 MB/s
PCI-X 133	8533 Mbit/s	1067 MB/s
PCI-X QDR 16-bit	8533 Mbit/s	1067 MB/s
InfiniBand single 4X[17]	8000 Mbit/s	1000 MB/s
UPA	15,360 Mbit/s	1920 MB/s
PCI Express (x8 link)[23]	16,000 Mbit/s	2000 MB/s
AGP 8x	17,066 Mbit/s	2133 MB/s
PCI-X DDR	17,066 Mbit/s	2133 MB/s
HyperTransport (800 MHz, 16-pair)	25,600 Mbit/s	3200 MB/s
HyperTransport (1 GHz, 16-pair)	32,000 Mbit/s	4000 MB/s
PCI Express (x16 link)[23]	32,000 Mbit/s	4000 MB/s
PCI-X QDR	34,133 Mbit/s	4266 MB/s
AGP 8x 64-bit	34,133 Mbit/s	4266 MB/s
PCI Express (x32 link)[23]	64,000 Mbit/s	8000 MB/s
PCI Express 2.0 (x16 link)[24]	64,000 Mbit/s	8000 MB/s
PCI Express 2.0 (x32 link)[24]	128,000 Mbit/s	16,000 MB/s
HyperTransport (2.8 GHz, 32-pair)	179,200 Mbit/s	22,400 MB/s

Portable Computer buses

PC Card 16 bit 255ns Byte mode	31.36 Mbit/s	3.92 MB/s
PC Card 16 bit 255ns Word mode	62.72 Mbit/s	7.84 MB/s
PC Card 16 bit 100ns Byte mode	80 Mbit/s	10 MB/s
PC Card 16 bit 100ns Word mode	160 Mbit/s	20 MB/s
PC Card 32 bit (CardBus) Byte mode	267 Mbit/s	33.33 MB/s
ExpressCard USB mode	480 Mbit/s	60 MB/s
PC Card 32 bit (CardBus) Word mode	533 Mbit/s	66.66 MB/s
PC Card 32 bit (CardBus) DWord mode	1067 Mbit/s	133.33 MB/s
ExpressCard PCI Express mode	2,000 Mbit/s	250 MB/s

Computer buses (storage)

PC Floppy Disk Controller (1.44MB)	0.5 Mbit/s	0.062 MB/s
CD Controller (1x)	1.2 Mbit/s	0.15 MB/s
MFH	5 Mbit/s	.625 MB/s
RLL	7.5 Mbit/s	.9375 MB/s
DVD Controller (1x)	11.1 Mbit/s	1.32 MB/s

Connection	Bits	Bytes
ESDI	24 Mbit/s	3 MB/s
ATA PIO Mode 0	26.4 Mbit/s	3.3 MB/s
SCSI 1 (5 MHz)	40 Mbit/s	5 MB/s
ATA PIO Mode 1	41.6 Mbit/s	5.2 MB/s
ATA PIO Mode 2	66.4 Mbit/s	8.3 MB/s
Fast SCSI 2 (8 bits/10 MHz)	80 Mbit/s	10 MB/s
ATA PIO Mode 3	88.8 Mbit/s	11.1 MB/s
iSCSI over Fast Ethernet	100 Mbit/s	12.5 MB/s
ATA PIO Mode 4	133.3 Mbit/s	16.7 MB/s
Fast Wide SCSI 2 (16 bits/10 MHz)	160 Mbit/s	20 MB/s
Ultra DMA ATA 33	264 Mbit/s	33 MB/s
Ultra Wide SCSI 40 (16 bits/20 MHz)	320 Mbit/s	40 MB/s
Ultra DMA ATA 66	528 Mbit/s	66 MB/s
Ultra-2 wide SCSI 80 (16 bits/40 MHz)	640 Mbit/s	80 MB/s
Serial Storage Architecture SSA	640 Mbit/s	80 MB/s
Ultra DMA ATA 100	800 Mbit/s	100 MB/s
Fibre Channel 1GFC (1.0625 GHz)[25]	850 Mbit/s	106.25 MB/s
iSCSI over Gigabit Ethernet	1000 Mbit/s	125 MB/s
Ultra DMA ATA 133	1064 Mbit/s	133 MB/s
Serial ATA (SATA-150)[26]	1200 Mbit/s	150 MB/s
Ultra-3 SCSI 160 (16 bits/40 MHz DDR)	1280 Mbit/s	160 MB/s
Fibre Channel 2GFC (2.125 GHz)[25]	1700 Mbit/s	212.5 MB/s
Serial ATA (SATA-300)[26]	2400 Mbit/s	300 MB/s
Ultra-320 SCSI (16 bits/80 MHz DDR)	2560 Mbit/s	320 MB/s
Serial Attached SCSI (SAS)[26]	3000 Mbit/s	375 MB/s
Fibre Channel 4GFC (4.25 GHz)[25]	3400 Mbit/s	425 MB/s
Serial ATA (SATA-600) (Not yet implemented)[26]	4800 Mbit/s	600 MB/s
Ultra-640 SCSI (16 bits/160 MHz DDR) (Not yet implemented)	5120 Mbit/s	640 MB/s
Serial Attached SCSI 2 (Not yet implemented)[26]	6000 Mbit/s	750 MB/s
Fibre Channel 8GFC (8.50 GHz) (Not yet implemented) [25]	6800 Mbit/s	850 MB/s
iSCSI over 10G Ethernet (Very few products exist)	10000 Mbit/s	1250 MB/s
iSCSI over 100G Ethernet (Planned)	100000 Mbit/s	12500 MB/s
NFS over Infiniband	120000 Mbit/s	15000 MB/s

