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Technology Terms

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Whatis?com



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About the Author and Whatis.com

This book is based on a Web site, whatis.com, created by Lowell Thing in September, 1996, as an experiment in hypertext and also as a place for some information he was always forgetting. The original idea was to see how many useful hypertext links could fit on a Web page, and he wrote the first few topics in order to see what the idea would look like. One topic led to another and, by mid-2001, Lowell and some freelance contributors had written 3,500 definitions.

In February 2000, Whatis.com was purchased by TechTarget, a diversified media company providing targeted IT media to technology professionals. Lowell continues to play an active role as Editor of the site. Whatis.com currently serves more than one million visitors each month.

Lowell lives in Kingston, New York, with his wife, Suzanne. Their daughter, Emily, created the logo that was used during whatis.com's first three years, and their daughter, Hillary, contributed some of the first definitions. Lowell was formerly a technical writer and information planner for IBM. He is a senior member of the Society for Technical Communication.

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I would also like to thank Jim Connolly for being the first to see how whatis.com could fit into TechTarget; Ken Berquist and Bob Taylor for making it happen; Paul Gillin, Editor-in-Chief, for his overall guidance; and Don Hawk and Greg Strakosch for folding whatis.com into their own great idea while extending its possibilities. I would also like to thank Margaret "Peggy" Rouse for demanding that I hire her and for making our jobs so much fun.

Finally, I would like to thank the thousands of people worldwide who contributed to whatis.com during the first five years of its existence. In the first days, it was users from such places as Riga, Nairobi, and Ulan Bator who made the Web such an exciting place to be and who spurred us on with their thanks and suggestions. Turning whatis.com into a book seems like the end of Phase One. I invite the users of this book and the Web site to help us build Phase Two of what we like to hope will become the world's greatest mental construct about information technology.

Lowell Thing

How to Use This Book

You can look up any term by the alphabetical listing.

You can test your knowledge of IT vocabulary by picking out a term and seeing if our definition matches yours.

You may also be able to find the information you need in our "Fast References" section (for example, DSL, transmission speeds, prefix multipliers, fundamental physical units, and so forth).

For a term so new that it may not be in this book, visit the whatis.com Web site. We may have it and, if we don't, you can suggest that we add it.

For a given term, you may also want to visit whatis.com to see the Web sites we recommend for more information about the term.

Some notes about our definitions:

We report which terms are being used in information technology and what they currently mean. We report usage, and, only when it seems helpful, do we recommend a preference.

Because information technology changes rapidly, a definition can become outdated. If in doubt, the best source is always an authority such as the IEEE, the IETF, and similar standards or technology-sponsoring organizations.

We try to describe a term uniquely in the first sentence or two as you would in a dictionary. The rest of the definition is an elaboration that describes the term as you would in an encyclopedia.

We describe pronunciation only for terms we think some users will want to know how to pronounce.

FAST REFERENCES

Abbreviation

FYI

G

GA

Meaning

Go ahead

Grin

For your information

Chat Abbreviations

Chat abbreviations are commonly used in e-mail, online chatting, instant messaging, and conference postings.

