M

m *See:* milli.

M *See:* mega.

MA *See:* module address.

MAC *See:* medium access control.

MAC address An address that identifies a particular medium access control (MAC) sublayer service access point (SAP). (LM/C) 8802-6-1994

MAC frame (1) Except where explicitly stated otherwise, a MAC frame conveying MAC user data across a LAN, or a representation of such a MAC frame within a MAC Bridge or on the non-LAN communications equipment of a Remote Bridge Group. (C/LM) 802.1G-1996

(2) A token ring frame containing a MAC PDU exchanged between MAC entities used to convey information that is used by the MAC protocol or management of the MAC sublayer. (C/LM) 8802-5-1998

(3) The logical organization of control and data fields (e.g., addresses, data, error check sequences) defined for the MAC sublayer. The MAC frame may be constructed in either ISO/IEC 8802-3 or ISO/IEC 8802-5 format. *See also:* framelocal area networks. (C) 8802-12-1998

machine (1) (general) An article of equipment consisting of two or more resistant, relatively constrained parts that, by a certain predetermined intermotion, may serve to transmit and modify force, motion, or electricity so as to produce some given effect or transformation or to do some desired kind of work. *Notes:* 1. If a matrix has as its elements impedances, it is usually referred to as impedance matrix. Frequently the impedance matrix is called impedance for short. 2. Usually such impedances are defined with the mechanical angular velocity of the machine at steady state. *See also:* asynchronous machine. (PE) [9], 270-1966w

(2) (sound measurements) Any rotating electrical device of which the acoustical characteristics are to be measured. *Notes:* 1. A small machine has a maximum linear dimension of 250 mm. This dimension is over major surfaces, excluding minor surface protuberances as well as shaft extension, and is measured either parallel to the shaft, or at right angles to it, according to which dimension gives the greater measurement. 2. A medium machine has a maximum linear dimension from 250 mm to 1 m as measured for small machine. 3. A large machine has a maximum linear dimension in excess of 1 m as measured for small machine.

(3) A generic term for a device such as a processor or computer. (C) 610.10-1994w

(4) (computers) *See also:* universal Turing machine; Turing machine.

machine address *See:* absolute address.

machine-aided Pertaining to a process or function performed with the assistance of one or more computers. (C) 610.2-1987

machine-aided translation Translation from one natural language to another, with the assistance of computer based aids such as automated lexicons and automated thesauri. *Synonym:* machine translation. *See also:* mechanical translation. (C) 610.2-1987

machine, aircraft electric *See:* aircraft electric machine.

machine-centered simulation *See:* computer simulation.

machine check (A) An automatic check. **(B)** A programmed check of machine functions. *See also:* automatic; check. (C) 162-1963

machine code (1) (computers) An operation code that a machine is designed to recognize. (MIL/C) [2], [20], [85]

(2) (software) Computer instructions and data definitions expressed in a form that can be recognized by the processing unit of a computer. *Contrast:* compiler code; interpretive code; assembly code. *See also:* computer instruction code. (C) 610.12-1990, 610.10-1994w

machine current The rms magnitude of the fundamental sinusoidal current at the terminals of the machine. (IA/ID) 995-1987w

machine cycle The time required for a processor to perform one internal operation, excluding those which may be accomplished in parallel. *Synonym:* microcycle. (C) 610.10-1994w

machine-dependent Pertaining to software that relies on features unique to a particular type of computer and therefore executes only on computers of that type. *Contrast:* machine independent. (C) 610.12-1990

machine, electric *See:* electric machine.

machine equation *See:* computer equation.

machine final-terminal stopping device (elevators) A final-terminal stopping device operated directly by the driving machine. *Synonym:* stop-motion switch. *See also:* control. (EEC/PE) [119]

machine independent Pertaining to software that does not rely on features unique to a particular type of computer, and therefore executes on computers of more than one type. *Contrast:* machine-dependent. *See also:* portability. (C) 610.12-1990

machine instruction (1) (computers) An instruction that a machine can recognize and execute. (MIL/C) [2], [20], [85]

(2) An instruction in the machine language of a particular processing unit of a computer. *See also:* computer instruction; machine code. (C) 610.10-1994w

machine instruction set *See:* computer instruction set.

machine language (1) (A) A language, occurring within a machine, ordinarily not perceptible or intelligible to persons without special equipment or training. **(B)** A translation or transliteration of definition (A) above into more conventional characters but frequently still not intelligible to persons without special training. (C) 162-1963

(2) (software) A language that can be recognized by the processing unit of a computer. Such a language usually consists of patterns of 1's and 0's, with no symbolic naming of operations or addresses. *Synonyms:* machine-oriented language; first-generation language. *Contrast:* symbolic language; assembly language; fifth generation language; fourth generation language; high-order language. (C) 610.12-1990

(3) A programming language that is directly executed by the central processing unit (CPU) portion of a computer. *Note:* No further translation, mapping, or decoding is required. *Synonyms:* machine-oriented language; first-generation language. *Contrast:* symbolic language; assembly language; fifth generation language; fourth generation language; high-order language. (C) 610.13-1993w

(4) A programming language that is directly executed by the ALU portion of the processor in a computer. *Synonym:* hardware language. (C) 610.10-1994w

machine operation *See:* computer operation.

machine-oriented language (1) (A) (test, measurement, and diagnostic equipment) A language designed for interpretation and use by a machine without translation. **(B) (test, measurement, and diagnostic equipment)** A system for expressing information which is intelligible to a specific machine; for example, a computer or class of computers. Such a language may include instructions which define and direct machine operations, and information to be recorded by or acted upon by these machine operations. **(C) (test, measurement, and diagnostic equipment)** The set of instructions expressed in the number system basic to a computer, together with symbolic operation codes with absolute addresses, relative addresses, or symbolic addresses. *Synonym:* assembly language; machine language. (MIL) [2]

(2) (software) *See also:* machine language. (C) 610.12-1990

machine or transformer thermal relay (power system device function numbers) A relay that functions when the temperature of a machine armature or other load-carrying winding or element of a machine or the temperature of a power rectifier or power transformer (including a power rectifier transformer) exceeds a predetermined value. (SUB/PE) C37.2-1979s

machine positioning accuracy, precision, or reproducibility (numerically controlled machines) Accuracy, precision, or reproducibility of position sensor or transducer and interpeting system, the machine elements, and the machine positioning servo. *Note:* Cutter, spindle, and work deflection, and cutter wear are not included. (May be the same as control positioning accuracy, precision, or reproducibility in some systems.) (IA/EEC) [61], [74]

machine readable Pertaining to data in a form that can be automatically input to a computer; for example, data encoded on a diskette. (C) 610.12-1990

machine-readable (A) Pertaining to a medium that can record information and convey it to a machine or sensing device. *Synonym:* machine-sensible. **(B)** Pertaining to information that can be read and processed by a machine. (C) 610.10-1994

MAchine-Readable Cataloging In library automation, an internationally-accepted standard for systems used to create catalogs of machine-readable bibliographic records. *Synonyms:* LCMARC; LC-MARC. (C) 610.2-1987

machine-readable medium (1) A data medium that is machine-readable. *Synonym:* automated data medium. (C) 610.5-1990w

(2) A data medium that can be used to convey data. (C) 610.10-1994w

machine recognition *See:* pattern recognition.

machine ringing (telephone switching systems) Ringing that once started continues automatically, rhythmically until the call is answered or abandoned. (COM) 312-1977w

machinery control room An enclosed or separated space generally located within the machinery spaces that functions as a central control station. (IA/MT) 45-1998

machinery spaces Spaces that are primarily used for machinery of any type, or equipment for the control of such machinery, such as boiler, engine, generator, motor, pump and evaporator rooms. (IA/MT) 45-1998

machine-sensible *See:* machine-readable.

machine simulation A simulation that is executed on a machine. *See also:* computer simulation. (C) 610.3-1989w

machine time *See:* time.

machine-tool control transformers (power and distribution transformers) Step-down transformers which may be equipped with fuse or other overcurrent protection device, generally used for the operation of solenoids, contactors, relays, portable tools, and localized lighting. (PE/TR) C57.12.80-1978r

machine translation (MT) *See:* machine-aided translation.

machine voltage The rms value of the fundamental sinusoidal voltage at the terminals of the machine. (IA/ID) 995-1987w

machine winding (rotating machinery) A winding placed in slots or around poles directly by a machine. *See also:* rotor; stator. (PE) [9]

machine word *See:* word; computer word.

machining accuracy, precision, or reproducibility Accuracy, precision, or reproducibility obtainable on completed parts under normal operating conditions. (IA/EEC) [61], [74]

MACRO A macro language used in Digital's VAX/VMS environment. (C) 610.13-1993w

macro (1) (software) In software engineering, a predefined sequence of computer instructions that is inserted into a program, usually during assembly or compilation, at each place that its corresponding macroinstruction appears in the program. (C) 610.12-1990

(2) In word processing, a predefined sequence of text and text formatting commands collected under a single user-defined name. Each time the name is entered, it is automatically replaced by the sequence of text and commands. (C) 610.2-1987

(3) A defined procedure or sequence of operations or characters that is inserted in the procedure each time its name is invoked. (SCC20) 771-1998

macroassembler An assembler that includes, or performs the functions of, a macrogenerator. (C) 610.12-1990

macrobending (fiber optics) In an optical waveguide, all macroscopic deviations of the axis from a straight line; distinguished from microbending. *See also:* microbend loss; macrobend loss; microbending. (Std100) 812-1984w

macrobend loss (fiber optics) In an optical waveguide, that loss attributable to macrobending. Macrobending usually causes little or no radiative loss. *Synonym:* curvature loss. *See also:* macrobending; microbend loss. (Std100) 812-1984w

macro definition *See:* macro.

macro generating program *See:* macrogenerator.

macrogenerator A routine, often part of an assembler or compiler, that replaces each macroinstruction in a source program with the predefined sequence of instructions that the macroinstruction represents. *Synonym:* macro generating program. (C) 610.12-1990

macroinstruction (1) (software) A source code instruction that is replaced by a predefined sequence of source instructions, usually in the same language as the rest of the program and usually during assembly or compilation. *See also:* macro; macrogenerator. (C) 610.12-1990, 610.10-1994w

(2) (computers) An instruction in a source language that is equivalent to a specified sequence of machine instructions. (C) [20], [85]

macro language A language used to define macros or macroinstructions. *Note:* IEEE Std 610.12-1990 defines terminology relating to macroinstructions. (C) 610.13-1993w

macro library A collection of macros available for use by a macrogenerator. *See also:* system library. (C) 610.12-1990

macroprocessor (software) A routine or set of routines provided in some assemblers and compilers to support the definition and use of macros. (C) 610.12-1990

macroprogramming Computer programming using macros and macroinstructions. (C) 610.12-1990

MAC service The unconfirmed connectionless-mode MAC service defined in ISO/IEC 10039, as an abstraction of the features common to a number of specific MAC services for Local Area Networks. (C/LM) 802.1G-1996

MAC service data unit (MSDU) The user data unit received in an MA-UNITDATA request for transfer by the medium access control (MAC) sublayer. (LM/C) 8802-6-1994

MAC sublayer *See:* medium access control sublayer.

MACSYMA An interactive programming system used to perform formal algebraic manipulation and symbolic mathematics. (C) 610.13-1993w

MAD *See:* minimum approach distance; Michigan Algorithmic Decoder.

MADCAP An extensible language used to perform numerical computation and set-theoretic operations, using input and output devices that permit two-dimensional input and output. (C) 610.13-1993w

mag card A colloquial reference to magnetic card. (C) 610.10-1994w

magic tee *See:* hybrid tee.

magner (polyphase circuit) At the terminals of entry into a delimited region, the algebraic sum of the reactive power for the individual terminals of entry when the the voltages are all determined with respect to the same arbitrarily selected common reference point in the boundary surface (which may be the neutral terminal of entry). The reference direction for the currents and the reference polarity for the voltages must be the same as for the instantaneous power and the active power.

The reactive power for each terminal entry is determined by considering each conductor and the common reference point as a single-phase two-wire circuit and finding the reactive power for each in accordance with the definition of **magner (single-phase two-wire circuit)**. If the voltages and currents are sinusoidal and of the same period, the reactive power Q for a three-phase circuit is given by

$$Q = E_a I_a \sin(\alpha_a - \beta_a) + E_b I_b \sin(\alpha_b - \beta_b) + E_c I_c \sin(\alpha_c - \beta_c)$$

where the symbols have the same meaning as in **power, instantaneous (polyphase circuit)**. If there is no neutral conductor and the common point for voltage measurement is selected as one of the phase terminals of entry, the expression will be changed in the same way as that for **power, instantaneous (polyphase circuit)**. If both the voltages and currents in the preceeding equations constitute symmetrical polyphase set of the same phase sequence

$$Q = 3E_a I_a \sin(\alpha_a - \beta_a)$$

In general the reactive power Q at the $(m + 1)$ terminals of entry of a polyphase circuit of m phases to a delimited region, when one of the terminals is the neutral terminal of entry, is expressed by the equation

$$Q = \sum_{s=1}^{s=m} \sum_{r=k}^{r=\infty} E_{sr} I_{sr} \sin(\alpha_{sr} - \beta_{sr})$$

where the symbols have the same meaning as in **power, active (polyphase circuit)**. The reactive power can also be stated in terms of the root-mean-square amplitude of the symmetrical components of the voltages and currents as

$$Q = \mathrm{m} \sum_{k=0}^{k=m-1} \sum_{r=k}^{r=\infty} E_{kr} I_{kr} \sin(\alpha_{kr} - \beta_{kr})$$

where the symbols have the same meaning as in **power, active (polyphase circuit)**. When the voltages and currents are quasi- periodic and the amplitudes of the voltages and currents are slowly varying, the reactive power for the circuit of each conductor may be determined for this condition as in **power, reactive (magner) (single-phase two-wire circuit)**. The reactive power for the polyphase circuit is the sum of the reactive power values for the individual conductors. Reactive power is expressed in vars when the voltages are in volts and the currents in amperes. *Note:* The sign of reactive power resulting from the above definition is the opposite of that given by the definition in the 1941 edition of the American Standard Definitions of Electrical Terms. The change has been made in accordance with a recommendation approved by the Standards Committee of the Institute of Electrical and Electronics Engineers, by the American National Standard Institute, and by the International Electrotechnical Commission. (Std100) 270-1966w

(2) (single-phase two-wire circuit) At the two terminals of entry of a single-phase two-wire circuit into a delimited region, for the special case of a sinusoidal voltage and a sinusoidal current of the same period, is equal to the product obtained by multiplying the root-mean-square value of the voltage between one terminal of entry and the second terminal of entry, considered as the reference terminal, by the root-mean-square value of the current through the first terminal and by the sine of the angular phase difference by which the voltage leads the current. The reference direction for the current and the reference polarity for the voltage must be the same as for active power at the same two terminals. Mathematically, the reactive power Q, for the case of sinusoidal voltage and current, is given by

$$Q = EI \sin(\alpha - \beta)$$

in which the symbols have the same meaning as in **power, instantaneous (two-wire circuit).** For the same conditions, the reactive power Q is also equal to the imaginary part of the product of the phasor voltage and the conjugate of the phasor current, or to the negative of the imaginary part of the product of the conjugate of the phasor voltage and the phasor current. Thus,

$$\begin{aligned} Q &= \mathrm{Im}\mathbf{EI}^* \\ &= -\mathrm{Im}\mathbf{E}^*\mathbf{I} \\ &= \frac{1}{2j}\,[\mathbf{EI}^* - \mathbf{E}^*\mathbf{I} \end{aligned}$$

in which $\mathbf{E}$ and $\mathbf{I}$ are the phasor voltage and phasor current, respectively, and * denotes the conjugate of the phasor to which it is applied. If the voltage is an alternating voltage and the current is an alternating current, the reactive power for each harmonic component is equal to the product obtained by multiplying the root-mean-square amplitude of that harmonic component of the voltage by the root-mean-square amplitude of the same harmonic component of the current and by the sine of the angular phase difference by which that harmonic component of the voltage leads the same harmonic component of the current. Mathematically, the reactive power of the r th harmonic component of Q_r is given by

$$\begin{aligned} Q_r &= E_r I_r \sin(\alpha_r - \beta_r) \\ &= Im\mathbf{E}_r\mathbf{I}_r^* \\ &= \frac{1}{2j}\,[\mathbf{E}_r\mathbf{I}_r^* - \mathbf{E}_r^*\mathbf{I}_r] \\ &= -\mathbf{Im}\mathbf{E}_r^*\mathbf{I}_r \end{aligned}$$

in which the symbols have the same meaning as in **power, instantaneous (two-wire circuit)** and **power, active (single-phase two-wire circuit) (average power) (power)**. The reactive power at the two terminals of entry of a single-phase two- wire circuit into a delimited region, for an alternating voltage and current, is equal to the sum of the values of reactive power for every harmonic component. Mathematically, the reactive power Q for an alternating voltage and current, is given by

$$\begin{aligned} Q &= Q_1 + Q_2 + Q_3 + Q_4 + \ldots + Q_r + \ldots \\ &= E_1 I_1 \sin(\alpha_1 - \beta_1) + E_2 I_2 \sin(\alpha_2 - \beta_2) + \ldots \\ &= \sum_{r=1}^{r=\infty} Q_r = \sum_{r=1}^{r=\infty} E_r I_r \sin(\alpha_r - \beta_r) \end{aligned}$$

in which the symbols have the same meaning as in **power, instantaneous (two-wire circuit)**. If the voltage and current are quasi-periodic functions of the form given in **power, instantaneous (two-wire circuit)** and the amplitudes are slowly varying, so that each may be considered to be constant during any one period, but to have slightly different values in successive periods, the reactive power at any time t may be taken as

$$Q = \sum_{r=1}^{r=\infty} E_r(t) I_r(t) \sin(\alpha_r - \beta_r)$$

by analogy with the expression for active power. When the reactive power is positive, the direction of flow of quadergy is in the reference direction of energy flow. Because the reactive power for each harmonic may have either sign, the direction of the reactive power for a harmonic component may be the same as or opposite to the direction of the total reactive power. The value of reactive power is expressed in vars when the voltage is in volts and the current in amperes. *Notes:* 1. The sign of reactive power resulting from the above definition is the opposite of that given by the definition in the 1941 edition of the American Standard Definitions of Electrical Terms. The change has been made in accordance with a recommendation approved by the Standards Committee of the Institute of Electrical and Electronics Engineers, by the American National Standards Institute, and by the Electrotechnical Commission. 2. Any designation of positive reactive power as inductive reactive power is deprecated. If the reference direction is from the generator toward the load, reactive power is positive if the load is predominantly inductive and negative if the load is predominantly capacitive. Thus a

capacitor is a source of quadergy and an inductor is a consumer of quadergy. Designations of two kinds of reactive power are unnecessary and undesirable. (Std100) 270-1966w

(3) The product of voltage and the component of alternating current that is 90° out of phase with it. In a passive network reactive power represents the energy that is exchanged alternatively between a capacitive and an inductive storage medium. (CAS) [13]

magnesium cell A primary cell with the negative electrode made of magnesium or its alloy. *See also:* electrochemistry. (EEC/PE) [119]

magnet A body that produces a magnetic field external to itself. (Std100) 270-1966w

magnet, focusing *See:* focusing magnet.

magnetic (1) Pertaining to any form of storage medium in which patterns of magnetization are used to store or represent information; for example, magnetic storage, or a magnetic delay line. (C) 610.10-1994w

(2) (as applied to a switching device) A term indicating that interruption of the circuit takes place between contacts separable in an intense magnetic field. *Note:* With respect to contactors, this term indicates the means of operation. (SWG/PE) C37.100-1992

magnetic air circuit breaker *See:* circuit breaker; magnetic; air circuit breaker.

magnetically shielded type instrument An instrument in which the effect of external magnetic fields is limited to a stated value. The protection against this influence may be obtained either through the use of a physical magnetic shield or through the instrument's inherent construction. *See also:* instrument. (EEC/AII) [102]

magnetic amplifier A device using one or more saturable reactors, either alone or in combination with other circuit elements, to secure power gain. Frequency conversion may or may not be included. (PE/EM) 43-1974s

magnetic area moment *See:* magnetic moment.

magnetic-armature loudspeaker A magnetic loudspeaker whose operation involves the vibration of a ferromagnetic armature. (EEC/PE) [119]

magnetic axis (rotating machinery) (coil or winding) The line of symmetry of the magnetic-flux density produced by current in a coil or winding, this being the location of approximately maximum flux density, with the air gap assumed to be uniform. *See also:* stator; rotor. (PE) [9]

magnetic bearing (navigation) Bearing relative to magnetic north. *See also:* navigation. (AES/RS) 686-1982s, [42]

magnetic biasing The simultaneous conditioning of the magnetic recording medium during recording by the superposing of an additional magnetic field upon the signal magnetic field. *Note:* In general, magnetic biasing is used to obtain a substantially linear relationship between the amplitude of the signal and the remanent flux density in the recording medium. *See also:* phonograph pickup; direct-current magnetic biasing; alternating-current magnetic biasing. (SP/MR) [32]

magnetic bias, relay *See:* relay magnetic bias.

magnetic blowout A magnet, often electrically excited, whose field is used to aid the interruption of an arc drawn between contacts. *See also:* contactor. (IA/ICTL/IAC) [60]

magnetic brake A friction brake controlled by electromagnetic means. (IA/ICTL/IAC) [60]

magnetic-brush development (electrostatography) Development in which the image-forming material is carried to the field of the electrostatic image by means of ferromagnetic particles acting as carriers under the influence of a magnetic field. *See also:* electrostatography. (ED) [46]

magnetic bubble memory *See:* bubble memory.

magnetic card (1) (computers) A card with a magnetic surface on which data can be stored by selective magnetization of portions of the flat surface. (C) [20], [85]

(2) A card with a magnetic surface that can be used for data storage. (C) 610.10-1994w

magnetic cell A storage cell in which patterns of magnetization are used to represent information. *Synonym:* static magnetic cell. (C) 610.10-1994w

magnetic character A character that is formed on paper using a special magnetic ink. (C) 610.10-1994w

magnetic circuit A region at whose surface the magnetic induction is tangential. *Note:* The term is also applied to the minimal region containing essentially all the flux, such as the core of a transformer. (Std100) 270-1966w

magnetic compass A device for indicating the direction of the horizontal component of a magnetic field. *See also:* magnetometer. (EEC/PE) [119]

magnetic-compass repeater indicator A device that repeats the reading of a master direction indicator, through a self-synchronous coupling means. (EEC/PE) [119]

magnetic constant (1) (permeability of free space) (pertinent to any system of units) The magnetic constant is the scalar dimensional factor that in that system relates the mechanical force between two currents to their magnitudes and geometrical configurations. More specifically, μ_0 is the magnetic constant when the element of force $d\mathbf{F}$ of a current element $I_1 d\mathbf{l}_1$ on another current element $I_2 d\mathbf{l}_2$ at a distance r is given by

$$d\mathbf{F} = \mu_0 I_1 I_2 d\mathbf{l}_1 \times (d\mathbf{l}_2 \times \mathbf{r}_1)/nr^2$$

where $\mathbf{r}_1$ is a unit vector in the direction from $d\mathbf{l}_1$ to $d\mathbf{l}_2$, and n is a dimensionless factor which is unity in unrationalized systems and 4π in a rationalized system. *Note:* In the centimeter-gram-second (cgs) electromagnetic system, μ_0 is assigned the magnitude unity and the dimension numeric. In the centimeter-gram-second (cgs) electrostatic system, the magnitude of μ_0 is that of $1/c^2$ and the dimension is $[L^{-2}T^2]$. In the International System of Units (SI) μ_0 is assigned the magnitude $4\pi \cdot 10^{-7}$ and has the dimension $[LMT^{-2}I_{-2}]$. (Std100) 270-1966w

(2) (radio-wave propagation) *See also:* permeability. (AP/PROP) 211-1990s

magnetic contactor A contactor actuated by electromagnetic means. *See also:* contactor. (IA/ICTL/IAC) [60]

magnetic control relay A relay that is actuated by electromagnetic means. *Note:* When not otherwise qualified, the term refers to a relay intended to be operated by the opening and closing of its coil circuit and having contacts designed for energizing and/or de-energizing the coils of magnetic contactors or other magnetically operated device. *See also:* relay. (IA/IAC) [60]

magnetic core (1) A configuration of magnetic material that is, or is intended to be, placed in a rigid spatial relationship to current-carrying conductors and whose magnetic properties are essential to its use. *Note:* For example, it may be used to concentrate an induced magnetic field as in a transformer, induction coil, or armature; to retain a magnetic polarization for the purpose of storing data; or for its nonlinear properties as in a logic element. It may be made of iron wires, iron oxide, coils of magnetic tape, ferrite, thin film, etc. (C/MIL) 162-1963w, [20], [85], [2]

(2) A tiny doughnut-shaped piece of magnetic material used for its non-linear properties to store data in main storage. *Synonym:* memory core. (C) 610.10-1994w

magnetic coupling *See:* coupling; electrical coupling.

magnetic course (navigation) Course relative to magnetic north. *See also:* navigation. (AES/RS) 686-1982s, [42]

magnetic deflection (cathode-ray tubes) Deflecting an electron beam by the action of a magnetic field. *See also:* cathode-ray tube. (ED) [45], [84]

magnetic delay line A delay line whose operation is based on the time of propagation of magnetic waves. (C) [20], 610.10-1994w, [85]

magnetic deviation Angular difference between compass north and magnetic north caused by magnetic effects in the vehicle. *See also:* navigation. (AES) [42]

magnetic device (packaging machinery) A device actuated by electromagnetic means. (IA/PKG) 333-1980w

magnetic dipole *See:* Hertzian magnetic dipole.

magnetic dipole moment (centimeter-gram-second electromagnetic-unit system) The volume integral of magnetic polarization is often called magnetic dipole moment. *See also:* magnetic polarization. (Std100) 270-1966w

magnetic direction indicator (MDI) An instrument providing compass indication obtained electrically from a remote gyrostabilized magnetic compass or equivalent. *See also:* radio navigation. (EEC/PE) [119]

magnetic disk (1) A flat circular plate with a magnetic surface on which data can be stored by selective polarization of portions of the flat surface. (C/MIL) 162-1963w, [2], [20], [85]

(2) A disk made of plastic or metal that is coated with a magnetizable surface on one or both sides, on which information can be stored. *Contrast:* optical disk. *See also:* magneto-optical disk; diskette; hard disk; platter; floppy disk. (C) 610.10-1994w

magnetic disk drive A disk drive that can access a magnetic disk. (C) 610.10-1994w

magnetic dissipation factor (magnetic material) The cotangent of its loss angle or the tangent of its hysteretic angle. (Std100) 270-1966w

magnetic drum (1) A right circular cylinder with a magnetic surface on which data can be stored by selective polarization of portions of the curved surface. (C/MIL) 162-1963w, [20], [2], [85]

(2) A cylinder whose entire surface is coated with a magnetic material on which information can be stored in tracks running the circumference of the cylinder. (C) 610.10-1994w

magnetic field ($\vec{H}$) (1) The field surrounding any current-carrying conductor. *See also:* electric field. (PE/IC) 1143-1994r

(2) For time harmonic fields in a medium with linear and isotropic magnetic properties, the magnetic flux density divided by the permeability of the medium. (AP/PROP) 211-1997

magnetic field induction (1) (inductive coupling) The process of generating voltages and/or currents in a conductive object or electric circuit by means of time-varying magnetic fields. *Notes:* 1. "Magnetic field induction" was formerly called "electromagnetic induction." This usage is now deprecated because electromagnetic induction refers to combined electric and magnetic field effects. 2. "Magnetic field induction" is preferred over "magnetic induction" because the latter is reserved to mean magnetic flux density. (T&D/PE) 1048-1990

(2) (overhead power lines) The induction process that results from time-varying quasi-static magnetic fields. *Notes:* 1. "Magnetic field induction" was formerly called "electromagnetic induction". This usage is now deprecated because electromagnetic induction refers to combined electric and magnetic field effects. 2. The term "magnetic field induction" is preferred over "magnetic induction" because the latter may be taken to mean magnetic flux density. *Synonym:* inductive coupling (ground system). *See also:* electromagnetic field induction. (T&D/PE) 539-1990

(3) (inductive coupling) The process of generating voltages and/or currents in conductive objects or electric circuits by the induction process that results from time-varying quasi-static magnetic fields. *Notes:* 1. "Magnetic field induction" was formerly called "electromagnetic induction." This usage is now depreciated because electromagnetic induction refers to the combined electric and magnetic field effects. 2. The term "magnetic field induction" is preferred over "magnetic induction" because the latter may be taken to mean magnetic flux density. 3. The fields in the vicinity of a transmission line can be adequately described as an electric field and a magnetic field. Electromagnetic may imply one or both of these fields. There should be no questions as to what is meant when the electric field or the magnetic field is discussed. (T&D/PE) 524a-1993r

magnetic field integral equation A Fredholm integral equation of the second kind for the electric current density induced on the surface S of a perfect electric conductor. *Note:* The tangential component of the incident magnetic field acts as the source for the current, hence, the name. The equation is as follows:

$$\vec{J}s = 2\hat{n} \times \vec{H}^i + 2\hat{n} \times \int_{S_0} (\vec{J}_S \times \nabla_0 g) dS_0$$

where

$\hat{n}$ = unit normal to S
$\vec{H}^i$ = incident magnetic field
$g = \exp[-jk_0|\vec{r} - \vec{r}_0|]/4\pi|\vec{r} - \vec{r}_0|$
$\vec{J}_s$ = surface current density

(AP/PROP) 211-1997

magnetic field intensity *See:* magnetic field strength.

magnetic field interference A form of interference induced in the circuits of a device due to the presence of a magnetic field. *Note:* It may appear as common-mode or normal-mode interference in the measuring circuit. *See also:* accuracy rating. (EEC/ERI) [111]

magnetic field strength (*H*) (1) (magnetizing force) That vector point function whose curl is the current density and that is proportional to magnetic flux density in regions free of magnetized matter. *Note:* A consequence of this definition is that the familiar formula

$$\mathbf{H} = \frac{1}{4\pi} \int \mathbf{J} \times \nabla(1/r) \mathrm{d}v - \frac{1}{4\pi} \nabla \int \mathbf{M} \cdot \nabla\,(1/r) \mathrm{d}v$$

(where **H** is the magnetizing force, **J** is current density, and **M** is magnetization) is a mathematical identity. (Std100) 270-1966w

(2) (overhead power lines) A vector quantity, often denoted as $\vec{H}$, related to the magnetic flux density, $\vec{B}$, by:

$$\vec{H} = (\vec{B}/\mu_0) - \vec{M}$$

where μ_0 = the magnetic permeability of free space, $\vec{M}$ = the magnetization of the magnetic medium. In free space, $\vec{M}$ vanishes and the relationship between $\vec{H}$ and $\vec{B}$ becomes

$$\vec{H} = \vec{B}/\mu_0$$

The preferred unit for $\vec{H}$ is amperes per meter (A/m). (T&D/PE) 539-1990

(3) The magnitude of a time-varying magnetic field, which, when coupled to a coil, induces a voltage. The unit of magnetic field strength is ampere per meter (A/m). (COM/TA) 1027-1984s

