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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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	CS
dielectrics and electrical insulation	DEI
dispersed energy storage and generation	DESG
education	EDU
electrical equipment and components	EEC
electricity metering	ELM
electromagnetic compatibility	EMC
electron devices	ED
engineering in medicine and biology	EMB
engineering management	EM
geoscience and remote sensing	GRS
graphic symbols and designations	GSD
industrial electronics	IE
industry applications	IA
information infrastructure	II
information theory	IT
instrumentation and measurement	IM
intelligent vehicle highway systems	IVHS
lasers and electro-optics	LEO
magnetics	MAG
microwave theory and techniques	MTT
military	MIL
National Electrical Code	NEC
National Electrical Safety Code	NESC
National Fire Protection Association	NFPA
neural networks	NN
non-ionizing radiation	NIR
nuclear and plasma sciences	NPS
nuclear instruments	NI
oceanic engineering	OE
photovoltaics	PV
power electronics	PEL
power engineering	PE
power quality	PQ
power switchgear	SWG
quantities, units, and letter symbols	QUL
reliability	R
roadway lighting	RL
robotics and automation	RA
rotating electrical machinery	REM
signal processing	SP
Standard 100 legacy data	Std100
stationary batteries	SB
substations	SUB
surge-protective devices	PSPD
systems, man, and cybernetics	SMC
test technology	TT
time and frequency	TF
transformers, regulators, and reactors	TRR
transmission and distribution	T&D
ultrasonics, ferroelectrics, and frequency control	UFFC
vehicular technology	VT

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(2) (electric power supply) Energy generated from water, as, wind, or other source which cannot be stored and which is beyond the immediate needs of the electric system producing the energy. (PE/PSE) 346-1973w

dump power Power generated from water, gas, wind, or other source that cannot be stored or conserved and that is beyond the immediate needs of the electric system producing the power. *See also:* generating station. (T&D/PE) [10]

dunnage material *See:* bunker material.

duodecimal (A) Pertaining to a characteristic or property involving a selection, choice, or condition in which there are twelve possibilities. **(B)** Pertaining to the numeration system with a radix of twelve. (C) [20], [85]

(2) (A) (mathematics of computing) Pertaining to a selection in which there are 12 possible outcomes. **(B) (mathematics of computing)** Pertaining to the numeration system with a radix of 12. (C) 1084-1986

duolater coil *See:* honeycomb coil.

duosexadecimal (A) Pertaining to a selection in which there are 32 possible outcomes. **(B)** Pertaining to the numeration system with a radix of 32. *Synonym:* duotricenary. (C) 1084-1986

duotricenary *See:* duosexadecimal.

duplex (1) A simultaneous, two-way, independent transmission in both directions. *Synonym:* full duplex. (SUB/PE) 999-1992w

(2) (data transmission) Pertaining to a simultaneous two-way independent transmission in both directions. (PE) 599-1985w

(3) A type of printing that involves the process of creating images or impressions on both sides of the printing media. (C/MM) 1284.1-1997

duplex artificial line (balancing network) A balancing network, simulating the impedance of the real line and distant terminal apparatus, that is employed in a duplex circuit for the purpose of making the receiving device unresponsive to outgoing signal currents. *See also:* telegraphy. (PE/EEC) [119]

duplex benchboard A combination assembly of a benchboard and a vertical control switchboard placed back to back and enclosed with a top and ends (not grille). Access space with entry doors is provided between the benchboard and vertical control switchboard. (SWG/PE) C37.100-1992, C37.21-1985r

duplex cable A cable composed of two insulated single-conductor cables twisted together. *Note:* The assembled conductors may or may not have a common covering of binding or protecting material. (T&D/PE) [10], 30-1937w

duplex channel A communications channel capable of simultaneous duplex communication. (C/LM) 802.3-1998

duplex circuit *See:* data circuit.

