

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 In some cases, terms from withdrawn standards are included when no current source can be found.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

E

EACK See: extended acknowledgment.

E&M signaling (telephone switching systems) A technique for transferring information between a trunk circuit and a separate signaling circuit over leads designated "E" and "M." The "M" lead transmits to the signaling circuit and the "E" lead transmits to the trunk circuit.

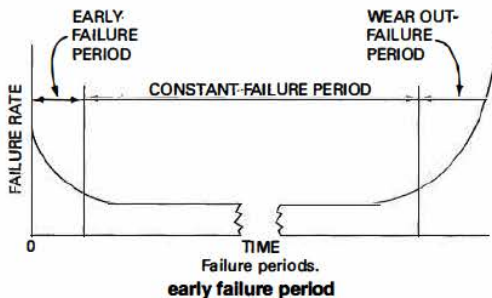
(COM) 312-1977w

EAM See: electrical accounting machine.

eardrum reference point (DRP) A point located at the end of the ear canal, corresponding to the eardrum position.

(COM) 1206-1994

early-failure period (1) That possible early period, beginning at a stated time and during which the failure rate decreases rapidly in comparison with that of subsequent period. See also: constant failure rate period.



(R) [29]

(2) (software) The period of time in the life cycle of a system or component during which hardware failures occur at a decreasing rate as problems are detected and repaired. *Synonym:* burn-in period. *Contrast:* constant-failure period; wearout-failure period. See also: bathtub curve.

(C) 610.12-1990

early-warning radar Radar employed to search for distant enemy aircraft.

(AE) 686-1990w

ear mold A receiver-to-ear coupling device consisting of a short length of tubing (sound-pipe) and a fitting, usually made of hard plastic. The fitting is custom molded to an individual's concha and ear canal entrance. It occludes that portion of the ear canal into which the fitting extends.

(COM) 1206-1994

EAROM See: electrically alterable read-only memory.

earphone (receiver) An electroacoustic transducer intended to be closely coupled acoustically to the ear. *Note:* The term receiver should be avoided when there is risk of ambiguity.

(SP) [32]

earphone coupler A cavity of predetermined size and shape that is used for the testing of earphones. The coupler is provided with a microphone for the measurement of pressures developed in the cavity. *Note:* Couplers generally have a volume of six cubic centimeters for testing regular earphones and a volume of two cubic centimeters for testing insert earphones.

(SP) [32]

ear reference point (ERP) (1) A point on the artificial test head where the intersection of the receiver ear-cap axis with the external ear-cap plane is placed for testing.

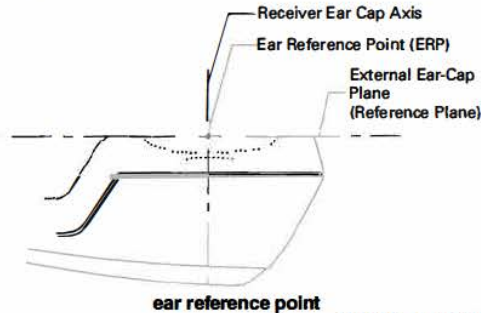
(COM) 269-1992

(2) A virtual point for geometric reference located at the entrance to the listener's ear, traditionally used for calculating telephonometric loudness ratings.

(COM) 1206-1994

(3) The intersection of the receiver ear-cap axis with the external ear-cap plane (planar area containing points of the receiver end of the handset which, in normal handset use

which, in normal handset use, rest against the ear) as shown below.



ear reference point

(COM) 1027-1996

earth, effective radius (radio-wave propagation) A value for the radius of the earth that is used in place of the geometrical radius to correct approximately for atmospheric refraction when the index of refraction in the atmosphere changes linearly with height. *Note:* Under conditions of standard refraction the effective radius of the earth is 8.5×10^6 meters, or $4/3$ the geometrical radius. See also: radiation; radio-wave propagation.

(AP) [36]

earth-fault protection See: ground protection.

earth inductor See: generating magnetometer.

earth rate The angular velocity of the earth with respect to inertial space. Its magnitude is $7.292 \cdot 10^{-5}$ rad/s (15.041°/h). This vector quantity is usually expressed as two components in local level coordinates, north (or horizontal) and up (or vertical).

(AE) 528-1994

earth resistivity The measure of the electrical impedance of a unit volume of soil. The commonly used unit is the ohm-meter (Ω -m) that refers to the impedance measured between opposite faces of a cubic meter of soil.

(PE) 367-1996

earth's rate correction (1) (navigation aid terms) A rate applied to a gyroscope to compensate for the apparent precession of the spin axis caused by the rotation of the earth.

172-1983w

(2) (gyros) A command rate applied to a gyro to compensate for the rotation of the earth with respect to the gyro input axis.