(4) The magnitude of the magnetic field vector $\vec{H}$. The units of magnetic field strength are in amperes per meter. *Synonym:* magnetizing force. (AP/PROP) 211-1997

(5) A field vector that is equal to the magnetic flux density divided by the permeability of the medium. Magnetic field strength is expressed in units of amperes per meter (A/m). (NIR) C95.1-1999

magnetic field strength produced by an electric current (Biot-Savart law and/or Ampere's law) The magnetic field strength, at any point in the neighborhood of a circuit in which there is an electric current i, can be computed on the assumption that every infinitesimal length of circuit produces at the point an infinitesimal magnetizing force and the resulting magnetizing force at the point is the vector sum of the contributions of all the elements of the circuit. The contribution, dH, to the magnetizing force at a point P caused by the current i in an element ds of a circuit that is at a distance r from P, has a direction t at is perpendicular to both ds and r and a magnitude equal to

$$\frac{i\ \mathrm{ds}\ \sin\theta}{r^2}$$

where θ is the angle between the element ds and the line r. In vector notation

$$\mathrm{d}H = \frac{i[r \times \mathrm{ds}]}{r^2}$$

This law is sometimes attributed to Biot and Savart, sometimes to Ampere, and sometimes to Laplace, but no one of them gave it in its differential form. (Std100) 270-1966w

magnetic field vector (A) (radio-wave propagation) *(any point in a magnetic field).* The magnetic induction divided by the permeability of the medium. **(B) (radio-wave propagation)** In a medium with linear and isotropic magnetic property, the magnetic induction divided by the permeability of the medium. *Synonym:* magnetic vector. *See also:* radio-wave propagation. (AP) 211-1977

magnetic figure of merit The ratio of the real part of complex apparent permeability to magnetic dissipation factor. *Note:* The magnetic figure of merit is a useful index of the magnetic efficiency of a material in various electromagnetic devices. (Std100) 270-1966w

magnetic filling factor *See:* filling factor.

magnetic flux (ϕ) (1) (through an area) The surface integral of the normal component of the magnetic induction over the area. Thus,

$$\phi_A = \int_A (\mathrm{B} \cdot \mathrm{d}A)$$

where ϕ_A is the flux through the area A, and **B** is the magnetic induction at the element dA of this area. *Note:* The net magnetic flux through any closed surface is zero. (Std100) 270-1966w

(2) A condition in a medium produced by a magnetomotive force such that, when altered in magnitude, a voltage is induced in an electric circuit linked with the flux. (IA/PC) 844-1991

magnetic flux density (B) (1) (β) (induction motors) Flux per unit area through an element of area normal to the direction of flux. (IA/PC) 844-1991

(2) (overhead power lines) The vector quantity, often denoted as $\vec{B}$, of zero divergence at all points which determines the component of the Coulomb-Lorentz force that is proportional to the velocity of a moving charge. *Notes:* 1. In a zero electric field, the force, $\vec{F}$, is given by

$$\vec{F} = q\vec{v} \times \vec{B}$$

where $\vec{v}$ = the velocity of the electric charge q. The vector properties of the field produced by currents in power lines are the same as those given above for the electric field. The preferred unit for the magnitude of the field components is the tesla (T) (1 T = 10^4 Gauss). 2. For time-varying (ac) fields, values are expressed as their rms values unless stated otherwise. *Synonym:* magnetic field. (T&D/PE) 539-1990

(3) (magnetic field) The vector quantity (B-field) of divergence zero at all points, which determines the component of the Coulomb-Lorentz force, that is proportional to the velocity of the charge carrier. *Note:* In a zero electric field, the force F is given by $\vec{F} = q\vec{v} \times \vec{B}$, where $\vec{v}$ is the velocity of the electric charge q. The vector properties of the field produced by currents in power lines are the same as those given above for the electric field. The magnitudes of the field components are expressed by their rms values in tesla (1T= 10^4G). (T&D/PE) 644-1994

(4) A vector field that acts on moving charges (q) such that the force per unit charge ($\vec{F}$) is equal to the vector (cross) product of the velocity ($\vec{v}$) of the particle and $\vec{B}$, the magnetic flux density:

$$\frac{\vec{F}}{q} = \vec{v} \times \vec{B}$$

The units of magnetic flux density are in volt seconds per meter squared. (AP/PROP) 211-1997

(5) A field vector quantity that results in a force (F) that acts on a moving charge or charges. The vector product of the velocity (v) at which an infinitesimal unit test charge, q, is moving with B, is the force that acts on the test charge divided by q.

$$\frac{F}{q} = (v \times B)$$

Magnetic flux density is expressed in units of tesla (T). One tesla is equal to 10^4 gauss (G). (NIR) C95.1-1999

magnetic flux density meter (1) (overhead power lines) A meter designed to measure magnetic flux density. These meters may use any of several types of flux density sensors or probes. *Note:* For measurement of the magnetic flux density from ac power systems, the meter shall conform to IEEE Std 644-1987. (T&D/PE) 539-1990

(2) A meter designed to measure the magnetic flux density. *Note:* Several types of meters are in common use, e.g., field meters with air core coil probes, meters with Hall-effect probes, and meters that combine two coils with a ferromagnetic core as in a fluxgate magnetometer. (T&D/PE) 1308-1994

magnetic flux leakage That portion of the total magnetic flux in a circuit that does not intercept the material that contains the magnetic flux that is heating. 844-1991

magnetic focusing (electron beams) A method of focusing an electron beam by the action of a magnetic field. (BT/ED/AV) [34], [45]

magnetic friction clutch (coupling) (electric coupling) A friction clutch (coupling) in which the pressure between the friction surfaces is produced by magnetic attraction. (EM/PE) 290-1980w

magnetic friction coupling An electric coupling in which torque is transmitted by means of mechanical friction. Pressure normal to the rubbing surfaces is controlled by means of an electromagnet and a return spring. *Note:* Couplings may be either magnetically engaged or magnetically released depending upon application. (PE) [9]

magnetic head (1) A transducer for converting electric variations into magnetic variations for storage on magnetic media, or for reconverting energy so stored into electric energy, or for erasing such stored energy. (SP/MR) [32]

(2) A head that can read, write, or erase on a magnetic storage medium. *See also:* erase head; floating head; fixed head; cylinder; access arm. (C) 610.10-1994w

magnetic heading (navigation) Heading relative to magnetic north. *See also:* navigation. (AES/RS) 686-1982s, [42]

magnetic hysteresis (electrical heating systems) The property of a magnetic material to convert electric energy to heat by virtue of the fact that the magnetic induction for a given magnetizing force depends upon the previous conditions of magnetization. (IA/PC) 844-1991

magnetic hysteresis loss (A) (magnetic material) The power expended as a result of magnetic hysteresis when the magnetic induction is periodic. **(B) (magnetic material)** The energy loss per cycle in a magnetic material as a result of magnetic hysteresis when the induction is cyclic (not necessarily periodic). *Note:* Definitions (A) and (B) are not equivalent; both are in common use. (Std100) 270-1966

magnetic hysteretic angle The mean angle by which the exciting current leads the magnetizing current. *Note:* Because of hysteresis, the instantaneous value of the hysteretic angle will vary during the cycle; the hysteretic angle is taken to be the mean value. (Std100) 270-1966w

magnetic induction* **(1) (signal-transmission system)** The process of generating currents or voltages in a conductor by means of a magnetic field. *See also:* magnetic flux density; signal. (IE) [43]

(2) *See also:* magnetic flux density. (AP/PROP) 211-1997

* Deprecated.

magnetic ink (1) An ink that contains particles of a magnetic substance whose presence can be detected by magnetic sensors. (C) [85], [20]

(2) A special ink containing magnetic particles that can be detected and traced by input devices designed specifically for that purpose. (C) 610.2-1987

(3) Special ink that can be read by a magnetic scanner, such as is used on bank checks. *See also:* magnetic character. (C) 610.10-1994w

magnetic ink character A character imprinted on a document using magnetic ink. *Synonym:* magnetic character. (C) 610.2-1987

magnetic ink character reader (MICR) A character reader that recognizes characters using magnetic ink character recognition. *Contrast:* optical character reader. (C) 610.10-1994w

magnetic ink character recognition (MICR) The automatic recognition of magnetic ink characters. *Contrast:* optical character recognition. *See also:* code for magnetic characters. (C) 610.2-1987, 610.10-1994w

magnetic ink scanner A scanner that can read magnetic ink characters. (C) 610.10-1994w

magnetic latching relay (A) A relay that remains operated from remanent magnetism until reset electrically. **(B)** A bistable polarized (magnetically latched) relay. (PE/EM) 43-1974

magnetic loading (rotating machinery) The average flux per unit area of the air-gap surface. *See also:* asynchronous machine. (PE) [9]

magnetic loss That contribution to the attenuation constant of a propagating mode on a planar transmission line that represents losses associated with the magnetic properties of the substrates (and overlays) materials involved, which may also include conduction mechanisms. (MTT) 1004-1987w

magnetic loss angle (1) (core) The angle by which the fundamental component of the core-loss current leads the fundamental component of the exciting current in an inductor having a ferromagnetic core. *Note:* The loss angle is the complement of the hysteretic angle. (Std100) 270-1966w

(2) For a pure sinusoidal wave in a medium with complex permeability μ, the angle defined by the equation

$$f_m = \tan^{-1}\left(\frac{\mu''}{\mu'}\right)$$

where

μ'' = the imaginary part of the complex permeability

μ' = the real part of the complex permeability

(AP/PROP) 211-1997

magnetic loss factor, initial (material) The product of the real component of its complex permeability and the tangent of its magnetic loss angle, both measured when the magnetizing force and the induction are vanishingly small. *Note:* In anisotropic media, magnetic loss factor becomes a matrix. (Std100) 270-1966w

magnetic loss filling factor *See:* filling factor.

magnetic loudspeaker A loudspeaker in which acoustic waves are produced by mechanical forces resulting from magnetic reactions. (EEC/PE) [119]

magnetic microphone *See:* variable-reluctance microphone.

magnetic microscope An electron microscope with magnetic lenses. *See also:* electron optics. (ED) [45], [84]

magnetic mine A submersible explosive device with a detonator actuated by the distortion of the earth's magnetic field caused by the approach of a mass of magnetic material such as the hull of a ship. (EEC/PE) [119]

magnetic moment (1) (magnetized body) The volume integral of the magnetization

$$\mathrm{m} = \int \mathrm{M}dv$$

(2) (current loop)

$$\mathrm{m} = I \int \mathrm{n}da = (I/2) \int r \times dr$$

where n is the positive normal to a surface spanning the loop, and r is the radius vector from an arbitrary origin to a point on the loop. *Notes:* 1. The numerical value of the moment of a plane current loop is IA, where A is the area of the loop. 2. The reference direction for the current in the loop indicates a clockwise rotation, when the observer is looking through the loop in the direction of the positive normal. 270-1966w

magnetic north The direction of the horizontal component of the earth's magnetic field toward the north magnetic pole. *See also:* navigation. (AES/RS) 686-1982s, [42]

magnetic overload relay An overcurrent relay the electric contacts of which are actuated by the electromagnetic force produced by the load current or a measure of it. *See also:* relay. (IA/IAC) [60]

magnetic-particle coupling (1) (electric coupling) An electric coupling that transmits torque through the medium of magnetic particles in a magnetic field between coupling members. (EM/PE) 290-1980w

(2) A type of electric coupling in which torque is transmitted by means of a fluid whose viscosity is adjustable by virtue of suspended magnetic particles. *Note:* The coupling fluid is incorporated in a magnetic circuit in which the flux path includes the two rotating members, the fluid, and a magnetic yoke. Flux density, and hence the fluid viscosity, are controlled through adjustment of current in a magnetic coil linking the flux path. (PE) [9]

magnetic pickup *See:* variable-reluctance pickup.

magnetic-plated wire A magnetic wire having a core of nonmagnetic material and a plated surface of ferromagnetic material. (SP) [32]

magnetic-platform influence (electric instruments) The change in indication caused solely by the presence of a magnetic platform on which the instrument is placed. *See also:* accuracy rating. (EEC/AII) [102]

magnetic polarization In the centimeter-gram-second electromagnetic-unit system, the intrinsic induction divided by 4π is sometimes called magnetic polarization or magnetic dipole moment per unit volume. *See also:* intrinsic induction. (Std100) 270-1966w

magnetic poles (magnet) Those portions of the magnet toward which or from which the external magnetic induction appears to converge or diverge, respectively. *Notes:* 1. By convention, the north-seeking pole is marked with N, or plus, or is colored red. 2. The term is also sometimes applied to a fictitious magnetic charge. (Std100) 270-1966w

magnetic pole strength (magnet) The magnetic moment divided by the distance between its poles. *Note:* Many authors use the above quantity multiplied by the magnetic constant; the two choices are numerically equal in the centimeter-gram-second electromagnetic-unit system. (Std100) 270-1966w

magnetic-powder-impregnated tape A magnetic tape that consists of magnetic particles uniformly dispersed in a nonmagnetic material. *Synonym:* impregnated tape. (SP) [32]

magnetic power factor The cosine of the magnetic hysteretic angle (the sine of the magnetic loss angle). (Std100) 270-1966w

magnetic recorder Equipment incorporating an electromagnetic transducer and means for moving a magnetic recording medium relative to the transducer for recording electric signals as magnetic variations in the medium. *Note:* The generic term magnetic recorder can also be applied to an instrument that has not only facilities for recording electric signals as magnetic variations, but also for converting such magnetic variations back into electric variations. *See also:* phonograph pickup. (SP) [32]

magnetic recording (1) (facsimile) Recording by means of a signal-controlled magnetic field. *See also:* recording. (COM) 168-1956w

(2) A method for storing data by selectively magnetizing portions of a magnetizable material. *See also:* nonreturn-to-reference recording; longitudinal magnetic recording; phase-modulation recording; perpendicular magnetic recording; return-to-reference recording. (C) 610.10-1994w

magnetic recording head In magnetic recording, a transducer for converting electric currents into magnetic fields, in order to store the electric signal as a magnetic polarization of the magnetic medium. (SP) [32]

magnetic recording medium A material usually in the form of a wire, tape, cylinder, disk, etc., on which a magnetic signal may be recorded in the form of a pattern of magnetic polarization. (SP) [32]

magnetic relay freezing Sticking of the relay armature to the core as a result of residual magnetism. (EEC/REE) [87]

magnetic reproducer Equipment incorporating an electromagnetic transducer and means for moving a magnetic recording medium relative to the transducer, for reproducing magnetic signals as electric signals. (SP) [32]

magnetic reproducing head In magnetic recording, a transducer for collecting the flux due to stored magnetic polarization (the recorded signal) and converting it into an electric voltage. (SP) [32]

magnetic rotation (polarized light) When a plane polarized beam of light passes through certain transparent substances along the lines of a strong magnetic field, the plane of polarization of the emergent light is different from that of the incident light. *Synonym:* Faraday effect. (Std100) 270-1966w

magnetic sensitivity (Hall effect devices) The ratio of the voltage across the Hall terminals to the magnetic flux density for a given magnitude of control current. (MAG) 296-1969w

magnetic shunt The section of the core of the ferroresonant transformer that provides the major path for flux generated by the primary winding current that does not link the secondary winding. In addition, the shunts provide a major path for the flux resulting from the output and resonating winding currents that do not link the primary winding. (PEL) 449-1998

magnetic spectrograph An electronic device based on the action of a constant magnetic field on the paths of electrons, and used to separate electrons with different velocities. *See also:* electron device. (ED) [84], [46]

magnetic starter (packaging machinery) A starter actuated by electromagnetic means. (IA/PKG) 333-1980w

magnetic storage (1) A method of storage that uses the magnetic properties of matter to store data by magnetization of materials such as cores, films, or plates, or of material located on the surfaces of tapes, discs, or drums, etc. *See also:* magnetic core; magnetic drum; magnetic tape. (C) 162-1963w
(2) Any storage medium that stores data using magnetic properties such as magnetic cores, disks, or tapes. *Contrast:* semiconductor storage. (C) 610.10-1994w

magnetic storm (1) A disturbance in the Earth's magnetic field, associated with abnormal solar activity, and capable of seriously affecting both radio and wire transmission. *See also:* radio transmitter. (EEC/PE) [119]
(2) A disturbance of the Earth's magnetic field, generally lasting one or more days and characterized by significant changes in the strength of this field. (AP/PROP) 211-1997

magnetic susceptibility (isotropic medium) In rationalized systems, the relative permeability minus unity.

$$\kappa = \mu_r - 1 = B_i/\mu_0 H$$

Notes: 1. In unrationalized systems, $k = (\mu_r - 1)4\pi$. 2. The susceptibility divided by the density of a body is called the susceptibility per unit mass, or simply the mass susceptibility. The symbol is χ. Thus, $\chi = \kappa/\rho$ where ρ is the density. χ multiplied by the atomic weight is called the atomic susceptibility. The symbol is χ_A. 3. In anisotropic media, susceptibility becomes a matrix. (Std100) 270-1966w

magnetic tape (1) (A) (homogeneous or coated) A tape with a magnetic surface on which data can be stored by selective polarization of portions of the surface. **(B) (homogeneous or coated)** A tape of magnetic material used as the constituent in some forms of magnetic cores. *See also:* coated magnetic tape. (C/MIL) 162-1963, [85], [2]
(2) A storage medium made of a flexible plastic ribbon that is coated with magnetic material (such as an iron oxide compound) on which information can be stored. (C) 610.10-1994w

magnetic tape cartridge A cartridge holding magnetic tape, on which information can be stored. (C) 610.10-1994w

magnetic tape cassette A cassette holding magnetic tape on which information can be stored. *See also:* magnetic tape cartridge. (C) 610.10-1994w

magnetic tape drive *See:* tape drive.

magnetic tape handler (test, measurement, and diagnostic equipment) A device that handles magnetic tape and usually consists of a tape transport and magnetic tape reader with associated electrical and electronic equipments. Most units provide for tape to be wound and stored on reels; however, some units provide for the tape to be stored loosely in closed bins. (MIL) [2]

magnetic tape reader (1) (test, measurement, and diagnostic equipment) A device capable of converting information from magnetic tape where it has been stored as variations in magnetizations into a series of electrical impulses. (MIL) [2]
(2) A reader capable of reading information on magnetic tape. (C) 610.10-1994w

magnetic tape storage A type of sequential access storage in which information is stored by magnetic recording on the surface of a magnetic tape. (C) 610.10-1994w

magnetic test coil A coil that, when connected to a suitable device, can be used to measure a change in the value of magnetic flux linked with it. *Note:* The change in the flux linkage may be produced by a movement of the coil or by a variation in the magnitude of the flux. Test coils used to measure magnetic induction B are often called B coils; those used to determine magnetizing force H may be called H coils. A coil arranged to rotate through an angle of 180 degrees about an axis of symmetry perpendicular to its magnetic axis is sometimes called a flip coil. *See also:* magnetometer. (EEC/PE) [119]

magnetic thin film (1) A layer of magnetic material, usually less than 10 000 angstroms thick. *Note:* In electronic computers, magnetic thin films may be used for logic or storage elements. *See also:* coated magnetic tape; magnetic core; magnetic tape. (C) 162-1963w
(2) A layer of magnetic material, usually less than one micron thick, applied to a carrier or base for use as storage cells. (C) 610.10-1994w

magnetic thin film storage A type of magnetic storage in which information is stored by magnetic recording on a magnetic thin film. (C) 610.10-1994w

magnetic track braking A system of braking in which a shoe or slipper is applied to the running rails by magnetic means. *See also:* electric braking. (EEC/PE) [119]

magnetic variometer An instrument for measuring differences in a magnetic field with respect to space or time. *Note:* The use of variometer to designate a continuously adjustable inductor is deprecated. *See also:* magnetometer. (EEC/PE) [119]

magnetic vector (radio-wave propagation) *See also:* magnetic field vector. (AP) 211-1977s

magnetic vector potential An auxiliary solenoidal vector point function characterized by the relation that its curl is equal to the magnetic induction and its divergence vanishes. Curl $\mathbf{A} = \mathbf{B}$, Divergence $\mathbf{A} = \mathbf{0}$. *Note:* These relations are satisfied identically by

$$A = (\mu_0/4\pi)\left[\int \mathbf{M} \times \nabla(1/r)\mathrm{d}v + \int (\mathbf{J}/r)\mathrm{d}v\right]$$

where v is the volume. (Std100) 270-1966w

magnetization (intensity of magnetization) (at a point of a body) The intrinsic induction at that point divided by the magnetic constant of the system of units employed:

$$M = B_i/\mu_0 = (B - \mu_0 H)/\mu_0$$

Note: The magnetization can be interpreted as the volume density of magnetic moment. (Std100) 270-1966w

magnetizing current (1) A hypothetical current assumed to flow through the magnetizing inductance of a transformer. (CHM) [51]

(2) (rotating machinery) The quadrature (leading) component (with respect to the induced voltage) of the exciting current supplied to a coil. (PE) [9], 270-1966w

magnetizing force *See:* magnetic field strength.

magnetizing inductance A hypothetical inductance, assumed to be in parallel with the core-loss resistance, that would store the same amount of energy as that stored in the core for a specified value of excitation. (CHM) [51]

magnet meter (magnet tester) An instrument for measuring the magnetic flux produced by a permanent magnet under specified conditions of use. It usually comprises a torque-coil or a moving-magnet magnetometer with a particular arrangement of pole-pieces. *See also:* magnetometer. (PE/EEC) [119]

magneto *See:* magnetoelectric generator.

magneto central office A telephone central office for serving magneto telephone sets. (COM) [48]

magnetoelectric generator (electric installations on shipboard) An electric generator, in which the magnetic flux is provided by one or more permanent magnets. (IA/MT) 45-1983s

magnetographic printer A nonimpact printer that creates, by means of magnetic heads operating on a metallic drum, a latent image which is made visible by a toner and transferred and fixed on paper. (C) 610.10-1994w

magneto-hydrodynamic wave (radio-wave propagation) A low-frequency wave in an electrically highly conducting fluid (such as a plasma) permeated by a static magnetic field. The restoring forces of the waves are, in general, the combination of a magnetic tensile stress along the magnetic field lines and the compressive stress between the field lines and the fluid pressure (for example, an Alfvén wave). (AP/PROP) 211-1990s

magneto-ionic medium An ionized gas that is permeated by a fixed magnetic field. (AP/PROP) 211-1997

magneto-ionic wave At a given frequency, either of the two characteristic plane electromagnetic waves that can travel in a homogeneous magneto-ionic medium without change of polarization. *Note:* These characteristic waves are also called the ordinary and extraordinary waves. *See also:* extraordinary wave; ordinary wave. (AP/PROP) 211-1997

magnetometer An instrument for measuring the intensity or direction (or both) of a magnetic field or of a component of a magnetic field in a particular direction. *Note:* The term is more usually applied to instruments that measure the intensity of a component of a magnetic field, such as horizontal-intensity magnetometers, vertical-intensity magnetometers, and total-intensity magnetometers. (EEC/PE) [119]

magnetomotive force (acting in any closed path in a magnetic field) The line integral of the magnetizing force around the path. (Std100) 270-1966w

magneto-optic (fiber optics) Pertaining to a change in a material's refractive index under the influence of a magnetic field. Magneto-optic materials generally are used to rotate the plane of polarization. (Std100) 812-1984w

magneto-optical disk A disk that uses optical methods, such as a laser, to record information on a magnetic storage medium. *Synonym:* optically assisted magnetic storage. *See also:* magnetic disk; optical disk. (C) 610.10-1994w

magnetopause The transition region between the planetary and the interplanetary magnetic fields. (AP/PROP) 211-1997

magnetoresistive coefficient (Hall generator) The ratio at a specified magnetic flux density B of the rate of change of resistance with magnetic flux density to the resistance R_B at the specified magnetic flux density B, defined by the equation

$$\alpha_B = \frac{1}{R_B}\frac{dR_B}{dB}$$

(MAG) 296-1969w

magnetoresistive effect The change in the resistance of a current-carrying Hall plate when acted upon by a magnetic field. *Notes:* 1. An increase in magnetic field may cause either an increase or a decrease in ferromagnetic and similar Hall plates, whereas there is usually an increase with Hall plates made of other material. 2. There are two factors affecting the changes in resistance: first, a bulk effect due to the characteristics of the Hall plate, and second, a geometric effect due to the shape of the Hall plate and to the presence or absence of shorting bars made of conducting material deliberately, as in the shorting bars plated on some magnetoresistors or the microconductors dispersed in other magnetoresistors or inadvertently, as in the case of the control current electrodes in a Hall generator, added to the current-carrying Hall plate. (MAG) 296-1969w

magnetoresistive ratio (Hall generator) The ratio of the resistance R_B, at a magnetic flux density B, to the resistance R_0, at zero magnetic flux density, defined by the equation

$$\alpha_M = \frac{R_B}{R_0}$$

(MAG) 296-1969w

magnetosphere The region of a planetary atmosphere where the planetary magnetic field, as modified by the solar wind and the interplanetary magnetic field, controls the motions of charged particles. *Note:* The Earth's magnetosphere includes part of the F region of the terrestrial ionosphere up to the magnetopause. (AP/PROP) 211-1997

magnetostriction The phenomenon of elastic deformation that accompanies magnetization. (Std100) 270-1966w

magnetostriction loudspeaker A loudspeaker in which the mechanical displacement is derived from the deformation of a material having magnetostrictive properties. (EEC/PE) [119]

magnetostriction microphone A microphone that depends for its operation on the generation of an electromotive force by the deformation of a material having magnetostrictive properties. *See also:* microphone. (EEC/PE) [119]

magnetostriction oscillator An oscillator with the plate circuit inductively coupled to the grid circuit through a magnetostrictive element, the frequency of oscillation being determined by the magnetomechanical characteristics of the coupling element. *See also:* oscillatory circuit. (AP/ANT) 145-1983s

magnetostrictive relay A relay in which operation depends upon dimensional changes of a magnetic material in a magnetic field. *See also:* relay. (EEC/REE) [87]

magneto switchboard (telephone switching systems) A telecommunication switchboard for serving magneto telephone sets. (COM) 312-1977w

magneto telephone set A local-battery telephone set in which current for signaling by the telephone station is supplied from a local hand generator, usually called a magneto. *See also:* telephone station. (EEC/PE) [119]

magneto-telluric (M-T) An adjective denoting natural magnetic and electric fields, and effects produced by them. (COM) 365-1974w

magneto-telluric current A current in the Earth associated with time-varying geomagnetic fields. (AP/PROP) 211-1997

magneto-telluric fields Electric and magnetic fields induced in the Earth by external time-varying sources that are usually of ionospheric origin. (AP/PROP) 211-1997

magnetron (induction and dielectric heating) An electron tube characterized by the interaction of electrons with the electric field of a circuit element in crossed steady electric and magnetic fields to produce alternating-current power output. (IA) 54-1955w

magnetron injection gun (microwave tubes) A gun that produces a hollow beam of high total permeance that flows parallel to the axis of a magnetic field. *See also:* magnetron. (ED) [45]

magnetron oscillator An electron tube in which electrons are accelerated by a radial electric field between the cathode and one or more anodes and by an axial magnetic field that pro-

vides a high-energy electron stream to excite the tank circuits. *See also:* magnetron. (AP/ANT) 145-1983s

magnet valve (electric controller) A valve controlling a fluid, usually air, operated by an electromagnet. *See also:* multiple-unit control. (VT/LT) 16-1955w

magnet wire (rotating machinery) Single-strand wire with a thin flexible insulation, suitable for winding coils. *See also:* rotor; stator. (PE) [9]

magnified sweep (oscilloscopes) A sweep whose time per division has been decreased by amplification of the sweep waveform rather than by changing the time constants used to generate it. *See also:* oscillograph. (IM/HFIM) [40]

magnitude (1) The quantitative attribute of size, intensity, extent, etc., that allows a particular entity to be placed in order with other entities having the same attribute. *Notes:* 1. The magnitude of the length of a given bar is the same whether the length is measured in feet or in centimeters. 2. The word magnitude is used in other senses. The definition given here is the basic one needed for the logical buildup of later definitions. (Std100) 270-1966w

(2) The real number indicating the maximum or peak value of a periodically varying quantity. *See also:* amplitude. (AP/PROP) 211-1997

magnitude characteristic (linear passive networks) The absolute value of a response function evaluated on the imaginary axis of the complex-frequency plane. (CAS) 156-1960w

magnitude contours (control system feedback) Loci of selected constant values of the magnitude of the return transfer function drawn on a plot of the loop transfer function for real frequencies. *Note:* Such loci may be drawn on the Nyquist or inverse Nyquist diagrams, or Nichols chart. *See also:* feedback control system. (PE/EDPG) [3]

magnitude origin line (pulse terminology) A line of specified magnitude which, unless otherwise specified, has a magnitude equal to zero and extends through the waveform epoch. (IM/WM&A) 194-1977w

magnitude parameters and references (pulse terminology) (Unless otherwise specified, derived from data within the waveform epoch.) *See also:* magnitude reference lines; top magnitude; base magnitude; magnitude reference points. (IM/WM&A) 194-1977w

magnitude ratio (hydraulic turbines) The ratio of the peak magnitude of the output signal to the peak magnitude of a constant-frequency constant-amplitude sinusoidal input signal. (PE/EDPG) 125-1977s

magnitude reference points *See:* proximal (distal) point; mesial point.

magnitude reference line (pulse terminology) A line parallel to the magnitude origin line at a specified magnitude. (IM/WM&A) 194-1977w

magnitude reference lines (1) (pulse terminology) The magnitude reference line at the base (top) magnitude. *Synonym:* baseline. *See also:* waveform epoch. (IM/WM&A) 194-1977w

(2) (percent reference magnitude) A reference magnitude specified by:

$$(x)\%M_r = M_b + \frac{x}{100}(M_t - M_b)$$

where
$0 < x < 100$
$(x)\%M_r$ = percent reference magnitude
M_b = base magnitude
M_r = top magnitude

M_b, M_t, and $(x)\%M_r$ are all in the same unit of measurement.

(3) (proximal line) (distal) A magnitude reference line at a specified magnitude in the proximal (distal) region of a pulse waveform. Unless otherwise specified, the proximal (distal) line is at the 10 (90) percent reference magnitude. *See also:* waveform epoch.