Computer buses (external)

Apple Desktop Bus	0.010 Mbit/s	0.00125 MB/s
MIDI	0.0313 Mbit/s	0.0039 MB/s

Connection	Bits	Bytes
Serial RS-232 max	0.2304 Mbit/s	0.0288 MB/s
Parallel (Centronics) CPP ~133 kHz	1 Mbit/s	0.133 MB/s
Serial 16550 UART max	1.5 Mbit/s	0.15 MB/s
USB Low Speed (USB 1.0)	1.536 Mbit/s	0.192 MB/s
Serial UART max	2.7648 Mbit/s	0.27648 MB/s
Serial RS-422 max	10 Mbit/s	1.25 MB/s
USB Full Speed (USB 1.1)	12 Mbit/s	1.5 MB/s
Parallel (Centronics) EPP 2 MHz	16 Mbit/s	2 MB/s
Serial EIA-485 max	35 Mbit/s	3.5 MB/s
FireWire (IEEE 1394) 100	98.304 Mbit/s	12.288 MB/s
FireWire (IEEE 1394) 200	196.608 Mbit/s	24.576 MB/s
FireWire (IEEE 1394) 400	393.216 Mbit/s	49.152 MB/s
USB Hi-Speed (USB 2.0)	480 Mbit/s	60 MB/s
FireWire (IEEE 1394b) 800[27]	786.432 Mbit/s	98.304 MB/s
Fibre Channel 1Gb SCSI	1062.5 Mbit/s	100 MB/s
FireWire (IEEE 1394b) 1600[27]	1573 Mbit/s	196.6 MB/s
Camera Link Base (single) 24bit 85 MHz[28]	2040 Mbit/s	261.12 MB/s
Fibre Channel 2Gb SCSI	2125 Mbit/s	200 MB/s
eSATA (SATA 300)	2400 Mbit/s	300 MB/s
FireWire (IEEE 1394b) 3200[27]	3145.7 Mbit/s	393.216 MB/s
Fibre Channel 4Gb SCSI	4250 Mbit/s	531.25 MB/s
USB 3.0 (Planned)	4800 Mbit/s	600 MB/s
Camera Link Full (dual) 72bit 85 MHz[29]	6120 Mbit/s	765 MB/s
Infiniband QDR 12X	120000 Mbit/s	15000 MB/s

Computer buses (MAC to PHY)

MII (4 Lanes)	100 Mbit/s	12.5 MB/s
RMII (2 Lanes)	100 Mbit/s	12.5 MB/s
SMII (1 Lanes)	100 Mbit/s	12.5 MB/s
GMII (8 Lanes)	1.0 Gbit/s	125 MB/s
RGMII (4 Lanes)	1.0 Gbit/s	125 MB/s
SGMII (2 Lanes)	1.0 Gbit/s	125 MB/s
XGMII (32 Lanes)	10.0 Gbit/s	1.25 GB/s
XAUI (4 Lanes)	10.0 Gbit/s	1.25 GB/s

Computer buses (PHY to XPDR)

XSBI (16 Lanes)	0.995 Gbit/s	0.124 GB/s
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Memory Interconnect Buses / RAM

NOTE: Dual channel bandwidths are theoretical maximums and do not always reflect real world performance. In many cases, performance may be closer to single channel operation (half the bandwidth).