(AE) 528-1994

earth station (communication satellite) A ground station designed to transmit to and receive transmission from communication satellites.

(COM) [24]

earth terminal See: ground terminal.

ear tip A receiver-to-ear coupling device consisting of a short length of tubing (sound-pipe) and a soft bulb-shaped fitting. It occludes that portion of the ear canal into which the ear tip extends.

(COM) 1206-1994

Easytrieve A database manipulation language used for extracting data from data files and databases.

(C) 610.13-1993

EBCDIC See: extended binary coded decimal interchange code.

E bend (E-plane bend) (waveguide technique) A smooth change in the direction of the axis of a waveguide, throughout which the axis remains in a plane parallel to the direction of polarization. See also: waveguide.

(EEC/PE) [119]

EBR See: electron beam recording.

ECAP II See: Electronic Circuit Analysis Program II.

ECC See: error-correcting code; error-correction coding.

eccentric groove (disc recording) (eccentric circle) A locked groove whose center is other than that of the disc record (generally used in connection with mechanical control of phonographs). See also: phonograph pickup.

(SP) [32]

eccentricity (power distribution, underground cables) (1) (general) The ratio of the difference between the minimum

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gross dependable capacity (power system measurement) The gross maximum capacity, modified for ambient limitations for a specified period of time, such as a month or a season.

(PE) 762 1980s

gross generation (electric power system) The generated output power at the terminals of the generator.

(PE) 858-1993, 94-1991

gross head (power operations) The difference of elevations between water surfaces of the forebay and tailrace under specified conditions.

(PE) 858 1987s

gross heat rate (power operations) A measure of generating station thermal efficiency, generally expressed as British thermal unit per kilowatt-hour (Btu/kWh). *Note:* It is computed by dividing the total Btu content of the fuel burned (or of heat released from a nuclear reactor) by the resulting kilowatt hours (kWh) generated.

(PE) 858 1987s

gross information content A measure of the total information, redundant or otherwise, contained in a message. *Note:* It is expressed as the number of bits or hartleys required to transmit the message with specified accuracy over a noiseless medium without coding. *See also:* bit.

(EEC/PE) [119]

gross maximum capacity (power system measurement) The maximum capacity that a unit can sustain over a specified period of time. To establish this capacity, formal demonstration is required. The test should be repeated periodically. This demonstrated capacity level shall be corrected to generating conditions for which there would be minimum ambient restriction. When a demonstration test has not been conducted, the estimated maximum capacity of the unit shall be used.

(PE) 762 1980s

gross maximum generation (power system measurement) The energy that could have been produced by a unit in a given period of time if operated continuously at gross maximum capacity.

(PE) 762-1980s

gross rated capacity The gross steady output that a generating unit or station can produce for at least two hours under specified operating conditions. *See also:* generating station.

(PE/T&D) [10]

gross reserve generation (power system measurement) The energy that a unit could have produced in a given period but did not, because it was not required by the system. This is the difference between gross available generation and gross actual generation:

$$GRG = GAG + GAAG$$

(PE) 762-1980s

gross seasonal unavailable generation (power system measurement) The difference between the energy that would have been generated if operating continuously at gross maximum capacity and the energy that would have been generated if operating continuously at gross dependable capacity, calculated only during the time the unit was in the available state.

(PE) 762-1980s

gross unit unavailable generation (power system measurement) The difference between the energy that would have been generated if operating continuously at gross dependable capacity and the energy that would have been generated if operating continuously at available capacity. This is the energy that could not be generated by a unit due to planned and unplanned outages and unit deratings.

(PE) 762 1980s

ground (1) (earth) (ground systems) A conducting connection, whether intentional or accidental, by which an electric circuit or equipment is connected to the earth, or to some conducting body of relatively large extent that serves in place of the earth. *Note:* It is used for establishing and maintaining the potential of the earth (or of the conducting body) or approximately that potential, on conductors connected to it, and for conducting body current to and from the earth (or the conducting body).

(IA/NESC/PE/PSPD/T&D) [86], 1048 1990, 1050-1996, 1100-1992, 32 1972r, 463-1993, 524a-1993, 81 1983

(2) (A) **(transmission path)** A direct conducting connection to the earth or body of water that is a part thereof. (B) **(trans-**

mission path) A conducting connection to a structure that serves a function similar to that of an earth ground (that is, a structure such as a frame of an air, space, or land vehicle that is not conductively connected to earth).

(Std100) 315-1975r

(3) **(hydroelectric power plants)** Connection to earth or to a common conducting body that serves in place of the earth.

(PE) 1020-1988r

groundable parts Those parts that may be connected to ground without affecting operation of the device.