duplex current-limiting reactor A center tapped reactor used in two circuit branches fed by a common circuit and wound in such a way as to employ negative coupling under normal operating conditions to reduce circuit impedance and positive coupling under fault conditions to increase circuit impedance. (PE/TR) C57.16-1996

duplex data circuit A pair of associated transmit and receive channels that provide a means of two-way data communications. *See also:* virtual circuit. (C) 610.7-1995

duplexer (nonlinear, active, and nonreciprocal waveguide components) (radar) A device that utilizes the finite delay between the transmission of a pulse and the echo thereof so as to permit the connection of the transmitter and receiver to a common antenna. A duplexer commonly employs either a circulator and receiver protector or a balanced network of transmit-receive switches and a receiver protector. (MTT) 457-1982w

duplexing *See:* double storage.

duplexing assembly, radar *See:* transmit-receive switch.

duplex lap winding (rotating machinery) A lap winding in which the number of parallel circuits is equal to twice the number of poles. (PE) [9]

duplex operation (1) (data transmission) (A) (general) The operation of transmitting and receiving apparatus at one location in conjunction with associated transmitting and receiving equipment at another location; the processes of transmission and reception being concurrent. **(B) (radio communication) (two-way radio communication circuit)** The operation utilizing two radio-frequency channels, one for each direction of transmission, in such manner that intelligence may be transmitted concurrently in both directions. (AP/PE/VT/ANT) 145-1983s, 599-1985w, [37]

(2) A mode of operation of a data link or a data circuit in which data is transmitted in both directions simultaneously. (C) 610.7-1995

duplex signaling (telephone switching systems) A form of polar-duplex signaling for a single physical circuit. (COM) 312-1977w

duplex switchboard A control switchboard consisting of panels placed back to back and enclosed with a top and ends (not grille). Access space with entry doors is provided between the rows of panels. (SWG/PE) C37.100-1992, C37.21-1985r

duplex system A telegraph system that affords simultaneous independent operation in opposite directions over the same. *See also:* telegraphy. (EEC/PE) [119]

duplex transmission Transmission in which data may be sent simultaneously in both directions on a transmission medium. *Contrast:* half-duplex transmission; simplex transmission. (C) 610.7-1995

duplex type (breaker-and-a-half arrangement) A unit substation which has two stepdown transformers, each connected to an incoming high-voltage circuit. The outgoing side of each transformer is connected to a radial (stub-end) feeder. These feeders are joined on the feeder side of the power circuit breakers by a normally open-tie circuit breaker. (PE/TR) C57.12.80-1978r

duplex wave winding (rotating machinery) A wave winding in which the number of parallel circuits is four, whatever the number of poles. (PE) [9]

duplicate (data management) To copy data from a source to a destination that has similar physical form as the source. *Synonym:* reproduce. *See also:* copy. (C) 610.5-1990w

duplicate lines (power transmission) Lines of substantially the same capacity and characteristics, normally operated in parallel, connecting the same supply point with the same distribution point. *See also:* center of distribution. (T&D/PE) [10]

duplicate service (power transmission) Two services, usually supplied from separate sources, of substantially the same capacity and characteristics. *Note:* The two services may be operated in parallel on the consumer's premises, but either one alone is of sufficient capacity to carry the entire load. *See also:* loop service; dual service; service; emergency service. (T&D/PE) [10]

duplication check (1) A check based on the consistency of two independent performances of the same task. (C/EEC/IE) [20], [126]

(2) (data management) A check that requires that the results of two independent performances of the same operations be identical. (C) 610.5-1990w

duration (pulse terminology) The absolute value of the interval during which a specified waveform or feature exists or continues. (IM/WM&A) 194-1977w

duration of unscheduled interrupt The length of the delay caused by an unscheduled or unexpected interrupt. (C) 610.10-1994w

dust-ignition-proof (class II locations) Enclosed in a manner that will exclude ignitable amounts of dusts or amounts that might affect performance or rating and that, where installed