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IEEE Std 100-1996

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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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OF ELECTRICAL AND~~

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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 In some cases, terms from withdrawn standards are included when no current source can be found.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.

The sponsoring body for this document was Standards Coordinating Committee 10 on Definitions (SCC10), which consisted of the following members:

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Assistance was provided by the IEEE Standards editorial staff.

## 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.

Cat

AE  
AHD  
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AP  
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BA  
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CHM  
COM  
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RA  
REL

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(AE) 172-1983w  
specified area that is to  
cings that are not related  
(C) 610.2-1987

**e devices) (low-voltage**  
re characteristic of some  
bit a low resistance and  
ite as a result of an ex-  
D) [8], C62.32-1981s  
operation of a signal in  
(EEC/PE) [119]

**k circuit)** A drop signal  
attract the attention of  
(EEC/PE) [119]

**ective devices) (low-**  
ices) A defined electrici-  
ied as a clearing stim-  
vice under laboratory  
led to simulate condi-

) [8], C62.32-1981s  
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terruption. *Note:* The  
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(PE/SWG) [56]  
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1992, C37.40-1993  
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(B) C37.123-1996

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(MM) 1596-1992

that has less than  
(EEC/IE) [126]

ntent of which is  
(M) 802.10-1992

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ctors at a definite  
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ee also: raceway.  
(EEC/PE) [119]

part of a building  
and whose walls  
(EEC/IE) [126]

a specified value  
ee also: electro-

76], C63.4-1991  
: button without  
(C) 1295-1993

ts services of a  
f) 1296-1987s  
orporation.

93, 1351-1994  
sting a service.  
) 610.7-1995

(4) Software that uses an interface. (C/PA) 1224.1-1993  
(5) *See also:* batch client.

**client execution environment** The machine state that exists  
when a client program begins execution.  
(BA/C) 1275-1994

**client interface** A set of data and procedures giving a client  
program access to client interface services.  
(BA/C) 1275-1994

**client instance** A manifestation of the client that shares the input  
and output queues of the client with other instances.  
(C/PA) 1224.1-1993

**client interface handler** A mechanism by which control and  
data are transferred from a client program to the firmware,  
and subsequently returned, for the purpose of providing client  
interface services. (BA/C) 1275-1994

**client layer** In the OSI model, refers to the data link and phys-  
ical layers. *See also:* application layer; data link layer; entity  
layer; logical link control sublayer; medium access control  
(MAC) sublayer; network layer; physical layer; presentation  
layer; session layer; sublayer; transport layer.  
(C) 610.7-1995

**client interface services** Those services that Open Firmware  
provides to client programs, including device tree access,  
memory allocation, mapping, console I/O, mass storage, and  
network I/O. (BA/C) 1275-1994

**client-server** In a communications network, the client is the  
requesting device and the server is the supplying device. For  
example, the user interface could reside in the client work-  
station while the storage and retrieval functions could reside  
in the server database. (C) 610.7-1995

**client role** The location where the software is actually executed  
or used (as opposed to the target where it is actually installed).  
The configuration of software is performed by this role.  
(C/PA) 1387.2-1995

**climber in training** A worker who is in training to become a  
qualified climber. (PE/T&D) 1307-1996

**client program** A software program that is loaded and executed  
by Open Firmware (or a secondary boot program). (The client  
program may use services provided by the Open Firmware  
client interface.) (BA/C) 1275-1994

**climbing** The vertical movement (ascending and descending)  
and horizontal movement to access or depart the worksite.  
(NESC/PE/T&D) 1307-1996, C2-1997

**climbing space** The vertical space reserved along the side of a  
pole or structure to permit ready access for linemen to equip-  
ment and conductors located on the pole structure.  
(PE/T&D) [10], 196-1951w, C2.2-1960

**clinometer (navigation aids)** An instrument for indicating the  
degree of slope of the angle of roll or pitch of a vehicle,  
according to the plane in which it is mounted.  
(AE) 172-1983w

**clip (1) (charged-particle detectors) (radiation detectors)**  
**(x-ray energy spectrometers)** A limiting operation, such as  
the use of a high-pass filter or a nonlinear operation such as  
diode limiting of pulse amplitude. *Synonym:* clipping. *See*  
*also:* contact clip; differentiated; fuse clips.  
(NPS) 301-1976s, 325-1971w, 759-1984r

(2) **(charged-particle detectors)** A limiting operation, such  
as the use of a high-pass filter (differentiator) or a nonlinear  
operation to limit the amplitude of a pulse. The first usage is  
archaic. *Synonym:* clipping. (NPS) 300-1988r  
(3) *See also:* clamp, cable. (PE/T&D) 524-1992