(4) (mesial line) A magnitude reference line at a specified magnitude in the mesial region of a pulse waveform. Unless otherwise specified, the mesial line is at the 50 percent reference magnitude. *See also:* waveform epoch.

magnitude-referenced point (pulse terminology) A point at the intersection of a magnitude reference line and a waveform. (IM) 194-1977w

magnitude-related adjectives (A) (pulse terminology) Proximal (distal). Of or pertaining to a region near to (remote from) a first state or region of origin. **(B) (pulse terminology)** Mesial. Of or pertaining to region between the proximal and distal regions. (IM/WM&A) 194-1977

mag tape A colloquial reference to magnetic tape. (C) 610.10-1994w

Mahoney map (mathematics of computing) A diagram used in logic design, simplification, or optimization; invented by Matthew V. Mahoney. *See also:* Karnaugh map; logic map. (C) 1084-1986w

MAID *See:* minimum air insulation distance.

mailbox (1) A register that maps write data to unit-internal message storage locations. The mapping between registers and message-storage locations is transparent to the one or more producers. A message is sent to a mailbox by performing an atomic block copy of the message bytes to the mailbox register. Following this message write, the mailbox hardware moves the mapping to the next message storage location to prepare for the next message write. (C/MM) 1212.1-1993

(2) The mechanism for storing and retrieving intelligent transportation systems (ITS) messages between the back office equipment (BOE) and onboard equipment (OBE). The specific processing mechanisms are defined by the resource manager. (SCC32) 1455-1999

mailbox service *See:* electronic mail.

mail bridge A bridge that screens mail that is passing between two networks to ensure that the mail items meet administrative constraints. *See also:* learning bridge. (C) 610.7-1995

mail exploder The part of an electronic mail delivery system that accepts a piece of mail and a list of addressees as input and sends a copy of the message to each addressee on the list. (C) 610.7-1995

mail gateway A device that connects to two or more electronic mail systems, especially dissimilar mail systems on two different networks, and transfers mail messages between them. (C) 610.7-1995

mail server On a network, a server that allows users to exchange mail messages. *See also:* file server; disk server; network server; terminal server; database server; print server. (C) 610.7-1995

mail system gateway Software that uses the MT interface (the client). (C/PA) 1224.1-1993w

main (interior wiring) A feeder extending from the service switch, generator bus, or converter bus to the main distribution center. (EEC/PE) [119]

main amplifier (shaping amplifier) The section of amplifier following the preamplifier that contains the pulse-shaping networks (filter networks). These networks optimize the signal-to-noise ratio in the amplifying chain. (NPS) 325-1996

main anode (pool-cathode tube) An anode that conducts load current. *Note:* The word main is used only when it is desired to distinguish the anode to which it is applied from an auxiliary electrode such as an excitation anode. It is used only in connection with pool-tube terms. *See also:* electrode. (ED) [45]

main bang (1) (radar) A transmitted pulse. (IM/WM&A) 194-1977w

(2) The transmitted pulse of a radar, especially its amplitude trace as viewed on an A-display at the start of transmission. (AES) 686-1997

main bonding jumper The connection between the grounded circuit conductor and the equipment grounding conductor at the service. (NESC/NEC) [86]

main capacitance (capacitance potential devices) The capacitance between the network connection and line. *See also:* outdoor coupling capacitor. 31-1944w

main circuit All the conducting parts of the gas-insulated substation assembly included in or connected to the circuits that its switching devices are designed to close or open. (SWG/SUB/PE) C37.122-1983s, C37.122.1-1993, C37.100-1992

main console *See:* master console.

main contacts (1) For resistance-type LTCs, a set of through current-carrying contacts that have no transition impedance between the transformer winding and the contacts and commutates the current to the main switching contacts without any arc. (PE/TR) C57.131-1995
(2) (of a switching device) Contacts that carry all or most of the main current. (SWG/PE/TR) C37.100-1992, C57.12.44-1994

main control unit In a processor with more than one instruction control unit, that unit to which, for a given interval of time, the other units are subordinated. (C) 610.10-1994w

main discharge current wave The relatively long portion of the ESD current wave that follows the initial current pulse, or that occurs by itself when the initial current pulse does not exist. It may be unidirectional or oscillatory; its initial slope may be fast or slow. (SPD/PE) C62.47-1992r

main distributing frame (telephone switching systems) A frame where crossconnections are made between the outside plant and central office equipment. (COM) 312-1977w

main distribution center A distribution center supplied directly by mains. *See also:* distribution center. (EEC/PE) [119]

main distribution frame *See:* wiring closet.

main distribution function *See:* wiring closet.

main exciter (1) (rotating machinery) An exciter that supplies all or part of the power required for the excitation of the principal electric machine or machines. *See also:* asynchronous machine. (PE) [9]
(2) (synchronous machines) The source of all or part of the field current for the excitation of an electric machine, exclusive of another exciter. (PE/EDPG) 421-1972s

main exciter response ratio (nominal exciter response) The numerical value obtained when the response, in volts per second, is divided by the rated-load field voltage, which response, if maintained constant, would develop, in one-half second, the same excitation voltage-time area as attained by the actual exciter. *Note:* The response is determined with no load on the exciter, with the exciter voltage initially equal to the rate-load field voltage, and then suddenly establishing circuit conditions that would be used to obtain nominal exciter ceiling voltage. For a rotating exciter, the response should be determined at the rated speed. This definition does not apply to main exciters having one or more series fields, except a light differential series field, or to electronic exciters. (PE/EEC) [119]

main file *See:* master file.

mainframe (1) A rigid framework that provides mechanical support for modules inserted into the backplane, ensuring that connectors mate properly and that adjacent modules do not contact each other. It also provides cooling airflow, and ensures that modules do not disengage from the backplane due to vibration or shock. (C/MM) 1155-1992
(2) The cabinet that houses the central processor and main storage of a computer system. *Note:* This term is sometimes used as an abbreviation for mainframe computer. (C) 610.10-1994w

mainframe computer A computer employing one or more mainframes. *Note:* The distinction between a microcomputer, minicomputer, and mainframe 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. *See also:* mainframe. (C) 610.10-1994w

main gap (glow-discharge tubes) The conduction path between a principal cathode and a principal anode. (ED) 161-1971w

main ground bus (1) A conductor or system of conductors that provides for connecting all designated metallic components of the gas-insulated substation to station ground (ground grid). (SWG/PE/SUB) C37.100-1992, C37.122-1983s
(2) A conductor or system of conductors provided for connecting all designated metallic components of the gas-insulation substation (GIS) to a substation grounding system. (PE/SUB) 80-2000

main lead (rotating machinery) A conductor joining a main terminal to the primary winding. *See also:* asynchronous machine. (PE) [9]

main lobe *See:* major lobe.

main memory *See:* main storage.

main model The top-level unit under test (UUT) model description that includes a list of component packages and a netlist. (SCC20) 1445-1998

main program A software component that is called by the operating system of a computer and that usually calls other software components. *See also:* subprogram; routine. (C) 610.12-1990

main protection *See:* primary protection.

main reflector The largest reflector of a multiple reflector antenna. (AP/ANT) 145-1993

main ring path Principal transmission path in the trunk cabling. The main ring path carries the data in the primary direction. *Contrast:* backup path. (C/LM) 8802-5-1998

mains (1) The ac power source available at the point of use in a facility. It consists of the set of electrical conductors (referred to by terms including "service entrance," "feeder," or "branch circuit") for delivering power to connected loads at the utilization voltage level. (SPD/PE) C62.48-1995, C62.41-1991r
(2) *See also:* primary distribution mains; center of distribution; secondary distribution mains.

mains coupling coefficient *See also:* mains decoupling factor.

mains decoupling factor (mains coupling coefficient) The ratio of the radio-frequency voltage at the mains terminal to the interfering apparatus to the radio-frequency voltage at the aerial terminals of the receiver. *Note:* Generally expressed in logarithmic units. *See also:* electromagnetic compatibility. (INT) [53], [70]

main secondary terminals The main secondary terminals provide the connections to the main secondary winding. *See also:* main secondary winding. 31-1944w

main secondary winding (capacitance potential devices) Provides the secondary voltage or voltages on which the potential device ratings are based. *See also:* main secondary terminals. 31-1944w

mains-interference immunity (mains-interference ratio) The degree of protection against interference conducted by its supply mains as measured under specified conditions. *Note:* See International Special Committee on Radio Interference recommendation 25.1 and International Electrotechnical Commission publication 69 or subsequent publications where the term "mains-interference ratio" is used. *See also:* electromagnetic compatibility. (INT) [53], [70]

main station A telephone station with a distinct call number designation, directly connected to a central office. *See also:* telephone station. (EEC/PE) [119]

main-station code (telephone switching systems) The digits designating a main station; these usually follow an office code. (COM) 312-1977w

main storage That part of internal storage into which instructions and other data must be loaded for subsequent execution or processing. *Synonyms:* primary storage; main memory. *Contrast:* auxiliary storage. *See also:* real storage; common storage; random-access memory. (C) 610.10-1994w

main switchgear connections Those that electrically connect together devices in the main circuit, or connect them to the bus, or both. *Synonym:* primary switchgear connections. (SWG/PE) C37.100-1992

main switching contacts For resistance-type LTCs, a set of contacts that has no transition impedance between the transformer winding and the contacts and makes and breaks current. (PE/TR) C57.131-1995

maintainability (1) (A) (software) The ease with which a software system or component can be modified to correct faults, improve performance or other attributes, or adapt to a changed environment. *See also:* flexibility; extendability. **(B) (software)** The ease with which a hardware system or component can be retained in, or restored to, a state in which it can perform its required functions. (C) 610.12-1990

(2) Ability of an item, under stated conditions of use, to be retained in or restored to a state in which it can perform its required functions, when maintenance is performed under stated conditions and using prescribed procedures and resources. *Note:* Maintainability can, depending on the particular analysis situation, be stated by one or several maintainability characteristics, such as discrete probability distribution, mean active maintenance time, etc. 2. The value of the maintainability characteristic may differ for different maintenance situations. 3. When the term maintainability is used as a maintainability characteristic, it always denotes the probability that the active maintenance is carried out within a given period of time. 4. The required function may be defined as a stated condition. (R) [29]

(3) The measure of the ability of an item to be retained in, or restored to, a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair. (C/BA) 896.3-1993w

Maintaining, Preparing & Producing Executive Reports (MAPPER) A nonprocedural programming language for UNIVAC computers, designed for novice users. (C) 610.13-1993w

maintaining voltage (operating voltage) (glow lamp) The voltage measured across the lamp electrodes when the lamp is operating. (EEC/EL) [104]

maintain temperature (1) Specified temperature of the fluid or process material that the heating system is designed to hold at equilibrium under specified design conditions. (BT/IA/AV/PC) 152-1953s, 844-1991

(2) Specified temperature of the fluid or process material that the heat tracing is designed to hold at equilibrium under specified design conditions. (IA) 515-1997

maintenance (1) (computers) Any activity intended to keep equipment, programs or a data base in satisfactory working condition, including tests, measurements, replacements, adjustments, and repairs. *See also:* software maintenance; file maintenance. (C) [20], [85]

(2) (test, measurement, and diagnostic equipment) Activity intended to keep equipment (hardware) or programs (software) in satisfactory working condition, including tests, measurements, replacements, adjustments, repairs, program copying, and program improvement. Maintenance is either preventive or corrective. (MIL) [2]

(3) The combination of all technical and corresponding administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. *Note:* The required function may be defined as a stated condition. (R) [29]

(4) (A) (software) The process of modifying a software system or component after delivery to correct faults, improve performance or other attributes, or adapt to a changed environment. **(B) (software)** The process of retaining a hardware system or component in, or restoring it to, a state in which it can perform its required functions. *See also:* preventive maintenance. (C) 610.12-1990

(5) *See also:* software maintenance. (C/SE) J-STD-016-1995

(6) The act of preserving or keeping in existence those conditions that are necessary in order for equipment to operate as it was originally intended. (IA/PSE) 902-1998

maintenance bypass Removal of the capability of a channel, component, or piece of equipment to perform a protective action due to a requirement for replacement, repair, test, or calibration. *Note:* A maintenance bypass is not the same as an operating bypass. A maintenance bypass may reduce the degree of redundancy of equipment, but it does not result in the loss of a safety function. (PE/NP) 603-1998

maintenance concept (test, measurement, and diagnostic equipment) A description of the general scheme for maintenance and support of an item in the operational environment. (MIL) [2]

maintenance data/knowledge collection system One system within the AI-ESTATE architectural concept. This system supports collection of data and knowledge necessary for a maintenance function. It is a special form of the knowledge/data base management system of the AI-ESTATE architectural concept. (ATLAS) 1232-1995

maintenance, depot *See:* depot maintenance.

maintenance derated hours (electric generating unit reliability, availability, and productivity) The available hours during which a Class 4 unplanned derating was in effect. (PE/PSE) 762-1987w

maintenance engineering analysis (test, measurement, and diagnostic equipment) A process performed during the development stage to derive the required maintenance resources such as personnel, technical data, support equipment, repair parts, and facilities. (MIL) [2]

maintenance factor *See:* light loss factor.

maintenance, intermediate *See:* intermediate maintenance.

maintenance interval (1) (Class 1E battery chargers and inverters) The period, defined in terms of real time, operating time, number of operating cycles, or a combination of these, during which satisfactory performance is required without maintenance or adjustments. (PE/NP) 650-1979s

(2) (switchgear assemblies for Class 1E applications in nuclear power generating stations) The period, defined in terms of real time, operating time, number of operating cycles, or a combination of these, during which satisfactory performance is expected without maintenance or adjustments. (SWG/PE) C37.100-1992, C37.82-1971s

maintenance level (test, measurement, and diagnostic equipment) The level at which maintenance is to be accomplished, that is, organizational, intermediate, and depot. (MIL) [2]

maintenance manual *See:* support manual.

maintenance measurement accuracy The ratio of good measurements to total measurements. Total measurements include missed measurements or peg counts, as well as errored measurements or peg counts. Maintenance peg counts should register all detected events under all conceivable operating conditions. If, under certain infrequent trouble conditions, registration of detected events requires unreasonable expense or switching system action that interferes with normal call processing, then the events may not be counted. The switching system should tag such defective measurements on the maintenance measurement report. Maintenance usage counts are the ratios of bad measurements to total measurements. (COM/TA) 973-1990w

maintenance operation device A removable device for use with power-operated circuit breakers that is used for manual operation of a de-energized circuit breaker during maintenance only. *Note:* This device is not to be used for closing the circuit breaker on an energized circuit. (SWG/PE) C37.100-1992

maintenance, organizational *See:* organizational maintenance.

maintenance outage hours (electric generating unit reliability, availability, and productivity) The number of hours a unit was in a Class 4 unplanned outage state. (PE/PSE) 762-1987w

maintenance panel A part of a unit of equipment used to display information or provide access to test points for maintenance. (C) 610.10-1994w

maintenance phase *See:* operation and maintenance phase.

maintenance plan (software) A document that identifies the management and technical approach that will be used to maintain software products. Typically included are topics such as tools, resources, facilities, and schedules. *See also:* document. (C/SE) 729-1983s

maintenance proof test (rotating machinery) A test applied to an armatue winding after being in service that is suitable for continued service. It is usually made at a lower voltage than the acceptance proof test. (PE/EM) 95-1977r

maintenance, scheduled *See:* scheduled maintenance.

maintenance temperature *See:* maintain temperature.

maintenance test (1) (electric submersible pump cable) Test made after removal of the cable from the well. It is intended to detect deterioration of the cable to determine suitability for reuse. (IA/PC) 1017-1985s

(2) (power cable systems) A test made during the operating life of a cable system. It is intended to detect deterioration of the system and to check the entire workmanship so that suitable maintenance procedures can be initiated. (PE/IC) 400-1991

MA interface The X.400 Application API. (C/PA) 1224.1-1993w

main-terminal (1) (A) (bidirectional thyristor) The main terminal that is named 1 by the device manufacturer. **(B) (bidirectional thyristor)** The main terminal that is named 2 by the device manufacturer. *See also:* anode. (IA/ED) 223-1966, [46], [12]

(2) (rotating machinery) A termination for the primary winding. *See also:* asynchronous machine. (PE) [9]

main terminals (thyristor) The terminals through which the principal current flows. *See also:* anode. (IA/ED) 223-1966w, [46], [12]

main transformer (power and distribution transformers) The term "main transformer" as applied to two single-phase Scott-connected units for three-phase to two-phase or two-phase to three-phase operation, designates the transformer that is connected directly between two of the phase wires of the three-phase lines. *Note:* A tap is provided at the midpoint for connection to the teaser transformer. (PE/TR) C57.12.80-1978r

main trunk *See:* trunk line.

main unit (power and distribution transformers) The core and coil unit that furnishes excitation to the series unit. (PE/TR) C57.12.80-1978r

main winding, single-phase induction motor A system of coils acting together, connected to the supply line, that determines the poles of the primary winding, and that serves as the principal winding for transfer of energy from the primary to the secondary of the motor. *Note:* In some multispeed motors, the same main winding will not be used for both starting operation and running operation. *See also:* asynchronous machine. (PE) [9]

main window The primary window for an application. (C) 1295-1993w

major alarm (telephone switching systems) An alarm indicating trouble or the presence of hazardous conditions needing immediate attention in order to restore or maintain the system capability. (COM) 312-1977w

major cycle (electronic computation) In a storage device that provides serial access to storage positions, the time interval between successive appearances of a given storage position. (C) 162-1963w

major defect A unit of product that, when tested, falls below 85% of its specified rated ultimate strength. (PE/T&D) C135.61-1997

major event A catastrophic event that exceeds design limits of the electric power system and that is characterized by the following (as defined by the utility):

a) Extensive damage to the electric power system;
b) More than a specified percentage of customers simultaneously out of service;
c) Service restoration times longer than specified.

Some examples are extreme weather, such as a one in five year event, or earthquakes. (PE/T&D) 1366-1998

major failure *See:* failure.

major insulation (1) (outdoor apparatus bushings) Insulating material internal to the bushing between the line potential conductor and ground. (PE/TR) 21-1976

(2) The insulating material providing the dielectric, which is necessary to maintain proper isolation between the energized conductor and ground potential. It consists of internal insulation and the insulating envelope(s). (PE/TR) C57.19.03-1996

majority (1) (computers) A logic operator having the property that if P is a statement, Q is a statement, R is a statement..., then the majority of P, Q, R, ..., is true if more than half the statements are true, false if half or less are true. (C) [20], [85]

(2) (mathematics of computing) A Boolean operator having the property that if P is a statement, Q is a statement, R is a statement, . . . then the majority of P,Q,R, . . . is true if more than half the statements are true, false if half or less are true. (C) 1084-1986w

majority carrier (semiconductor) The type of charge carrier constituting more than one half the total charge-carrier concentration. *See also:* semiconductor; semiconductor device. (ED) 216-1960w

majority circuit A circuit with multiple inputs whose output is related to the state of the majority of its inputs. *Note:* Majority circuits are typically used in fault tolerant computers. *See also:* voting computer; majority gate. (C) 610.10-1994w

majority element *See:* majority gate.

majority emitter (transistor) An electrode from which a flow of majority carriers enters the interelectrode region. *See also:* transistor. (IA) [12]

majority gate A gate that performs a majority operation. *Synonym:* majority element. (C) 610.10-1994w

majority operation A threshold operation in which each of the operands may take only the values 0 and 1; it takes the value 1 if an only if the number of operands having the value 1 is greater than the number of operands that have the value 0. *See also:* majority gate. (C) 610.10-1994w

major key *See:* primary key.

major lobe The radiation lobe containing the direction of maximum radiation. *Note:* In certain antennas, such as multilobed or split-beam antennas, there may exist more than one major lobe. *See also:* antenna. (AP/PE/T&D/ANT) [35], 145-1993, 1260-1996

major loop (control) A continuous network consisting of all of the forward elements and the primary feedback elements of the feedback control system. *See also:* feedback control system. (IA/IAC) [60]

major modification Includes conversion from one type of machine to another type of machine, conversion from one type of enclosure to another type of enclosure, or conversion from one rating to another rating or both. (IA/PC) 1068-1996

major pulse waveform features *See:* base; first transition; top; last transition.

major scheduled generation station shutdown Periodic shutdowns of the generating station for an extended time scheduled for major reconditioning of the station, for example, fuel reloading. (PE/NP) 380-1975w

major storm disaster Designates weather that exceeds design limits of facilities, and that satisfies all of the following: Extensive mechanical damage to facilities; More than a specified percentage of customers out of service; Service restoration longer than a specified time. *Notes:* 1. Typical industry criteria are 10% of customers out of service and 24 hours or more restoration time. Percentage of customers out of service

may be related to a company operating area rather than to an entire company. Examples of major storm disasters are hurricanes and major ice storms. 2. It is suggested that the specified percentage of customers out of service and restoration times be 10% and 24 hours. Percentage of customers out of service may be related to a company operating area rather than to an entire company. Examples of major storm disasters are hurricanes and major ice storms.
(PE/PSE) 859-1987w, 346-1973w

make-break operation (pulse operation) (data transmission) Used to describe a method of data transmission by means of opening and closing a circuit to produce a series of current pulses. (PE) 599-1985w

make-break relay contacts A contact form in which one contact closes connection to another contact and then opens its prior connection to a third contact. (EEC/REE) [87]

make busy (telephone switching systems) Conditioning a circuit to be unavailable for service. (COM) 312-1977w

make-busy signal (telephone switching systems) A signal transmitted from the terminating end of a trunk to prevent the seizure of the originating end. (COM) 312-1977w

make, % make (dial-pulse address signaling systems) (telephony) In dial-pulse signaling, make is that portion of the signal in which the dialing contacts are closed (make). % is the ratio of make time to the total pulse period (make + break) time. (COM/TA) 753-1983w

makeup time That part of available time needed for reruns due to faults or mistakes in operations. (C) 610.10-1994w

making capacity The maximum current or power that a contact is able to make under specified conditions. *See also:* contactor. (IA/ICTL/IAC) [60], [84]

making current (of a switching device) The value of the available current at the time the device closes. *Notes:* 1. Its rms value is measured from the envelope of the current wave at the time of the first major current peak. 2. The making current may also be expressed in terms of instantaneous value of current, in which case it is measured at the first major peak of the current wave. This is designated peak making current.
(SWG/PE) C37.100-1992, C37.30-1971s

making current, rated (switching device) The maximum root-mean-square current against which the recloser is required to close under specified conditions. *Notes:* 1. The root-mean-square value is measured from the envelope of the current wave at the time of the first major current peak. 2. See ANSI C37.05-1964 (R1969), Methods for Determining the Values of a Sinusoidal Current Wave and Normal-Frequency Recovery Voltage for AC High-Voltage Circuit Breakers.
(SWG/PE) C37.60-1981r

making-current tests (high-voltage switchgear) Tests that consist of manual or remote control closing of the device against a prescribed current. (SWG/PE) C37.40-1981s

malfunction (1) An error that results from failure in the hardware. *See also:* error; fault; mistake.
(C/MIL) 162-1963w, 165-1977w, [2]

(2) (seismic qualification of Class 1E power equipment) The loss of capability of Class 1E equipment to initiate or sustain a required function, or the initiation of an undesired spurious action that can result in consequences adverse to safety.
(SWG/PE/NP) 649-1980s, C37.81-1989r, 650-1979s, 344-1975s

(3) The loss of capability to initiate or sustain a required function, often a protective action, or the initiation of undesired spurious action. *Note:* A certain degree of equipment degradation may be acceptable in one system and not in another. In such cases, an evaluation of the equipment or device application should include a determination that the degree of relay contact bounce, changes in device calibration, or degradation of pressure-retaining boundaries are within acceptable limits.
(SWG/SUB/PE/PE) C37.122-1983s, C37.100-1992, C37.122.1-1993

(4) (analog computer) *See also:* error. (C) 166-1977w

(5) (test, measurement, and diagnostic equipment) *See also:* fault. (MIL) [2]

malicious call (telephone switching systems) A call of an harassing, abusive, obscene, or threatening nature.
(COM) 312-1977w

managed network A network or set of networks established and controlled by one or more organizations to meet specific organizational or business needs. (C) 2001-1999

MAN *See:* metropolitan area network.

managed object The OSI structure of management information (ISO/IEC 10165-2:1992) term used as an abstract representation of a resource. This managed object has a set of attributes. These attributes are equivalent to data objects.
(LM/C) 802.10-1992

management A process that consists of functions such as planning, organizing, controlling and supervising, and is performed to set and meet the stated objectives.
(C) 610.7-1995

management game A simulation game in which participants seek to achieve a specified management objective given preestablished resources and constraints; for example, a simulation in which participants make decisions designed to maximize profit in a given business situation and a computer determines the results of those decisions. *See also:* war game.
(C) 610.3-1989w

Management Information Base (MIB) A repository of information to describe the operation of a specific network device.
(C/LM) 802.3-1998

management information base (MIB) (1) A conceptual database of information contained in the collection of all the managed object classes and their instances.
(LM/C) 802.10-1992

(2) A simple network management protocol (SNMP) compatible data structure that defines the functional groups and management objects of a unit or system.
(C/MM) 1284.1-1997

management information format (MIF) A desktop management interface (DMI) compatible data structure that defines the functional groups and management objects of a unit or system. (C/MM) 1284.1-1997

management information model A model that identifies the entities and their relationships that participate in managing an OSI environment. (C) 610.7-1995

management information octets DQDB Layer Protocol Data Units (PDUs) used to carry DQDB Layer Management Protocol information between peer DQDB Layer Management Entities (LMEs). (LM/C) 8802-6-1994

management information system (MIS) An automated system designed to provide managers with the information required to make basic decisions. *Synonyms:* executive information system; business information system. *See also:* decision support system; computer-aided management. (C) 610.2-1987

management interface An interface provided by both the Media Independent Interface (MII) or Gigabit Media Independent Interface (GMII) that provides access to management parameters and services. (C/LM) 802.3-1998

management review A systematic evaluation of a software acquisition, supply, development, operation, or maintenance process performed by or on behalf of management that monitors progress, determines the status of plans and schedules, confirms requirements and their system allocation, or evaluates the effectiveness of management approaches used to achieve fitness for purpose. (C/SE) 1028-1997

manager role Where each task is initiated. The *manager role* is concerned with taking appropriate action at the completion or failure of a task. (C/PA) 1387.2-1995

Manchester biphase-L encoding A signal transmission method defined for the representation of binary data bits. Manchester biphase-L encoding specifies two "half-bits," so that a guaranteed mid-bit transition occurs in the transmitted signal. The

transition is defined to be positive for encoding a logic "0" and negative for encoding a logic "1."
(EMB/MIB) 1073.4.1-2000

Manchester encoding A method of encoding data in which separate data and clock signals can be combined into a single, self-synchronizable data stream, suitable for transmission on a serial channel. (C) 610.7-1995

mandatory A syntax keyword used to specify a total mapping. *Contrast:* optional. *See also:* total. (C/SE) 1320.2-1998

mandatory category A category that is essential to establish a common definition and to provide common terminology and concepts for communication among projects, business environments, and personnel. (C/SE) 1044-1993

mandatory nonidentifying relationship A kind of nonidentifying relationship in which an instance of the child entity must be related to an instance of the parent entity. *Contrast:* optional nonidentifying relationship. *See also:* nonidentifying relationship. (C/SE) 1320.2-1998

manhole (1) (More accurately termed splicing chamber or cable vault) A subsurface chamber, large enough for a man to enter, in the route of one or more conduit runs, and affording facilities for placing and maintaining in the runs, conductors, cables, and any associated apparatus. *See also:* splicing chamber. (T&D/PE) [10]

(2) An opening in an underground system that workmen or others may enter for the purpose of installing cables, transformers, junction boxes, and other devices, and for making connections and tests. *See also:* splicing chamber; distribution center. (BT/AV) [34]

(3) A subsurface enclosure that personnel may enter used for the purpose of installing, operating, and maintaining submersible equipment and cable.
(NESC/T&D) C2-1997, C2.2-1960

man-centered simulation (man-centred simulation) *See also:* human-centered simulation. (C) 610.3-1989w

manhole chimney A vertical passageway for workmen and equipment between the roof of the manhole and the street level. (T&D/PE) [10]

manhole cover A removable lid that closes the opening to a manhole or similar subsurface enclosure.
(NESC) C2-1997

manhole cover frame The structure that caps the manhole chimney at ground level and supports the cover.
(T&D/PE) [10]

manhole grating A grid that provides ventilation and a protective cover for a manhole opening. (NESC) C2-1997

manifold insulation (rotating machinery) (liquid cooling) The insulation applied between ground and a manifold connecting several parallel liquid-cooling paths in a winding. *See also:* stator. (PE) [9]

manifold-pressure electric gauge A device that measures the pressure of fuel vapors entering the cylinders of an aircraft engine. *Note:* The gauge is provided with a scale, usually graduated in inches of mercury, absolute. It provides remote indication by means of a self-synchronous generator and motor. (EEC/PE) [119]

manipulated variable (control) A quantity or condition that is varied as a function of the actuating signal so as to change the value of the directly controlled variable. *Note:* In any practical control system, there may be more than one manipulated variable. Accordingly, when using the term it is necessary to state which manipulated variable is being discussed. In process control work, the one immediately preceding the directly controlled system is usually intended. *See also:* feedback control system. (IA/ICTL/IAC) [60]

manipulation detection A mechanism used to detect whether a data unit has been modified (either accidentally or intentionally). (LM/C) 802.10-1992

man-machine interface (1) (man-machine performance in nuclear power generating stations) The devices through which personnel receive information from the system or process and the devices through which personnel exercise their control of the system or process.
(PE/NP) 845-1988s, 1023-1988r

(2) (station control and data acquisition) The operator contact with equipments governed by IEEE Std C37.1-1979, Mil-Std-1472 is recommended as a reference for use in the design and evaluation of the man/machine interface to equipments governed by this standard. Alternative human engineering data may be specified by the user. The man/machine interface for operation concerns standards and recommendations for information displays, control capabilities, colors and man/machine interaction of equipments governed by IEEE Std C37.1-1979. (SUB/PE) C37.1-1979s

(3) (software) *See also:* user interface. (C) 610.12-1990

man-machine simulation *See:* human-machine simulation.

man-made noise Noise generated in machines or other technical devices. *See also:* electromagnetic compatibility.
(EMC) [53]

manned space flight network (MSFN) (communication satellite) A network of ground communication and tracking facilities maintained for the support of manned space flight programs. (COM) [24]

mantissa (A) (mathematics of computing) The fractional part of a logarithm. *Contrast:* characteristic. **(B) (mathematics of computing)** For floating-point arithmetic, *See also:* significand. (C) 1084-1986

manual (1) (electric systems) Operated by mechanical force, applied directly by personal intervention. *See also:* distribution center. (IA/IAC) [60]

(2) Capable of being operated by personal intervention.
(NESC) C2-1997

manual block-signal system A block or a series of consecutive blocks governed by block signals operated manually upon information by telegraph, telephone, or other means of communication. *See also:* block-signal system.
(EEC/PE) [119]

manual central office A central office of a manual telephone system. (COM) [48]

manual checkout (test, measurement, and diagnostic equipment) A checkout system which relies completely on manual operation, operator decision and evaluation of results.
(MIL) [2]

manual control (1) (excitation systems for synchronous machines) In excitation control system usage, manual control refers to maintaining synchronous machine terminal voltage by operator action. *Note:* Manual control means may include an exciter field rheostat, controlled rectifiers, or a direct-current (dc) regulator controlling either exciter field current or exciter output voltage, or other means that do not include regulation of synchronous machine terminal voltage.
(PE/EDPG) 421.1-1986r

(2) Those elements in the excitation control system which provide for manual adjustment of the synchronous machine terminal voltage by open-loop control.
(PE/EDPG) 421-1972s

(3) Control in which the main devices under control, whether manually or power operated, are controlled by an attendant.
(SWG/PE/SUB) C37.100-1992, C37.1-1994