(PE/SWG) C37.100-1992, C37.40 1993

ground absorption (data transmission) The loss of energy in transmission of radio waves, due to dissipation in the ground.

(PE) 599 1985w

ground acceleration (1) (seismic qualification of Class 1E equipment for nuclear power generating stations) The acceleration of the ground resulting from the motion of a given earthquake. The maximum ground acceleration is the zero period acceleration (ZPA) of the ground response spectrum.

(PE) 344 1987r

(2) The acceleration of the ground resulting from a given earthquake's motion. The maximum ground acceleration can be obtained from the ground response spectrum as the acceleration at high frequencies (in excess of 33 Hz).

(PE/SWG) C37.100-1992, C37.81-1989r

ground and test device A term applied to a switchgear assembly accessory device which can be inserted in place of a drawout circuit breaker for the purposes of grounding the main bus and/or external circuits connected to the switchgear assembly and/or primary circuit testing.

(PE/SWG) C37.100 1992, C37.20.2 1993

ground-area open floodlight (illuminating engineering) A unit providing a weatherproof enclosure for the lamp socket and housing. No cover glass is required. (EEC/IE) [126]

ground-area open floodlight with reflector insert (illuminating engineering) A weatherproof unit so constructed that the housing forms only part of the reflecting surface. An auxiliary reflector is used to modify the distribution of light. No cover glass is required. (EEC/IE) [126]

ground bar (lightning) A conductor forming a common junction for a number of ground conductors. (PE) [8], [84]

ground-based navigation aid An aid that requires facilities located upon land or sea. *See also:* navigation.

(AE) [42], 686 1982s

ground, block *See:* ground, traveler.

ground bus A bus to which the grounds from individual pieces of equipment are connected, and that, in turn, is connected to ground at one or more points. (PE/SWG) C37.100 1992

ground bushing (separable insulated connectors) An accessory device designed to electrically ground and mechanically seal a de energized power cable terminated with an elbow.

(PE/T&D) 386 1995

ground, butt *See:* ground, structure base.

ground cable bond A cable bond used for grounding the armor or sheaths of cables or both. *See also:* ground.

(PE/T&D) [10]

ground chain *See:* ground, structure base.

ground clamp A clamp used in connecting a grounding conductor to a grounding electrode or to a thing grounded. *Synonym:* grounding clamp. *See also:* ground.

(PE/T&D) [10]

ground clutter Clutter resulting from the ground or objects on the ground. (AE) 686-1990w

ground conductivity A property of the ground, expressed as the ratio of electric current density to electric field strength.

(PE/T&D) 1260 1996

ground conductor (lightning) A conductor providing an electric connection between part of a system, or the frame of a machine or piece of apparatus, and a ground electrode or a ground bar. *See also:* grounded conductor. (PE) [8], [84]

ground conduit A conduit used solely to contain one or more grounding conductors. *See also:* ground. (PE/T&D) [10]

ground, running A portable device designed to connect a moving conductor or wire rope, or both, to an electrical ground. These devices are normally placed on the conductor or wire rope adjacent to the pulling and tensioning equipment located at either end of a sag section. They are primarily used to provide safety for personnel during construction or reconstruction operations. *Synonyms:* ground roller; ground, moving; ground, rolling; ground, traveling.

(PE/T&D) 1048-1990, 524-1992

ground set *See:* master ground.

ground, sheave *See:* ground, traveler.

ground source *See:* ground.

ground speed (navigation) The speed of a vehicle along its track. *See also:* navigation. (AE) [42], 686-1982s

ground-start signaling (telephone switching systems) A method of signaling using direct current in a ground return path to indicate a service request. (COM) 312-1977w

ground-state maser (laser maser) A maser in which the terminal level of the amplifying transition is appreciably populated at thermal equilibrium for the ambient temperature.

(LEO) 586-1980w

ground stick *See:* master ground; ground, personal.

ground stick, insulated An insulated rod, fabricated from fiberglass reinforced plastic, with specialized connection hardware, operating mechanism, and of sufficient length to allow for safe gripping and installation of grounding clamps.

(PE/T&D) 524a-1993

ground, structure base A portable device designed to connect (bond) a metal structure to an electrical ground. It is primarily used to provide safety for personnel during construction, reconstruction, or maintenance operations. *Synonyms:* ground chain; ground, butt; ground, structure; ground, tower.

(PE/T&D) 1048-1990, 524-1992

ground support equipment (test, measurement, and diagnostic equipment) All equipment (implements, tools, test equipment devices--mobile or fixed--and so forth) required on the ground to make an aerospace system (aircraft, missile, and so forth) operational in its intended environment.

