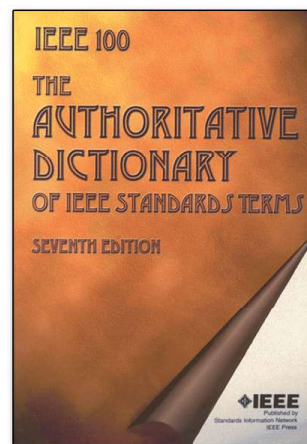


IEEE 100
The Authoritative Dictionary of
IEEE Standards Terms

Seventh Edition



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Introduction

IEEE standards establish an authoritative common language that defines quality and sets technical criteria. By guaranteeing consistency and conformity through open consensus, IEEE standards add value to products, facilitate trade, drive markets, and ensure safety. That's why leading companies, organizations, and industries around the globe rely on them.

Critical components of this common language are the terms and definitions that are at the foundation of the vast body of IEEE standards. In the past decade alone, hundreds of terms—describing the latest tools, techniques, and best practices—have been added to the lexicon of IEEE standards.

In this newly updated *Authoritative Dictionary of IEEE Standards Terms*, professional experts and students alike will gain an in-depth understanding and appreciation for the breadth of coverage of IEEE standards terms and definitions not found in any other single source.

The seventh edition of IEEE 100 has been revised to include nearly 35 000 technical terms and definitions from over 800 standards—covering areas such as power and energy, communications, information technology, and transportation systems. In addition to an extensive list of widely used acronyms and abbreviations, this new edition also contains detailed abstracts of each term's associated standard(s). What's more, all definitions are augmented by a combination of indispensable information, including:

- ◆ Preferred and popular usage of each term
- ◆ Variations in meanings among different technical specialties
- ◆ Cross-indexing to related works
- ◆ Key explanatory notes for further term clarification

In preparing this latest edition of the Dictionary, we realized that the standards community desired more than just a compilation of IEEE standardized terms and definitions. They needed an authoritative resource created by the organization that develops and produces the standards from which the terms and definitions are derived—the IEEE. In addition, we determined the Dictionary needed to be not only user friendly, but also rich in information. In other words, it needed to be the *Authoritative Dictionary of IEEE Standards Terms*.

Susan K. Tatiner
Director, IEEE Standards Publishing Programs

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Kim Breitsfelder
Don Messina

Additional assistance was provided by the IEEE Standards editorial staff.

How to Use This Dictionary

The terms defined in the Dictionary are listed in *letter-by-letter* alphabetical order. Spaces are ignored in this style of alphabetization, so *cable value* will come before *cab signal*. Descriptive categories associated with the term in earlier editions of the Dictionary will follow the term in parentheses. New categories appear after the definitions (see Categories, below), followed by the designation of the standard or standards that include the definition. If a standard designation is followed by the letter *s*, it means that edition of the standard was superseded by a newer revision and the term was not included in the revision. If a designation is followed by the letter *w*, it means that edition of the standard was withdrawn and not replaced by a revision. A bracketed number refers to the non-IEEE standard sources given in the back of the book.

Abstracts of the current set of approved IEEE standards are provided in the back of the book. It should be noted that updated information about IEEE standards can be obtained at any time from the IEEE Standards World Wide Web site at <http://standards.ieee.org/>.

Categories

The category abbreviations that are used in this edition of the Dictionary are defined below. This information is provided to help elucidate the context of the definition. Older terms for which no category could be found have had the category *Std100* assigned to them. Note that terms from sources other than IEEE standards, such as the National Electrical Code® (NEC®) or the National Fire Protection Association, may not be from the most recent editions; the reader is cautioned to check the latest editions of all sources for the most up-to-date terminology.

Categories sorted by abbreviation

AES	aerospace and electronic systems
AHDL	computer—Analog Hardware Descriptive Language
AMR	automatic meter reading and energy management
AP	antennas and propagation
ATL	computer—Abbreviated Test Language for All Systems
BA	computer—bus architecture
BT	broadcast technology
C	computer
CAS	circuits and systems
CE	consumer electronics
CHM	components, hybrids, and manufacturing technology
COM	communications
CS	control systems
DA	computer—design automation
DEI	dielectrics and electrical insulation
DESG	dispersed energy storage and generation
DIS	computer—distributed interactive simulation
ED	electron devices
EDU	education
EEC	electrical equipment and components
ELM	electricity metering
EM	engineering management
EMB	engineering in medicine and biology
EMC	electromagnetic compatibility
GRS	geoscience and remote sensing
GSD	graphic symbols and designations
IA	industry applications
IE	industrial electronics
II	information infrastructure
IM	instrumentation and measurement
IT	information theory