Ciating, histant	messagnig, and comerence posinigs.	GA	Go ahead
Abbreviation	Meaning	GAL	Get a life
ADN	Any day now	GD&R	Grinning, ducking, and running
AFIK	As far as I know	GIWIST	Gee, I wish I'd said that
AFK	Away from keyboard	GMTA	Great minds think alike
ARE	Acronym-rich environment	GOL	Giggling out loud
	•	GTRM	Going to read mail
A/S/L?	Age/sex/location?	нтн	Hope this helps
B4N	Bye for now	IAC	
BAK	Back at the keyboard		In any case
BBIAB	Be back in a bit	IANAL	I am not a lawyer (but)
BBL	Be back later	IC	I see
BEG	Big evil grin	IHA	I hate acronyms
BFD	Big f***ing deal	IIRC	If I recall/remember/recollect correctly
BFN	Bye for now	ILU or ILY	I love you
BG	Big grin	IM	Immediate message
BIOYIOP	Blow it out your I/O port	IMHO	In my humble opinion
BL	Belly laughing	IMing	Chatting with someone online usually
BOTEC	Back-of-the-envelope calculation		while doing other things such as
BRB	Be right back		playing trivia or other interactive game
BTA	But then again	IMNHO	In my not so humble opinion
BTW	By the way	IMO	In my opinion
BWTHDIK		IOW	In other words
	But what the heck do I know?	IPN	I'm posting naked
CU	See you	IRL	In real life (that is, when not chatting)
CUL	See you later	IYSWIM	
CUL8ER	See you later		If you see what I mean
CYA	Cover your ass	JBOD	Just a bunch of disks (like redundant
CYO	See you online	***	array of independent disks, etc.)
DBA	Doing business as	JIC	Just in case
DFLA	Disenhanced four-letter acronym	JК	Just kidding
	(that is, a TLA)	KOTC	Kiss on the cheek
DL	Dead link	KWIM?	Know what I mean?
DIKU	Do I know you?	L8R	Later
DITYID	Did I tell you I'm distressed?	LD	Later, dude
DQMOT	Don't quote me on this	LDR	Long-distance relationship
EG	Evil grin	LLTA	Lots and lots of thunderous applause
EMFBI	Excuse me for butting in	LOL	Laughing out loud
EOM	End of message	LRF	Little Rubber Feet (the little pads on
EOT	· ·		the bottom of displays and other
EOI	End of thread (meaning: end of		equipment)
TOTAL A	discussion)	LTM	Laugh to myself
ETLA	Extended three-letter acronym	LTR	Long-term relationship
	(that is, an FLA)	LULAB	
F2F	Face to face		Love you like a brother
FAQ	Frequently-ask question(s)	LULAS	Love you like a sister
FISH	First in, still here	MorF	Male or female
FLA	Four-letter acronym	MOSS	Member of the same sex
FMTYEWTK	Far more than you ever	MOTOS	Member of the opposite sex
	wanted to know	MUSM	Miss you so much
FOMCL	Falling off my chair laughing	NFG	No f*****g good
FUBAR	F***ed up beyond all repair or	NFW	No feasible way or no f*****g way
	recognition	NIFOC	Naked in front of computer
FUD	Fear, Uncertainty, and Doubt	NP or N/P	No problem
FWIW	For what it's worth	NRN	No response necessary
	· · · · · · · · · · · · · · · · · · ·	OIC	Oh, I see
		OLL	Online love