(MIL) [2]

ground surveillance radar A radar set operated at a fixed point for observation and control of the position of aircraft or other vehicles in the vicinity. *See also:* navigation. (AE) [42]

ground system (1) That portion of an antenna consisting of a system of conductors or a conducting surface in or on the ground. (AP) 145-1993

(2) (general) Consists of all interconnected grounding connections in a specific area. *Synonym:* grounding system.

(PE/T&D) 524a-1993

(3) That portion of an antenna closely associated with and including an extensive conducting surface, which may be the earth itself. *See also:* antenna. (AP) [35]

ground terminal (1) (metal-oxide surge arresters for ac power circuits) (surge arresters) The conducting part provided for connecting the arrester to ground.

(PE/PSPD) C62.11-1993

(2) (lightning protection system) The portion extending into the ground, such as a ground rod, ground plate, or the conductor itself, serving to bring the lightning protection system into electric contact with the ground. (PE) [8], [84]

ground, tower *See:* ground, structure base.

ground transformer *See:* grounding transformer.

ground, traveler *See:* traveler ground.

ground, traveling *See:* ground, running.

ground, ufer *See:* ground electrode, concrete-encased.

groundwall insulation The main high voltage electrical insulation that separates the copper conductors from the grounded stator core in motor and generator stator windings.

(DEI) 1043-1996

ground wave (1) (data transmission) A radio wave that is propagated over the earth and is ordinarily affected by the presence of the ground and troposphere. *Notes:* 1. The ground

wave includes all components of a radio wave over the earth except ionospheric and tropospheric waves. 2. The ground wave is refracted because of variations in the dielectric constant of the troposphere including the condition known as a surface duct. *See also:* radiation; radio-wave propagation.

(AP/PE) 149-1979r, 599-1985w

(2) (radio-wave propagation) From a source in the vicinity of the surface of the Earth, a wave that would exist in the vicinity of the surface in the absence of an ionosphere. *Note:* The ground wave can be decomposed into the Norton surface wave and a space wave consisting of the vector sum of a direct wave and a ground reflected wave. (AP) 211-1990

ground well A hole with a diameter greater than an inserted ground rod, drilled to a specified depth, and backfilled with a highly conductive material. The backfill will be in intimate contact with the earth. (PE) 665-1995

ground window The area through which all grounding conductors, including metallic raceways, enter a specific area. It is often used in communications systems through which the building grounding system is connected to an area that would otherwise have no grounding connection. (IA) 1100 1992

ground wire (1) (data transmission) (telecommunications) A conductor leading to an electric connection with the ground.

(PE) 599-1985w

(2) (overhead power lines) A conductor having grounding connections at intervals, that is suspended usually above but not necessarily over the line conductor to provide a degree of protection against lightning discharges. *See also:* ground.

(PE/T&D) [10]

ground, working *See:* ground, personal.

group (1) (storage cell) An assembly of plates of the same polarity burned to a connecting strap. *See also:* battery.

(EEC/PE) [119]

(2) (electric and electronics parts and equipment) A collection of units, assemblies, or subassemblies which is a subdivision of a set or system, but which is not capable of performing a complete operational function. Typical examples: antenna group, indicator group. (GSD) 200-1975r

(3) (data management) A set of items that are related to each other in some way; for example, a set of records that have the same value for a particular field, or a set of files in a generation data group. (C) 610.5-1990

(4) A repeater port or a collection of repeater ports that can be related to the logical arrangement of ports within a repeater. (C/LM) 802.3u-1995

(5) *See also:* channel group; Remote Bridge Group.

(COM/C/LM) 802.1G-1996

group address (GP) (1) A predefined destination address that denotes a set of selected service access points (SAPs) from the medium access control (MAC) sublayer service offered by the DQDB layer to the logical link control (LLC) sublayer.

(C/LM) 8802-6-1994

(2) The high order (left justified) bits assigned in the device address field of a FASTBUS address which are used to identify the segment on which a device is located; more than one group address may be assigned to a given segment. *See base group address.* 960-1993

group alerting (telephone switching systems) A central office feature for simultaneously signaling a group of customers from a control station providing an oral or recorded announcement. (COM) 312-1977w

group ambient temperature (cable or duct) (power distribution, underground cables) The no-load temperature in a group with all other cables or ducts in the group loaded.

(PE) [4]

group-busy tone (telephone switching systems) A tone that indicates to operators that all trunks in a group are busy.

(COM) 312-1977w

group code recording *See:* constant-linear-velocity recording.

group, commutating A group of thyristor converter circuit elements and the alternating-voltage supply elements conductively connected to them in which the direct current of the

distinguish between similar or identical features. The assignment of integer modifiers should be sequential as a function of time within a waveform epoch or within features thereof.