IVHS	intelligent vehicle highway systems
LEO	lasers and electro-optics
LM	computer—local and metropolitan area networks
MAG	magnetics
MIL	military
MM	computer—microprocessors and microcomputers
MTT	microwave theory and techniques
NEC	National Electrical Code
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NI	nuclear instruments
NIR	non-ionizing radiation
NN	neural networks
NPS	nuclear and plasma sciences
ODM	computer—optical disk and multimedia platforms
OE	oceanic engineering
PA	computer—portable applications
PE	power engineering
PEL	power electronics
PQ	power quality
PSPD	power surge protective devices
PV	photovoltaics
QUL	quantities, units, and letter symbols
R	reliability
RA	robotics and automation
REM	rotating electrical machinery
RL	roadway lighting
S&P	computer—security and privacy
SB	stationary batteries
SE	computer—software engineering
SMC	systems, man, and cybernetics
SP	signal processing
Std100	Standard 100 legacy data
SUB	substations
SWG	power switchgear
T&D	transmission and distribution
TF	time and frequency
TRR	transformers, regulators, and reactors
TT	test technology
UFFC	ultrasonics, ferroelectrics, and frequency control
VT	vehicular technology

Categories sorted by name

aerospace and electronic systems	AES
antennas and propagation	AP
automatic meter reading and energy management	AMR
broadcast technology	BT
circuits and systems	CAS
communication	COM
components, hybrids, and manufacturing technology	CHM
computer	C
computer—Abbreviated Test Language for All Systems	ATL
computer—Analog Hardware Descriptive Language	AHDL
computer—bus architecture	BA
computer—design automation	DA
computer—distributed interactive simulation	DIS
computer—local and metropolitan area networks	LM
computer—microprocessors and microcomputers	MM
computer—optical disk and multimedia platforms	ODM
computer—portable applications	PA
computer—security and privacy	S&P
computer—software engineering	SE
consumer electronics	CE

control systems
 dielectrics and electrical insulation
 dispersed energy storage and generation
 education
 electrical equipment and components
 electricity metering
 electromagnetic compatibility
 electron devices
 engineering in medicine and biology
 engineering management
 geoscience and remote sensing
 graphic symbols and designations
 industrial electronics
 industry applications
 information infrastructure
 information theory
 instrumentation and measurement
 intelligent vehicle highway systems
 lasers and electro-optics
 magnetics
 microwave theory and techniques
 military
 National Electrical Code
 National Electrical Safety Code
 National Fire Protection Association
 neural networks
 non-ionizing radiation
 nuclear and plasma sciences
 nuclear instruments
 oceanic engineering
 photovoltaics
 power electronics
 power engineering
 power quality
 power switchgear
 quantities, units, and letter symbols
 reliability
 roadway lighting
 robotics and automation
 rotating electrical machinery
 signal processing
 Standard 100 legacy data
 stationary batteries
 substations
 surge-protective devices
 systems, man, and cybernetics
 test technology
 time and frequency
 transformers, regulators, and reactors
 transmission and distribution
 ultrasonics, ferroelectrics, and frequency control
 vehicular technology

CS
 DEI
 DESG
 EDU
 EEC
 ELM
 EMC
 ED
 EMB
 EM
 GRS
 GSD
 IE
 IA
 II
 IT
 IM
 IVHS
 LEO
 MAG
 MTT
 MIL
 NEC
 NESC
 NFPA
 NN
 NIR
 NPS
 NI
 OE
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is a measure of the instantaneous phase difference between the quantities; while its speed of rotation indicates the frequency difference between the quantities; and its direction of rotation indicates which of the quantities is of higher frequency. *Note:* This term is also used to designate a cathode-ray oscilloscope providing either: 1) a rotating pattern giving indications similar to that of the conventional synchroscope; or 2) a triggered sweep, giving an indication of synchronism. *See also:* instrument. (EEC/PE) [119]

synchro system (alternating current) An electric system for transmitting angular position or motion. It consists of one or more synchro transmitters, one or more synchro receivers or synchro control transformers and may include differential synchro machines. (PE) [9]

synchro transmitter (rotating machinery) (or generator) A transformer with relatively rotatable primary and secondary windings, the output of the secondary winding being two or more voltages that vary with and completely define the relative angular position of the primary and secondary windings. *See also:* synchro system. (PE) [9]

synchrotron A device for accelerating charged particles (for example, electrons) to high energies in a vacuum. The particles are guided by a changing magnetic field while they are accelerated many times in a closed path by a radio-frequency electric field. (ED) [45]

SyncLink A physical interconnect model, consisting of shared input and output links, that supports the RamLink logical protocols. SyncLink is optimized for short-distance single-board communications using a bused connection. The signal-levels for this interconnect model have been left for a future extension to this standard. (C/MM) 1596.4-1996

sync packet (1) A special packet that is used heavily during initialization and occasionally during normal operation for the purpose of checking and adjusting receiver circuit timing. (C/MM) 1596.3-1996, 1596-1992