Abbreviation	Meaning	Abbreviation	Meaning
OTF	Off the floor	THX	Thanks
НОТС	On the other hand	TIA	Thanks in advance (used if you post
OTTOMH	Off the top of my head		a question and are expecting a
PANS	Pretty awesome new stuff (as		helpful reply)
	opposed to "POTS")	TLA	Three-letter acronym
PCMCIA	People can't master computer	TLK2UL8R	Talk to you later
	industry acronyms	TMI	Too much information
PDA	Public display of affection	TOPCA	Til our paths cross again (early
PEBCAK	Problem exists between chair and		Celtic chat term)
	keyboard	TPTB	The powers that be
PIBKAC	Problem is between keyboard and	TTFN	Ta-Ta for now
	chair	TTT	Thought that, too (when someone
PITA	Pain in the ass		types in what you were about to
PMFJIB	Pardon me for jumping in but	ATTION OF	type)
POOF	Goodbye (leaving the room)	TTYL	Talk to you later
POTS	Plain old telephone service	TU	Thank you
PU	That stinks!	UAPITA	You're a pain in the ass
RL	Real life (that is, when not chatting)	UW	You're welcome
ROR	Raffing out roud (Engrish for	VBG	Very big grin
	"laughing out loud")	VBSEG	Very big s***-eating grin
ROTFL	Rolling on the floor laughing	WDALYIC	Who died and left you in charge?
ROTFLMAO	Rolling on the floor laughing my a**	WFM	Works for me
	off	WIBNI	Wouldn't it be nice if
ROTFLMAOWPIMP	Rolling on the floor laughing my a**	WT?	What/who the?
	off while peeing in my pants	WTFO	What the F***! Over!
ROTFLMBO	Rolling on the floor laughing my	WTG	Way to go!
	butt off	WTGP?	Want to go private?
RPG	Role-playing games	WU?	What's up?
RSN	Real soon now	WUF?	Where are you from?
RTFM	Read the f***ing manual	WYSIWYG	What you see is what you get
RYO	Roll your own (write your own pro-	YGBSM	You gotta be s***tin' me!
	gram; derived from cigarettes rolled	YMMV	Your mileage may vary.
	yourself with tobacco and paper)		
54L	Spam for life (what you may get	Emoticons (Smileve)
JIL	when you become someone's		
	customer or client)	Emoticons (some	etimes known as "smileys") are a popul
SHCOON	Shoot hot coffee out of nose	form of expression	on on the Internet, especially in e-mail. Ju
SEG	S***-eating grin	type in each char	acter one at a time to create the emoticon
SF	Surfer-friendly (low-graphics Web	:-)	Smile
	site)	;-)	Smile with a wink
SNAFU	Situation normal, all f***ed up		
SO	Significant other	:<})	User with mustache, smiling
SOL	Smilling out loud or sh*t out of luck	:-{}	Mad
	Sick of me yet?	:-(Sad
WE SINEY		:' -(
SOMY			Crying
STFW	Search the f*****g Web		
STFW STW	Search the Web	:~	Also crying
STFW STW SWAG	Search the Web Stupid wild-a** guess	:~	
STFW STW SWAG TAFN	Search the Web Stupid wild-a** guess That's all for now	:~ :-))	Really happy
STFW STW SWAG	Search the Web Stupid wild-a** guess That's all for now There ain't no such thing as	;~ :-)) :-D	Really happy Big grin
STFW STW SWAG TAFN TANSTAAFL	Search the Web Stupid wild-a** guess That's all for now There ain't no such thing as a free lunch	:~ :-))	Really happy
STFW STW SWAG TAFN	Search the Web Stupid wild-a** guess That's all for now There ain't no such thing as a free lunch Thread from hell (a discussion that	;~ :-)) :-D	Really happy Big grin
STFW STW SWAG TAFN TANSTAAFL	Search the Web Stupid wild-a** guess That's all for now There ain't no such thing as a free lunch Thread from hell (a discussion that just won't die and is often irrelevant	;~ :-)) :-D :-* :- <i>P~</i>	Really happy Big grin A kiss A lick
STFW STW SWAG TAFN TANSTAAFL	Search the Web Stupid wild-a** guess That's all for now There ain't no such thing as a free lunch Thread from hell (a discussion that	;~ :-)) :-D :-*	Really happy Big grin A kiss

: -P	Sticking out your tongue
; -	User happens to be Popeye
:-/	Perplexed
=:0	Frightened (hair standing on end)
=80	Bug-eyed with fright
:-}	Embarassed smile
: -)<>>>>	Basic Smiley with a necktie
;-^)	Tongue in cheek
%*@ : - (Hung over
:	Drooling
>:)	Perplexed look
.)	Keeping an eye out for you
8:-)	Glasses on forehead
8:[Normal smiling face of a gorilla
0:-)	Angel
]:-[[Robot
(:V)	Duck 3:-o Cow
:-]	Vampire
(_8-()	Homer Simpson
C :-=	Charlie Chaplin
= : -) =	Abe Lincoln
*<:-)	Santa Claus
-:-)	User sports a mohawk and admires Mr. T
(:)-)	Scuba diver
:-"[User has a cold
:-{}	User with heavy lipstick
:-)8	User is well dressed
>:-<	Mad
*#:-)	Scotsman wearing his Scottish tam
9 ₆ - ^	User is another Picasso
#-)	User partied all night
<:I	Dunce
:-	Have an ordinary day!" Smiley
:}{:	Kisses (stolen from June bug)
0000(0) (0)0000	Toes
()	Secret smile
#0 "	Oh, nooooooo Mr. Bill!!!"

The Speed of...

This table shows the stated data rates for the most important end-user and backbone transmission technologies.