Connection	Giga bit/s	Bytes
FPM DRAM	1.408 Gbit/s	0.176 GB/s
EDO DRAM	2.112 Gbit/s	0.264 GB/s
SPARC MBus	2.55 Gbit/s	0.32 GB/s
PC66 SDRAM	4.264 Gbit/s	0.533 GB/s
PC100 SDRAM	6.4 Gbit/s	0.8 GB/s
HP Runway bus 125 MHz 64-bit	6.4 Gbit/s	0.8 GB/s
PC133 SDRAM	8.528 Gbit/s	1.066 GB/s
PC800 RDRAM (single-channel)	12.8 Gbit/s	1.6 GB/s
PC1600 DDR-SDRAM (single channel)	12.8 Gbit/s	1.6 GB/s
HP Runway bus 125 MHz 64-bit DDR	16 Gbit/s	2 GB/s
PC1066 RDRAM (single-channel)	16.8 Gbit/s	2.1 GB/s
PC2100 DDR-SDRAM (single channel)	16.8 Gbit/s	2.1 GB/s
PC1200 RDRAM (single-channel)	19.2 Gbit/s	2.4 GB/s
PC2700 DDR-SDRAM (single channel)	21.6 Gbit/s	2.7 GB/s
PC800 RDRAM (dual-channel)	25.6 Gbit/s	3.2 GB/s
PC1600 DDR-SDRAM (dual channel)	25.6 Gbit/s	3.2 GB/s
PC3200 DDR-SDRAM (single channel)	25.6 Gbit/s	3.2 GB/s
PC2-3200 DDR2-SDRAM (single channel)	25.6 Gbit/s	3.2 GB/s
PC1066 RDRAM (dual-channel)	33.6 Gbit/s	4.2 GB/s
PC2100 DDR-SDRAM (dual channel)	33.6 Gbit/s	4.2 GB/s
PC2-4200 DDR2-SDRAM (single channel)	34.136 Gbit/s	4.267 GB/s
PC4000 DDR-SDRAM (single channel)	34.3 Gbit/s	4.287 GB/s
PC1200 RDRAM (dual-channel)	38.4 Gbit/s	4.8 GB/s
PC2-5300 DDR2-SDRAM (single channel)	42.4 Gbit/s	5.3 GB/s
PC2-5400 DDR2-SDRAM (single channel)	42.664 Gbit/s	5.333 GB/s
PC2700 DDR-SDRAM (dual channel)	43.2 Gbit/s	5.4 GB/s
PC3200 DDR-SDRAM (dual channel)	51.2 Gbit/s	6.4 GB/s
PC2-3200 DDR2-SDRAM (dual channel)	51.2 Gbit/s	6.4 GB/s
PC2-6400 DDR2-SDRAM (single channel)	51.2 Gbit/s	6.4 GB/s
Itanium zx1 bus	51.2 Gbit/s	6.4 GB/s
PC4000 DDR-SDRAM (dual channel)	67.2 Gbit/s	8.4 GB/s
PC2-4200 DDR2-SDRAM (dual channel)	67.2 Gbit/s	8.4 GB/s
PC2-5300 DDR2-SDRAM (dual channel)	84.8 Gbit/s	10.6 GB/s
PC2-5400 DDR2-SDRAM (dual channel)	85.328 Gbit/s	10.666 GB/s
PC2-6400 DDR2-SDRAM (dual channel)	102.4 Gbit/s	12.8 GB/s

Connection	Bits	Bytes
PC2-8000 DDR2-SDRAM (dual channel)	128.0 Gbit/s	16.0 GB/s
PC2-8500 DDR2-SDRAM (dual channel)	136.0 Gbit/s	17 GB/s
PC3-8500 DDR3-SDRAM (dual channel)	136.0 Gbit/s	17 GB/s
PC3-10600 DDR3-SDRAM (dual channel)	165.6 Gbit/s	21.2 GB/s
PC3-12800 DDR3-SDRAM (dual channel)	204.8 Gbit/s	25.6 GB/s