(4) (programmable instrumentation) *See also:* local control. (IM/AIN) 488.1-1987r

manual controller An electric controller having all of its basic functions performed by devices that are operated by hand.
(IA/MT) 45-1998

manual data input (numerically controlled machines) A means for the manual insertion of numerical control commands. (IA) [61]

manual fire-alarm system A fire-alarm system in which the signal transmission is initiated by manipulation of a device provided for the purpose. *See also:* protective signaling.
(EEC/PE) [119]

manual holdup-alarm system An alarm system in which the signal transmission is initiated by the direct action of the person attacked or of an observer of the attack. *See also:* protective signaling. (EEC/PE) [119]

manual hyphenation In text formatting, hyphenation in which all line-ending and word break decisions are made by the user. *See also:* semi-manual hyphenation; automatic hyphenation. (C) 610.2-1987

manual input (A) (computers) The entry of data by hand into a device at the time of processing. **(B) (computers)** The data entered as in definition (A). (C) [20], [85]

manual load (armature current) division The effect of a manually operated device to adjust the division of armature currents between two or more motors or two or more generators connected to the same load. *See also:* feedback control system. (IA/ICTL/IAC) [60]

manual locking carabiner Has a self-closing gate which remains closed but not locked (unless purposely locked by the user) until intentionally opened by the user for connection or disconnection. (T&D/PE) 1307-1996

manual lockout device A device that holds the associated device inoperative unless a predetermined manual function is performed to release the locking feature. (SWG/PE) C37.100-1992

manually operated door or gate A door or gate that is opened and closed by hand. *See also:* hoistway. (EEC/PE) [119]

manually release-free *See:* mechanically release-free.

manually trip-free *See:* mechanically release-free.

manual mobile telephone system A mobile communication system manually interconnected with any telephone network, or a mobile communication system manually interconnected with a telephone network. (VT) [37]

manual operation Operation by hand without the use of any other source of power. (SWG/PE) C37.100-1992

manual outage An outage occurrence that results from intentional or inadvertent operator controlled opening of switching devices. (PE/PSE) 859-1987w

manual potentiometer (analog computer) A potentiometer that is set by hand, also known as a "hand-set potentiometer." (C) 165-1977w

manual release (electromagnetic brake) A device by which the braking surfaces may be manually disengaged without disturbing the torque adjustment. *See also:* electric drive. (IA/ICTL/IAC/APP) [60], [75]

manual reset A function that requires a manual operation to reestablish specific conditions. (SWG/PE) C37.100-1981s

manual-reset relay A relay that may be reset manually after an operation. (EEC/REE) [87]

manual-reset thermal protector (rotating machinery) A thermal protector designed to perform the function by opening the circuit to or within the protected machine, but requiring manual resetting to close the circuit. *See also:* starting-switch assembly. (PE) [9]

manual ringing (telephone switching systems) Ringing that is started by the manual operation of a key and continues only while the key is held operated. (COM) 312-1977w

manual speed adjustment A speed adjustment accomplished manually. *See also:* electric drive. (IA/ICTL/IAC) [60]

manual switchboard (telephone switching systems) A telecommunication switchboard for making interconnections manually by plugs and jacks or keys. (COM) 312-1977w

manual telecommunications exchange (telephone switching systems) A telecommunications exchange in which connections between stations are manually set by means of plugs and jacks or keys. (COM) 312-1977w

manual telecommunication system (telephone switching systems) A telecommunications system in which connections between customers are ordinarily established manually by operators in accordance with orders given orally by the calling parties. (COM) 312-1977w

manual test A test or collection of tests that requires an operator. The tests may involve power failure testing, on-line replacement testing, media testing, or cable connection tests (when loop-back cables are required). A manual test is invoked by writing to the TEST_START register. (C/MM) 1212-1991s

manual test equipment (test, measurement, and diagnostic equipment) Test equipment that requires separate manipulations for each task (for example, connection to signal to be measured, selection of suitable range, and insertion of stimuli). (MIL) [2]

manual testing Testing that requires a human to execute some or all of a test procedure. (SCC20) 1226-1998

manual transfer or selector device (power system device function numbers) A manually operated device that transfers the control circuits in order to modify the plan of operation of the switching equipment or of some of the devices. (PE/SUB) C37.2-1979s

manual trip device A device that is connected to the tripping linkage and that can be operated manually to trip a switching device. (SWG/PE) C37.100-1992

manufacture (software) In software engineering, the process of copying software to disks, chips, or other devices for distribution to customers or users. (C) 610.12-1990

manufactured building Any building that is of closed construction and that is made or assembled in manufacturing facilities on or off the building site, other than mobile homes or recreational vehicles. (NESC/NEC) [86]

manufacturer *See:* builder **(rotating electric machinery)** The organization supplying the electric machinery to the purchaser. (PE/EM) 11-1980r

manufacturing phase (software) The period of time in the software life cycle during which the basic version of a software product is adapted to a specified set of operational environments and is distributed to a customer base. (C) 610.12-1990

manufacturer A The supplier of the initial GIS. *See also:* gas-insulated substations. (PE) 1416-1998

manufacturer B The supplier of the extension GIS. *See also:* gas-insulated substations. (PE) 1416-1998

manuscript (numerically controlled machines) An ordered list of numerical control instructions. *See also:* programming. (IA) [61]

manuscript editor *See:* document editor.

many-to-many relationship (1) (data management) A relationship between two entities A and B such that any instance of A may be more associated with than one instance of B, and vice-versa. *Note:* The use of "m:n relationship" as a synonym for this term is deprecated. *Synonym:* m:n relationship. (C) 610.5-1990w

(2) A kind of relationship between two state classes (not necessarily distinct) in which each instance of one class may be associated with any number of instances of a second class (possibly none), and each instance of the second class may be related to any number of instances of the first class (possibly none). (C/SE) 1320.2-1998

many-to-one decoder *See:* decoder.

MAP *See:* memory allocation and protection.

map (1) (A) (data management) To establish a correspondence between the elements of one set and the elements of another set. *Synonym:* map over. **(B) (data management)** To establish a correspondence between the logical structure of a database and the physical structure of that database. (C/IA/APP) [20], 610.5-1990, [75]

(2) To create an association between a page-aligned range of the address space of a process and a range of physical memory or some memory object, such that a reference to an address in that range of the address space results in a reference to the associated physical memory or memory object. The mapped memory or memory object is not necessarily memory-resident. (C/PA) 9945-1-1996

map a range of addresses To create an association process's address space and a range of physical memory or some memory object, such that a reference to an address in that range of the address space results in a reference to the associated physical memory or memory object. The mapped memory or memory object is not necessarily memory-resident. (C) 1003.5-1999

map over *See:* map.

MAPPER *See:* Maintaining, Preparing & Producing Executive Reports.

mapping (1) Establishing a sequence of the Activities in this standard according to a selected software life cycle model (SLCM). *See also:* Instance; Invocation; Iteration. (C/SE) 1074-1997

(2) Process of correspondence between the elements of one set and the elements of another set. (SCC20) 1226-1998

(3) An assigned correspondence between two things that is represented as a set of ordered pairs. Specifically, a mapping from a class to a value class is an attribute. A mapping from a state class to a state class is a participant property. A mapping from the (cross product of the) instances of the class and the instances of the input argument types to the (cross product of the) instances of the other (output) argument types is an operation. (C/SE) 1320.2-1998

mapping completeness A designation of whether a mapping is complete (totally mapped) or incomplete (partial). *See also:* partial; total. (C/SE) 1320.2-1998

mapping function (computer graphics) A transformation that converts display elements from one coordinate system to another. (C) 610.6-1991w

mapping onto network protocol The embodiment of hardware and software as it relates to supporting IEEE 1451.1 communications on a specific bus standard. (IM/ST) 1451.1-1999

map program (software) A software tool, often part of a compiler or assembler, that generates a load map. (C) 610.12-1990

map-reader function generator A variant function generator using a probe to detect the voltage at a point on a conducting surface and having coordinates proportional to the inputs. *See also:* electronic analog computer. (C) 165-1977w

map vertical *See:* geographic vertical.

MAR *See:* memory address register.

MARC *See:* MAchine-Readable Cataloging.

margin (1) (electric penetration assemblies) The difference between the most severe design service conditions and the conditions used in the design qualification to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance. (PE/NP) 317-1983r

(2) (nuclear power generating station) (valve actuators) (safety systems equipment in nuclear power generating stations) The difference between service conditions and the conditions used for equipment qualification. (PE/NP) 382-1985, 323-1974s, 649-1980s, 627-1980r

(3) (switchgear assemblies for Class 1E applications in nuclear power generating stations) The difference between the demonstrated capability of the equipment and that required in service for specific conditions. (SWG/PE) C37.100-1992, C37.82-1971s

(4) (A) (data transmission) (Digital) Of a receiving equipment, the maximum degree of distortion of the received signal which is compatible with the correct translation of all of the signals which it may possibly receive. *Note:* This maximum degree of distortion applies without reference to the form of distortion effecting the signals. In other words, it is the maximum degree of the most unfavorable distortion acceptable, beyond which incorrect translation occurs, which determines the value of the margin. The condition of the measurements of the margin are to be specified in accordance with the requirements of the system. **(B) (data transmission)** (Analog) The excess of receive level beyond that needed for proper operation. (PE) 599-1985

(5) (teletypewriter) (orientation margin) (printing telegraphy) That fraction of a perfect signal element through which the time of selection may be varied in one direction from the normal time of selection, without causing errors while signals are being received. *Note:* There are two distinct margins, determined by varying the time of selection in either direction from normal. *See also:* telegraphy. (COM) [49]

(6) (nickel-cadmium storage batteries) The combination of design margin and aging factor originally used in determining the battery's initial capacity requirements. (PE/EDPG) 1106-1987s

margin-adjust hyphenation *See:* hot zone hyphenation.

margin-adjust zone *See:* hot zone.

marginal check (electronic computation) A preventive maintenance procedure in which certain operating conditions (for example, supply voltage or frequency) are varied about their nominal values in order to detect and locate incipient defective parts. *See also:* check. (C) 162-1963w

marginal checking (test, measurement, and diagnostic equipment) A system or method of determining circuit weaknesses and incipient malfunctions by varying the operating conditions of the circuitry. (MIL) [2]

marginal relay A relay that functions in response to predetermined changes in the value of the coil current or voltage. *See also:* relay. (EEC/REE) [87]

marginal testing (test, measurement, and diagnostic equipment) Testing that presents results on an indicator that has tolerance bands for evaluating the signal or characteristic being tested. (For example: a green band might indicate an acceptable tolerance range; a yellow band, a tolerance range representing marginal operation; and a red band, a tolerance that is unsatisfactory for operation of the item). (MIL) [2]

margin of commutation γ (margin angle) The time, expressed in degrees (one cycle of the ac waveform, 360°) from the termination of commutation in inverter operation to the next point of intersection between the two halfwaves of the voltage phases which have just commutated. *Note:* At this point of intersection, the converter circuit element which has just terminated conduction changes from reverse blocking state to OFF state. (IA/IPC) 444-1973w

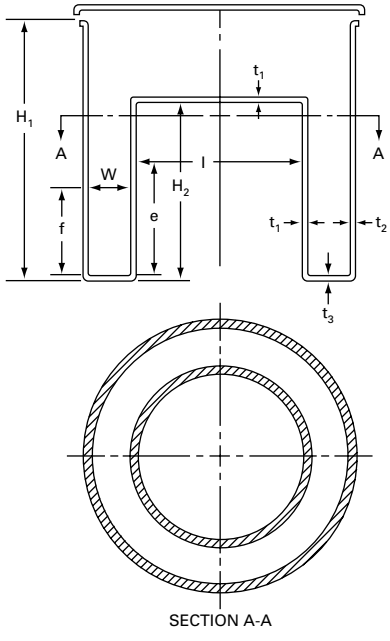
marine distribution panel A panel receiving energy from a distribution or subdistribution switchboard and distributing energy to energy-consuming devices or other distribution panels or panelboards of a ship. *See also:* marine electric apparatus. (EEC/PE) [119]

marine electric apparatus Electric apparatus designed especially for use on shipboard to withstand the conditions peculiar to such application. (EEC/PE) [119]

marine generator and distribution switchboard Receives energy from the generating plant and distributes directly or indirectly to all equipment of a ship supplied by the generating plant. *See also:* marine electric apparatus. (EEC/PE) [119]

Marinelli beaker (1) (germanium semiconductor detector) Reentrant (inverted well) beaker. It is available in a variety of sizes for use in large volume, low level, measurements. The beaker specified herein is shown in a corresponding figure. A schematic of a typical sample-detector geometry is also illustrated in a corresponding figure. The specified beaker is considered to be of 450 mL capacity. The actual volume is greater than this, but, for purposes of this standard, the beaker is to be filled to 450 mL $\pm$ 2 mL. The beaker specified was selected because of: high counting efficiency for the sample material used; commercial availability at low cost; common usage in many laboratories; physical convenience. (NPS) 680-1978w

(2) A reentrant (inverted well) beaker that can be fitted over a detector endcap for the purpose of holding a radioactive sample in a configuration that surrounds a major portion of the detector. (NPS) 325-1996



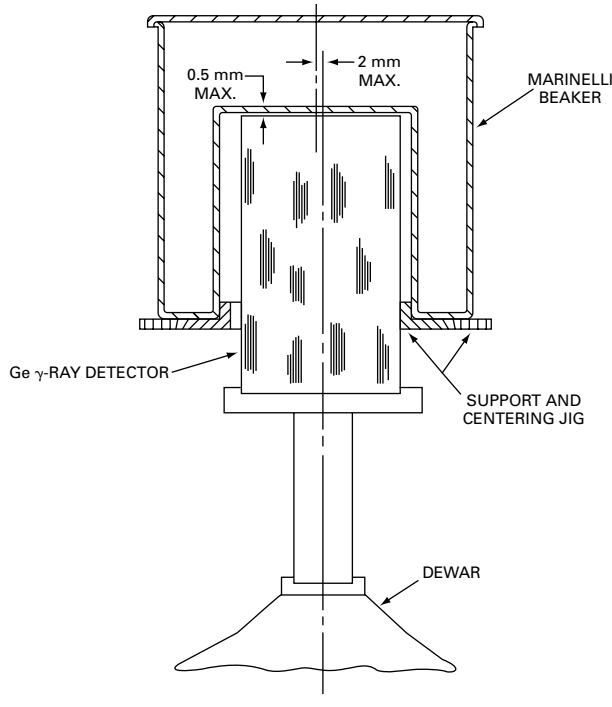
	mm	inches
H_1	104.1 ± 1.3	4.10 ± 0.05
H_2	68.33 ± 0.15	2.690 ± 0.006
I	[77.40 − 0.008 e] ± 0.10 avg., ± 0.25 max.	[3.048 − 0.008 e] ± 0.004 avg., ± 0.010 max.
W	[14.83 + 0.008 f] ± 0.10 avg., ± 0.25 max.	[0.584 + 0.008 f] ± 0.004 avg., ± 0.010 max.
t_1	1.90 ± 0.1	0.075 ± 0.004
t_2	2.00 ± 0.25	0.079 ± 0.010
t_3	3.60 ± 0.15	0.142 ± 0.006

MATERIAL : PLASTIC OF DENSITY 1.1 ± 0.1

standard Marinelli beaker

Marinelli beaker standard source (germanium semiconductor detector) A standard Marinelli beaker containing a carrier with radioactive material. An MBSS may be a certified MBSS, a calibrated MBSS, a certified solution MBSS, or a calibrated solution MBSS. The calibration uncertainty of the photon emission rate for the filled beaker shall be not more than three percent unless otherwise stated. *Note:* The photon emission rate as used in IEEE Std 680-1978w is the number of photons per second resulting from the decay of radionuclides in the source, and is thus higher than the detected rate at the surface. (NPS) 680-1978w

marine panelboard A single panel or a group of panel units assembled as a single panel, usually with automatic overcurrent circuit breakers or fused switches, in a cabinet for flush or surface mounting in or on a bulkhead and accessible only from the front, serving lighting branch circuits or small power branch circuits of a ship. *See also:* marine electric apparatus. (EEC/PE) [119]



Marinelli beaker with solid state detector

marine subdistribution switchboard Essentially a section of the marine generator and distribution switchboard (connected thereto by a bus feeder and remotely located) that distributes energy in a certain section of a vessel. *See also:* marine electric apparatus. (EEC/PE) [119]

mariner's compass A magnetic compass used in navigation consisting of two or more parallel polarized needles secured to a circular compass card that is delicately pivoted and enclosed in a glass-covered bowl filled with alcohol to support by flotation the weight of the moving parts. *Note:* The compass bowl is supported in gimbals mounted in the binnacle. The compass card is graduated to show the 32 points of the compass in addition to degrees. (EEC/PE) [119]

mark (1) (liquid-filled power transformers) The descriptive name, instructions, cautions, or other information applied to polychlorinated biphenyls (PCBs) and PCB items or other objects subject to these regulations. (LM/C) 802.2-1985s

(2) (computers) *See also:* flag.

(3) (data management) A symbol or group of symbols that indicates the beginning or end of a field, a word, an item of data, or a set of data such as a file, a record, or a block. (C) 610.5-1990w

(4) A symbol or symbols that indicate the beginning or the end of a field, of a word, or of a data item in a file, record, or block. *Synonym:* marker. *See also:* beginning-of-tape marker; field mark; file mark; end mark; address mark; word mark; group mark; end-of-tape marker; index mark. (C) 610.10-1994w

mark detection *See:* mark sensing.

marked (liquid-filled power transformers) The marking of polychlorinated biphenyl (PCB) items and PCB storage areas and transport vehicles by means of applying a legible mark by painting, fixation of an adhesive label, or by any other method that meets the requirement of these regulations. (LM/C) 802.2-1985s

marked ratio The ratio of the rated primary value to the rated secondary value as stated on the nameplate. (PE/TR/PSR) C57.13-1993, C37.110-1996, C57.12.80-1978r

marker (1) (telephone switching systems) A wired-logic control circuit that, among other functions, tests, selects, and establishes paths through a switching stage or stages. (COM) 312-1977w

(2) (navigation aid terms) A radio beacon to designate a small area. (AES/GCS) 172-1983w

(3) (computer graphics) A symbol with a specific appearance that identifies a particular location. *See also:* polymarker. (C) 610.6-1991w

(4) *See also:* plumb marker pole. (T&D/PE) 524-1992r

marker beacon (navigation aid terms) A radio beacon to designate a small area. (AES/GCS) 172-1983w

marker-beacon receiver A receiver used in aircraft to receive marker-beacon signals that identify the position of the aircraft when over the marker-beacon station. (EEC/PE) [119]

marker lamp (railway practice) A signal lamp placed at the side of the rear end of a train or vehicle, displaying light of a particular color to indicate the rear end and to serve for identification purposes. (EEC/PE) [119]

marker light (railway practice) A light that by its color or position, or both, is used to qualify the signal aspect. (EEC/PE) [119]

marker radio beacon (navigation aid terms) A beacon that indicates a specific location. (AES/GCS) 172-1983w

marker signal (oscilloscopes) A signal introduced into the presentation for the purpose of identification, calibration, or comparison. (IM/HFIM) [40]

marker size An attribute specifying the size of a marker, relative to the standard size of a marker on the display device. (C) 610.6-1991w

marker type An attribute specifying the geometric shape of a marker; for example, dot, asterisk, circle. (C) 610.6-1991w

market Demand and supply of goods and services. (C/SE) 1430-1996

marketplace An infrastructure that supports the exchange of goods and services. (C/SE) 1430-1996

MARK IV A procedural language used for report writing and data manipulation. (C) 610.13-1993w

marking (marking and spacing intervals) (data transmission) (telegraph communication) Intervals that correspond, according to convention, to one condition or position of the originating transmitting contacts, usually a closed condition; spacing intervals are the intervals that correspond to another condition of the originating transmitting contacts, usually an open condition. *Note:* The terms "mark" and "space" frequently used for the corresponding conditions. The waves corresponding to the marking and spacing intervals are frequently designated as marking and spacing waves, respectively. (PE) 599-1985w

marking and spacing intervals (telegraph communication) Intervals that correspond, according to convention, to one condition or position of the originating transmitting contacts, usually a closed condition; spacing intervals are the intervals that correspond to another condition of the originating transmitting contacts, usually an open condition. *Note:* The terms mark and space are frequently used for the corresponding conditions. The waves corresponding to the marking and spacing intervals are frequently designated as marking and spacing waves, respectively. *See also:* telegraphy. (PE/EEC) [119]

marking engine A set of electrical and mechanical components that moves the print media and marks that media. In some implementations, a facsimile transmission function is considered to be a marking engine. (C/MM) 1284.1-1997

marking pulse (teletypewriter) The signal pulse that, in direct current, neutral, operation, corresponds to a circuit-closed or current-on condition. (COM) [49]

marking wave (telegraph communication) (keying wave) The emission that takes place while the active portions of the code characters are being transmitted. *See also:* radio transmitter. (AP/ANT) 145-1983s

Markov chain A discrete Markov process. (C) 610.3-1989w

Markov chain model A discrete, stochastic model in which the probability that the model is in a given state at a certain time depends only on the value of the immediately preceding state. *Synonym:* Markov model. *See also:* semi-Markov model. (C) 610.3-1989w, 1084-1986w

Markov model *See:* Markov chain model.

Markov process A stochastic process which assumes that in a series of random events, the probability for occurrence of each event depends only on the immediately preceding outcome. *See also:* semi-Markov process. (C) 610.3-1989w

mark scanning Optical sensing of marks recorded manually on a data medium. *Contrast:* mark sensing. (C) 610.2-1987

mark sensing Electrical sensing of conductive marks recorded manually on a nonconductive data medium. For example, graphite marks on paper. *Synonym:* mark detection. *Contrast:* mark scanning. (C) 610.2-1987

mark-sensing card A card that can be marked with a special electrographic pencil, then read directly into a computer. (C) 610.10-1994w

mark sensing column A vertical line of positions on a data medium, capable of being detected by mark sensing. (C) 610.2-1987

markup language *See:* page description language.

M-array glide slope (instrument landing systems) A modified null-reference glide-slope antenna system in which the modification is primarily an additional antenna used to obtain a high degree of energy cancellation at the low elevation angles. *Note:* Called M because it was 13th in a series of designs. This system is used at locations where higher terrain exists in front of the approach end of the runway, in order to reduce unwanted reflections of energy into the glide-slope sector. *See also:* navigation. (AES/RS) 686-1982s, [42]

marshaling/demarshaling The mapping of information typed as given in the signatures of `Perform-`, `Execute-`, and `Publish-`like operations into the network-specific, on-the-wire formats, including any required endian issues. Demarshaling is the reverse process. (IM/ST) 1451.1-1999

MARshall System for Aerospace Simulation (MARSYAS) A simulation language used for simulating large physical systems, designed for use by people inexperienced in simulation or programming. Allows equations and FORTRAN subroutines to be written along with the statements describing a block diagram model. (C) 610.13-1993w

MARSYAS *See:* MARshall System for Aerospace Simulation.

maser (1) (data transmission) (microwave amplification by stimulated emission of radiation) The general class of microwave amplifiers based on molecular interaction with electromagnetic radiation. The nonelectronic nature of the maser principle results in very low noise. (PE) 599-1985w

(2) (laser maser) A device for amplifying or generating radiation by induced transitions of electrons, atoms, molecules, or ions between two energy levels having a population inversion; microwave amplification by stimulated emission of radiation. (LEO) 586-1980w

mask (1) (A) (computers) A pattern of characters that is used to control the retention or elimination of portions of another pattern of characters. **(B) (computers)** A filter. (C) [20], [85]

(2) (software) A pattern of bits or characters designed to be logically combined with an unknown data item to retain or suppress portions of the data item; for example, the bit string "00000011" when logically ANDed with an eight-bit data item, gives a result that retains the last two bits of the data item and has zero in all the other bit positions. *See also:* interrupt mask. (C) 610.12-1990

mask document In word processing, a form displayed on a display screen with blank areas for the user to complete. (C) 610.2-1987

masking (1) (A) The process by which the threshold of audibility for one sound is raised by the presence of another (masking) sound. **(B)** The amount by which the threshold of audibility of a sound is raised by the presence of another (masking) sound. The unit customarily used is the decibel. (ACO)

(2) (color television) A process to alter color rendition in which the appropriate color signals are used to modify each other. *Note:* The modification is usually accomplished by suitable cross coupling between primary color-signal channels. *See also:* television. (BT/SP/AV) [34], [32]

masking audiogram A graphic presentation of the masking due to a stated noise. *Note:* This is plotted in decibels as a function of the frequency of the masked tone. (SP) [32]

masking, fault *See:* fault masking.

mask&swap A data-access operation that stores a *next* value to the *test* specified bits within a specified data type and returns the previous data value. (C/MM) 1596.5-1993

maskSwap A bus transaction that stores bits of a *next* argument to a specified data address and returns the previous data value from that address. The affected bits are specified by a *test* argument. In the CSR Architecture this is called a mask_swap transaction. (C/MM) 1596.5-1993

masquerade The pretense by an entity to be a different entity. (LM/C) 802.10-1992

mass (International System of Units (SI)) The SI unit of mass is the kilogram. This unit, or one of the multiples formed by attaching an SI prefix to gram, is preferred for all applications. Among the base and derived units of SI, the unit of mass is the only one whose name, for historical reasons, contains a prefix. Names of decimal multiples and submultiples of the unit of mass are formed by attaching prefixes to the word gram. The megagram (Mg) is the appropriate unit for measuring large masses such as have been expressed in tons. However, the name ton has been given to several large mass units that are widely used in commerce and technology: the long ton of 2240 lb, the short ton of 2000 lb, and metric ton of 1000 kilograms (also called the tonne). None of these terms are SI. The term metric ton should be restricted to commercial usage, and no prefixes should be used with it. Use of the term tonne is deprecated. *See also:* units and letter symbols. (QUL) 268-1982s

Massachusetts General Hospital Utility Multi-Programming System (MUMPS) An ANSI standard programming system containing its own operating system, command language, and interactive programming language; designed specifically for medical applications and is particularly adaptable to string handling functions and management of hierarchical data. (C) 610.13-1993w

mass-attraction vertical The normal to any surface of constant geopotential; it is the direction that would be indicated by a plumb bob if the earth were not rotating. *See also:* navigation. (AES/RS) 686-1982s, [42]

mass burning rate Mass loss per unit time by materials burning under specified conditions. (DEI) 1221-1993w

mass loading The change in phase velocity of a surface acoustic wave produced by a thin layer on the substrate of higher density than that of the substrate; perturbations in reflections, velocity, and dispersion that occur due to loading effects of thin films on the substrate surface. (UFFC) 1037-1992w

mass spectrograph An electronic device based on the action of a constant magnetic field on the paths of ions, used to separate ions of different masses. *See also:* electron device. (Std100) [84]

mass storage An area of storage, or a storage device, having a very large storage capacity. *Note:* Sometimes referred to as secondary storage in order to differentiate from main storage. *Synonym:* bulk storage. (C) 610.10-1994w

mass unbalance (gyros) The characteristic of a gyro resulting from lack of coincidence of the center of supporting forces and the center of mass. It gives rise to torques caused by linear accelerations that lead to acceleration-sensitive drift rates. (AES/GYAC) 528-1994

mast (power transmission and distribution) A column or narrow-base structure of wood, steel, or other material, supporting overhead conductors, usually by means of arms or brackets, span wires, or bridges. *Note:* Broad-base lattice steel supports are often known as towers; narrow-base steel supports are often known as masts. *See also:* pole; tower. (T&D/PE) [10]

mast arm *See:* bracket.