Technology	Speed	Physical Medium	Application
GSM mobile telephone service	9.6 to 14.4 Kbps RF in space (wireless) ne service		Mobile telephone for business and personal use
High-Speed Circuit-Switched Data service (HSCSD)	Up to 56 Kbps	Up to 56 Kbps RF in space (wireless) Mobile telephone for business and person	
Regular telephone service (POTS)	Up to 56 Kbps	Twisted pair	Home and small business access
Dedicated 56Kbps on Frame Relay	56 Kbps	Various	Business e-mail with fairly large file attachments
DS0	64 Kbps	All	The base signal on a channel in the set of Digital Signal levels
General Packet Radio System (GPRS)	56 to 114 Kbps	RF in space (wireless)	Mobile telephone for business and personal use
ISDN	BRI: 64 Kbps to 128 Kbps PRI: 23 (T-1) or 30 (E1) assignable 64-Kbps channels plus control channel; up to 1.544 Mbps (T-1) or 2.048 (E1)	BRI: Twisted pair PRI: T-1 or E1 line	BRI: Faster home and small business access PRI: Medium and large enter prise access
IDSL	128 Kbps	Twisted-pair	Faster home and small business access
AppleTalk	230.4 Kbps	Twisted pair	Local area network for Apple devices; several networks can be bridged; non-Apple devices can also be connected
Enhanced Data GSM Environment (EDGE)	384 Kbps	RF in space (wireless)	Mobile telephone for business and personal use
Satellite	400 Kbps (DirecPC and others)	RF in space (wireless)	Faster home and small enter prise access
Frame relay	56 Kbps to 1.544 Mbps	Twisted-pair or coaxial cable	Large company backbone for LANs to ISP ISP to Internet infrastructure
DS1/T-1	1.544 Mbps	Twisted-pair, coaxial cable, or optical fiber	Large company to ISP ISP to Internet infrastructure
Universal Mobile Telecommunications Service (UMTS)	Up to 2 Mbps	RF in space (wireless)	Mobile telephone for business and personal use (available in 2002 or later)
E-carrier	2.048 Mbps	Twisted-pair, coaxial cable, or optical fiber	32-channel European equiva- lent of T-1
T-1C (DS1C)	3.152 Mbps	Twisted-pair, coaxial cable, or optical fiber	Large company to ISP ISP to Internet infrastructure
IBM Token Ring/802.5	4 Mbps (also 16 Mbps)	Twisted-pair, coaxial cable, or optical fiber	Second most commonly used local area network after Ethernet

Technology	Speed	Physical Medium	Application
DS2/T-2	6.312 Mbps	Twisted-pair, coaxial cable, or optical fiber	Large company to ISP ISP to Internet infrastructure
Digital Subscriber Line (DSL)	512 Kbps to 8 Mbps	Twisted-pair (used as a digital, broadband medium)	Home, small business, and enterprise access using existing copper lines
E-2	8.448 Mbps	Twisted-pair, coaxial cable, or optical fiber	Carries four multiplexed E-1 signals
Cable modem	512 Kbps to 52 Mbps (see "Key and explanation" below)	Coaxial cable (usually uses Ethernet); in some systems, telephone used for upstream requests	Home, business, school access
Ethernet	10 Mbps	10BASE-T (twisted-pair); 10BASE-2 or -5 (coaxial cable); 10BASE-F (optical fiber)	Most popular business local area network (LAN)
IBM Token Ring/802.5	16 Mbps (also 4 Mbps)	Twisted-pair, coaxial cable, or optical fiber	Second most commonly-used local area network after Ethernet
E-3	34.368 Mbps	Twisted-pair or optical fiber	Carries 16 E-l signals
DS3/T-3	44.736 Mbps	Coaxial cable	ISP to Internet infrastructure Smaller links within Internet infrastructure
OC-1	51.84 Mbps	Optical fiber	ISP to Internet infrastructure Smaller links within Internet infrastructure
High-Speed Serial and Interface (HSSI)	Up to 53 Mbps	HSSI cable	Between router hardware WAN lines Short-range (50 feet) interconnection between slower LAN devices and faster WAN lines
Fast Ethernet	100 Mbps	100BASE-T (twisted pair); 100BASE-T (twisted pair); 100BASE-T (optical fiber)	Workstations with 10 Mbps Ethernet cards can plug into a Fast Ethernet LAN
Fiber Distributed-Data Interface (FDDI)	100 Mbps	Optical fiber	Large, wide-range LAN usually in a large company or a larger ISP
T-3D (DS3D)	135 Mbps	Optical fiber	ISP to Internet infrastructure Smaller links within Internet infrastructure
E-4	139.264 Mbps	Optical fiber	Carries 4 E3 channels Up to 1,920 simultaneous voice conversations
OC-3/SDH	155.52 Mbps	Optical fiber	Large company backbone Internet backbone
E-5	565.148 Mbps	Optical fiber	Carries 4 E4 channels Up to 7,680 simultaneous voice conversations