**clipboard** A software storage device that is used to store an  
object that is cut or copied from the screen and to retrieve an  
object that is pasted. (C) 1295-1993

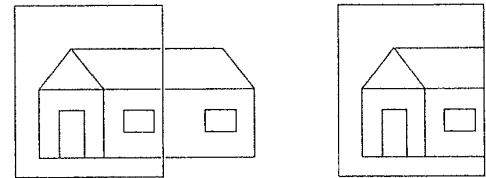
**clipper (data transmission)** A device that automatically limits  
the instantaneous value of the output to a predetermined max-  
imum value. *Note:* The term is usually applied to devices  
which transmit only portions of an input wave lying on one  
side of an amplitude boundary. (PE) 599-1985w

**clipper limiter** A transducer that gives output only when the  
input lies above a critical value and a constant output for all

inputs above a second higher critical value. *Synonym:* ampli-  
tude gate. *See also:* transducer. (AP) 145-1983s

**clipping (1) (voice-operated telephone circuit)** The loss of ini-  
tial or final parts of words or syllables due to nonideal oper-  
ation of the voice-operated devices. (EEC/PE) [119]

(2) **(computer graphics)** A computer graphics technique in  
which display elements lying totally outside a view area are  
made invisible and display elements lying partially inside a  
view area are scissored to remove the parts outside the view  
area before they are mapped to the display image. *Note:* In  
two-dimensional graphics, this view area is called the win-  
dow; in three-dimensional graphics, it is called the view  
volume. *See also:* scissoring; view volume; window; wrap-  
around.



Before Clipping

After Clipping

clipping

(C) 610.6-1991  
(3) *See also:* clip. (NPS) 300-1988r  
(4) *See also:* clipping-in. (PE/T&D) 524-1992

**clipping-in (conductor stringing equipment)** The transferring  
of sagged conductors from the travelers to their permanent  
suspension positions and the installing of the permanent sus-  
pension clamps. *Synonyms:* clamping-in; clipping.  
(PE/T&D) 524-1992, 524a-1993

**clipping offset (conductor stringing equipment)** A calculated  
distance, measured along the conductor from the plumb  
mark to a point on the conductor at which the center of the  
suspension clamp is to be placed. When stringing in rough  
terrain, clipping offsets may be required to balance the hori-  
zontal forces on each suspension structure.  
(PE/T&D) 524-1992

**clips** *See:* contact clips; fuse clips.

**CLIST** A command language used in the IBM MVS environ-  
ment. (C) 610.13-1993

**CLK** A fixed-frequency clock signal. The main SBus timing  
signal. (BA/C) 1496-1993

**clock (1) (A)** A device that generates periodic signals used for  
synchronization. **(B)** A device that measures and indicates  
time. *See also:* master clock; real-time clock; time-of-day  
clock; timer; wall clock. **(C)** A register whose content  
changes at regular intervals in such a way as to measure time.  
(C) [20]

(2) A signal, the transitions of which (between the low and  
high logic level [or vice versa]) are used to indicate when a  
stored-state device, such as a flip-flop or latch, may perform  
an operation. (C/TT) 1149.1-1990, 1149.5-1995

(3) An object that measures the passage of time. The current  
value of the time measured by a clock can be queried and,  
possibly, set to a value within the legal range of the clock.  
(C/PA) 1003.5b-1995, 9945-1-1996

(4) **(A)** A device that generates periodic, accurately spaced  
signals used for such purposes as timing, regulation of the  
operations of a processor, or generation of interrupts.  
**(B)** To trigger a circuit to perform an operation, such as to  
accept data into a register. (C) 610.10-1994

(5) *See also:* dynamometer.  
(PE/T&D) 516-1987s, 524-1992

**clock accuracy** The deviation from absolute accuracy per unit  
of time. In a hierarchical, master-slave synchronization plan,  
with one primary and at least one backup reference being  
designated for each local digital switch, the clock rate of the  
local switch is controlled by the master. Under that method  
of operation, the local digital switch should operate at zero

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

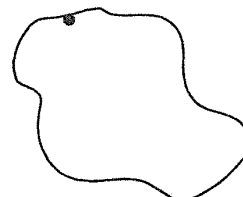
**closed-circuit transition** As applied to reduced-voltage controllers, including star-delta controllers, a method of starting in which the power to the motor is not interrupted during the starting sequence. *See also:* electric controller. (IA) [60]

**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

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