Master *See:* SBus Master.

master (1) (FASTBUS acquisition and control) A device that is capable of asserting or controlling an operation on a segment according to the FASTBUS protocol. A master may, in addition, contain slave logic. (NID) 960-1993

(2) (STD bus) A card controlling a bus transaction. The master that is currently controlling the bus is the current master. The card that is host to all other masters is the permanent master. All masters that are not the permanent master are temporary masters. (C/MM) 961-1987r

(3) (VMEbus) A functional module that initiates data transfer bus (DTB) cycles to transfer data between itself and a slave module. (BA/C) 1014-1987

(4) (VSB) A functional module that initiates bus cycles in order to transfer data between itself and VSB slaves. The master that is currently in control of the DTB is referred to as the *active* master. (MM/C) 1096-1988w

(5) (NuBus) A bus device that initiates a transaction. (C/MM) 1196-1987w

(6) (NuBus) A module that has acquired control of the bus through the control acquisition procedure. (C/BA) 1014.1-1994w, 896.3-1993w, 896.4-1993w, 10857-1994

(7) A device that initiates communications requests to gather data or perform controls. (PE/SUB) 1379-1997

master antenna television system (MATV) A small television antenna distribution system usually restricted to one or two buildings. (LM/C) 802.7-1989r

master-capable Said of an MTM-Bus module that is an S-module at a given time, but contains appropriate circuitry so that it may be converted by system control to an M-module if required. (TT/C) 1149.5-1995

master clock *See:* clock.

master clock node The node managing the overall synchronization process, which initiates clock synchronization cycles. *Synonym:* reference clock node. (C/BA) 896.2-1991w

master compass A magnetic or gyro compass arranged to actuate repeaters, course recorders, automatic pilots, or other devices. (EEC/PE) [119]

master console In a computer system with more than one console, the primary console that is used to control the computer. *Synonym:* main console. *Contrast:* auxiliary console. *See also:* remote console. (C) 610.10-1994w

master contactor (power system device function numbers) A device, generally controlled by [a master element] device function 1 or the equivalent and the required permissive and protective devices, that serves to make and break the necessary control circuits to place an equipment into operation under the desired conditions and to take it out of operation under other abnormal conditions. (SUB/PE) C37.2-1979s

master control The train-borne device or system directly providing the control signals to the train. (VT/RT) 1475-1999, 1474.1-1999

master controller (1) (load-frequency control) (electric power generators) The central device that develops corrective action for execution at one or more generating units. (PE/PSE) 94-1991w

(2) (car retarders) A controller that governs the operation of one or more magnetic or electropneumatic controllers. *Note:* It is designed to coordinate the movement or the pressure of the retarder with the movement of the retarder level. *See also:* car retarder; multiple-unit control. (VT/LT) 16-1955w

(3) (land transportation vehicles) A device that generates local and trainlike control signals to the propulsion and/or brake systems. (VT/LT) 16-1955w

(4) A physical device utilized by a human operator to provide the master control of a train. (VT) 1475-1999

master controller state A state of the finite state machine (fsm) required of M-modules that controls M-module Link Layer behavior with regard to message transmission. (TT/C) 1149.5-1995

master direction indicator A device that provides a remote reading of magnetic heading. It receives a signal from a magnetic sensing element. (PE/NP) 344-1975s

master drive A drive that sets the reference input for one or more follower drives. *See also:* feedback control system. (IA/ICTL/IAC) [60]

master elect A module that has won the most recent arbitration competition. (C/BA) 10857-1994, 896.4-1993w, 896.3-1993w

master element (power system device function numbers) The initiating device, such as a control switch, etc. which serves either directly or through such permissive devices as protective and time-delay relays to place an equipment in or out of operation. *Note:* This number is normally used for a hand-operated device, although it may also be used for an electrical or mechanical device for which no other function number is suitable. (SUB/PE) C37.2-1979s

master file (data management) An organized collection of records that is relatively permanent; for example, a file containing employee names, addresses, and salary information. *Synonym:* main file. *Contrast:* transaction file. (C) 610.2-1987, 610.5-1990w

master form An original form from which, directly or indirectly, other forms may be prepared. (EEC/PE) [119]

master ground A portable device designed to short circuit and connect (bond) a de-energized circuit or piece of equipment, or both, to an electrical ground. Normally located remote from, and on both sides of, the immediate work site. Primarily used to provide safety for personnel during construction, reconstruction, or maintenance operations *Synonyms:* ground set; ground stick. (T&D/PE) 524a-1993r, 516-1995, 524-1992r

master library (software) A software library containing master copies of software and documentation from which working copies can be made for distribution and use. *Contrast:* system library; software repository; software development library; production library. (C) 610.12-1990

master oscillator (data transmission) An oscillator so arranged as to establish the carrier frequency of the output of an amplifier. (PE) 599-1985w

master physical layer In a 100BASE-T2 link containing a pair of PHYs, the PHY that uses an external clock for generating its clock signals to determine the timing of transmitter and receiver operations. It also uses the master transmit scrambler generator polynomial for side-stream scrambling. Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link. *See also:* slave Physical Layer. (C/LM) 802.3-1998

master reference system for telephone transmission Adopted by the International Advisory Committee for Long Distance Telephony (CCIF), a primary reference telephone system for determining, by comparison, the performance of other telephone systems and components with respect to the loudness, articulation, or other transmission qualities of received speech. *Note:* The determination is made by adjusting the loss of a distortionless trunk in the master reference system for equal performance with respect to the quality under consideration. (EEC/PE) [119]

master remote unit (MRU) An intelligent electronic device that acts as a data concentrator or master to other intelligent electronic devices. (That is, an MRU acquires data from and sends data to other intelligent electronic devices). *Synonyms:* submaster; remote master. (PE/SUB) 1379-1997

master routine *See:* subroutine.

master sequence device (power system device function numbers) A device such as a motor-operated multicontact switch, or the equivalent, or a programming device, such as a computer, that establishes or determines the operating sequence of the major devices in an equipment during starting and stopping or during other sequential switching operations. (SUB/PE) C37.2-1979s

mastership (FASTBUS acquisition and control) A master is asserting mastership when it has control of the segment to which it is attached and is asserting grant acknowledge (GK) or address sync (AS). (NID) 960-1993

master/slave operation (power supplies) A system of interconnection of two regulated power supplies in which one (the master) operates to control the other (the slave). *Note:* Specialized forms of the master.slave configuration are used in: 1) complementary tracking (plus and minus tracking around a common point); 2) parallel operation to obtain increased current output for voltage regulation; 3) compliance extension to obtain increased voltage output for current regulation. (AES) [41]

master state *See:* supervisor state.

master station (1) (A) (data transmission) (supervisory system). The station from which remotely located units of switchgear or other equipment are controlled by supervisory control or that receives supervisory indications or selected telemeter readings. **(B) (data transmission)** (electronic navigation). One station of a group of stations, as in LORAN, that is used to control or synchronize the emission of the other stations. (SWG/SWG/PE) C37.100-1992, 599-1985

(2) (station control and data acquisition) (of a supervisory system) The entire complement of devices, functional modules, and assemblies that are electrically interconnected to effect the master station supervisory functions. The equipment includes the interface with the communication channel

but does not include the interconnecting channel. During communication with one or more remote stations, the master station is the superior in the communication hierarchy. (PE/SUB) C37.100-1992, C37.1-1994

(3) (electronic navigation) One station of a group of stations, as in loran, that is used to control or synchronize the emission of the other stations. *See also:* radio navigation. (AES/RS) 686-1982s, [42]

(4) A station that controls other terminals sharing multiple-access transmission medium on a multipoint circuit. (C) 610.7-1995

master-station supervisory equipment (data transmission) That part of a (single) supervisory system that includes all necessary supervisory control relays, keys, lamps, and associated devices located at the master station for selection, control, indication, and other functions to be performed. (SWG/PE) C37.100-1992, 599-1985w

master switch A switch that dominates the operation of contactors, relays, or other remotely operated devices. (IA/MT) 45-1998

master terminal (1) A dedicated terminal that is reserved for the operator of the system or other authorized persons that are privileged to initiate conversations, and to control system-wide processes and operations. *Synonyms:* control terminal; operator console. (C) 610.10-1994w

(2) The entire complement of devices, functional modules, and assemblies that are electrically interconnected to effect the master terminal supervisory functions (of a supervisory system). The equipment includes the interface with the communication channel, but does not include the interconnecting channel. (SUB/PE) 999-1992w

master terminal unit (station control and data acquisition) The master station of a supervisory control system. *See also:* station; master station. (SWG/PE/SUB) C37.100-1992, C37.1-1994

mast-type antenna for aircraft A rigid antenna of streamlined cross section consisting essentially of a formed conductor or conductor and supporting body. (EEC/PE) [119]

MAT *See:* machine-aided translation.

mat (rotating machinery) A randomly distributed unwoven felt of fibers in a sheetlike configuration having relatively uniform density and thickness. *See also:* stator; rotor. (PE) [9]

match (A) A condition in which the values of corresponding components of two or more data items are equal. *See also:* hit. **(B)** To compare two or more data items to determine whether their corresponding components are equal as in definition "A." (C) 610.5-1990

matched A state applying to a sequence of zero or more characters when the characters in the sequence correspond to a sequence of characters defined by a BRE or ERE pattern. (C/PA) 9945-2-1993

matched condition *See:* matched termination.

matched filter A filter that maximizes the output ratio of peak signal power to mean noise power. *Note:* For white noise, a matched filter has a frequency response function that is the complex conjugate of the transmitted spectrum. Its impulse response is the time inverse of the transmitted waveform. (AES) 686-1997

matched generator insertion gain (waveguide) A gain resulting from placing two ports of a network between a load having an arbitrary impedance and a matched generator. It is the ratio of the power absorbed in the load when connected to the generator (reference power) to that when the network is inserted. *Contrast:* matched generator insertion loss. (MTT) 146-1980w

matched generator insertion loss (waveguide) A loss resulting from placing two ports of a network between a load having an arbitrary impedance and a matched generator. It is the ratio of the power absorbed in the load when connected to the generator (reference power) to that when the network is inserted. *Contrast:* matched generator insertion gain. (MTT) 146-1980w

matched impedances Two impedances are matched when they are equal. *Note:* Two impedances associated with an electric network are matched when their resistance components are equal and when their reactance components are equal. *See also:* network analysis. (Std100) 270-1966w

matched insertion gain (waveguide) A gain resulting from placing two ports of a network between a matched generator and a matched load. It is the ratio of the power absorbed in the load when connected to the generator (reference power) to that when the network is inserted. *Contrast:* matched insertion loss. (MTT) 146-1980w

matched insertion loss (waveguide) A loss resulting from placing two ports of a network between a matched generator and a matched load. It is the ratio of the power absorbed in the load when connected to the generator (reference power) to that when the network is inserted. *Contrast:* matched insertion gain. (MTT) 146-1980w

matched load insertion gain (waveguide) A gain resulting from placing two ports of a network between a generator having an arbitrary impedance and a matched load. It is the ratio of the power absorbed in the load when connected to the generator (reference power) to that when the network is inserted. *Contrast:* matched load insertion loss. (MTT) 146-1980w

matched load insertion loss (waveguide) A loss resulting from placing two ports of a network between a generator having an arbitrary impedance and a matched load. It is the ratio of the power absorbed in the load when connected to the generator (reference power) to that when the network is inserted. *Contrast:* matched load insertion gain. (MTT) 146-1980w

matched terminated line (waveguide) A transmission line having no reflected wave at any transverse section. (MTT) 146-1980w

matched termination (waveguide components) A termination matched with regard to the impedance in a prescribed way; for example, a reflectionless termination or a conjugate termination. *See also:* transmission line; reflectionless termination. (MTT) 147-1979w

matched transmission line (data transmission) A transmission line is said to be matched at any transverse section if there is no wave reflection at that section. (PE) 599-1985w

matched waveguide *See:* matched terminated line.

matching *See:* image matching.

matching error (analog computer) An error resulting from inaccuracy in matching (two resistors) or mating (a resistor and a capacitor) passive elements. *See also:* electronic analog computer. (EEC/IE) [126]

matching, impedance *See:* load matching.

matching interaction An instruction method employed by some computer-assisted instruction systems, in which the student is asked to match answers to questions. (C) 610.2-1987

matching, load *See:* load matching.

matching loss (1) (radar) The loss in S/N (signal-to-noise) output relative to a matched filter, caused by using a filter of other than matched response to the transmitted signal. *Synonym:* mismatch loss. (AES/RS) 686-1982s

(2) (telecommunications) The net probability of not being able to establish a network path between an originating line or incoming trunk and a terminating line or trunk when the terminating line or trunk is idle. *Synonym:* overflow loss. (COM/TA) 973-1990w

matching section (waveguide) (waveguide transformer) (transforming section) A length of waveguide of modified cross section, or with a metal or dielectric insert, used for impedance transformation. *See also:* waveguide. (AP/ANT) [35]

matching transformer (induction heater) A transformer for matching the impedance of the load to the optimum output characteristic of the power source. (IA) 54-1955w

material (nuclear power generating station) A substance or combination of substances used as constituents in the manufacture of components, modules, or items. *Note:* This term applies specifically to the subject matter of IEEE Std 467-1980. (PE/NP) 467-1980w

material absorption *See:* absorption.

material dispersion (fiber optics) That dispersion attributable to the wavelength dependence of the refractive index of material used to form the waveguide. Material dispersion is characterized by the material dispersion parameter M. *See also:* dispersion; material dispersion parameter; distortion; waveguide dispersion; profile dispersion parameter. (Std100) 812-1984w

material dispersion parameter (M) (fiber optics)

$$M(\lambda) = -1/c(dN/d\lambda) = \lambda/c(d^2n/d\lambda^2)$$

where n is the refractive index, N is the group index: $N = n - \lambda(dn/d\lambda)$, λ is the wavelength, and c is the velocity of light in vacuum. *Notes:* 1. For many optical waveguide materials, M is zero at a specific wavelength λ_0, usually found in the 1.2 to 1.5 μm range. The sign convention is such that M is positive for wavelengths shorter than λ_0 and negative for wavelengths longer than λ_0. 2. Pulse broadening caused by material dispersion in a unit length of optical fiber is given by M times spectral linewidth ($\Delta\lambda$), except at $\lambda = \lambda_0$, where terms proportional to $(\Delta\lambda)^2$ are important. (See Note 1). *See also:* group index; material dispersion. 812-1984w

material scattering (fiber optics) In an optical waveguide, that part of the total scattering attributable to the properties of the materials used for waveguide fabrication. *See also:* scattering; waveguide scattering; Rayleigh scattering. (Std100) 812-1984w

material temperature class (thermal classification of electric equipment and electrical insulation) (evaluation of thermal capability) The lowest value of a range of temperature indices for insulating materials. (EI) 1-1986r

Mathematica A programming language designed to manipulate equations symbolically. (C) 610.13-1993w

mathematical adjectives All definitions are stated in terms of time (the independent variable) and magnitude (the dependent variable). Unless otherwise specified, the following terms apply only to waveform data within a waveform epoch. These adjectives may be used to describe the relation(s) between other specified variable pairs (for example, time and power, time and voltage, etc.).

a) *Instantaneous.* Pertaining to the magnitude at a specified time.

b) *Positive (negative) peak.* Pertaining to the maximum (minimum) magnitude.

c) *Peak-to-peak.* Pertaining to the absolute value of the algebraic difference between the positive peak magnitude and the negative peak magnitude.

d) *Root-mean-square (rms).* Pertaining to the square root of the average of the square of the magnitude. If the magnitude takes on n discrete values m_j, the root-mean-square magnitude is

$$M_{rss} = \left[\sum_{j=1}^{j=n} m_j^2\right]^{1/2}$$

If the magnitude is a continuous function of time m(t),

$$M_{rss} = \left[\int_{t_1}^{t_2} m^2(t)dt\right]^{1/2}$$

The summation or the integral extends over the interval of time for which the rms magnitude is desired or, if the function is periodic, over any integral number of periodic repetitions of the function.

e) *Average.* Pertaining to the mean of the magnitude. If the magnitude takes on n discrete values m_j, the average magnitude is

$$M_{rms} = \left[\left(\frac{1}{n}\right)\sum_{j=1}^{j=n} m_j^2\right]^{1/2}$$

If the magnitude is a continuous function of time $m(t)$

$$M_{rms} = \left[\left(\frac{1}{t_2 - t_1}\right)\int_{t_1}^{t_2} m^2(t)dt\right]^{1/2}$$

The summation or the integral extends over the interval of time for which the average magnitude is desired or, if the function is periodic, over any integral number of periodice repetitions of the function.

f) *Average absolute* Pertaining to the mean of the absolute magnitude. If the magnitude takes on n discrete values m_j, the average absolute magnitude is

$$\overline{M} = \left(\frac{1}{n}\right)\sum_{j'=1}^{j'=n} m_j$$

If the magnitude is a continuous function of time $m(t)$

$$\overline{M} = \left(\frac{1}{t_2 - t_1}\right)\int_{t_1}^{t_2} m(t)dt$$

The summation or the integral extends over the interval of time for which the average absolute magnitude is desired or, if the function is periodic, over any integral number of periodic repetitions of the function.

g) *Root sum of squares (rss).*Pertaining to the square root of the arithmetic sum of the squares of the magnitude. If the magnitude takes on n discrete values m_j, the root sum of squares magnitude is

$$|\overline{M}| = \left(\frac{1}{n}\right)\sum_{j'=1}^{j'=n} |m_j|$$

If the magnitude is a continuous function of time $m(t)$,

$$|\overline{M}| = \left(\frac{1}{t_2 - t_1}\right)\int_{t_1}^{t_2} |m(t)|dt$$

The summation or the integral extends over the interval of time for which the root sum of squares magnitude is desired r, if the function is periodic, over any integral number of periodic repetitions of the function.

(IM/WM&A) 194-1977w

mathematical check (1) (graphic symbols for electrical and electronics diagrams) A programmed check of a sequence of operations that makes use of the mathematical properties of the sequence. Sometimes called a control. *See also:* programmed check. (GSD) 315-1975r

(2) (mathematics of computing) A check of the accuracy of a calculation by performing additional calculations. For example, verification of multiplication results by dividing the product by the multiplier to obtain the multiplicand. *Synonym:* arithmetic check. (C) 1084-1986w

mathematical model (1) (analog computer) A set of equations used to represent a physical system. (C) 165-1977w

(2) (modeling and simulation) A symbolic model whose properties are expressed in mathematical symbols and relationships; for example, a model of a nation's economy expressed as a set of equations. *Contrast:* graphical model; narrative model; software model. (C) 610.3-1989w

mathematical programming In operations research, a procedure for locating the maximum or minimum of a function subject to constraints. (C) 610.2-1987

Mathematical Programming System Extended (MPSX) A programming language used widely for controlling the solution strategy for mathematical programming problems. (C) 610.13-1993w

mathematical quantity *See:* mathematico-physical quantity.

mathematical simulation (analog computer) The use of a model of mathematical equations generally solved by computers to represent an actual or proposed system. (C) 165-1977w

mathematical symbol (abbreviation) A graphic sign, a letter or letters (which may have letters or numbers, or both, as subscripts or superscripts, or both), used to denote the performance of a specific mathematical operation, or the result of such operation, or to indicate a mathematical relationship.

See also: abbreviation; symbol for a unit; symbol for a quantity. (GSD) 267-1966

mathematico-physical quantity (symbolic quantity) (mathematical quantity) (abstract quantity) A concept, amenable to the operations of mathematics, that is directly related on one (or more) physical quantity and is represented by a letter symbol in equations that are statements about that quantity. *Note:* Each mathematical quantity used in physics is related to a corresponding physical quantity in a way that depends on its defining equation. It is characterized by both a qualitative and a quantitative attribute (that is, dimensionality and magnitude). (Std100) 270-1966w

matrix (1) (A) (color television) An array of coefficients symbolic of a color coordinate transformation. *Note:* This definition is consistent with mathematical usage. **(B) (color television)** To perform a color coordinate transformation by computation or by electrical, optical, or other means. (BT/AV) 201-1979

(2) (A) (mathematics) A two-dimensional rectangular array of quantities. Matrices are manipulated in accordance with the rules of matrix algebra. **(B) (mathematics)** By extension, an array of any number of dimensions. (C) [20], [85]

(3) A logic network whose configuration is an array of intersections of its input-output leads, with elements connected at some of these intersections. The network usually functions as an encoder or decoder. *Note:* A translating matrix develops several output signals in response to several input signals; a decoder develops a single output signal in response to several input signals (therefore sometimes called an and matrix); an encoder develops several output signals in response to a single input signal and a given output signal may be generated by a number of different input signals (therefore sometimes called an OR matrix). *See also:* encode; translate; decode. (C) 162-1963w

(4) (general) Loosely, any encoder, decoder, or translator. (Std100) 270-1966w

(5) (electrochemistry) A form used as a cathode in electroforming. (EEC/PE) [119]

(6) (data management) A two-dimensional array conceptually arranged in rows and columns. *Note:* A matrix with m rows and n columns is said to be of size $m \times n$ (m-by-n). *See also:* row-major order; table; column-major order. (C) 610.5-1990w

matrix-addressed storage display device A raster display device that does not require refresh. For example, a plasma panel. (C) 610.10-1994w

matrix character generator A character generator that creates characters composed of selected dots. *Contrast:* stroke character generator. (C) 610.6-1991w

matrix circuit *See:* matrix unit.

matrix, fundamental *See:* transition matrix.

matrix of controls In networking, a two-dimensional matrix that shows the relationship between all the controls in the communications network and the specific threats they mitigate. (C) 610.7-1995

matrix printer *See:* dot matrix printer.

matrix spike An aliquot of a sample which is spiked with a known concentration of the analyte of interest. (NI) N42.23-1995

matrix storage A type of storage whose elements are arranged in such a manner that access to any location requires the use of two or more coordinates; for example, cathode ray storage. (C) 610.10-1994w

matrix, system *See:* system matrix.

matrix, transition *See:* transition matrix.

matrix unit (color television) A device that performs a color coordinate transformation by electrical, optical, or other means. *Synonym:* matrix circuit. (BT/AV) 201-1979w

matte dip (electroplating) A dip used to produce a matte surface on a metal. *See also:* electroplating. (PE/EEC) [119]

matte surface (illuminating engineering) A surface from which the reflection is predominantly diffuse, with or without a negligible specular component. *See also:* diffuse reflection. (EEC/IE) [126]

MATV *See:* master antenna television system.

MAU *See:* medium attachment unit.

maximum allowable conductor temperature The maximum temperature limit that is selected in order to minimize loss of strength, sag, line losses, or a combination of the above. (T&D/PE) 738-1993

maximum arrest force The peak force measured by the test instrumentation during arrest of the test weight in the dynamic test. (T&D/PE) 1307-1996

maximum asymmetric short-circuit current (rotating machinery) The instantaneous peak value reached by the current in the armature winding within a half of a cycle after the winding has been suddenly short-circuited, when conditions are such that the initial value of any aperiodic component of current is the maximum possible. (PE) [9]

maximum available power (MAP) The maximum power that can be obtained by increasing dc current while not controlling the ac voltage. (PE/T&D) 1204-1997

maximum average power (attenuator) That maximum specified input power applied for a minimum of one hour (unless specified for a longer period) at the maximum operating temperature with output terminated in the characteristic impedance which will not permanently change the specified properties of the attenuator after return to ambient temperature at a power level 20 dB below maximum specified input power. (IM/HFIM) 474-1973w

maximum average power output (television) The maximum radio-frequency output power that can occur under any combination of signals transmitted, averaged over the longest repetitive modulation cycle. *See also:* television. (EEC/PE) [119]

maximum bundle gradient (overhead-power-line corona and radio noise) For a bundle of two or more subconductors, the highest value among the maximum gradients of the individual subconductors. For example, for a three-conductor bundle with individual maximum subconductor gradients of 16.5, 16.9, and 17.0 kV/cm, the maximum bundle gradient would be 17.0 kV/cm. (T&D/PE) 539-1990

maximum capability (power operations) The maximum generation expressed in kilowatt-hours per hour (kWh/h) which a generating unit, station, power source, or system can be expected to supply under optimum operating conditions. (PE/PSE) 858-1987s

maximum capacity (electric generating unit reliability, availability, and productivity) The maximum capacity that a unit can sustain over a specified period of time. The maximum capacity can be expressed as gross maximum capacity (GMC) or net maximum capacity (NMC). To establish this capacity, formal demonstration is required.The test is repeated periodically. This demonstrated capacity level is corrected to generating conditions for which there is minimum ambient restriction. When a demonstration test has not been conducted, the estimated maximum capacity of the unit is used. (PE/PSE) 762-1987w

maximum common-mode signal level The maximum level of the common-mode signal at which the common mode rejection ratio is still valid. (IM/WM&A) 1057-1994w

maximum continuous exposure temperature The highest temperature to which a component of the heat-tracing system may be continuously exposed (heater de-energized). (IA) 515-1997

maximum continuous operating voltage (MCOV) (1) The maximum rms value of power-frequency voltage that may be applied continuously between the terminals of the arrester without degradation or deleterious effects. (PE) C62.34-1996

(2) The maximum designated root-mean-square (rms) value of power-frequency voltage that may be applied continuously between the terminals of the arrester. (SPD/PE) C62.11-1999

(3) The maximum designated root-mean-square value of power frequency voltage that may be applied continuously between the terminals of the overvoltage protective device. (SPD/PE) C62.62-2000

maximum continuous rating (rotating machinery) The maximum values of electric and mechanical loads at which a machine will operate successfully and continuously. *Note:* An overload may be implied, along with temperature rises higher than normal standards for the machine. *See also:* asynchronous machine. (PE) [9]

maximum control current (magnetic amplifier) The maximum current permissible in each control winding either continuously or for designated operating intervals as specified by the manufacturer and shall be specified as either root-mean-square or average. (MAG) 107-1964w

maximum credible voltage or current transient That voltage or current transient that may exist in circuits, as determined by test or analysis, taking into consideration the circuit location, routing, and interconnections combined with failures that the circuits may credibly experience. (PE/NP) 384-1992r

maximum current (wattmeter or power-factor meter) (instrument) A stated current that, if applied continuously at maximum stated operating temperature and with any other circuits in the instrument energized at rated values, will not cause electric breakdown or any observable physical degradation. *See also:* instrument. (EEC/AII) [102]

maximum-deflection angle The maximum plane angle subtended at the deflection center by the usable screen area. *Note:* In this term, the hyphen is frequently omitted. (ED) 161-1971w

maximum demand (1) (power operations) The largest of a particular type of demand occurring within a specified period. (PE/PSE) 858-1987s

(2) (electric power systems in commercial buildings) The greatest of all the demands that have occurred during a specified period of time; determined by measurement over a prescribed time interval. (IA/PSE) 241-1990r

(3) The greatest of all demands that have occurred during a specified period of time such as one-quarter, one-half, or one hour. *Note:* For utility billing purposes the period of time is generally one month. (IA/PSE) 141-1993r

(4) The highest demand measured over a selected period of time, e.g., one month. (AMR/SCC31) 1377-1997

(5) *See also:* demand—maximum. (ELM) C12.1-1981

maximum-demand pointer (friction pointer of a demand meter) (demand meter) A means used to indicate the maximum demand that has occurred since its previous resetting. The maximum-demand pointer is advanced up the scale of an indicating demand meter by the pointer pusher. When not being advanced, it is held stationary, usually by friction, and it is reset manually when the meter is read for billing purposes. *See also:* demand meter. (EEC/PE) [119]

maximum design cantilever load-static (MDCL-static) The maximum cantilever load the surge arrester is designed to continuously carry. (SPD/PE) C62.11-1999

maximum design rating (composite insulators) The maximum mechanical load that the insulator is designed to withstand continuously for the life of the insulator. (T&D/PE) 987-1985w

maximum design voltage (1) (device) The highest voltage at which the device is designed to operate. *Note:* When expressed as a rating this voltage is termed rated maximum voltage. (PE/PSR) C37.90-1978s

(2) (outdoor electric apparatus) (to ground) The maximum voltage at which the bushing is designed to operate continuously. (PE/TR) 21-1976

(3) (power and distribution transformers) The highest rms phase-to-phase voltage that equipment components are designed to withstand continuously, and to operate in a satisfactory manner without derating of any kind. (PE/TR) C57.12.80-1978r

(4) (A) (of a device) The highest voltage at which the device is designed to operate. **(B)** (of a relay) The highest root-mean-square (rms) or dc voltage at which a relay is designed to be energized continuously. (SWG/SWG/PE) C37.100-1992

maximum-deviation sensitivity (in frequency-modulation receivers) Under maximum system deviation, the least signal input for which the output distortion does not exceed a specified limit. *See also:* frequency modulation. 188-1952w

maximum differential input The largest value of peak-to-peak differential (ppd) amplitude at which a receiver is expected to operate, under worst-case conditions, without exceeding the objective bit error ratio. (C/LM) 802.3-1998

maximum discharge current The maximum surge current that the surge protective device withstands without damage. The maximum discharge current is a peak impulse current, with a wave shape of 8/20. (PE) C62.34-1996

maximum effort (electric generating unit reliability, availability, and productivity) Repairs were accomplished in the shortest possible time. *See also:* repair urgency. (PE/PSE) 762-1987w

maximum excursion (electric conversion) The maximum positive or negative deviation from the initial or steady value caused by a transient condition. (AES) [41]

maximum exposure temperature (1) (electrical heating systems) The highest temperature to which an object may be exposed continuously. (IA/PC) 844-1991

(2) (electrical heat tracing for industrial applications) The highest temperature to which a device in the heat-tracing system may be exposed for a given period of time. (BT/AV) 152-1953s

(3) The highest temperature to which a component of the heat-tracing system may be exposed either continuously or for a specified period of time. (IA/PC) 515.1-1995

maximum frequency of interest (A) For switching power supplies: 10 times the maximum power switch switching frequency. **(B)** For filter products: 10 times the 3dB point. (PEL) 1515-2000

maximum generation (electric generating unit reliability, availability, and productivity) The energy that could have been produced by a unit in a given period of time if operated continuously at maximum capacity. Maximum generation can be expressed as gross maximum generation (GMG) or net maximum generation (NMG).

$$MG = \text{period hours} \cdot \text{maximum capacity} = PH \cdot MC$$
$$GMG = PH \cdot GMC$$
$$NMG = PH \cdot NMC$$

(PE/PSE) 762-1987w

maximum grid current A design value of the maximum grid current, defined as follows:

$$I_G = D_f \times I_g$$

where

I_G = the maximum grid current in A

D_f = the decrement factor for the entire duration of fault t_f, given in s

I_g = the rms symmetrical grid current in A

(PE/SUB) 80-2000

maximum ground acceleration (seismic design of substations) The maximum value of acceleration input to the equipment during a given earthquake for a particular site. (PE/SUB) 693-1984s, C37.122.1-1993

maximum hottest conductor temperature Used in discussions involving the life testing of materials, in lieu of the phrase winding hottest-spot temperature (θ_h). (PE/TR) 1276-1997

maximum instantaneous fuel change (gas turbines) The fuel change allowable for an instantaneous or sudden increased or decreased load or speed demand. *Note:* It is expressed in terms of equivalent load change in percent of rated load. (PE/EDPG) 282-1968w, [5]

maximum keying frequency (facsimile) (fundamental scanning frequency) The frequency in hertz numerically equal to

the spot speed divided by twice the scanning spot X dimension. *See also:* scanning. (COM) 168-1956w

maximum limiting resolution (diode-type camera tube) The highest value of limiting resolution obtained under optimum irradiance conditions using a stationary bar pattern. Units: LP/RH. (ED) 503-1978w

maximum maintain temperature (1) Specified maximum temperature of a surface or process which the heat tracing is capable of maintaining continuously. (IA/PC) 515.1-1995

(2) Specified maximum temperature of a surface or process that the heat-tracing cable or surface heating device is capable of maintaining continuously. (IA) 515-1997

maximum mechanical load The largest service load allowed on a composite insulator or bushing. The maximum mechanical load (MML) is within the reversible elastic range and is supplied by the manufacturer. (PE/SUB) 693-1997

maximum modulating frequency (facsimile) The highest picture frequency required for the facsimile transmission system. *Note:* The maximum modulating frequency and the maximum keying frequency are not necessarily equal. *See also:* facsimile transmission. (COM) 168-1956w

maximum momentary speed variation (hydraulic turbines) The maximum momentary change of speed when the load is suddenly changed a specified amount. (PE/EDPG) 125-1977s

maximum observed frequency (MOF) In oblique-incidence ionospheric sounding, the MOF is the highest frequency for which the signals transmitted from a sounder are observed on the ionogram, regardless of the propagation path involved. (AP/PROP) 211-1997

maximum OFF voltage (magnetic amplifier) The maximum output voltage existing before trip ON control signal is reached as the control signal is varied from trip OFF to trip ON. (MAG) 107-1964w

maximum operating common-mode signal The largest common-mode signal for which the waveform recorder will meet its effective bits specifications in recording a simultaneously-applied, normal-mode signal. (IM/WM&A) 1057-1994w

maximum operating voltage (*V*m) (1) (household electric ranges) The maximum voltage to which the electric parts of the range may be subjected in normal operation. *See also:* appliance outlet. (IA/APP) [90]

(2) The maximum system operating rms phase-to-phase (or phase-to-ground for single phase, or pole-to-ground for dc) voltage, which is also equal to the 1 per unit (p.u.) base. For clearance calculation, the maximum operating crest phase-to-ground voltage is equal to 1 per unit (p.u.). (T&D/PE) 516-1995

maximum output (receivers) The greatest average output power into the rated load regardless of distortion. *See also:* radio receiver. 188-1952w

maximum output jitter The peak-to-peak jitter acceptable to enable satisfactory interconnection of digital networks and equipment. (COM/TA) 1007-1991r

maximum output voltage (magnetic amplifier) The voltage across the rated load impedance with maximum control current flowing through each winding simultaneously in a direction that increases the output voltage. *Notes:* 1. Maximum output voltage shall be specified either as root-mean-square or average. 2. While specification may be either root-mean-square or average, it remains fixed for a given amplifier. (MAG) 107-1964w

maximum peak power (attenuator) That maximum peak power at the maximum specified pulse-length and average power which, when applied for a minimum of one hour (unless specified for a longer period) at the maximum operating temperature, while the output is terminated in the characteristic impedance, will not permanently change the specified properties of the attenuator when returned to ambient temperature at a power level 20 dB below the maximum specified input power or lower. (IM/HFIM) 474-1973w

maximum permissible exposure (MPE) The rms and peak electric and magnetic field strengths, their squares, or the plane-wave equivalent power densities associated with these fields and the induced and contact currents to which a person may be exposed without harmful effect and with an acceptable safety factor. (NIR) C95.1-1999

maximum power output (hydraulic turbines) The maximum output which the turbine-generator unit is capable of developing at rated speed with maximum head and maximum gate. (PE/EDPG) 125-1977s

maximum pulse rate (metering) The number of pulses per second at which a pulse device is nominally rated. (ELM) C12.1-1982s

maximum pulse repetition rate (digital delay line) The maximum pulse repetition rate shall be equal to 1/2 Dτ, where Dτ is the time spacing between the peaks of the output doublet. (UFFC) [22]

maximum rated step voltage The highest value of rated step voltage for which the LTC is designed. (PE/TR) C57.131-1995

maximum rated through current The rated through current for which both the temperature rise of the contacts and the service duty test apply. (PE/TR) C57.131-1995

maximum rate of fuel change (gas turbines) The rate of fuel change that is allowable after the maximum instantaneous fuel change, when an instantaneous speed or load demand upon the turbine is greater than that corresponding to the maximum instantaneous fuel change. *Note:* It is expressed in percent of equivalent load change per second. (PE/EDPG) 282-1968w, [5]

maximum relative side lobe level The maximum relative directivity of the highest side lobe with respect to the maximum directivity of the antenna. (AP/ANT) 145-1993

maximum retention time (storage tubes) The maximum time between writing into a storage tube and obtaining an acceptable output by reading. *See also:* storage tube. (ED) 161-1971w

maximum safe input power (1) (spectrum analyzer) The power applied at the input which will not cause degradation of the instrument characteristics. *Note:* Input signal conditions, for example, peak or average power, should be specified. (IM) 748-1979w

(2) (non-real time spectrum analyzer) The power applied at the input which will not cause degradation of the instrument characteristics. (IM) [14]

(3) (electrothermic unit) The maximum peak pulse or cw input power that will cause no permanent change in the calibration or characteristics of the electrothermic unit. Specify in watt-microseconds the maximum (safe) input energy per pulse and the applicable pulse repetition frequency in hertz or in kilohertz. Specify in watts or milliwatts the maximum (safe) input peak pulse power. (IM) 544-1975w

maximum sensitivity (frequency-modulation systems) The least signal input that produces a specified output power. 188-1952w

maximum sine-current differential permeability (toroidal magnetic amplifier cores) The maximum value of sine-current differential permeability obtained with a specified sine-current magnetizing force. (Std100) 106-1972

maximum single-conductor gradient (overhead-power-line corona and radio noise) The maximum value attained by the gradient $E(\theta)$ as θ varies over the range 0 to 2π, where $E(\theta)$ is the gradient on the surface of the power line conductor expressed as a function of angular position (θ). Unless otherwise stated, the gradient is a nominal gradient. *See also:* nominal conductor gradient; maximum single-subconductor gradient. (T&D/PE) 539-1990

maximum single-subconductor gradient (overhead-power-line corona and radio noise) The maximum value attained by the gradient $E(\theta)$ as θ varies over the range 0 to 2π, where $E(\theta)$ is the gradient on the surface of the power line subconductor expressed as a function of angular position (θ). Unless otherwise stated, the gradient is a nominal gradient.