Notes

1. ^ TTY uses a Baudot code, not ASCII. This uses 5 bits per character instead of 8, plus one start and 1.5 stop bits (7.5 total bits per character sent).
2. ^ Data communication over the telephone network
3. ^ a b c d e f g h i j k 300 baud modems operating at 30 characters per second, were often described as "reading speed" since the characters scrolled across the screen at the same rate as most people can read. All modems are assumed to be in serial operation with 1 start bit, 8 data bits, no parity, and 1 stop bit (2 stop bits for 110-baud modems). Therefore, a total of 10 bits (11 bits for 110-baud modems) are needed to transmit each 8-bit byte. The "bytes" column reflects the net data transfer rate after the protocol overhead has been removed.
4. ^ a b 56K modems: V.90 and V.92 capacity can only be achieved when the upstream (service provider) end of the connection is digital. In addition, certain telecommunications administrations limit the signal strength the modem can transmit onto the telecommunications circuit, which in turn limits the actual maximum data rate to less than the theoretical maximum. In the USA, this limited the possible downstream maximum to 53.3 kbit/s.
5. ^ Note that effective aggregate bandwidth for an ISDN installation is typically higher than the rates shown for a single channel due to the use of multiple channels. A basic rate interface (BRI) provides 2 "B" channels and one "D" channel. Each B channel provides 64 kbit/s bandwidth and the 'D' channel carries signalling (call setup) information. B channels can be bonded to provide a 128 kbit/s data rate. Primary rate interfaces (PRI) vary depending on whether the region uses E1 (Europe, world) or T1 (North America) bearers. In E1 regions, the PRI carries 30 B-channels and 1 D-channel; in T1 regions the PRI carries 23 B-channels and 1 D-channel. The D-channel has different bandwidth on the two interfaces.
6. ^ ADSL connections will vary in throughput from 64 kbit/s to several Mbit/s depending on configuration. Most are commonly below 3 Mbit/s. Some ADSL and SDSL connections have a higher bandwidth than T1 but their bandwidth is not guaranteed, and will drop when the system gets overloaded, whereas the T1 type connections are usually guaranteed and have no contention ratios.
7. ^ a b DOCSIS 1.0 includes technology which first became available around 1995-1996, and has since become very widely deployed. DOCSIS 1.1 introduces some security improvements and Quality-of-Service (QoS).
8. ^ a b DOCSIS 2.0 specifications provide increased upstream throughput for symmetric services.
9. ^ a b DOCSIS 3.0 is currently in development by the CableLabs consortium and is slated to include support for channel bonding and IPv6.
10. ^ Actual frame relay connections will vary in throughput from 8 kbit/s to 45 Mbit/s depending on configuration. Most are commonly below 2 Mbit/s.
11. ^ SDSL is available in various different speeds.
12. ^ ADSL connections will vary in throughput from 64 kbit/s to several Mbit/s depending on configuration. Most are commonly below 2 Mbit/s. Some ADSL and SDSL connections have a higher bandwidth than T1 but their speed is not guaranteed, and will drop when the system gets overloaded, whereas the T1 type connections are usually guaranteed and have no contention ratios.

13. ^ Satellite internet may have a high bandwidth but also has a high latency due to the distance between the modem, satellite and hub. One-way satellite connections exist where all the downstream traffic is handled by satellite and the upstream traffic by land-based connections such as 56K modems and ISDN.
 14. ^ Ethernet throughput
 15. ^ FireWire natively supports TCP/IP, and is often used as an alternative to Ethernet when connecting 2 nodes.
<http://www.tweaktown.com/articles/309/3>
 16. ^ Speed comparison between FW and Gigaset shows that FW's lower overhead has nearly the same throughput as Gigaset
<http://www.unibrain.com/Products/DriverAPI/FireNET.htm>
 17. ^ a b c d e f g InfiniBand uses an 8B/10B encoding scheme.
 18. ^ a b PC bus systems
 19. ^ The Zorro II bus use 4 clocks per 16-Bit of data transferred. See the Zorro III technical specification for more information.
 20. ^ Dave Haynie, designer of the Zorro III bus, claims in this posting that the theoretical max of the Zorro III bus can be derived by the timing information given in [chapter 5](#) of the Zorro III technical specification.
 21. ^ Dave Haynie, designer of the Zorro III bus, claims in this posting that Zorro III is an asynchronous bus and with that does not have a classical MHz rating. A maximum theoretical MHz value may be derived by examining timing constraints detailed in the Zorro III technical specification, which should yield about 37.5 MHz. No existing implementation performs to this level.
 22. ^ Dave Haynie, designer of the Zorro III bus, claims in this posting that Zorro III has a max burst rate of 150 MB/s.
 23. ^ a b c d e f Note that PCI Express lanes use an 8B/10B encoding scheme.
 24. ^ a b PCIe 2.0 effectively doubles the bus standard's bandwidth from 2.5 Gbit/s to 5 Gbit/s
 25. ^ a b c d Fibre Channel 1GFC, 2GFC, 4GFC use an 8B/10B encoding scheme. Fibre Channel 10GFC, which uses a 64B/66B encoding scheme, is not compatible with 1GFC, 2GFC and 4GFC, and is used only to interconnect switches.
 26. ^ a b c d e SATA and SAS use an 8B/10B encoding scheme.
 27. ^ a b c FireWire (IEEE 1394b) uses an 8B/10B coding scheme.
 28. ^ "Getting Camera Link specs right", Steve Scheiber, Test & Measurement World, May 22, 2006. Retrieved 2007-09-28.
 29. ^ "Getting Camera Link specs right", Steve Scheiber, Test & Measurement World, May 22, 2006. Retrieved 2007-09-28

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