(IM) 194-1977w

integer arithmetic Fixed-point arithmetic in which the radix point is assumed to lie immediately to the right of the least significant digit in each numeral; that is, all numbers are assumed to be integers.

(C) 1084-1986w

integer array (inta) (subroutines for CAMAC) The symbol *inta* represents an integer array, the length and contents of which are not defined in this standard. It is intended to contain system-dependent or implementation-dependent information associated with the definition of a LAM. If no such information is required, the array need not be used. This information can include parameters necessary for interrupt linkage, event specification, etc. The documentation for an implementation must describe the requirements for any parameters contained in this array. *Synonym:* *inta*.

(NPS) 758-1979r

integer character string A decimal character string, an octal character string, or a hexadecimal character string.

(C/PA) 1387.2-1995

integer data Numeric data used to represent whole numbers; that is, numeric values without fractional parts. For example, 0, +1, 1, +2; 2, ... *See also:* fixed-point data; packed decimal data; unsigned packed decimal data; zoned decimal data.

(C) 610.5-1990

integer programming In operations research, a class of procedures for locating the maximum or minimum of a function under given constraints, one of which is that some or all variables must have integer values. *Synonym:* discrete programming.

(C) 610.2-1987

integer type A data type whose members can assume only integer values and can be operated on only by integer arithmetic operations, such as addition, subtraction, and multiplication. *Contrast:* character type; enumeration type; logical type; real type.

(C) 610.12-1990

integer unit A processing unit that performs integer and control-flow operations and contains general-purpose integer registers and processor state registers, as defined by this standard.

(C/MM) 1754-1994

integer variable A variable that may assume only integer (non-fractional) values.

(C) 1084-1986w

integral action rate (process control) (proportional plus integral control action devices) For a step input, the ratio of the initial rate of change of output due to integral control action to the change in steady-state output due to proportional control action. *Note:* Integral action rate is often expressed as the number of repeats per minute because it is equal to the number of times per minute that the proportional response to a step input is repeated by the initial integral response.

(PE) [3]

integral bushing An apparatus bushing designed for use with another connector component, such as an elbow.

(PE/T&D) 386-1995

integral coupling (rotating machinery) A coupling flange that is a part of a shaft and not a separate piece. *See also:* rotor.

(PE) [9]

integral-horsepower motor A motor built in a frame as large as or larger than that of a motor of open construction having a continuous rating of one horsepower at 1700 1800 revolutions per minute. *See also:* asynchronous machine.

(EEC/PE) [119]

integral nonlinearity (1) (A) (x-ray energy spectrometers) (of a pulse amplifying system) The maximum nonlinearity (deviation) over the specified operating range of a system, usually expressed as a percentage of the maximum of the specified range. (B) (percent) (semiconductor radiation detectors) The departure from linear response expressed as a percentage of the maximum rated output pulse amplitude.

(NPS) 301-1976s

(2) The maximum difference between the ideal and actual code transition levels after correcting for gain and offset.

(IM) 1057-1994

integral process A process that is needed to successfully complete project Activities, but is outside the management and development processes. The integral processes are verification and validation, software configuration management, documentation development, and training.

(C/SE) 1074.1-1995

integral-slot winding (rotating machinery) A distributed winding in which the number of slots per pole per phase is an integer and is the same for all poles. *See also:* rotor; stator.

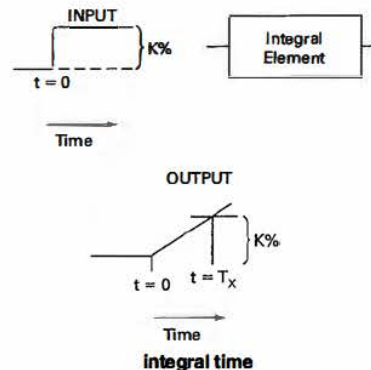
(PE) [9]

integral switch and fuse A switch and fuse assembly mounted on the same frame.

(PE/SWG) C37.20.4-1996

integral test equipment *See:* self-test.

integral time (speed governing of hydraulic turbines) The integral time, T_X , of an integrating element is the time required for the element's percent output to be equal in magnitude to the element's percent input where that input is a step function. The integral gain of an element is the reciprocal of its integral time.



(PE) 125-1977s

integral unit substation A unit substation in which the incoming, transforming, and outgoing sections are manufactured as a single compact unit.

(PE/SWG) C37.100-1992, C57.12.80-1978r

integrated (A) (charged-particle detectors) (germanium gamma-ray detectors) (pulse) (pulse amplifier) (x-ray energy spectrometers) A pulse is integrated when it is passed through a low-pass network, such as a single resistance-capacitance (RC) network or a cascaded RC network. (B) (pulse) (pulse amplifier) A pulse that is passed through a low-pass network, such as a single RC network or a cascaded RC network.

