

IEEE Std 100-1996

The IEEE Standard Dictionary of Electrical and Electronics Terms

Sixth Edition



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The IEEE Standard Dictionary of Electrical and Electronics Terms

Sixth Edition

**Standards Coordinating Committee 10, Terms and Definitions
Jane Radatz, Chair**

This standard is one of a number of information technology dictionaries being developed by standards organizations accredited by the American National Standards Institute. This dictionary was developed under the sponsorship of voluntary standards organizations, using a consensus-based process.

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Introduction

Since the first edition in 1941 of the American Standard Definitions of Electrical Terms, the work now known as IEEE Std 100, The IEEE Standard Dictionary of Electrical and Electronics Terms, has evolved into the unique compendium of terms that it is today.

The current edition includes all terms defined in approved IEEE standards through December 1996. Terms are categorized by their technical subject area. They are also associated with the standards or publications in which they currently appear. In some cases, terms from withdrawn standards are included when no current source can be found. Earlier editions of IEEE Std 100 included terms from sources other than IEEE standards, such as technical journals, books, or conference proceedings. These terms have been maintained for the sake of consistency and their sources are listed with the standards in the back of the book.

The practice of defining terms varies from standard to standard. Many working groups that write standards prefer to work with existing definitions, while others choose to write their own. Thus terms may have several similar, although not identical, definitions. Definitions have been combined wherever it has been possible to do so by making only minor editorial changes. Otherwise, they have been left as written in the original standard.

Users of IEEE Std 100 occasionally comment on the surprising omission of a particular term commonly used in an electrical or electronics field. This occurs because the terms in IEEE Std 100 represent only those defined in the existing or past body of IEEE standards. To respond to this, some working groups obtain authorization to create a glossary of terms used in their field. All existing, approved standard glossaries have been incorporated into this edition of IEEE Std 100, including the most current glossaries of terms for computers and power engineering.

IEEE working groups are encouraged to refer to IEEE Std 100 when developing new or revised standards to avoid redundancy. They are also encouraged to investigate deficiencies in standard terms and create standard glossaries to alleviate them.

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How to use this dictionary

The terms defined in this 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 IEEE Std 100 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.

Acronyms and abbreviations are no longer listed in a separate section in the dictionary; rather, they are incorporated alphabetically with other terms. Each acronym or abbreviation refers to its expanded term, where it is defined. Acronyms and abbreviations for which no definition was included in past editions have been deleted from this edition of IEEE Std 100.

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 IEEE Std 100 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

| | |
|------|--|
| AE | 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 | 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 | AE |
| antennas and propagation | AP |
| automatic meter reading and energy management | AMR |
| broadcast technology | BT |
| circuits and systems | CAS |
| communications | 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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nominal slips. If the link connecting the master switch to the slave switch is broken, the number of slips will depend on clock accuracy. (COM) 973-1990w

clock cycle One period of the CLK signal, beginning with the rising edge of the signal and ending on the following rising edge of the signal. (BA/C) 1496-1993

clocked data one (CD1) A Manchester-encoded data 1. A CD1 is encoded as a LO for the first half of the bit-cell and a HI for the second half of the bit-cell. (C/LM) 802.3u-1995

clocked data zero (CD0) A Manchester-encoded data 0. A CDO is encoded as a HI for the first half of the bit-cell and a LO for the second half of the bit-cell. (C/LM) 802.3u-1995

clocked logic (power-system communication) The technique whereby all the memory cells (flip-flops) of a logic network are caused to change in accordance with logic input levels but at a discrete time. *See also:* digital. (PE) 599-1985w

clocked violation HI (CVH) A symbol that deliberately violates Manchester-encoding rules, used as a part of the Collision Presence signal. A CVH is encoded as a transition from LO to HI at the beginning of the bit cell, HI for the entire bit cell, and a transition from HI to LO at the end of the bit cell. (C/LM) 802.3u-1995

clocked violation LO (CVL) A symbol that deliberately violates Manchester-encoding rules, used as a part of the Collision Presence signal. A CVL is encoded as a transition from HI to LO at the beginning of the bit cell, LO for the entire bit cell, and a transition from LO to HI at the end of the bit cell. (C/LM) 802.3u-1995

clocking (data transmission) The generation of periodic signals used for synchronization. *See also:* data processing. (COM) [49]

clocking bit (1) In asynchronous transmission, a bit that signals a synchronization event. (C) 610.7-1995