See also: maximum single-conductor gradient; nominal conductor gradient. (T&D/PE) 539-1990

maximum sound pressure (for any given cycle of a periodic wave) The maximum absolute value of the instantaneous sound pressure occurring during that cycle. *Note:* In the case of a sinusoidal sound wave this maximum sound pressure is also called the pressure amplitude. (SP) [32]

maximum speed The highest speed within the operating speed range of the drive. *See also:* electric drive. (IA/ICTL/IAC) [60]

maximum static error (MSE) The maximum difference between any code transition level and its ideal value. (IM/WM&A) 1057-1994w

maximum surge current rating (semiconductor rectifiers) (rectifier circuits) (nonrepetitive) The maximum forward current having a specified waveform and short specified time interval permitted by the manufacturer under stated conditions. *See also:* average forward current rating. (IA) [62]

maximum surge energy absorbed (for rating purposes only) The maximum allowable surge energy that the photocontrol can absorb without changing its operating characteristics. This is based on a single 10/1000 μs current waveform. (RL) C136.10-1996

maximum system deviation (frequency-modulation systems) The greatest frequency deviation specified in the operation of the system. *Note:* Maximum system deviation is expressed in kilohertz. In the case of FCC authorized frequency modulation broadcast systems in the range from 88 to 108 MHz, the maximum system deviation is ±75 kHz. (BT) 185-1975w

maximum system voltage (1) (electrical systems in commercial buildings) The highest system voltage that occurs under normal operating conditions, and the highest system voltage for which equipment and other components are designed for satisfactory continuous operation without derating of any kind. (IA/PSE) 241-1990r

(2) The highest voltage at which a system is operated. (This voltage excludes voltage transients and temporary overvoltages caused by abnormal system conditions such as faults, load rejection, etc.). *Note:* This is generally considered to be the maximum system voltage. (SPD/PE) C62.22-1991s

(3) The highest rms phase-to-phase voltage that occurs on the system under normal operating conditions, and the highest rms phase-to-phase voltage for which equipment and other system components are designed for satisfactory continuous operation without deterioration of any kind. (C/PE/TR) 1313.1-1996, C57.12.80-1978r

(4) The highest voltage at which a system is operated. *Note:* This is generally considered to be the maximum system voltage as prescribed in ANSI C84.1-1995. (SPD/PE) C62.11-1999, C62.62-2000

maximum test output voltage (magnetic amplifier) (nonreversible output) The output voltage equivalent to the summation of the minimum output voltage plus 66 2/3 percent of the difference between the rated and minimum output voltages. (MAG) 107-1964w

(2) (A) (reversible output) Positive maximum test output voltage is the output voltage equivalent to 66 2/3 percent of the rated output voltage in the positive direction. **(B) (reversible output)** Negative maximum test output voltage is the output voltage equivalent to 66 2/3 percent of the rated output voltage in the negative direction. (MAG) 107-1964

maximum theoretical deviation from a sine wave (self-commutated converters) (converter characteristics) For a nonsinusoidal wave, the ratio of the arithmetic sum of the amplitudes (rms) of all harmonics in the wave to the amplitude (rms) of the fundamental. (IA/SPC) 936-1987w, 519-1992

maximum total sag The total sag at the midpoint of the straight line joining the two points of support of the conductor. *See also:* sag. (NESC/BT/T&D/AV) C2-1997, [34], C2.2-1960

maximum transfer unit The largest amount of data that can be transferred across a given physical network. (C) 610.7-1995

maximum undistorted output (amplitude-modulation broadcast receivers) The so-called maximum undistorted output is arbitrarily taken as the least power output which contains, under given operating conditions, a total power at harmonic frequencies equal to one percent of the apparent power at the fundamental frequency. This corresponds to a root-sum-square total voltage at harmonic frequencies equal to 10 percent of the root-sum-square voltage at the fundamental frequency, if measured across a pure resistance. (The root-sum-square voltage of a complex wave is the square root of the sum of the squares of the component voltages.) (CE) 186-1948w

maximum usable frequency (MUF) The highest frequency by which a radio wave can propagate between given terminals, on a specified occasion, by ionospheric refraction alone. *Notes:* 1. Where the MUF is restricted to a particular ionospheric propagation mode, the values may be quoted together with an indication of that mode (e.g., 1E MUF, 2F2 MUF). 2. If the extraordinary component of the wave is involved, then this is noted [e.g., 1F2 MUF (X)]. Absence of a specific response to the magneto-ionic component implies that the quoted value relates to the ordinary wave. 3. It is sometimes useful to quote the ground range for which the MUF applies. This is indicated in kilometers following the indication of the mode type [e.g., 1F2 (4000) MUF (X)]. (AP/PROP) 211-1997

maximum usable reading time (storage tubes) The length of time a storage element, line, or area can be read before a specified degree of decay occurs. *Notes:* 1. This time may be limited by static decay, dynamic decay, or a combination of the two. 2. It is assumed that rewriting is not done. 3. The qualifying adjectives maximum usable are frequently omitted in general usage when it is clear that the maximum usable reading time is implied. *See also:* storage tube. (ED) 158-1962w

maximum usable read number (storage tubes) The number of times a storage element, line, or area can be read without rewriting before a specified degree of decay results. *Note:* The qualifying adjectives maximum usable are frequently omitted in general usage when it is clear that the maximum usable read number is implied. *See also:* storage tube. (ED) 158-1962w, [45]

maximum usable viewing time (storage tubes) The length of time during which the visible output of a storage tube can be viewed, without rewriting, before a specified decay occurs. *Note:* The qualifying adjectives maximum usable are frequently omitted in general usage when it is clear that maximum usable viewing time implied. *See also:* storage tube. (ED) 158-1962w

maximum usable writing speed (storage tubes) The maximum speed at which information can be written under stated conditions of operation. Note the qualifying adjectives maximum usable are frequently omitted in general usage when it is clear that the maximum usable writing speed is implied. *See also:* storage tube. (ED) 158-1962w

maximum useful output *See:* maximum undistorted output.

maximum value of magnetic field (measurement of power frequency electric and magnetic fields from ac power lines). At a given point, the root-mean-square (rms) value of the semimajor axis of the magnetic field ellipse. (T&D/PE) 1308-1994

maximum value of the electric field strength At a given point, the rms value of the semimajor axis magnitude of the electric field ellipse. *See also:* electric field strength. (T&D/PE) 644-1994

maximum value of the field (overhead power lines) At a given point, the rms value of the major semi-axis magnitude of the field ellipse; i.e., the largest value of the field that would be measured at that point. (T&D/PE) 539-1990

maximum value of the magnetic field At a given point, the rms value of the semimajor axis magnitude of the magnetic field ellipse. (T&D/PE) 644-1994

maximum voltage (instrument) (wattmeter, power-factor meter or frequency meter) A stated voltage that, if applied continuously at the maximum stated operating temperature and with any other circuits in the instrument energized at rated values, will not cause electric breakdown or any observable physical degradation. *See also:* accuracy rating; instrument. (EEC/AII) [102]

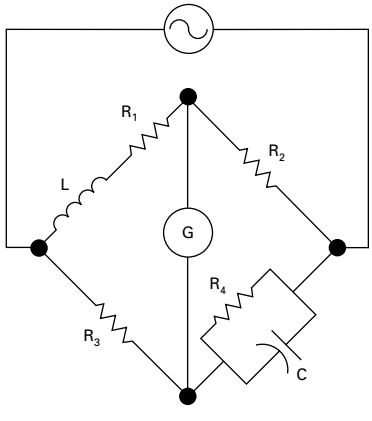
maximum voltage rating The highest phase-to-ground or phase-to-ground and phase-to-phase voltage (rms) at which a connector is designed to operate. (T&D/PE) 386-1995

maximum (hottest-spot) winding temperature The maximum or hottest temperature of the current carrying components of a transformer winding in contact with insulation or insulating fluid. The hottest spot temperature is a naturally occurring phenomena due to the generation of losses and the heat transfer phenomena. It is the highest temperature inside the transformer winding and is greater than the measured average winding temperature of the coil conductors. All transformers have a maximum (hottest-spot) winding temperature. (PE/TR) C57.134-2000

maximum (hottest-spot) winding temperature rise The arithmetic difference between maximum (hottest-spot) winding temperature and the ambient temperature. (PE/TR) C57.134-2000

maxwell (line) The unit of magnetic flux in the centimeter-gram-second electromagnetic system. *Note:* The maxwell is 10^{-8} weber. (Std100) 270-1966w

Maxwell bridge (general) A 4-arm alternating-current bridge characterized by having in one arm an inductor in series with a resistor and in the opposite arm a capacitor in parallel with a resistor, the other two arms being normally nonreactive resistors. *Note:* Normally used for the measurement of inductance (or capacitance) in terms of resistance and capacitance (or inductance). The balance is independent of the frequency, and at balance the ratio of the inductance to the capacitance is equal to the product of the resistances of either pair of opposite arms. It differs from the Hay bridge in that in the arm opposite the inductor, the capacitor is shunted by the resistor. (See the corresponding figure.) *See also:* bridge.



$R_1R_4 = R_2R_3 = L/C$

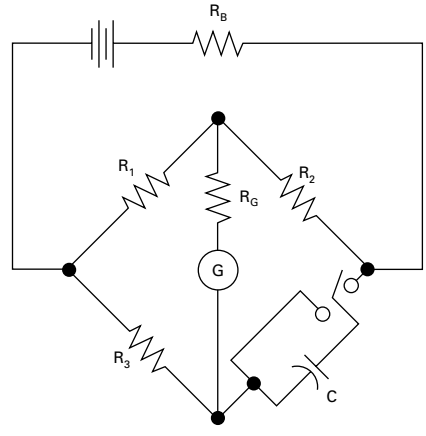
Maxwell bridge

(PE/EEC) [119]

Maxwell direct-current commutator bridge A 4-arm bridge characterized by the presence in one arm of a commutator, or 2-way contactor, that, with a known periodicity, alternately connects the unknown capacitor in series with the bridge arm and then opens the bridge arm while short-circuiting the capacitor, the other three arms being nonreactive resistors. (See the corresponding figure.) *Note:* Normally used for the measurement of capacitance in terms of resistance and time. The bridge is normally supplied from a battery and the detector is a direct-current galvanometer.

$$C = \frac{R_1}{nR_2R_3} \times \frac{\left[1 - \dfrac{R_1^2}{(R_1 + R_2 + R_B)(R_1 + R_3 + R_G)}\right]}{\left[1 + \dfrac{R_1R_B}{R_3(R_1 + R_2 + R_B)}\right]\left[1 + \dfrac{R_1R_G}{R_2(R_1 + R_3R_G)}\right]}$$

See also: bridge.



Maxwell direct-current commutator bridge

(EEC/PE) [119]

Maxwell-Garnett mixing formula Gives the approximate dielectric constant of a medium containing a few small spherical dielectric inclusions, ε_r, as:

$$\varepsilon_r = \varepsilon_1 \frac{1 + 2fy}{1 - fy} \quad \text{with} \quad y = \frac{\varepsilon_2 - \varepsilon_1}{\varepsilon_2 + 2\varepsilon_1}$$

where

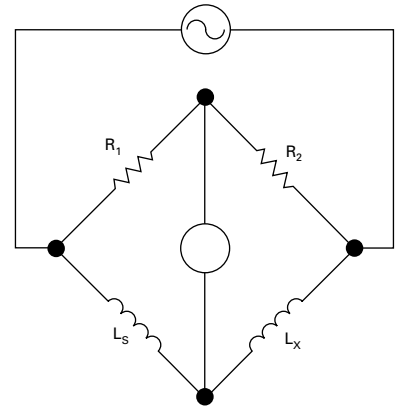
ε_1 = the relative dielectric constant of the background medium

ε_2 = the relative dielectric constant of the inclusions

f = the volume fraction of the inclusions

The Maxwell-Garnett mixing formula is valid when f is less than a few percent and the inclusions are small compared to the wavelength. (AP/PROP) 211-1997

Maxwell inductance bridge A 4-arm alternating-current bridge characterized by having inductors in two adjacent arms and usually, nonreactive resistors in the other two arms. (See the corresponding figure.) *Note:* Normally used for the comparison of inductances. The balance is independent of the frequency. *See also:* bridge.

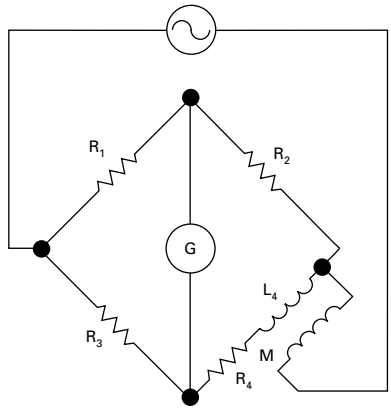


$R_X = R_S\dfrac{R_2}{R_1}$ $\qquad$ $L_X = L_S\dfrac{R_2}{R_1}$

Maxwell inductance bridge

(EEC/PE) [119]

Maxwell mutual-inductance bridge An alternating-current bridge characterized by the presence of mutual inductance between the supply circuit and that arm of the network that includes one coil of the mutual inductor, the other three arms being normally non-reactive resistors. (See the corresponding figure.) *Note:* Normally used for the measurement of mutual inductance in terms of self-inductance. The balance is independent of the frequency. *See also:* bridge.



Maxwell mutual-inductance bridge

(EEC/PE) [119]

Maxwell's equations (Maxwell's laws) The fundamental equations of macroscopic electrmagnetic field theory. All real (physical) electric and magnetic fields satisfy Maxwell's equations, namely

$$\nabla \times \mathbf{E} = \frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \times \mathbf{H} = \frac{\partial \mathbf{D}}{\partial t} + \mathbf{J}$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \cdot \mathbf{D} = q_r$$

where **E** is electric field strength, **D** is electric flux density, **H** is magnetic field strength, **B** is magnetic flux density, **J** is current density, and q_r is volume charge density.

(Std100) 270-1966w

may (1) With respect to implementations, the word may is to be interpreted as an optional feature that is not required in this standard but can be provided. With respect to strictly conforming POSIX applications, the word may means that the optional feature shall not be used.

(C/PA) 1003.1-1988s

(2) An indication of an optional feature or behavior of the implementation that is not required by this standard, although there is no prohibition against providing it. A Strictly Conforming POSIX.2 Application is permitted to use such features, but shall not rely on the implementation's actions in such cases. To avoid ambiguity, the reverse sense of *may* is not expressed as *may not,* but as *need not*.

(C/PA) 2003.2-1996

(3) An indication of an optional feature.

1) With respect to implementations, the word *may* is to be interpreted as an optional feature that is not required in a standard but can be provided.
2) With respect to Strictly Conforming POSIX.5 Applications, the word *may* means that the optional feature shall not be used.

(C) 1003.5-1999

May Day *See:* radio distress signal.

MB *See:* megabyte.

MBASIC A dialect of the BASIC programming language.

(C) 610.13-1993w

Mbit Indicates 2^{20} bits. (C/MM) 1596.4-1996

MBWO *See:* microwave backward-wave oscillator.

Mbyte Megabyte. Indicates 2^{20} bytes.

(C/MM) 1212-1991s, 1596.4-1996

MC (metal-cladswitchgear) *See:* message code.

MCA *See:* multichannel analyzer; multichannel pulse-height analyzer.

MC cable (metal-clad cable) A factory assembly of one or more conductors, each individually insulated and enclosed in a metallic sheath of interlocking tape, or a smooth or corrugated tube. (NEC/NESC) [86]

McCulloh circuit A supervised, metallic loop circuit having manually or automatically operated switching equipment at the receiving end, that, in the event of a break, a ground, or a combination of a break and a ground at any point in the metallic circuit, conditions the circuit, by utilizing a ground return, for the receipt of signals from suitable signal transmitters on both sides of the point of trouble.

(EEC/PE) [119]

M channel A 96 kbit/s maintenance channel that is used to convey Physical Layer status and control information to the far end of the link. (C/LM) 802.9a-1995w

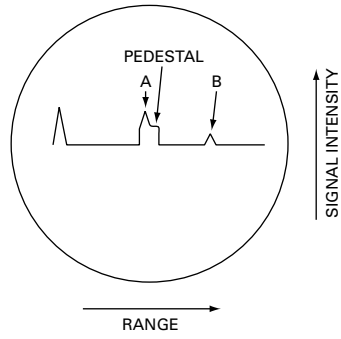
MCOV *See:* maximum continuous operating voltage.

MDA *See:* minimum detectable amount; mirrored disk array.

MDC *See:* minimum detectable concentration.

MDI (Medium Dependent Interface) *See:* medium dependent interface; magnetic direction indicator.

M-display A type of A-display in which one target range is determined by moving an adjustable pedestal, notch, or step along the baseline until it coincides with the horizontal position of the target-signal deflection; the control that moves the pedestal is calibrated in range. *Note:* This display is usually identified as a variant of an A-display.



M-display

(AES) 686-1997

MDR *See:* memory data register; memory buffer register.

MDS *See:* minimum detectable signal.

MDV *See:* minimum detectable velocity.

ME *See:* metal-enclosed power switchgear.

MEA *See:* minimum en-route altitude.

mean access time The average access time identified with the normal operation of a device. (C) 610.10-1994w

mean charge (nonlinear capacitor) The arithmetic mean of the transferred charges corresponding to a particular capacitor voltage, as determined from a specified alternating charge characteristic. *See also:* nonlinear capacitor. (ED) [46]

mean-charge characteristic (nonlinear capacitor) The function relating mean charge to capacitor voltage. *Note:* Mean-charge characteristic is always single-valued. *See also:* nonlinear capacitor. (ED) [46]

mean first slip time (communication satellite) The mean time for a phase-lock loop starting to lock to a slip one or more cycles. (COM) [25]

mean free path For sound waves in an enclosure, the average distance sound travels between successive reflections in the enclosure. (ED/SP/ACO) [46], [32]

mean Hall plate temperature (Hall effect devices) The value of the temperature averaged over the volume of the Hall plate. (MAG) 296-1969w

mean horizontal intensity (illuminating engineering) (candlepower) The average intensity (candelas) of a lamp in a plane perpendicular to the axis of the lamp and which passes through the luminous center of the lamp. (EEC/IE) [126]

meaning (of a responsibility) A statement of what the responsibility means. The statement of responsibility is written from the point of view of the requester, not the implementer. The statement of responsibility states what the requester needs to know to make intelligent use of the property or constraint. That statement should be complete enough to let a requester decide whether to make the request, but it should stop short of explaining how a behavior or value is accomplished or derived. Meaning is initially captured using freeform natural language text in a glossary definition. It may be more formally refined into a statement of *pre-conditions* and *post-conditions* using the *specification language*. (C/SE) 1320.2-1998

mean instrument reading The arithmetic average of a series of readings. (NI) N42.17B-1989r

mean life The arithmetic mean of the times to failure of a group of nominally identical items. *See also:* reliability. (R) [29]

mean life, assessed *See:* assessed mean life.

mean life, extrapolated *See:* extrapolated mean life.

mean life, observed *See:* observed mean life.

mean life, predicted *See:* predicted mean life.

mean logistics time (MLT) The mean downtime occasioned by the unavailability of spares, replacement parts, test equipment, maintenance facilities, or personnel. (PE/NP) 933-1999

mean of reversed direct-current values (alternating-current instruments) The simple average of the indications when direct current is applied in one direction and then reversed and applied in the other direction. *See also:* accuracy rating. (EEC/AII) [102]

mean outage duration The mean duration of outage occurrences of a specified type = outage time due to outages of a specified type/number of outage occurrences of a specified type. *Note:* Also referred to as mean time to restoration. (PE/PSE) 859-1987w

mean pulse time The arithmetic mean of the leading-edge pulse time and the trailing-edge pulse time. *Note:* For some purposes, the importance of a pulse is that it exists (or is large enough) at a particular instant of time. For such applications the important quantity is the mean pulse time. The leading-edge pulse time and trailing-edge pulse time are significant primarily in that they may allow a certain tolerance in timing. (IM/WM&A) 194-1977w

mean radiating temperature For a non-isothermal body or medium:

— The temperature that would give rise to the same total brightness as the actual medium, or

— The temperature that would give rise to the same spectral brightness as the actual medium.

(AP/PROP) 211-1997

mean side lobe level The average value of the relative power pattern of an antenna taken over a specified angular region, which excludes the main beam, the power pattern being relative to the peak of the main beam. (AP/ANT) 145-1993

means of grounding (neutral grounding in electrical utility systems) The generic agent by which various degrees of grounding are achieved; for example, inductance grounding, resistance grounding, and resonant grounding. (SPD/PE) C62.92-1987r

mean spherical luminous intensity (illuminating engineering) Average value of the luminous intensity in all directions for a source. Also, the quotient of the total emitted luminous flux of the source by 4π.

$$I_{ms} = \left(\frac{1}{4\pi}\right)\int_0^{\pi} I\, d\omega = \frac{\Phi_{total}}{4\pi}$$

(EEC/IE) [126]

mean temperature coefficient of output voltage (Hall effect devices) The arithmetic average of the percentage changes in output voltage per degree Celsius taken over a given temperature range for a given control current magnitude and a given magnetic flux density. (MAG) 296-1969w

mean time before failures (MTBF) (power supplies) A measure of reliability giving the time before first failure. Mean time before failures may be approximated or predicted by summing the reciprocal failure rates of individual components in an assembly. (AES) [41]

mean time between failures (MTBF) (1) (power supplies) For repairable equipment, a measure of reliability giving the average time between repairs. Mean time between failures may be approximated or predicted by summing the reciprocal failure rates of individual components in an assembly. (AES) [41]

(2) (supervisory control, data acquisition, and automatic control) (station control and data acquisition) The time interval (hours) that may be expected between failures of an operating equipment. (SWG/PE/SPD/SUB) C37.100-1992, C62.1-1981s, C37.1-1994

(3) The average time (preferably expressed in hours) between failures of a continuously operating device, circuit, or system. (PE/PSC) 599-1985w

(4) (nuclear power generating station) The arithmetic average of operating times between failures of an item. (PE/NP) 352-1975s, 933-1999

(5) (repairable items) The product of the number of items and their operating time divided by the total number of failures. (R) [29]

(6) The expected or observed time between consecutive failures in a system or component. (C) 610.12-1990

(7) For a stated period in the life of a device, the mean value of the lengths of time between consecutive failures under stated conditions. *Note:* Used to measure equipment reliability—the higher the MTBF, the more reliable the equipment. (C) 610.10-1994w

(8) The mean exposure time between consecutive failures of a component. It can be estimated by dividing the exposure time by the number of failures in that period, provided that a sufficient number of failures has occurred in that period. (IA/PSE) 493-1997

mean time between failures, assessed (repaired items) The mean time between failures of an item determined by a limiting value or values of the confidence interval associated with a stated confidence level, based on the same data as the observed mean time between failures of nominally identical items. *Notes:* 1. The source of the data shall be stated. 2. Results can be accumulated (combined) only when all conditions are similar. 3. The assumed underlying distribution of failures against time shall be stated. 4. It should be stated whether a one-sided or a two-sided interval is being used. 5. Where one limiting value is given, this is usually the lower limit. (R) [29]

mean time between failures, extrapolated (repaired items) Extension by a defined extrapolation or interpolation of the observed or assessed mean time between failures for duration and.or conditions different from those applying to the observed or assessed mean time between failures. *Note:* The validity of the extrapolation shall be justified. (R) [29]

mean time between failures, observed (repaired items) For a stated period in the life of an item, the mean value of the length of time between consecutive failures, computed as the ratio of the cumulative observed time to the number of failures under stated conditions. *Notes:* 1. The criteria for what constitutes a failure shall be stated. 2. Cumulative time is the sum of the times during which each individual item has been performing its required function under stated conditions.

3. This is the reciprocal of the observed failure rate during the period. (R) [29]

mean time between failures, predicted (repaired items) For the stated conditions of use, and taking into account the design of an item, the mean time between failures computed from the observed, assessed, or extrapolated failure rates of its parts. *Note:* Engineering and statistical assumptions shall be stated, as well as the bases used for the computation (observed or assessed). (R) [29]

mean time between hazardous events (MTBHE) The average time between occurrences of events, where hazardous events and the equipment that may precipitate them are defined at the system level. The hazardous events included in MTBHE are those whose consequences are of a given severity, as determined by the organization generating the safety goals. (VT/RT) 1483-2000

mean time to diagnosis (MTTD) The average length of time taken to isolate and diagnose the failure of a system or system component. (C) 610.10-1994w

mean time to failure (nonrepaired items) The total operating time of a number of items divided by the total number of failures. *See also:* reliability. (R) [29]

mean time to failure, assessed (non-repaired items) The mean time to failure of an item determined by a limiting value or values of the confidence interval associated with a stated confidence level, based on the same data as the observed mean time to failure of nominally identical items. *Notes:* 1. The source of the data shall be stated. 2. Results can be accumulated (combined) only when all conditions are similar. 3. The assumed underlying distribution of failures against time shall be stated. 4. It should be stated whether a one-sided or a two-sided interval is being used. 5. Where one limiting value is given this is usually the lower limit. (R) [29]

mean time to failure, extrapolated (non-repaired items) Extension by a defined extrapolation or interpolation of the observed or assessed mean time to failure for durations and/or conditions different from those applying to the observed or assessed mean time to failure. *Note:* The validity of the extrapolation shall be justified. (R) [29]

mean time to failure, observed (non-repaired items) For a stated period in the life of an item, the ratio of the cumulative time for a sample to the total number of failures in the sample during the period, under stated conditions. *Notes:* 1. The criteria for what constitutes a failure shall be stated. 2. Cumulative time is the sum of the times during which each individual item has been performing its required function under stated conditions. 3. This is the reciprocal of the observed failure rate during the period. (R) [29]

mean time to failure, predicted (non-repaired items) For the stated conditions of use, and taking into account the design of an item the mean time to failure computed from the observed, assessed or extrapolated mean times to failure of its parts. *Note:* Engineering and statistical assumptions shall be stated, as well as the bases used for the computation (observed or assessed). (R) [29]

mean time to fix (MTTF) *See:* mean time to repair.

mean time to outage The mean time to outage occurrence of a specified type = service time/number of outage occurrences of the specified type. *Note:* There are other indices such as mean time between failure. (PE/PSE) 859-1987w

mean time to repair (MTTR) (1) (supervisory control, data acquisition, and automatic control) (station control and data acquisition) The time interval (hours) that may be expected to return failed equipment to proper operation. (SWG/PE/SUB) C37.100-1992, C37.1-1994

(2) (nuclear power generating station) The arithmetic average of time required to complete a repair activity. (PE/NP) 380-1975w, 352-1975s, 933-1999

(3) (software) The expected or observed time required to repair a system or component and return it to normal operations. (C) 610.12-1990

(4) For a stated period in the life of a device, the average time required for corrective maintenance to be performed. *Note:* Used to measure the complexity and modularity of equipment—the higher the MTTR, the more complex the equipment. (C) 610.10-1994w

(5) The mean time to repair or replace a failed component. It can be estimated by dividing the summation of repair times by the number of repairs, and, therefore, it is practically the average repair time. (IA/PSE) 493-1997

mean zonal candlepower (illuminating engineering) The average intensity (candelas) of a symmetrical luminaire or lamp at an angle to the luminaire or lamp axis that is in the middle of the zone under consideration. (EEC/IE) [126]

measurand A physical or electrical quantity, property, or condition that is to be measured. (SWG/PE) C37.100-1992

measure (1) The number (real, complex, vector, etc.) that expresses the ratio of the quantity to the unit used in measuring it. (Std100) 270-1966w

(2) (software reliability) A quantitative assessment of the degree to which a software product or process possesses a given attribute. (SE/C) 982.2-1988, 982.1-1988