(NPS) 300-1988r

integrated alarm system (alarm monitoring and reporting systems for fossil-fueled power generating stations) An alarm display system consisting of window annunciators combined with cathode-ray tube (CRT), printer, or mimic display.

(PE) 676-1986w

integrated antenna system A radiator with an active or non-linear circuit element or network incorporated physically within the structure of the radiator.

(AP) 145-1993

integrated circuit (IC) (1) (solid state) A combination of interconnected circuit elements inseparably associated on or within a continuous substrate. *Note:* To further define the nature of an integrated circuit, additional modifiers may be prefixed. Examples are: 1) dielectric-isolated monolithic integrated circuit, 2) beamlead monolithic integrated circuit, 3) silicon-chip tantalum thin-film hybrid integrated circuit. *See also:* element; film integrated circuit; integrated electronics; multichip integrated circuit. (ED) [46], 274-1966w (2) (A) A combination of connected circuit elements (such as transistors, diodes, resistors, and capacitors) inseparably associated on or within a continuous substrate. *Synonym:* chip. *See also:* program. (B) A solid-state circuit consisting of in-

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terconnected active and passive semiconductor devices dif-
fused into a single silicon chip. *Synonyms:* chip; microcircuit.
See also: monolithic integrated circuit; very high speed inte-
grated circuit. (C) 610.10-1994

Integrated Civil Engineering System (ICES) A general-pur-
pose software system including several programming lan-
guages, such as COGO and STRUDL, and subsystems that
are designed for use in civil engineering and engineering
management. (C) 610.13-1993

integrated data dictionary A data dictionary that is function-
ally involved in data accesses, performing required checks
for value limits and data types and disallowing illegal modi-
fications to data elements within the system that is described.
(C) 610.5-1990

integrated database A repository for storing all information
pertinent to the systems engineering process to include all
data, schema, models, tools, technical management decisions,
process analysis information, requirement changes, process
and product metrics, and trade-offs. (C/SE) 1220-1994

integrated data processing (IDP) The use of computers to co-
ordinate a number of processes and improve overall efficiency
by reducing or eliminating redundant data entry or processing
operations. (C) 610.2-1987

integrated demand The demand integrated over a specified pe-
riod divided by that period. (PE) 858-1993

integrated-demand meter (block-interval demand meter) A
meter that indicates or records the demand obtained through
integration. *See also:* demand meter; electricity meter.
(ELM) C12.1-1982s

integrated device electronics A data-transfer interface in which
the control electronics for the disk drive are physically located
on the drive itself rather than on an expansion board or drive
adapter. *Synonym:* integrated drive electronics.
(C) 610.10-1994

integrated diagnostics A process that covers the entire spec-
trum of diagnostic activities in all phases of weapon system
acquisition. (ATL) 1226-1993

integrated drive electronics *See:* integrated device electronics.

integrated electronics The portion of electronic art and tech-
nology in which the interdependence of material, device, cir-
cuit, and system-design consideration is especially signifi-
cant: more specifically, that portion of the art dealing with
integrated circuits. *See also:* integrated circuit.
(ED) [46], 274-1966w

integrated energy curve (power operations) A curve of de-
mand versus energy showing the amount of energy repre-
sented under a load curve, or a load duration curve, above
any point of demand. (PE) 858-1987s

integrated heating system A complete system consisting of
components such as pipelines, vessels, heating elements, heat
transfer medium, thermal insulation, moisture barrier, non-
heating leads, temperature controller, safety signs, junction
boxes, conduit and fittings. (NEC/NESC) [86]

integrated injection logic A family of circuit logic in which
the logic state is defined by current flow rather than by voltage
level. (C) 610.10-1994

integrated mica *See:* mica paper.

integrated microprocessor One or more large scale integration
devices so interconnected as to provide all of the functions of
a central processing unit within a single LSI circuit. *Note:*
This use of the term is deprecated typically "microprocessor"
is used. *See also:* diagonally integrated microprocessor; hor-
izontally integrated microprocessor; vertically integrated mi-
croprocessor. (C) 610.10-1994

integrated-numbering plan (telephone switching systems) In
the world-numbering plan, arrangements for identifying tele-
phone stations within a geographical area identified by a
world-zone number which is also used as a country code. *See*
also: world-zone number. (COM) 312-1977w