T	'n	е	S	D	e	e	d	0	f

Technology	Speed	Physical Medium	Application
OC-12/STM-4	622.08 Mbps	Optical fiber	Internet backbone
Gigabit Ethernet	1 Gbps	Optical fiber (and "copper" up to 100 meters)	Workstations/networks with 10/100 Mbps Ethernet plug into Gigabit Ethernet switches
OC-24	1.244 Gbps	Optical fiber	Internet backbone
SciNet	2.325 Gbps (15 OC-3 lines)	Optical fiber	Part of the vBNS backbone
OC-48/STM-16	2.488 Gbps	Optical fiber	Internet backbone
OC-192/STM-64	10 Gbps	Optical fiber	Backbone
OC-256	13.271 Gbps	Optical fiber	Backbone

Kilo, Mega, Giga, Tera, Peta, and All That

Kilo, mega, giga, tera, and peta are among the list of prefixes that are used to denote the quantity of something, 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.

	-		U
Prefix	Symbol(s)	Power of 10	Power of 2
yocto-	у	10 ⁻²⁴ *	
zepto-	z	10-21 *	
atto-	a	10 ⁻¹⁸ *	_
femto-	f	10-15 "	_
pico-	р	10-12 *	
nano-	n	10 ⁻⁹ *	_
micro-	m	10-6 *	
milli-	m	10 ⁻³ *	_ _ _
centi-	c	10-2 *	_
deci-	d	10-1 *	_
(none)	_	10 ⁰	2 ⁰
deka-	D	101*	
hecto-	h	102 *	_
kilo-	k or K **	10^{3}	2 ¹⁰
mega-	M	10^{6}	2 ²⁰ 2 ³⁰
giga-	G	10 ⁹	2 ³⁰
tera-	T	10 ¹²	$\frac{-}{2^{40}}$
peta-	P	10 ¹⁵	2 ⁵⁰
exa-	E	1018*	2 ⁶⁰
zetta-	Z	1021 *	2 ⁷⁰
yotta-	Y	10 ²⁴ *	2 ⁸⁰

^{*} Not generally used to express data speed

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. (The lowercase k is the technically correct symbol for kilo- when it represents 10^3 , although the uppercase K is often used instead.)

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.

^{**} $k = 10^3$ and $K = 2^{10}$

International System of Units

The International System of Units (abbreviated "SI" from the French version of the name) is a scientific method of expressing the magnitudes or quantities of seven important natural phenomena. This system was formerly called the meter-kilogram-second (MKS) system.

All SI units can be expressed in terms of standard multiple or fractional quantities, as well as directly. Multiple and fractional SI units are defined by prefix multipliers according to powers of 10 ranging from 10⁻²⁴ to 10²⁴.

The **meter** (abbreviation, m) is the SI unit of displacement or length. One meter is the distance traveled by a ray of electromagnetic (EM) energy through a vacuum in $^{1}/_{299,792,458}$ (3.33564095 × 10^{-9}) second. The meter was originally defined as one ten-millionth (0.0000001 or 10^{-7}) of the distance, as measured over the earth's surface in a great circle passing through Paris, France, from the geographic north pole to the equator.

The **kilogram** (abbreviation, kg) is the SI unit of mass. It is defined as the mass of a particular international prototype made of platinum-iridium and kept at the International Bureau of Weights and Measures. It was originally defined as the mass of one liter (10⁻³ cubic meter) of pure water.

The **second** (abbreviation, s or sec) is the SI unit of time. One second is the time that elapses during 9.192631770×10^9 cycles of the radiation produced by the transition between two levels of Cesium 133. It is also the time required for an EM field to propagate 299,792,458 (2.99792458 \times 10⁸) meters through a vacuum.

The **Kelvin** (abbreviation K), also called the degree Kelvin (abbreviation, o K), is the SI unit of temperature. One Kelvin is ${}^{1}/{}_{273.16}$ (3.6609 × 10⁻³) of the thermodynamic temperature of the triple point of pure water (H₂O).

The **ampere** (abbreviation, A) is the SI unit of electric current. One ampere is the current that would produce a force of 0.0000002 (2×10^{-7}) newton between two straight, parallel, perfectly conducting wires having infinite length and zero diameter, separated by one meter in a vacuum. One ampere represents 6.24×10^{18} unit electric charge carriers, such as electrons, passing a specified fixed point in one second.