(3) (A) A way to ascertain or appraise value by comparing it to a norm. **(B)** To apply a metric. (C/SE) 1061-1998

measured current (rotating machinery) The total direct current resulting from the application of direct voltage to insulation and including the leakage current, the absorption current, and, theoretically, the capacitive current. Measured current is the value read on the microammeter during a direct high voltage test of insulation. (PE/EM) 95-1977r

measured limiting voltage The maximum magnitude of voltage that is measured across the terminals of the surge protective device during the application of a series of impulses of specified wave shape and amplitude. (PE) C62.34-1996

measured service (telephone switching systems) Service in which charges are assessed in terms of the number of message units during the billing interval. (COM) 312-1977w

measured signal (automatic null-balancing electric instrument) The electrical quantity applied to the measuring-circuit terminals of the instrument. *Note:* It is the electrical analog of the measured variable. *See also:* measurement system. (EEC/EMI) [112]

measured value (power meters) An estimate of the value of a quantity obtained as a result of a measurement. *Note:* Indicated values may be corrected to give measured values. (IM) 470-1972w, 544-1975w

measured variable (automatic null-balancing electric instrument) (measurand) The physical quantity, property, or condition that is to be measured. *Note:* Common measured variables are temperature, pressure, thickness, speed, etc. *See also:* measurement system. (EEC/EMI) [112]

measure equations Equations in which the quantity symbols represent pure numbers, the measures of the physical quantities corresponding to the symbols. (Std100) 270-1966w

measurement (1) The determination of the magnitude or amount of a quantity by comparison (direct or indirect) with the prototype standards of the system of units employed. (Std100) 270-1966w

(2) The act or process of assigning a number or category to an entity to describe an attribute of that entity. A figure, extent, or amount obtained by measuring. (C/SE) 1061-1998

measurement component A general term applied to parts or subassemblies that are primarily used for the construction of measurement apparatus. *Note:* It is used to denote those parts made or selected specifically for measurement purposes and does not include standard screws, nuts, insulated wire, or other standard materials. *See also:* measurement system. (EEC/PE) [119]

measurement device An assembly of one or more basic elements with other components and necessary parts to form a separate self-contained unit for performing one or more measurement operations. *Note:* It includes the protecting, supporting, and connecting, as well as the functioning, parts, all of

which are necessary to fulfill the application requirements of the device. It should be noted that end devices (which see) are frequently but not always complete measurement devices in themselves, since they often are built-in with all or part of the intermediate means or primary detectors to form separate self-contained units. *See also:* measurement system.
(EEC/PE) [119]

measurement devices For an automatic control system, a device that measures physical and electrical quantities.
(PE/PSE) 94-1991w

measurement energy The energy required to operate a measurement device or system. *Note:* Measurement energy is normally obtained from the measurand or from the primary detector. *See also:* measurement system. (EEC/PE) [119]

measurement equipment A general term applied to any assemblage of measurement components, devices, apparatus, or systems. *See also:* measurement system. (EEC/PE) [119]

measurement inverter *See:* measuring modulator.

measurement mechanism An assembly of basic elements and intermediate supporting parts for performing a mechanical operation in the sequence of measurement. *Note:* For example, it may be a group of components required to effect the proper motion of an indicating or recording means and does not include such parts as bases, covers, scales, and accessories. It may also be applied to a specific group of elements by substituting a suitable qualifying term, such as time-switch mechanism or chart-drive mechanism. *See also:* measurement system. (EEC/PE) [119]

measurement range (instrument) That part of the total range within which the requirements for accuracy are to be met. *See also:* instrument. (EEC/PE) [119]

Measurements Assurance Program A program that allows manufacturers to verify the accuracy of their measurements through exchange and measurement of samples with NIST. This involves the analysis of blind test samples sent to the manufacturers by NIST, and NIST measurement of sources certified and provided by the manufacturers.
(NI) N42.22-1995

measurement space In pattern recognition, a set of all possible n-tuples (x_1, x_2, . . . , x_n) that can be used to represent n measurements of a pattern. *See also:* feature space.
(C) 610.4-1990w

measurement standard A standard that describes the characteristics of evaluating a process of product.
(C) 610.12-1990

measurement system One or more measurement devices and any other necessary system elements interconnected to perform a complete measurement from the first operation to the end result. *Note:* A measurement system can be divided into general functional groupings, each of which consists of one or more specific functional steps or basic elements.
(EEC/PE) [119]

measurement uncertainty (1) (test, measurement, and diagnostic equipment). The limits of error about a measured value between which the true value will lie with the confidence stated. *Note:* Uncertainty of measurement comprises, in general, many components. Some of these components may be estimated on the basis of the statistical distribution of the results of series of measurements and can be characterized by experimental standard deviations. Estimates of other components can be based on experience or other information.
(MIL/T&D/PE) [2], 1308-1994

(2) The limits of error for a measured value, between which the true value will lie with the confidence stated. (Measurement uncertainty is associated with measuring the absolute value of the electric and magnetic fields.)
(EMC) 1140-1994r

measurement voltage divider (voltage ratio box) (volt box) A combination of two or more resistors, capacitors, or other circuit elements so arranged in series that the voltage across one of them is a definite and known fraction of the voltage applied to the combination, provided the current drain at the tap point is negligible or taken into account. *Note:* The term volt box is usually limited to resistance voltage dividers intended to extend the range of direct-current potentiometers. *See also:* auxiliary device to an instrument.
(PE/EEC) [119]

measure of effectiveness (MOE) (1) Measure of how the system/individual performs its functions in a given environment. Used to evaluate alternative approaches' ability to meet functional objectives and mission needs. Examples of such measures include loss exchange results, face effectiveness contributions, and tons delivered per day.
(DIS/C) 1278.3-1996

(2) The metrics by which a customer will measure satisfaction with products produced by the technical effort.
(C/SE) 1220-1998

(3) Measure of how the system/individual performs its functions in a given environment. Used to evaluate whether alternative approaches meet functional objectives and mission needs. (C/DIS) 1278.4-1997

measure of performance (MOP) (1) Measure of how the system/individual performs its functions in a given environment (e.g., number of targets detected, reaction time, number of targets nominated, susceptibility of deception, task completion time). It is closely related to inherent parameters (physical and structural), but measures attributes of system/individual behavior. (DIS/C) 1278.3-1996

(2) An engineering performance measure that provides design requirements that are necessary to satisfy a measure of effectiveness. There are generally several measures of performance for each measure of effectiveness. (C/SE) 1220-1998

(3) Measure of how the system/individual performs its functions in a given environment. It is closely related to inherent parameters (physical and structural), but measures system/individual behavior. (C/DIS) 1278.4-1997

measuring accuracy, precision, or reproducibility (numerically controlled machines) Accuracy, precision, or reproducibility of position sensor or transducer and interpreting system. (IA/EEC) [61], [74]

measuring and test equipment (1) (nuclear power generating station) Devices or systems used to calibrate, measure, gage, test, inspect or control to acquire research, development, test or operational data or to determine compliance with design, specifications or other technical requirements.
(PE/NP) 498-1985s

(2) *See also:* test, measurement, and diagnostic equipment.
(MIL) [2]

measuring element (automatic control) That portion of the feedback elements which converts the signal from the primary detecting element to a form compatible with the reference input. (PE/EDPG) [3]

measuring mechanism (recording instrument) The parts that produce and control the motion of the marking device. *See also:* moving element. (EEC/ERI) [111]

measuring modulator (measurement inverter) (chopper) An intermediate means in a measurement system by which a direct-current or low-frequency alternating-current input is modulated to give a quantitatively related alternating-current output usually as a preliminary to amplification. *Note:* The modulator may be of any suitable type such as mechanical, magnetic, or varistor. The mechanical types, which are actuated by vibrating or rotating members, may be classified as contacting, microphonic, or generating (capacitive or inductive). *See also:* auxiliary device to an instrument.
(EEC/PE) [119]

measuring or test equipment (1) (nuclear power quality assurance) Devices or systems used to calibrate, measure, gage, test, or inspect in order to control or to acquire data to verify conformance to specified requirements. (PE/NP) [124]

(2) *See also:* test, measurement, and diagnostic equipment.
(MIL) [2]

measuring unit Any analog or digital device that analyzes input currents or voltages or both to produce an output to the relay logic. (PE/PSR) C37.90.1-1989r

measuring units and relay logic (surge withstand capability tests) Analog or digital devices which analyze the input currents and voltages to determine the immediate status of that part of the power system that they were installed to protect and to provide the control signal to trip circuit breakers. (PE/PSR) C37.90-1978s

mechanical back-to-back test (rotating machinery) A test in which two identical machines are mechanically coupled together and the total losses of both machines are calculated from the difference between the electrical input to one machine and the electrical output of the other machine. *See also:* efficiency. (PE) [9]

mechanical bias *See:* relay mechanical bias.

mechanical braking The kinetic energy of the drive motor and the driven machinery is dissipated by the friction of a mechanical brake. *See also:* electric drive. (IA/ICTL/IAC) [60]

mechanical condition monitor (power system device function numbers) A device that functions upon the occurrence of an abnormal mechanical condition (except that associated with bearings as covered under device function) [bearing protective device], such as excessive vibration, eccentricity, expansion, shock, tilting, or seal failure. (SUB/PE) C37.2-1979s

mechanical current rating (neutral grounding devices) (electric power) The symmetrical root-mean-square alternating-current component of the completely offset current wave that the device can withstand without mechanical failure. *Note:* The mechanical forces depend upon the maximum crest value of the current wave. However, for convenience, the mechanical current rating is expressed in terms of the root-mean-square value of the alternating-current component only of a completely displaced current wave. Specifically, the crest value of the completely offset wave will then be 2.82 times the mechanical current rating. *See also:* grounding device. (PE/SPD) 32-1972r

mechanical cutter (mechanical recorder) An equipment for transforming electric or acoustic signals into mechanical motion of approximately like form and inscribing such motion in an appropriate medium by cutting or embossing. (SP) [32]

mechanical data processing A method of data processing that involves the use of small, simple, mechanical machines. (C) 610.2-1987

mechanical failure (of a circuit breaker) Failure other than an electrical failure. (SWG/PE) C37.10-1995

mechanical fatigue test (rotating machinery) A test designed to determine the effect of a specific repeated mechanical load on the life of a component. *See also:* asynchronous machine; direct-current commutating machine. (PE) [9]

mechanical filter *See:* mechanical wave filter.

mechanical freedom (accelerometer) The maximum linear or angular displacement of the accelerometer's proof mass, relative to its case. (AES/GYAC) 528-1994

mechanical-hydraulic governor (hydraulic turbines) A governor in which the control signal proportional to speed error and necessary stabilizing signals are developed mechanically, summed by a mechanical system, and are then hydraulically amplified. (PE/EDPG) 125-1988r

mechanical-impact strength (insulators) The impact that, under specified conditions, the insulator can withstand without damage. *See also:* insulator. (EEC/IEPL) [89]

mechanical impedance The complex quotient of the effective alternating force applied to the system, by the resulting effective velocity. (SP) [32]

mechanical inertia time (hydraulic turbines) A characteristic of the machine due to the inertia of the rotating components of the machine defined as:

$$T_M = \frac{(Wk^2)(N^2)(10^{-6})}{(1.61)(\mathrm{HP})}$$

where

W = weight of machine rotating parts, pounds

k = radius of gyration, feet

N = rated speed, rev/min

HP = rated output of turbine, horsepower

Notes: 1. T_M is also approximately equal to $2H$ where H is the inertia constant. 2. To calculate T_M using International SI units:

$$T_M = J\omega_0^2 / P_0$$

where J = the polar moment of inertia in kgm^2 calculated by dividing Wk^2 in newton-meters by acceleration of gravity 9.81 m/second^2.

$$= Mk^2 = GD^2$$

$\omega_0 = \pi 2N/60$ rad/second

P_0 = rated output of turbine, watts.

(PE/EDPG) 125-1977s

mechanical inspection *See:* computer-aided inspection.

mechanical interchangeability (of fuse links) The characteristic that permits the designs of various manufacturers to be interchanged physically so they fit into and withstand the tensile stresses imposed by various types of prescribed cutouts made by different manufacturers. (SWG/PE) C37.100-1992, C37.40-1993

mechanical interlocking machine An interlocking machine designed to operate the units mechanically. *See also:* interlocking. (EEC/PE) [119]

mechanical latching relay A relay in which the armature or contacts may be latched mechanically in the operated or unoperated position until reset manually or electrically. (PE/EM) 43-1974s

mechanical limit (neutral grounding devices) The rated maximum instantaneous value of current, in amperes, that the device will withstand without mechanical failure. (PE/SPD) 32-1972r

mechanically delayed overcurrent trip *See:* overcurrent release; mechanically delayed release.

mechanically delayed release (trip) A release delayed by a mechanical device. (SWG/PE) C37.100-1992

mechanically de-spun antenna (communication satellite) A rotating directional antenna, mounted to a rotating object (namely spin stabilized communication satellite); the rotation of the antenna is counter to the rotation of the body it is mounted to, such that the antenna beam points into the same direction of space. (COM) [24]

mechanically release-free (trip-free) (as applied to a switching device) A term indicating that the release can open the device even though in a manually operated switching device the operating lever is being moved toward the closed position; or in a power-operated switching device, such as solenoid- or spring-actuated types, the operating mechanism is being moved toward the closed position either by continued application of closing power or by means of a maintenance closing lever. (SWG/PE/TR) C37.100-1992, C57.12.44-1994

mechanically reset relay *See:* hand-reset relay.

mechanically switched capacitor (MSC) A shunt-connected circuit containing a mechanical power-switching device in series with a capacitor bank and sometimes also a damping reactor. (PE/SUB) 1031-2000

mechanically switched reactor (MSR) A shunt-connected circuit containing a mechanical power switching device in series with a reactor. (PE/SUB) 1031-2000

mechanically timed relays Relays that are timed mechanically by such features as clockwork, escapement, bellows, or dashpot. *See also:* relay. (EEC/REE) [87]

mechanical modulator (A) (electronic navigation) A device that varies some characteristic of a carrier wave so as to transmit information, the variation being accomplished by physically moving or changing a circuit element. **(B) (electronic**

navigation) In instrument landing systems, a particular arrangement of radio-frequency transmission lines and bridges with resonant sections coupled to the lines and motor-driven capacitor plates that alter the resonance so as to produce 90- and 150-hertz modulations. *See also:* navigation.
(AES/RS) 686-1982, [42]

mechanical mouse A mouse whose motion-sensing component is mechanical in nature such as a control ball or a pair of wheels. *Contrast:* optical mouse. (C) 610.10-1994w

mechanical operation (of a switch) Operation by means of an operating mechanism connected to the switch by mechanical linkage. *Note:* Mechanically operated switches may be actuated either by manual, electrical, or other suitable means.
(SWG/PE) C37.100-1992

mechanical part Any part having no electric or magnetic function. (PE/EM) [9]

mechanical plating Any plating operation in which the cathodes are moved mechanically during the deposition. *See also:* electroplating. (EEC/PE) [119]

mechanical recorder *See:* mechanical cutter.

mechanical rectifier A rectifier in which rectification is accomplished by mechanical action. *See also:* rectification.
(EEC/PE) [119]

mechanical reference plane (standard connector) A transverse plane of the waveguide or transmission line to which all critical, longitudinal dimensions are referenced to assure nondestructive mating; it is the only plane where a mated standard connector pair butt against one another. *Note:* Usually a stable, rugged metal surface.
(IM/HFIM) 474-1973w

mechanical register (pulse techniques) An electromechanical indicating pulse counter. *See also:* pulse.
(NPS) 175-1960w

mechanical relay damping ring A loose member mounted on a contact spring to reduce contact chatter.
(EEC/REE) [87]

mechanical reproducer *See:* phonograph pickup.

mechanical shock A significant change in the position of a system in a nonperiodic manner in a relatively short time. *Note:* It is characterized by suddenness and large displacements and develops significant internal forces in the system. *See also:* shock motion. (SP) [32]

mechanical short-circuit rating The maximum asymmetrical (peak) fault current that the reactor is capable of withstanding with no loss of electrical or mechanical integrity.
(PE/TR) C57.16-1996

mechanical short-time current rating (current transformer) The root-mean-square value of the alternating-current component of a completely displaced primary current wave that the transformer is capable of withstanding, with secondary short-circuited. *Note:* Capable of withstanding means that after a test the current transformer shows no visible sign of distortion and is capable of meeting the other specified applicable requirements. *See also:* instrument transformer.
(PE/TR) [57]

mechanical splice (fiber optics) A fiber splice accomplished by fixtures or materials, rather than by thermal fusion. Index matching material may be applied between the two fiber ends. *See also:* optical waveguide splice; index matching material; fusion splice. (Std100) 812-1984w

mechanical switching device A switching device designed to close and open one or more electric circuits by means of guided separate contacts. *Note:* The medium in which the contacts separate may be designated by suitable prefix; that is, air, gas, oil, etc. (SWG/PE) C37.100-1992

mechanical terminal load (high voltage air switches, insulators, and bus supports) The external mechanical load at each terminal equivalent to the combined mechanical forces to which the air switch may be subjected.
(SWG/PE) C37.30-1992s

mechanical time constant (critically damped indicating instrument) The period of free oscillation divided by 2ν. *See also:* electromagnetic compatibility. (INT) [53], [70]

mechanical translation Translation from one natural language to another by a computer or through some other mechanical means. *See also:* machine-aided translation.
(C) 610.2-1987

mechanical transmission system An assembly of elements adapted for the transmission of mechanical power. *See also:* phonograph pickup. (SP) [32]

mechanical trip (railway practice) (trip arm) A roadway element consisting in part of a movable arm that in operative position engages apparatus on the vehicle to effect an application of the brakes by the train-control system.
(EEC/PE) [119]

mechanical wave filter (mechanical filter) A filter designed to separate mechanical waves of different frequencies. *Note:* Through electromechanical transducers, such a filter may be associated with electric circuits. *See also:* filter.
(PE/EEC) [119]

mechanical wrap or connection (soldered connections) The securing of a wire or lead prior to soldering.
(EEC/AWM) [105]

mechanism (1) (indicating instrument) The arrangement of parts for producing and controlling the motion of the indicating means. *Note:* It includes all the essential parts necessary to produce these results but does not include the base, cover, dial, or any parts, such as series resistors or shunts, whose function is to adapt the instrument to the quantity to be measured. *See also:* moving element; instrument.
(EEC/AII) [102]

(2) (recording instrument) Includes the arrangement for producing and controlling the motion of the marking device; the marking device; the device (clockwork, constant-speed motor, or equivalent) for driving the chart; the parts necessary to carry the chart. *Note:* It includes all the essential parts necessary to produce these results but does not include the base, cover, indicating scale, chart, or any parts, such as series resistors or shunts, whose function is to make the recorded value of the measured quantity correspond to the actual value. *See also:* moving element. (EEC/PE) [119]

(3) (overhead power lines) In the context of biological effects, the process(es) by which an agent (physical or chemical) causes the effect; e.g., causing a change in hormone production or in the function of cell membranes.
(T&D/PE) 539-1990

(4) (of a switching device) The complete assembly of levers and other parts that actuates the moving contacts of a switching device. (SWG/PE) C37.100-1992

(5) In an IDEF0 model, the means used by a function to transform input into output. (C/SE) 1320.1-1998

mechanism arrow An arrow or arrow segment that expresses IDEF0 mechanism, i.e., an object type set whose instances are used by a function to transform input into output. The arrowhead of an mechanism arrow is attached to the bottom side of a box. (C/SE) 1320.1-1998

mechanism loopback Loopback of output from one function to be mechanism for another function in the same diagram.
(C/SE) 1320.1-1998

mechanism of propagation *See:* ionospheric mode of propagation.

media (1) (A) A means of communication. *See also:* hypermedia. **(B)** Material on which information can be stored or transported. *Note:* Media is the plural form of medium. *See also:* input media; output media.
(C) 610.7-1995, 610.10-1994

(2) Any readable or writable data storage area.
(C/SS) 1244.1-2000

Media Access Control (MAC) The data link sublayer that is responsible for transferring data to and from the Physical Layer. (C/LM) 802.3-1998

media-independent information transfer (information transfer) Used as a general term to refer to any volume conforming to IEEE Trial-Use Std 949-1985w. (MM/C) 949-1985w

Media Independent Interface (MII) (1) A transparent signal interface at the bottom of the Reconciliation sublayer. (C/LM) 802.3-1998

(2) A set of signals with electrical, logical, and physical definitions that provide the complete interface between the medium access control (MAC) layer and Physical Layer (PHY) (via the RS). (C/LM) 802.5t-2000

Medium Dependent Interface The mechanical and electrical interface between the transmission medium and the Medium Attachment Unit (MAU) (10BASE-T) or PHY (100BASE-T). (C/LM) 802.3-1998

median (L_{50}) The level exceeded 50% of the time over a specified time period with a specified weather condition. (T&D/PE) 539-1990

median water conditions (power operations) Precipitation and runoff conditions which provide water for hydroelectric energy development approximating the median amount and distribution available over a long time period, usually the period of record. (PE/PSE) 858-1987s

medical devices Any product that interfaces to the patient directly or operates in the patient environment. (EMB/MIB) 1073.4.1-2000

medical information bus (MIB) The informal name for the IEEE 1073 family of standards. (EMB/MIB) 1073.3.1-1994

medical device system (MDS) A bedside medical device which is actively connected to a 1073-type communications link. (EMB/MIB) 1073-1996

medical information system (MIS) *See:* hospital information system.

medium (1) (computers) The material, or configuration thereof, on which data are recorded; for example, paper tape, cards, magnetic tape. (C) [20], [85]

(2) (information transfer) A vehicle capable of transferring data. (MM/C) 949-1985w

(3) (broadband local area networks) The physical layer utilized to allow transmission of signals to communicate to various devices connected to it. For example, the medium of a CATV system is a broadband coaxial cable. (LM/C) 802.7-1989r

(4) The physical material from which the link is constructed.local area networks. (C) 8802-12-1998

(5) In data communications, a path over which communication flows, such as coaxial cable; optical fiber. *Note:* Medium is the singular form of media. (C) 610.7-1995

(6) The singular form of the term media. (C) 610.10-1994w

(7) The material on which the data may be transmitted. STP, UTP, and optical fibers are examples of media. (C/LM) 8802-5-1998

(8) (data management) *See also:* empty medium; virgin medium; machine-readable medium; data medium. (C) 610.5-1990w

medium access control (1) That part of a data station that supports the medium access control functions that reside just below the LLC sublayer. The MAC procedures include framing/deframing data units, performing error checking, and acquiring the right to use the underlying physical medium. (C/LM/PE/CC/TR) 8802-2-1998, 799-1987w

(2) *See also:* medium access control sublayer. (LM/C/CC) 8802-6-1994

medium access control management protocol data unit (MMPDU) The unit of data exchanged between two peer MAC entities to implement the MAC management protocol. (C/LM) 8802-11-1999

medium access control procedure (MAC procedure) In a local area network (LAN) or metropolitan area network (MAN), the part of the protocol that governs access to the transmission medium independently of the physical characteristics of the medium, but taking into account the topological aspects of the subnetwork, in order to enable the exchange of data between nodes. The MAC procedures include framing, error protection, and acquiring the right to use the underlying transmission medium. (LM/C) 8802-6-1994

medium access control protocol data unit (MPDU) The unit of data exchanged between two peer MAC entities using the services of the physical layer (PHY). (C/LM) 8802-11-1999

medium access control service data unit (MSDU) Information that is delivered as a unit between MAC service access points (SAPs). (C/LM) 8802-11-1999

medium access control sublayer (MAC) (1) The portion of the data station that controls and mediates the access to the ring. (C/LM) 8802-5-1998

(2) In a local area network (LAN), the part of the data link layer that supports topology-dependent functions and uses the services of the physical layer to provide service to the logical link control (LLC) sublayer. In ISO/IEC 8802, the combined set of functions in the DQDB Layer that support the MAC Sublayer service to the logical link control (LLC) sublayer. (LM/C) 8802-6-1994

(3) The portion of the data link layer that controls access to the medium. The MAC sublayer is required in end nodes.local area networks. (LM/C) 8802-12-1998

(4) The lower sublayer of the data link layer of seven-layer OSI model; provides topology-dependent functions between the physical layer and the logical link control sublayer. *See also:* network layer; transport layer; sublayer; application layer; client layer; data link layer; presentation layer; physical layer; entity layer; session layer; logical link control sublayer. (C) 610.7-1995

medium attachment unit (MAU) (1) The device that interfaces the communications system to the medium. The MAU incorporates the circuitry from the PLS (physical layer signaling interface) to the medium interface. (LM/C) 802.7-1989r

(2) In a local area network (LAN), a device used in a data station to couple the data terminal equipment (DTE) to the transmission medium. (C/LM) 802.9a-1995w

(3) In a local area network, a device used in a data station to couple the data terminal equipment (DTE) to the transmission medium. *Note:* This term is contextually specific to IEEE Std 802.3. (C) 610.7-1995

(4) A device containing an attachment unit interface (AUI), physical medium attachment (PMA), and medium dependent interface (MDI) that is used to connect a repeater or data terminal equipment (DTE) to a transmission medium. (C/LM) 802.3-1998

medium dependent interface (MDI) (1) (medium attachment units and repeater units) The mechanical and electrical interface between the trunk cable medium and the medium attachment unit (MAU). *See also:* coaxial cable interface. (LM/C) 8802-3-1990s

(2) The mechanical and electrical interface between the transmission medium and the MAU (10BASE-T) or PHY (100BASE-T). (LM/C) 802.3u-1995s

(3) The physically exposed interface between the link segment medium and the PMD of the end node or repeater, for which all mechanical, electrical or optical, and transmitted signal requirements are specified.local area networks. (C) 8802-12-1998

medium frequency (MF) 300 kHz to 3 MHz. *See also:* radio spectrum. (AP/PROP) 211-1997

medium-grain parallel architecture Parallel architecture that uses between 32 and 1024 processors. *Contrast:* coarse-grain parallel architecture; fine-grain parallel architecture. (C) 610.10-1994w

medium independent interface (MII) The logical interface between the Physical Medium Independent (PMI) and PMD in an end node or repeater. Optionally, the MII may be implemented as a physically exposed interface with specified signaling timing and electrical characteristics.local area networks. (C) 8802-12-1998

medium interface connector (MIC) A connector interface at which signal transmit and receive characteristics are specified for attaching stations and concentrators. One class of MICs is the connection between the attaching stations and the lobe cabling. A second set is the attachment interface between the concentrator and its lobes. A third set is the interface between the concentrator and the trunk cabling. Two types of connectors are specified: one for connecting to STP media and one for connecting to UTP media. (C/LM) 8802-5-1998

medium ion (dc electric-field strength and ion-related quantities) Ion comprised of several molecules or molecular clusters bound together by charge that is larger and less mobile than a small ion due to more mass or a greater number of molecular clusters. Typical radius is in the range of 10^{-9} m to 2×10^{-8} m. Mobility is in the range of 10^{-7} m^2/Vs to 10^{-5} m^2/Vs. (T&D/PE) 539-1990, 1227-1990r

medium noise (sound recording and reproducing system) The noise that can be specifically ascribed to the medium. *See also:* noise. 191-1953w

medium-pulse-repetition-frequency waveform A pulsed-radar waveform whose pulse-repetition frequency (PRF) is such that targets of interest are ambiguous with respect to both range and Doppler shift. *See also:* high-pulse-repetition-frequency waveform; low-pulse-repetition-frequency waveform. (AES) 686-1997

medium scale integration (MSI) (A) Pertaining to an integrated circuit containing between 100 and 500 transistors in its design. *Contrast:* large scale integration; very large scale integration; small scale integration; ultra-large scale integration. **(B)** Pertaining to an integrated circuit containing between 10 and 100 elements. (C) 610.10-1994

medium voltage (1) (cable systems in power generating stations) 601 to 15 000 V. (PE/EDPG) 422-1977
(2) (system voltage ratings) A class of nominal system voltages greater than 1000 V and less than 100 000 V. *See also:* low voltage; nominal system voltage; high voltage. (IA/PSE/APP) 241-1990r, [80]

medium-voltage aluminum-sheathed power cable (aluminum sheaths for power cables) Cable used in an electric system having a maximum phase-to-phase rms ac voltage above 1 000 V to 72 500 V, the cable having an aluminum sheath as a major component in its construction. (PE/IC) 635-1989r

medium-voltage power cable (1) (cable systems in power generating stations) Cables designed to supply power to utilization devices of the plant auxiliary system, operated at 601 to 15 000 V. (PE/EDPG) 422-1977
(2) Cable designed to supply power to utilization devices of the plant auxiliary system, operated at 5000–46 000 V in sizes ranging from 8 AWG (8.37 mm^2) to 2000 kcmil (1010.0 mm^2). (PE/IC) 1185-1994

medium-voltage system (electric power for industrial and commercial systems only) An electric system having a maximum root-mean-square alternating-current voltage above 1000 volts to 72 500 volts. *See also:* voltage classes. (IA/PSE) 570-1975w

meet *See:* AND.

meg Colloquial reference for megabyte. (C) 610.10-1994w

mega (M) (A) (mathematics of computing) A prefix indicating one million (10^6). **(B) (mathematics of computing)** In statements involving size of computer storage, a prefix indicating 2^{20}, or 1 048 576. (C) 1084-1986

megabyte Either 1 000 000 bytes or 2^{20} bytes. *Notes:* 1. The user of these terms shall specify the applicable usage. If the usage is 2^{10} or 1024 bytes, or multiples thereof, then note 2 below shall also be included with the definition. 2. As used in IEEE Std 610.10-1994, the terms kilobyte (kB) means 2^{10} or 1024 bytes, megabyte (MB) means 1024 kilobytes, and gigabyte (GB) means 1024 megabytes. *See also:* gigabyte. (C) 610.10-1994w

megacycle One million cycles. (C) 610.10-1994w

megahertz (MHz) (1) A unit of frequency equal to 1 000 000 cycles per second. (LM/C) 802.7-1989r
(2) A unit of frequency equal to 1 000 000 Hz, that is, 10^6 Hz. (C) 610.7-1995

Meissner oscillator An oscillator that includes an isolated tank circuit inductively coupled to the input and output circuits of an amplifying device to obtain the proper feedback and frequency. *See also:* oscillatory circuit. (AP/ANT) 145-1983s

mel A unit of pitch. By definition, a simple tone of frequency 1000 hertz, 40 decibels above a listener's threshold, produces a pitch of 1000 mels. *Note:* The pitch of any sound that is judged by the listener to be *n* times that of the 1-mel tone is *n* mels. (SP) [32]

melting channel The restricted portion of the charge in a submerged resistor or horizontal-ring induction furnace in which the induced currents are concentrated to effect high energy absorption and melting of the charge. *See also:* induction heating. (IA) 54-1955w, 169-1955w

melting-speed ratio (1) The ratio between between 0.1 s and 300 s or 600 s minimum melting currents, whichever is specified, which designates the relative speed of the fuse link. (SWG/PE) C37.40-1993
(2) (of a fuse) A ratio of the current magnitudes required to melt the current-responsive element at two specified melting times. *Notes:* 1. Specification of the current wave shape is required for time less than one-tenth of a second. 2. The lower melting time in present use is 0.1 s, and the higher minimum melting current times are 100 a for low-voltage fuses and 300 s or 600 s, whichever specified, for high-voltage fuses. (SWG/PE) C37.100-1992

melting time (1) (protection and coordination of industrial and commercial power systems) The time required to melt the current-responsive element on a specified overcurrent. Where the fuse is current limiting in less than half-cycle, the melting time may be approximately half or less of the clearing time. (IA/PSP) 242-1986r
(2) (of a fuse) The time required for overcurrent to sever the current-responsive element. (SWG/PE/SWG-OLD) C37.100-1992, C37.40-1993, C37.40b-1996

member In data management, a subunit contained in a partitioned data set. (C) 610.5-1990w

membrane keyboard A type of keyboard in which the keys are not raised, rather it is composed of a semi-flexible plastic sheet with a conductive surface below. *Synonym:* pressure-sensitive keyboard. (C) 610.10-1994w

membrane potential The potential difference, of whatever origin, between the two sides of a membrane. *See also:* electrobiology. (EMB) [47]

memory (1) All of the addressable storage in a processing unit and other internal storage that is used to execute instructions. *See also:* main storage. (C) 610.10-1994w
(2) *See also:* storage medium; storage.