**integrated numbering-plan area (telephone switching sys-
tems)** A geographical area of the world that is identified by

a world-zone number which is also used as a country code.
See also: world-zone number. (COM) 312-1977w

integrated optical circuit (IOC) (fiber optics) An optical cir-
cuit, either monolithic or hybrid, composed of active and pas-
sive components, used for coupling between optoelectronic
devices and providing signal processing functions.
(Std100) 812 1984w

integrated plow (cable plowing) (static or vibratory plows)
A self-contained or integral plow-prime mover unit.
(Std100)

integrated pulse In the absence of qualifiers (such as "true in-
tegration"), a pulse that has passed through one or more low
pass networks ("integrators"). (NPS) 325-1996

integrated radiation (laser maser) The integral of the radiance
over the exposure duration. (LEO) 586-1980w

integrated services terminal equipment (ISTE) A device that
serves as an information source and/or an information sink
for the provision of voice, facsimile, video, data, and other
information. (COM/C/LM) 802.9a-1995, 8802-9-1996

integrating (block interval) demand meter (metering) A
meter that integrates power or a related quantity over a fixed
time interval, and indicates or records the average.
(ELM) C12.1-1982s

integrating accelerometer A device that produces an output
that is proportional to the time integral of an input accelera-
tion. (AE) 528-1994

integrating amplifier (1) (analog computer) An operational
amplifier that produces an output signal equal to the time
integral of a weighted sum of the input signals. *Note:* In an
analog computer, the term integrator is synonymous with in-
tegrating amplifier. (C) 165-1977w, 166-1977w

(2) In an analog computer, an operational amplifier that pro-
duces an output signal equal to the time integral of a weighted
sum of the input signals. (C) 610.10-1994

integrating circuit *See:* integrator.

integrating motor In an analog computer, a motor designed to
give a constant ratio of output shaft rotational speed to input
signal. *Note:* The angle of rotation of the shaft with respect
to a datum is thus proportional to the time integral of the
applied signal. (C) 610.10-1994

integrating network *See:* integrator.

integrating photometer (illuminating engineering) One
which enables total luminous flux to be determined by a single
measurement. The usual type is the Ulbricht sphere with as-
sociated photometric equipment for measuring the indirect
illuminance of the inner surface of the sphere. (The measuring
device is shielded from the source under measurement.)
(EEC/IE) [126]

integrating preamplifier (germanium gamma-ray detectors)
(x-ray energy spectrometers) A pulse preamplifier in which
individual pulses are intentionally integrated by passive or
active circuits. (NPS) 325-1986s, 759-1984r

integrating relay A relay that operates on the energy stored
from a long pulse or a series of pulses of the same or varying
magnitude, for example, a thermal relay. *See also:* relay.
(Std100)

integration (1) (software) The process of combining software
components, hardware components, or both into an overall
system. (C) 610.12-1990

(2) The merger or combining of two or more lower-level el-
ements into a functioning and unified higher-level element
with the functional and physical interfaces satisfied.
(C/SE) 1220-1994

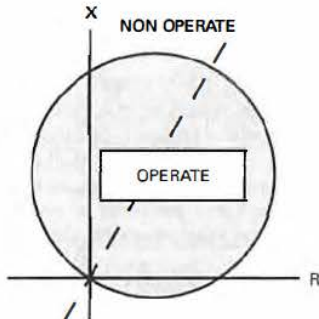
(3) Providing a single set of data for use between multiple
activities or departments (multiple application data base).
(PE) 1150-1991

(4) The combination of multiple signals of a radar to enhance
detectability, reduce measurement errors, improve angular
resolution, or improve performance in some other way.
(AE) 686-1990w

integration loss The loss incurred by integrating a signal non-
coherently instead of coherently. (AE) 686-1990w

mho (siemens) The unit of conductance (and of admittance) in the International System of Units (SI). The mho is the conductance of a conductor such that a constant voltage of one volt between its ends produces a current of one ampere in it. (Std100) 270-1966w

mho characteristic An inherently directional distance relay characteristic in which the threshold of operation for the basic form plots as a circle on an $R-X$ diagram, with the circle passing through the origin. See figure below. *Note:* For a self-polarized relay, the plot of the characteristic passes through the intersection of the $R-X$ axes; for a cross-polarized relay it includes this intersection, but the relay retains its full directional characteristic.



mho characteristic

(PE/SWG) C37.100-1992

mho relay A distance relay for which the inherent operating characteristic on an $R-X$ diagram is a circle that passes through the origin. *Note:* The operating characteristic may be described by the equation $Z = K \cos(\theta - \alpha)$ where K and α are constants and θ is the phase angle by which the input voltage leads the input current. (PE/SWG) C37.100-1992

MHz See: megahertz.

MIB See: management information base; medical information bus; Management Information Base.