(2) A bit containing an encoded signal, preceding the data within a data stream, or on a separate channel; used for establishing timing intervals. *See also:* clock track; synchronization bit. (C) 610.10-1994

clock pulse *See:* clock signal.

clock reference (digital accelerometer) Basic system timing reference. (MTT) 457-1982w

clock, reference A clock of very high stability and accuracy that may be completely autonomous and whose frequency serves as a basis of comparison for the frequency of other clocks. (COM) 1007-1991

clock register *See:* timer.

clock signal A periodic signal used for synchronizing events. *Synonyms:* clock pulse; timing pulse. (C) 610.10-1994

clockStrobe signal A packet that causes a node to record its time-of-day registers (if any) when it is received, and to record the duration of the propagation of the packet within the node. Used for precisely synchronizing multiple time-of-day clocks within a system. (C/MM) 1596-1992

clock tick An interval of time. A number of these occur each second. Clock ticks are one of the units that may be used to express a value found in type *clock.t*. (C/PA) 9945-1-1996

clock track A track on which a pattern of signals, known as synchronization bits, is recorded to provide a timing reference. *Synonym:* timing track. *See also:* clocking bit. (C) 610.10-1994

CLOS *See:* Common LISP Object System.

close To destroy a package instance. (BA/C) 1275-1994

close and latch The capability of a switching device to close (allow current flow) and immediately thereafter latch (remain closed) and conduct a specified current through the device under specified conditions. (PE/SWG) C37.100-1992

close coupling Any degree of coupling greater than the critical coupling. *Synonym:* tight coupling. *See also:* coupling; critical coupling. (EEC/PE) [119]

closed air circuit (rotating machinery) A term referring to duct-ventilated apparatus used in conjunction with external components so constructed that while it is not necessarily airtight, the enclosed air has no deliberate connection with the external air. *Note:* The term must be qualified to describe the means used to circulate the cooling air and to remove the heat produced in the apparatus. (PE) [9]

closed amortisseur An amortisseur that has the end connections connected together between poles by bolted or otherwise separable connections. (EEC/PE) [119]

closed architecture An architecture for which design parameters and specifications are not available to anyone except the manufacturer of the system. *Contrast:* open architecture. (C) 610.10-1994

closed-circuit cooling (rotating machinery) A method of cooling in which a primary coolant is circulated in a closed circuit through the machine and if necessary a heat exchanger. Heat is transferred from the primary coolant to the secondary coolant through the structural parts or in the heat exchanger. (PE) [9]

closed-circuit principle The principle of circuit design in which a normally energized electric circuit, on being interrupted or de-energized, will cause the controlled function to assume its most restrictive condition. (EEC/PE) [119]

closed-circuit signaling (data transmission) That type of signaling in which current flows in the idle condition, and a signal is initiated by increasing or decreasing the current. (PE) 599-1985w

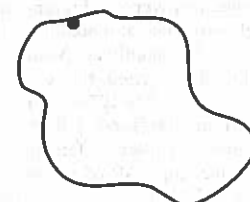
closed-circuit transition As applied to reduced-voltage controllers, including star-delta controllers, a method of starting in which the power to the motor is not interrupted during the starting sequence. *See also:* electric controller. (IA) [60]

closed-circuit transition auto-transformer starting (rotating machinery) The process of auto-transformer starting whereby the motor remains connected to the supply during the transition from reduced to rated voltage. (PE) [9]

closed-circuit voltage (batteries) The voltage at its terminals when a specified current is flowing. *See also:* battery. (EEC/PE) [119]

closed construction Any building, building component, assembly or system manufactured in such a manner that all concealed parts of processes of manufacture cannot be inspected before installation at the building site without disassembly, damage, or destruction. (NEC/NESC) [86]

closed curve (image processing and pattern recognition) A curve whose beginning and ending points are the same point.



closed curve

(C) 610.4-1990

closed loop (1) (automatic control) A signal path that includes a forward path, a feedback path, and a summing point and that forms a closed circuit. *See also:* feedback loop. (IA) [60], [69]

(2) (software) A loop that has no exit and whose execution can be interrupted only by intervention from outside the computer program or procedure in which the loop is located. *Contrast:* UNTIL; WHILE. (C) 610.12-1990