(2) A packet consisting of four high and four low flags, as well as four data bytes whose bits are the complement of the flag values, typically generated when leaving shutdown (to synchronize the device and controller receiver circuits). (C/MM) 1596.4-1996

sync signal *See:* synchronizing signal.

sync slip An error condition in serial communication channels in which the receiving terminal incorrectly recognizes the start of a new message. (SUB/PE) 999-1992w

syndrome A particular group of symptoms that occur together and that define a particular disease or abnormality. (T&D/PE) 539-1990

synergism The presence of a performance or aging effect, produced by a combination of aging factors, that is different from the effect predicted by the simple summations of the effects of these factors acting separately. (DEI/RE) 775-1993w

synonym In hashing, an item whose hash value is identical to that of another item. *See also:* collision resolution. (C) 610.5-1990w

syntactic error A violation of the structural or grammatical rules defined for a language; for example, using the statement $B + C = A$ in Fortran, rather than the correct $A = B + C$. *Synonym:* syntax error. *Contrast:* semantic error. (C) 610.12-1990

syntactic pattern recognition A type of structural pattern recognition that identifies primitives and relationships in natural or artificial language patterns. (C) 610.4-1990w

syntax (1) (A) (computers) The structure of expressions in a language. (B) (computers) The rules governing the structure of a language. (C/C) [20], [85]

(2) (software) The structural or grammatical rules that define how the symbols in a language are to be combined to form words, phrases, expressions, and other allowable constructs. (C) 610.12-1990

(3) A category into which an attribute value is placed on the basis of its form. (C/PA) 1328-1993w, 1327-1993w, 1224-1993w

(4) The structural components or features of a language and rules that define the ways in which the language constructs may be assembled together to form sentences. (C/SE) 1320.2-1998

(5) The grammatical rules pertaining to the structure of an ATLAS statement. (SCC20) 771-1998

(6) The structure of expressions in a language and the rules governing the structure of a language. (SCC32) 1489-1999

(7) *See also:* attribute syntax. (C/PA) 1328.2-1993w

syntax error *See:* syntactic error.

syntax template A lexical construct containing an asterisk from which several attribute syntaxes can be derived by substituting text for the asterisk. (C/PA) 1328-1993w, 1224-1993w, 1327-1993w

synthetic address *See:* generated address.

synthetic-aperture radar (SAR) (1) A radar system that generates the effect of a long antenna by signal processing means rather than by the actual use of a long physical antenna. (AES/GCS) 172-1983w

(2) A coherent radar system that generates a narrow cross range impulse response by signal processing (integrating) the amplitude and phase of the received signal over an angular rotation of the radar line of sight with respect to the object (target) illuminated. *Note:* Due to the change in line-of-sight direction, a synthetic aperture is produced by the signal processing that has the effect of an antenna with a much larger aperture (and hence a much greater angular resolution). (AES) 686-1997

synthetic-aperture radar-moving-target indication (SAR-MTI) A synthetic-aperture imaging radar that also detects moving targets (especially slow-moving ground vehicles) and displays them on the SAR image. (AES) 686-1997

synthetic benchmark program A benchmark program that consists of a small program constructed especially for benchmarking purposes, but does not necessarily perform any useful function. (C) 610.10-1994w

synthetic environment The integrated set of data elements that define the environment within which a given simulation application operates. The data elements include information about the initial and subsequent states of the terrain including cultural features, and atmospheric and oceanographic environments throughout a DIS exercise. The data elements include databases of externally observable information about instantiable DIS entities, and are adequately correlated for the type of exercise to be performed. (DIS/C) 1278.1-1995, 1278.2-1995

synthetic test (1) A test in which the major part of, or the total current, is obtained from one source (current circuit), and the major part of, or all of the transient recovery voltage from a separate source or sources (voltage circuit). (SWG/PE) C37.100-1992, C37.081-1981r

(2) A test in which the major part of, or the total current, is obtained from a source or sources (current circuit), and the major part of, or all of the transient recovery voltage from a separate source or sources (voltage circuit). (SWG/PE) C37.083-1999

synthesis tool Any system, process, or tool that interprets RTL VHDL source code as a description of an electronic circuit and derives a netlist description of that circuit. (C/DA) 1076.6-1999, 1076.3-1997

SyRS *See:* System Requirements Specification.

sysgen *See:* system generation.

system (1) (microcomputer system bus) (general system) A set of interconnected elements that achieve a given objective through the performance of a specified function. (C/MM/IM/AIN) 796-1983r, 488.1-1987r, 696-1983w

(2) (monitoring radioactivity in effluents) The entire assembled equipment excluding only the sample collecting pipe. (NI) N42.18-1980r