MIC See: medium interface connector.

mica flake (rotating machinery) Mica lamina in thickness not over approximately 0.0028 centimeter having a surface area parallel to the cleavage plane under 1.0 centimeter square. See also: rotor; stator. (PE) [9]

mica folium (rotating machinery) A relatively thin flexible bonded sheet material composed of overlapping mica splittings with or without backing or facing. See also: rotor; stator. (PE) [9]

mica paper (rotating machinery) (integrated mica) (reconstituted mica) Mica flakes having an area under approximately 0.200 centimeter square combined laminarily into a substantial sheet-like configuration with or without binder, backing, or facing. See also: rotor; stator. (PE) [9]

mica sheet (rotating machinery) A composite of overlapping mica splittings bonded into a planar structure with or without backing or facing. See also: rotor; stator. (PE) [9]

mica splitting (rotating machinery) Mica lamina in thickness approximately 0.0015 centimeter to 0.0028 centimeter having a surface area parallel to the basal cleavage plane of at least 1.0 centimeter square. See also: rotor; stator. (PE) [9]

mica tape (rotating machinery) A composite tape composed of overlapping mica splittings bonded together with or without backing or facing. See also: rotor; stator. (PE) [9]

Michigan Algorithmic Decoder (MAD) A programming language used widely for doing numerical computations. *Note:* MAD was designed to permit the development of a very fast compiler. See also: NOMAD. (C) 610.13-1993

MICR See: magnetic ink character recognition; magnetic ink character reader.

micro (μ) (mathematics of computing) A prefix indicating one millionth (10^{-6}). (C) 1084-1986w

microarchitecture (1) The microword definition, data flow, timing constraints, and precedence constraints that character-

ize a given microprogrammed computer. (C) 610.12-1990
(2) The architecture of a microprogrammed computer.

(C) 610.10-1994

microbar A unit of pressure formerly in common usage in acoustics. One microbar is equal to one dyne per square centimeter and equals 0.1 newton per square meter. The newton per square meter is now the preferred unit. *Note:* The term bar properly denotes a pressure of 10^6 dynes per square centimeter. Unfortunately, the bar was once used in acoustics to mean one dyne per square centimeter, but this is no longer correct. (SP) [32]

microbend loss (fiber optics) In an optical waveguide, that loss attributable to microbending. (Std100) 812-1984w

microbending (fiber optics) In an optical waveguide, sharp curvatures involving local axial displacements of a few micrometers and spatial wavelengths of a few millimeters. Such bends may result from waveguide coating, cabling, packaging, installation, etc. *Note:* Microbending can cause significant radiative losses and mode coupling. See also: macrobending. (Std100) 812-1984w

microchannel plate (electron image tube) An array of small aligned channel multipliers usually used for intensification. See also: amplifier; camera tube. (ED) [45]

microcircuit See: integrated circuit.

microcode (1) (software) A collection of microinstructions, comprising part of, all of, or a set of microprograms.

(C) 610.12-1990

(2) A collection of microinstructions comprising part of, or all of a microprogram. (C) 610.10-1994

microcode assembler A computer program that translates microprograms from symbolic form to binary form.

(C) 610.12-1990

microcomputer (micro) A computer that contains at least one microprocessor as its main computing element. *Note:* The distinction between a microcomputer, minicomputer, and main frame is not yet standardized, however, in 1991 a typical mainframe is IBM's 3090, a typical minicomputer is Digital's VAX, and a typical microcomputer is IBM's PS/2. (C) 610.10-1994

microcopy A copy of an image or document so reduced in size from its original that it cannot be read by the unaided human eye. For example, microform, microfiche, microfilm, microimage. (C) 610.2-1987

microcycle See: machine cycle.

microelectronic device (electric and electronics parts and equipment) An item of inseparable parts and hybrid circuits, usually produced by integrated circuit techniques. Typical examples are microcircuit, integrated circuit package, micro module. (GSD) 200-1975r

microfacsimile Transmission and reception of microimages via facsimile communication. (C) 610.2-1987

microfiche A sheet of microfilm capable of containing microimages in a grid pattern. The sheet usually contains a title that can be read without magnification. *Synonym:* fiche. (C) 610.2-1987

microfilm (A) A high resolution film for recording microimages. (B) To record microimages on film. See also: computer output microfilm. (C) 610.10-1994, 610.2-1987

microfilmer See: computer output microfilmer.

microfloppy disk A floppy disk that is 3.5 inches wide. *Contrast:* minifloppy disk. (C) 610.10-1994

microfont* See: optical character recognition-B.

* Deprecated.

microform A medium that contains micro-images. For example, microfiche, microfilm. (C) 610.2 1987

micrographics That branch of science and technology concerned with methods and techniques for converting information to or from microform. *Synonym:* microphotographics. See also: office automation. (C) 610.2-1987

microimage An image that is too small to be read by the human eye without magnification. (C) 610.10 1994, 610.2 1987

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