The candela (abbreviation, cd) is the SI unit of luminous intensity. It is the electromagnetic radiation, in a specified direction, that has an intensity of 1/683 ($1.46 \times 10-3$) watt per steradian at a frequency of 540 terahertz (5.40×1014 hertz).

The mole (abbreviation, mol) is the SI unit of material quantity. One mole is the number of atoms in 0.012 kilogram of the most common isotope of elemental carbon (C-12). This is approximately 6.022169×1023 , and is also called the Avogadro constant.

These units are included in our Table of Physical Units.

See the NIST Reference on Constants, Units, and Uncertainty" at http://physics.nist.gov/cuu/Units/current.html.

Table of Physical Units

This table shows, from the International System of Units, base and derived physical units, their shorthand symbols, and equivalent units in other unit systems. Many of the terms in the table are defined in this encyclopedia.

BASE UNITS

Quantity or phenomenon (and symbol)	Standard International unit (and symbol)	Alternate units (and symbols)
displacement (d)	meter (m)	centimeter (cm) foot (ft)
mass (m) weight (w)	kilogram (kg)	gram (g) pound (lb)
time (t)	second (s)	hour (hr) mean solar day (dy) synodic year (yr)
current (I)	ampere (A)	statampere (statA) abampere (abA)
temperature (T)	kelvin (°K or K)	degree Celsius (°C or C) degree Fahrenheit (°F or F) degree Rankine (°R or R)
amount of substance (N)	mole (mol)	
luminous intensity (B or L)	candela (cd)	

DERIVED UNITS

Quantity or phenomenon (and symbol)	Standard International unit (and symbol)	Alternate units (and symbols)
area (A)	meter squared (m ²)	centimeter squared (cm ²) circular mil foot squared (ft ²)
volume (V)	meter cubed (m ³)	centimeter cubed (cm ³) foot cubed (ft ³)
material density (D)	kilogram per meter cubed (kg/m3 or kg·m-3)	gram per centimeter cubed $(g/cm^3 \text{ or } g \cdot cm^{-3})$
specific volume	meter cubed per kilogram (m³/kg or m³ · kg-¹)	centimeter cubed per gram $(cm^3/g \text{ or } cm^3 \cdot g^{-1})$
amount of substance concentration	mole per meter cubed (mol/m³ or mol·m³)	
force (F or F)	newton (N)	dyne (dyn)
pressure stress	pascal (Pa)	dyne per centimeter squared (dyn/cm² or dyn · cm²)
speed (s) velocity (v or v)	meter per second (m/s or m · s ⁻¹)	centimeter per second (cm/s or cm · s-1)
acceleration (a or a)	meter per second squared (m/s² or m · s·²)	centimeter per second squared (cm/s ² or cm · s ⁻²) gravity (g)
current density	ampere per meter squared (A/m² or A·m²²)	ampere per centimeter squared (A/cm² or A·cm²)
electromotive force (emf) Voltage (V or E)	volt (V)	statvolt (statV) abvolt (abV)
resistance (R)	ohm (Ω)	statohm (stat Ω) abohm (ab Ω)
conductance (G)	siemens (S)	statsiemens (statS) absiemens (abS)
electric field strength (E)	volt per meter (V/m or V · m ⁻¹)	microvolt per meter (μV/m or μV·m ⁻¹)

DERIVED UNITS, Continued...

Quantity or phenomenon (and symbol)	Standard International unit (and symbol)	Alternate units (and symbols)
electric flux density	coulomb per meter squared $(C/m^2 \text{ or } C \cdot m^{-2})$	_
electric charge density	coulomb per meter cubed (C/m³ or C·m³)	
permittivity(ε)	farad per meter (F/m or F · m ⁻¹)	picofarad per meter (pF/m or pF · m ⁻¹)
power (P)	watt (W)	horsepower (hp) statwatt (statW) abwatt (abW)
energy (E)	joule (J)	erg (erg) watt hour (Wh) kilowatt hour (kWh)
magnetomotive force (M or mmf)	ampere-turn (AT)	gilbert (G)
charge quantity (Q)	coulomb (C)	statcoulomb (statC) abcoulomb (abC) faraday
capacitance (C)	farad (F)	statfarad (statF) abfarad (abF)
inductance (L)	henry (H)	stathenry (statH) abhenry (abH)
magnetic flux (Φ)	weber (Wb)	maxwell (Mx)
magnetic flux density	tesla (T)	gauss (G)
magnetic field strength (H)	ampere per meter (A/m or A · m ⁻¹)	oersted (Oe)
permeability (µ)	henry per meter $(H/m \text{ or } H \cdot m^{-1})$	microhenry per meter (µH/m or µH · m ⁻¹)
electromagnetic field strength	watt per meter squared $(W/m^2 \text{ or } W \cdot m^{-2})$	microwatt per meter squared $(\mu W/m^2 \text{ or } \mu W \cdot m^{-2})$
radiant intensity	watt per steradian (W/sr or W · sr ⁻¹)	lumen (lm)
luminance	candela per meter squared (cd/m² or cd·m²)	candela per centimeter squared $(cd/cm^2 \text{ or } cd \cdot cm^{-2})$
luminous flux	lumen (lm)	watt per steradian (W/sr or W · sr-1)
illuminance	lux (lx)	watt per meter squared $(W/m^2 \text{ or } W \cdot m^{-2})$
plane angular measure	radian (rad)	degree (deg or °)
solid angular measure	steradian (sr)	_
angular speed (ω) angular velocity (ω)	radian per second (rad/s or rad·s ⁻¹)	degree per second $(deg/s \text{ or } deg \cdot s^{-1})$
angular acceleration (α or α)	radian per second squared (rad/s² or rad · s²²)	degree per second squared $(\text{deg/s}^2 \text{ or deg} \cdot \text{s}^{-2})$
ionizing radiation	becquerel (Bq)	curie (cu)
absorbed ionizing radiation dose	gray (Gy)	rad (rad)
frequency (f or v)	hertz (Hz)	kilohertz (kHz) megahertz (MHz) gigahertz (GHz) terahertz (THz)

DERIVED UNITS, Continued...

Quantity or phenomenon (and symbol)	Standard International unit (and symbol)	Alternate units (and symbols)
wavelength (λ)	meter (m)	centimeter (cm) millimeter (mm) nanometer (nm) Angström (Å)
wave number	reciprocal meter (m ⁻¹)	-
data quantity	bit (b) byte (B)	kilobit (kb) megabit (Mb) gigabit (Gb) kilobyte (KB) megabyte (MB) gigabyte (GB)
data speed bandwidth	bit per second (bps)	kilobit per second (kbps) megabit per second (Mbps) gigabit per second (Gbps) character per second (cps)

TYPES OF DSL

This table shows different kinds of Digital Subscriber Line (DSL) service.

DSL Type	Description	Data Rate Downstream; Upstream	Distance Limit	Application	
IDSL	ISDN Digital	128 Kbps	18,000 feet on 24 gauge wire	Similar to the ISDN BRI service but data only (no voice on the same line)	
CDSL	Consumer DSL from Rockwell	1 Mbps downstream; less upstream	18,000 feet on 24 gauge wire	Splitterless home and small business service; similar to DSL Lite	
DSL Lite (same as G. Lite)	"Splitterless" DSL without the "truck roll"	From 256 Kbps to 6 Mbps downstream on the subscribed service	18,000 feet on 24 gauge wire	The standard ADSL; sacrifices speed for not having to install a splitter at the user's home or business	
G.Lite (same as	"Splitterless" DSL without the "truck roll"	From 256 kbps to 6 Mbps, depending on the Subscribed service	18,000 feet on 24 gauge wire	The standard ADSL; sacrifices speed for not having to install a splitter at the user's home or business	
HDSL	High bit-rate Digital Subscriber	1.544 Mbps duplex on two twisted-pair lines;	12,000 feet on 24 gauge wire	T1/E1 service between server and phone company or within a company; WAN, LAN, server access	
SDSL	Symmetric DSL	1.544 Mbps duplex (U.S. and Canada); 2.048 Mbps Europe) on a single duplex line downstream and upstream	12,000 feet on 24 gauge wire	Same as for HDSL but requiring only one line of twisted-pair	

Fast References

TYPES OF DSL, Continued...

DSL Type	Description	Data Rate Downstream; Upstream	Distance Limit	Application	
ADSL	Asymmetric Digital Subscriber Line	1.544 to 6.1 Mbps downstream; 16 to 640 Kbps upstream	1.544 Mbps at 18,000 feet; 2.048 Mbps at 16,000 feet; 6.312 Mpbs at 12,000 feet; 8.448 Mbps at 9,000 feet	Used for Internet and Web access, motion video, video on demand remote LAN access	
RADSL	Rate-Adaptive DSL from Westell	Adapted to the line, 640 Kbps to 2.2 Mbps to 1.088 Mbps upstream	Not provided	Similar to ADSL	
UDSL	Unidirectional DSL proposed by a company in Europe	Not known	Not known	Similar to HDSL	
VDSL	Very high digital Subscriber Line			ATM networks; Fiber to the Neighborhood	

TYPES OF RAM

This table summarizes many types of random access memory (RAM).

RAM Technology	Application and Computer Location	Access Speed Range	Ports	Characteristic
Static RAM (SRAM)	Level-1 and level-2 cache memory Also used in RAMDAC	Fast	One	RAM that is continually charged More expensive than DRAM
Burst SRAM (BSRAM)	Level-2 cache memory	Fast	One	SRAM inburst mode
DRAM	Main memory Low-cost video	Slow	One	A generic term for any king dynamic (constantly recharged) RAM
FPM (Fast page Mode) DRAM	Main memory low-cost video memory	slow	One	Prior to EDO DRAM, the most common type of DRAM
EDO (Extended Data Out)	Main memory low-cost video	5-20% faster than FPM DRAM	One	Uses overlapping reads (one can begin while another is finishing). Currently, the most common type of DRAM
BEDO (Burst Extended Data DRAM)	Main memory and low-cost video	Faster than EDO DRAM 4-1-1-1 at 66 MHz	One	Not widely used because not supported by processor chipset makers
EDRAM Enhanced DRAM	Level-2 cache memory	15 ns access to SRAM 35 ns access to DRAM	One	Contains a 256-byte SRAM inside a larger DRAM

RAM Technology	Application and Computer Location	Access Speed Range	Ports	Characteristic
Nonvolatile RAM	Preset phone numbers and profiles in modems	Fast	One	Battery-powered RAM
Synchronous DRAM (SDRAM)	Main memory	See specific forms of SDRAM	One	Generic term for DRAMS with a synchronous interface
JEDEC Synchronous DRAM JEDEC SDRAM)	Main memory	Intended to run at	One	An Intel specification designed to work with their i440 BX
PC100 Synchronous DRAM (PC100 SDRAM)	Main memory	Intended to run at	One	An Intel specification designed to work with their i440BX
Double Data Rate Synchronous DRAM (DDR DRAM)	Main memory	Up to 200 MHz	One	Activates output on both the up and the down part of the clock cycle, doubling the DATA RATE OF PC100 SDRAM
Enhanced Synchronous DRAM	Main memory	Fast (100 MHz +)	Two	Twice as fast as SDRAM
SyncLink DRAM (SLDRAM)	Main memory	Fastest (200 MHz +)	One	Open protocol-based design Uses "packets" for address, data, and control signals
Direct Rambus DRAM (DRDRAM)	Main memory	Up to 800 MHz but with a 16-bit bus width	One	Backed by Intel and Rambus
Ferroelectric RAM	Main memory in			Developed by Ramtron
RAMDAC	Video Card	Fast	One	Uses a small SRAM to store the color palette table used to provide data for digital-to analog conversion
Rambus DRAM (RDRAM)	Video memory for Nintendos	Up to 600 MHz	One	Intel and Rambus architecture
Synchronous Graphics RAM	Moderate to high- end video memory	Closer to VRAM than DRAM	One	Has special performance enhancing features Example: Matrox Mystique
VRAM (Video RAM)	Higher-cost video memory	Twice the speed of DRAM	Two	Dual-ported, meaning a new image can be stored in RAM while a previous image is being sent to the display
WRAM (Window RAM)	Less expensive video memory	25% faster than VRAM	Two	With RAMDAC, can handle true color at 1600 by 1200 pixel resolution
Multibank DRAM (MDRAM)	Low-cost high-end video memory	Faster	One	Interleaved memory accesses between banks Memory has multiple 32 kilobyte banks that can be accessed independently Can be manufactured to fit the amount of memory the card requires. No size-related performance penalty