memory action (of a relay) A method of retaining an effect of an input after the input ceases or is greatly reduced, so that this input can still be used in producing the typical response of the relay. *Note:* For example, memory action in a high-speed directional relay permits correct response for a brief period after the source of voltage input necessary to such response is short-circuited. (PE) C37.100-1992

memory address An address of a particular storage location in memory. (C) 610.10-1994w

memory address register A register containing the address of the memory location to be accessed. (C) 610.10-1994w

memory agent A module that uses split transactions to assume all the rights and responsibilities of some number of remote memory modules. (C/BA) 896.4-1993w

memory allocation and protection (A) To allocate physical sections of memory into logical partitions with read/write protection provided within each partition. **(B)** Pertaining to the hardware components that perform the allocation as in (A). (C) 610.10-1994

memory array (1) A matrix of memory locations arranged in a rectangular geometric pattern on an integrated circuit. (C) 610.10-1994w

(2) *See also:* array. (ED) 1005-1998

memory bank *See:* bank.

memory board A circuit board that provides random-access memory to a system. (C) 610.10-1994w

memory boundary The last address of an aligned data block. The maximum data block size that can be transferred by an IUT Master is the product of data width and data length. (C/BA) 896.4-1993w

memory buffer register A register in which a word is stored as it is read from memory or as it is written to memory. *Synonym:* memory data register. (C) 610.10-1994w

memory bus A bus connecting memory to the devices which can access it, including the processor and peripheral devices. (C) 610.10-1994w

memory capacity (1) The maximum number of bits that a memory is capable of storing. (ED) 641-1987w

(2) (software) The maximum number of items that can be held in a given computer memory; usually measured in words or bytes. (C) 610.12-1990

(3) *See also:* capacity. (ED) 1005-1998

(4) (electronic computation) *See also:* channel capacity; storage capacity.

memory cell (1) The smallest subdivision of a memory into which a unit of data has been or can be entered, in which it is or can be stored, and from which it can be retrieved. (ED) 641-1987w

(2) The combination of one or more single or merged transistors formed to provide a means of accessing, changing, and storing data. (ED) 1005-1998

memory compaction (A) A storage allocation technique in which the contents of all allocated storage areas are moved to the beginning of the storage space and the remaining storage blocks are combined into a single block. *Synonym:* garbage collection. **(B)** A storage allocation technique in which contiguous blocks of nonallocated storage are combined to form single blocks. (C) 610.12-1990

memory core *See:* magnetic core.

memory cycle (1) (test, measurement, and diagnostic equipment) The time required to read information from memory and replace it. (MIL) [2]

(2) A single complete access (read or write) of memory. (C) 610.10-1994w

memory data register *See:* memory buffer register.

memory device A device that contains only memory and implements configuration registers. (C/MM) 1155-1992

memory dump A display of the contents of all or part of a computer's internal storage, usually in binary, octal, or hexadecimal form. *See also:* static dump; selective dump; snapshot dump; dynamic dump; change dump. (C) 610.12-1990

memory image A series of bits that can be stored within a contiguous portion of transponder memory and that may be passed as a parameter within commands initiated by the roadside equipment (RSE). (SCC32) 1455-1999

memory integrated circuit An integrated circuit consisting of memory cells and usually including associated circuits such as signal amplification and address selection. (ED) 1005-1998

memory location A subdivision of a memory, including one or several memory cells, that is the smallest part of the memory that can be addressed. *Note:* The content of a memory location is usually called a bit, a byte, or a word, as appropriate. (ED) 1005-1998

memory management unit (MMU) A device that performs address translation between a CPU's virtual addresses and the physical addresses of some bus; typically, the bus represented by the root node. (C/BA) 1275-1994

memory map (1) A diagram that shows where programs and data are stored in a computer's memory. (C) 610.12-1990

(2) A list of all the current addresses in a computer. *Note:* This may indicate what is currently allocated, who is using it and where it is located. *Synonym:* memory map list. (C) 610.10-1994w

memory map list *See:* memory map.

memory mapping (A) The manner in which an address is translated into a physical address of a storage location. *See also:* biasing; segmenting; paging. **(B)** The process of translating addresses as in definition (A). (C) 610.10-1994

memory-mode agent An agent that communicates with others by using memory and/or I/O space on the parallel system bus. (C/MM) 1296-1987s

memory-mode system A system in which the agents communicate with one another with data structures in memory and/or I/O space. (C/MM) 1296-1987s

memory object (1) Either a file or shared memory object. When used in conjunction with *mmap*(), a memory object will appear in the address space of the calling process. (C/PA) 9945-1-1996

(2) Either a file or shared memory object. When used in conjunction with `Map_Memory`, `Open_And_Map_Shared_Memory`, or `Open_Or_Create_And_Map_Shared_Memory`, a memory object will appear in the address space of the calling process. (C) 1003.5-1999

memory organization The arrangement of memory cells, either by geometrical arrangement in rows and columns or by organization of the data to be stored. (ED) 1005-1998, 641-1987w

memory page A segment of transponder memory that is assigned a unique location by which it may be referenced. (SCC32) 1455-1999

memory relay (A) A relay having two or more coils, each of which may operate independent sets of contacts, and another set of contacts that remain in a position determined by the coil last energized. **(B)** Sometimes erroneously used for polarized relay. *See also:* relay. (EEC/REE) [87]

memory-resident Managed by the implementation in such a way as to provide an upper bound on memory access times. (C/PA) 9945-1-1996, 1003.5-1999

memory space The address space used for accessing physical memory devices for storage and retrieval of code and data. (C/MM) 1296-1987s

memory window The difference in threshold voltage between the low- and high-conductance logic states of a memory cell. (ED) 641-1987w

MENTOR A block-structured language used widely in computer-aided instruction; characterized by its ability to model a student's knowledge. (C) 610.13-1993w

menu (1) A list of options available for selection by the user of a computer system. *Synonyms:* display menu; help menu; menu selection. (C) 610.2-1987, 610.6-1991w

(2) A rectangular visual user interface control containing a group of controls used to select an action from a group of choices. (C) 1295-1993w

menu bar A visual user interface control that is the bounded area near the top of a window, below the title bar, and above the rest of the window that contains cascade buttons that provide access to other menus. (C) 1295-1993w

menu by-pass In a menu-driven system, a feature that permits advanced users to perform functions in a command-driven mode without selecting options from the menus. (C) 610.12-1990

menu-driven Pertaining to a system or mode of operation in which the user directs the system through menu selections. *Contrast:* command-driven. *See also:* menu by-pass. (C) 610.12-1990

menu selection (A) The process of choosing an item from a menu. **(B)** The item chosen from a menu. (C) 610.2-1987

mercury-arc converter, pool-cathode *See:* pool-cathode mercury-arc converter; oscillatory circuit.

mercury-arc rectifier A gas-filled rectifier tube in which the gas is mercury vapor. *See also:* rectification. (ED) [45], [84]

mercury cells Electrolytic cells having mercury cathodes with which deposited metals form amalgams. (EEC/PE) [119]

mercury-contact relays (A) (mercury plunger relay) A relay in which the magnetic attraction of a floating plunger by a field surrounding a sealed capsule displaces mercury in a pool to effect contacting between fixed electrodes. **(B) (mercury-wetted-contact relay)** A form of reed relay in which the reeds and contacts are glass enclosed and are wetted by a film of mercury obtained by capillary action from a mercury pool in the base of a glass capsule vertically mounted. **(C) (mercury-contact relay)** A relay mechanism in which mercury establishes contact between electrodes in a sealed capsule as a result of the capsule's being tilted by an electromagnetically actuated armature, either on pick-up or dropout or both. *See also:* mercury relay.

mercury fluorescent lamp (illuminating engineering) An electric discharge lamp having a high-pressure mercury arc in an arc tube, and an outer envelope coated with a fluorescing substance (phosphor) which transforms some of the ultraviolet energy generated by the arc into light. (EEC/IE) [126]

mercury-hydrogen spark-gap converter (dielectric heating) A spark-gap generator or power source which utilizes the oscillatory discharge of a capacitor through an inductor and a spark gap as a source of radio-frequency power. The spark gap comprises a solid electrode and a pool of mercury in a hydrogen atmosphere. *See also:* induction heating. (IA) 54-1955w, 169-1955w

mercury lamp (illuminating engineering) A high intensity discharge (HID) lamp in which the major portion of the light is produced by radiation from mercury operating at a partial pressure in excess of 1.013×10^5 Pa (one atmosphere). Includes clear, phosphor-coated (mercury-fluorescent), and self-ballasted lamps. (EEC/IE) [126]

mercury-lamp ballast *See:* ballast.

mercury-lamp transformer *See:* constant-current (series) mercury-lamp transformer.

mercury motor meter A motor-type meter in which a portion of the rotor is immersed in mercury, which serves to direct the current through conducting portions of the rotor. *See also:* electricity meter.

mercury oxide cell A primary cell in which depolarization is accomplished by oxide of mercury. *See also:* electrochemistry. 341

mercury-pool cathode (gas tube) A pool cathode consisting of mercury. (ED) [45], [84]

mercury relay A relay in which the movement of mercury opens and closes contacts. (EEC/REE) [87]

mercury storage A type of storage that utilizes the acoustic wave propagation properties of mercury to store data. *See also:* acoustic delay line. (C) 610.10-1994w

mercury vapor lamp transformers (power and distribution transformers) (multiple-supply type) Transformers, autotransformers, or reactors for operating mercury or metallic iodide vapor lamps for all types of lighting applications, including indoor, outdoor area, roadway, uviarc, and other process and specialized lighting. (PE/TR) C57.12.80-1978r

mercury-vapor tube A gas tube in which the active gas is mercury vapor. (ED) 161-1971w

merge (1) (computers) To combine two or more sets of items into one, usually in a specified sequence. (C/C) [20], [85] **(2) (data management)** To combine the items of two or more sets, all in the same order, into one set in that order. *See also:* unbalanced merge; collate; bitonic merge; coalesce; order-by-merging; balanced merge; merge sort. (C) 610.5-1990w

merge exchange sort *See:* Batcher's parallel sort.

merge search A sequential search in which the set of search arguments is ordered in the same sequence as the set to be searched; the set is searched sequentially, using the first search argument, until an equal or greater search key is found, the former case signifying a successful search, the latter, an unsuccessful search; the search for the next search argument begins where the last search left off. (C) 610.5-1990w

merge sort A sort in which the set to be sorted is divided into subsets, the items in each subset are sorted, and the sorted subsets are merged. *Synonym:* merging sort. *See also:* internal merge sort; external merge sort. (C) 610.5-1990w

merging Reconfiguration function that involves dual ring stations ceasing to use contra-rotating links in favor of a restored link or station. (LM/C) 802.5c-1991r

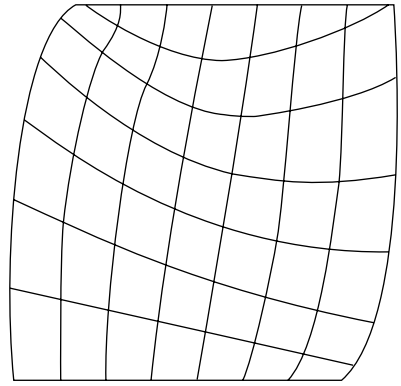
merging sort *See:* merge sort.

meridional ray (fiber optics) A ray that passes through the optical axis of an optical waveguide (in contrast with a skew ray, which does not). *See also:* optical axis; skew ray; paraxial ray; axial ray; geometric optics; numerical aperture. (Std100) 812-1984w

Merritt and Miller's Own Block Structured Simulation Language (MOBSSL-UAF) A simulation language used to model continuous systems using an augmented block structure. (C) 610.13-1993w

Mesa An application development language used by Xerox to program Viewpoint applications. (C) 610.13-1993w

mesh (1) A set of branches forming a closed path in a network, provided that if any one branch is omitted from the set, the remaining branches of the set do not form a closed path. *Note:* The term loop is sometimes used in the sense of mesh. *See also:* network analysis. (Std100) 270-1966w **(2) (computer graphics)** A group of polygons that, when placed on the surface of a three-dimensional object, visually describes the shape of the exterior surface. (See the corresponding figure.)



mesh

(C) 610.6-1991w

mesh-connected circuit A polyphase circuit in which all the current paths of the circuit extend directly from the terminal of entry of one phase conductor to the terminal of entry of another phase conductor, without any intermediate interconnections among such paths and without any connection to the neutral conductor, if one exists. *Note:* In a three-phase system this is called the delta (or D) connection. *See also:* network analysis. (Std100) 270-1966w

mesh current A current assumed to exist over all cross sections of a given closed path in a network. *Note:* A mesh current may be the total current in a branch included in the path, or it may be a partial current such that when combined with others the total current is obtained. *See also:* network analysis. (Std100) 270-1966w

mesh equations Any set of equations (of minimum number) such that the independent mesh or loop currents of a specified network may be determined from the impressed voltages. *Notes:* 1. For a given network, different sets of equations, equivalent to one another, may be obtained by different choices of mesh or loop currents. 2. The equations may be differential equations, or algebraic equations when impedances and phasor equivalents of steady-state single-frequency sine-wave quantities are used. *Synonym:* loop equations. *See also:* network analysis. (Std100) 270-1966w

mesh table A multidimension table that defines every type of delay model in terms of discrete points. Each point represents a delay value in terms of several cell parameters or interconnect parameters. The delay calculation module is expected to interpolate between these points based on a mathematical expression defined by the technology file. (C/DA) 1481-1999

mesh voltage The maximum touch voltage within a mesh of a ground grid. (PE/SUB) 80-2000

mesial point (pulse terminology) A magnitude referenced point at the intersection of a waveform and a mesial line. *See also:* waveform epoch. (IM/WM&A) 194-1977w

mesopause The upper boundary of the mesosphere. (AP/PROP) 211-1997

mesopic vision (illuminating engineering) Vision with fully adapted eyes at luminance conditions between those of photopic and scotopic vision, that is, between about 3.4 cd/m^2 (2.2×10^{-3} cd/in^2) (1.0 fL) and 0.034 cd/m^2 (2.2×10^{-5} cd/in^2) (0.01 fL). (EEC/IE) [126]

mesosphere That part of the Earth's atmosphere, located above the stratosphere, in which the temperature decreases with increasing height. The mesosphere extends to an altitude of around 85 km, where the temperature reaches a minimum value. (AP/PROP) 211-1997

message (1) (telephone switching systems) An answered call or the information content thereof. (COM) 312-1977w

(2) (A) In telecommunications, a combination of characters and symbols transferred from one point to another. **(B)** For bisync-type devices, the data unit from the beginning of a transmission to the first end-of-text (ETX) characters. **(C)** In information theory, an ordered series of characters or bits intended to convey information. **(D)** A group of characters and control bit sequences transferred as an entity from a data source to a data sink, where the arrangement of characters is determined by the data source. **(E)** An arbitrary amount of information whose beginning and end are defined or implied. (PE/SUB) 999-1992

(3) A value or set of values representing an interface event between functions. The term as used here is intended to be very primitive, not implying a particular structure or interface protocol unless modified by an appropriate adjective (like transaction-initiation message). A message can be arbitrarily simple (a signal) or complicated. (C/MM) 1212.1-1993

(4) A set of packets starting with a HEADER, consisting of that HEADER and all (ACKNOWLEDGE and DATA) packets transmitted as the immediate consequence of the command in that HEADER, and terminating when the M-module returns to the IDLE Master Controller state. (TT/C) 1149.5-1995

(5) An ordered series of characters used to convey information. (C) 610.7-1995

(6) Information that can be transferred among processes or threads by being added to and removed from a message queue. A message consists of a fixed-size message buffer. (C/PA) 9945-1-1996

(7) A logical grouping of one or more packets sent either from host to printer (a command message) or from printer to host (a response message). (C/MM) 1284.1-1997

(8) A package of information meeting a standard format that is sent to or from a transponder's memory. (SCC32) 1455-1999

(9) A communication sent from one object to another. *Message* encompasses requests to meet responsibilities as well as simple informative communications. *See also:* request. (C/SE) 1320.2-1998

(10) Information that can be transferred among tasks (possibly in different processes) by being added to and removed from a message queue. A message queue consists of a fixed-size buffer. (C) 1003.5-1999

(11) A grouping of data elements and/or data frames, as well as associated message metadata, that is used to convey a complete unit of information. For the purposes of this document, a message is an abstract description using a message set template (MST); it is not a specific instance. (SCC32) 1488-2000

(12) A set of ordered data (possibly empty) that includes a message boundary indication. Message data may span multiple packets. A packet shall not hold data from more than one message. (C/MM) 1284.4-2000

message attribute Information that describes a message and which may specify, at the logical level, relevant associated requirements for data exchange, interpretation, and handling. (SCC32) 1488-2000

message-based device An intelligent device that implements the defined VXIbus registers and communication protocols. (C/MM) 1155-1992

message body That portion of a message specification that describes the data elements and/or data frames contained within the message. (SCC32) 1488-2000

message box A visual user interface control used to display information not requested by the user but displayed in a secondary window by an application in response to an unexpected event or a possibility of something undesirable happening. (C) 1295-1993w

message code (MC) The predefined 12-bit code contained in an Auto-Negotiation Message Page. (LM/C) 802.3-1998

message_extension An allocated buffer in System Memory containing items that either would not fit in the primary_message or that are only needed for unusually large messages. (C/MM) 1212.1-1993

message group A collection of related messages. (SCC32) 1488-2000

message identifier An identifier used to identify derived MAC protocol data units (DMPDUs) derived from the same initial MAC protocol data unit (IMPDU). (LM/C) 8802-6-1994

message instance An occurrence of a message containing the actual values for the data elements and, in some cases, data about the message. (SCC32) 1488-2000

message length Although messages can be of any length up to 65 539 bytes, the packet size should be selected for effective transmissions over the physical link without requiring disassembly and reassembly. For connections through a network, the packet size of that network would generally be the most efficient. (C/MM) 1284.1-1997

message-mode agent An agent that exclusively uses message space for communication with other agents. (C/MM) 1296-1987s

message-mode system A system in which communication between agents is via blocks of data transmitted in the message space. (C/MM) 1296-1987s

message page (MP) An Auto-Negotiation Next Page encoding that contains a predefined 12-bit Message Code. (C/LM) 802.3-1998

message queue (1) A data structure and related procedures for passing a sequence of primary_messages from one or more producers to a consumer. (C/MM) 1212.1-1993

(2) An object to which messages can be added and removed. Messages may be removed in the order in which they were added or in priority order. (C/PA) 9945-1-1996, 1003.5-1999

message queue descriptor A per-process unique value used to identify an open message queue. (C) 1003.5-1999

message set A collection of messages based on the ITS class names. (SCC32) 1488-2000

message set template (MST) An abstract structure addressing the message attributes and syntax used to specify ITS messages, as well as rules for producing message standards using the MST (e.g., conformance statements). (SCC32) 1488-2000

message sink The part of a communications system that is the final destination of a message. *Contrast:* message source. (C) 610.7-1995

message source (1) That part of a communication system where messages are assumed to originate. *See also:* information theory. (Std100) 171-1958w

(2) The part of a communications system from which a message originates. *Synonym:* information source. *Contrast:* message sink. (C) 610.7-1995

message space The address space used for packet based communications ranging from interrupts to negotiated data movement. *See also:* packet. (C/MM) 1296-1987s

messages, species of A group of messages having in the Command fields of their respective HEADER packets a common command code. The name, S, of a message species is the same as the name of the command that defines the message species. (TT/C) 1149.5-1995

message stream modification Attempts to modify, delete, reorder, duplicate, or insert information while the message stream is being transmitted over a communication channel. Message stream modification attacks may be perpetrated at any point in the communication architecture (e.g., data link, network, transport, application), and could result in unauthorized modification of information or unauthorized receipt of services. (C/BA) 896.3-1993w

message switch (data transmission) A technique whereby messages are routed to the appropriate receiver by way of message address codes rather than by switching of the communication channel itself. (PE) 599-1985w

message switching (1) A method of handling messages over communications networks. The entire message is transmitted to an intermediate point (that is, a switching computer), stored for a period of time, perhaps very short, and then transmitted again towards its destination. The destination of each message is indicated by an address integral to the message. *See also:* circuit switching. (LM/COM) 168-1956w

(2) In data communications, a method of transporting messages by receiving, storing, and forwarding complete messages over communications networks. *See also:* time multiplexed switching; circuit switching; space-division switching. (C) 610.7-1995

message telecommunication network (telephone switching systems) An arrangement of switching and transmission facilities to provide telecommunication services to the public. (COM) 312-1977w

message-timed release (telephone switching systems) Release effected automatically after a measured interval of communication. (COM) 312-1977w

message unit (telephone switching systems) A basic chargeable unit based on the duration and destination of a call. (COM) 312-1977w

message-unit call (telephone switching systems) A call for which billing is in terms of accumulated message units. (COM) 312-1977w

meta (1) A word denoting a description that is one level of abstraction above the entity being described. (SCC32) 1489-1999

(2) A Greek prefix meaning that which pertains to the whole or overall entity or that which is in common or shared with all member entities comprising the whole. (IM/ST) 1451.2-1997

meta-attribute A documenting characteristic of a data concept. (SCC32) 1489-1999

metacomment A VHDL comment (--) that is used to provide synthesis-specific interpretation by a synthesis tool. (C/DA) 1076.6-1999

metacompiler *See:* compiler generator.

metadata (1) Data that describes other data; for example, a data dictionary contains a collection of metadata. (C) 610.5-1990w

(2) The information kept about software. It consists of the values of the various attributes of each of the objects. (C/PA) 1387.2-1995

(3) Information about the way asset description data is stored and organized within a library. (C/SE) 1430-1996

(4) Data that defines and describes other data. (SCC32) 1489-1999

metafile A file of device-independent commands, typically used to store graphical information to be displayed at a later time or on a different system or device. (C) 610.6-1991w

META 5 (A) A programming language used for symbolic data manipulation and for syntax-directed computing. **(B)** An assembly language for CDC computers. (C) 610.13-1993

metalanguage (1) A language used to specify some or all aspects of itself or of another language; for example, Backus-Naur form. (C) 610.13-1993w, 610.12-1990

(2) A form of notation used to rigorously define the syntax, and sometimes the semantics, of another language. (SCC20) 771-1998

metal clad The conducting parts are entirely enclosed in a metal casing. (EEC/PE) [119]

metal-clad switchgear (1) (electric power distribution for industrial plants) Metal-enclosed power switchgear characterized by the following necessary features.

a) The main circuit switching and interrupting device is of the removable type arranged with a mechanism for moving it physically between connected and disconnected positions and equipped with self-aligning and self-coupling primary and secondary disconnecting devices.
b) Major parts of the primary circuit, such as the circuit switching or interrupting devices, buses, potential transformers, and control power transformers, are enclosed by grounded metal barriers. Specifically included is an inner barrier in front of or a part of the circuit interrupting device to ensure that no energized primary circuit components are exposed when the unit door is opened.
c) All live parts are enclosed within grounded metal compartments. Automatic shutters prevent exposure of primary circuit elements when the removable element is in the test, disconnected, or fully withdrawn position.
d) Primary bus conductors and connections are covered with insulating material throughout. For special configurations, insulated barriers between phases and between phase and ground may be specified.
e) Mechanical interlocks are provided to ensure a proper and safe operating sequence.
f) Instruments, meters, relays, secondary control devices, and their wiring are isolated by grounded metal barriers from all primary circuit elements with the exception of short lengths of wire, such as at instrument transformer terminals.
g) The door through which the circuit interrupting device is inserted into the housing may serve as an instrument or relay panel and may also provide access to a secondary or control compartment within the housing.

Notes: 1. Auxiliary frames may be required for mounting associated auxiliary equipment, such as potential transformers, control power transformers, etc. 2. The term metal-clad switchgear can be properly used only if metal-enclosed switchgear conforms to the foregoing definition. All metal-clad switchgear is metal-enclosed, but not all metal-enclosed switchgear can be correctly designated as metal-clad. The most prevalent type of switching and interrupting device used in metal-clad switchgear is the air-magnetic power circuit breaker over 1000 volts (V). (IA/PSE) 141-1986s

(2) Switchgear that is characterized by the following necessary features:

a) The main switching and interrupting device is of the removable (drawout) type arranged with a mechanism for moving it physically between connected and disconnected positions and equipped with self-aligning and self-coupling primary disconnecting devices and disconnectable control wiring connections.
b) Major parts of the primary circuit, that is, the circuit switching or interrupting devices, buses, voltage transformers, and control power transformers, are completely enclosed by grounded metal barriers, that have no intentional openings between compartments. Specifically included is a metal barrier in front of, or a part of, the circuit

interrupting device to ensure that, when in the connected position, no primary circuit components are exposed by the opening of a door.

c) All live parts are enclosed within grounded metal compartments.

d) Automatic shutters that cover primary circuit elements when the removable element is in the disconnected, test, or removed position.

e) Primary bus conductors and connections are covered with insulating material throughout.

f) Mechanical interlocks are provided for proper operating sequence under normal operating conditions.

g) Instruments, meters, relays, secondary control devices and their wiring are isolated by grounded metal barriers from all primary circuit elements with the exception of short lengths of wire such as at instrument transformer terminals.

h) The door through which the circuit-interrupting device is inserted into the housing may serve as an instrument or relay panel, and may also provide access to a secondary or control compartment within the housing.

Notes: 1. Auxiliary vertical sections may be required for mounting devices or for use as a bus transition. 2. The term metal- clad (as applied to switchgear assemblies) is correctly used only in connection with switchgear conforming fully to this definition for metal-clad switchgear. Metal-clad switchgear is metal-enclosed, but not all metal-enclosed switchgear can be correctly designated as metal-clad.

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

metal distribution ratio (electroplating) The ratio of the thicknesses (weights per unit areas) of metal upon two specified parts of a cathode. *See also:* electroplating.

(PE/EEC) [119]

metal-enclosed (1) (metal-enclosed bus and calculating losses in isolated-phase bus) (as applied to metal-enclosed bus) Surrounded by a metal case or housing, with provisions for grounding. (SWG/PE) C37.23-1987r

(2) (as applied to a switchgear assembly or components thereof) Surrounded by a metal case or housing, usually grounded. (SWG/PE) C37.100-1992

metal-enclosed bus (1) (electric power distribution for industrial plants) An assembly of rigid electrical buses with associated connections, joints, and insulating supports, all housed within a grounded metal enclosure. Three basic types of metal-enclosed bus construction are recognized: nonsegregated phase, segregated phase, and isolated phase. The most prevalent type used in industrial power systems is the nonsegregated phase, which is defined as one in which all phase conductors are in a common metal enclosure without barriers between the phases. When metal-enclosed buses over 100 V are used with metal-clad switchgear, the bus conductors and connections are covered with insulating material throughout. When metal-enclosed buses are associated with metal-enclosed 1000 V and below power circuit breaker switchgear or metal-enclosed interrupter switchgear, the primary bus conductors and connections are usually bare.

(IA/PSE) 141-1986s

(2) (metal-enclosed bus and calculating losses in isolated-phase bus) An assembly of conductors with associated connections, joints, and insulating supports within a grounded metal enclosure. The conductors may be either rigid or flexible. (SWG/PE) C37.23-1987r

(3) An assembly of conductors with associated connections, joints, and insulating supports within a grounded metal enclosure. (PE/EDPG) 665-1995

(4) An assembly of conductors with associated connections, joints, and insulating supports within a grounded metal enclosure. The conductors may be either rigid or flexible. *Note:* In general, three basic types of construction are used: nonsegregated-phase, segregated-phase, and isolated-phase.

• *nonsegregated-phase bus.* A bus in which all phase conductors are in a common metal enclosure without barriers between phases. When associated with metal-clad switchgear, the primary bus and connections shall be covered with insulating material equivalent to the switchgear insulation system.

• *segregated-phase bus.* A bus in which all phase conductors are in a common metal enclosure but are segregated by metal barriers between phases.

• *isolated-phase bus.*A bus in which each phase conductor is enclosed by an individual metal housing separated from adjacent conductor housing by an air space. The bus may be self-cooled or may be forced-cooled by means of circulating a gas or liquid.

(SWG/PE) C37.100-1992

metal-enclosed equipment A capacitor equipment assembly enclosed in a metal enclosure or metal house, usually grounded, to prevent accidental contact with live parts *Synonym:* metal-housed equipment. (T&D/PE) 18-1992

metal-enclosed interrupter switchgear (1) (electric power distribution for industrial plants) Metal-enclosed power switchgear including the following equipment as required: interrupter switches; power fuses; bare bus and connections; instrument and control power transformers; control wiring and accessory devices. The interrupter switches and power fuses may be of the stationary or removable type. For the removable type, mechanical interlocks are provided to ensure a proper and safe operating sequence.

(PE/SWG/IA/PSE) 141-1986s

(2) Metal-enclosed power switchgear including the following equipment as required: Interrupter switches; Power fuses (current limiting or noncurrent limiting); Bare bus and connections; Instrument transformers; Control wiring and accessory devices. The interrupter switches and power fuses may be stationary or removable (drawout) type. When removable type, automatic shutters that cover primary circuit elements when the removable element is in the disconnected, test, or removed position, and mechanical interlocks are to be provided for proper operating sequence.

(SWG/PE) C37.20.3-1996

(3) Metal-enclosed power switchgear that includes the following equipment as required: (1) interrupter switches, (2) power fuses, (3) bare bus and connections, (4) instrument transformers, and (5) control wiring and accessory devices. The interrupter switches and power fuses may be of the stationary or removable type. When of the removable type, mechanical interlocks are provided to ensure a proper and safe operating sequence. (SWG/PE) C37.100-1992

metal-enclosed low-voltage power circuit-breaker switchgear (LV) (A) (metal-enclosed low-voltage power circuit-breaker switchgear) Low-voltage (LV) switchgear of multiple or individual enclosures, including the following equipment as required: low-voltage power circuit breakers (fused or unfused); bare bus and connections; instrument and control power transformers; instruments, meters, and relays; control wiring and accessory devices. The low-voltage power circuit breakers are contained in individual grounded metal compartments and controlled either remotely or from the front of the enclosure. The circuit breakers may be stationary or removable (drawout) type; when of removable type, mechanical interlocks are provided for proper operating sequence. **(B)** Metal-enclosed power switchgear, including the following equipment as required: 1000 V and below power circuit breakers (fused or unfused); bare bus and connections; instrument and control power transformers; instruments, meters, relays; control wiring and accessory devices; cable and busway termination facilities. The 1000 V and below power circuit breakers are contained in individual grounded metal compartments and controlled either remotely or from the front of the panels. The circuit breakers are usually of the drawout type, but may be nondrawout. When drawout-type circuit breakers are used, mechanical interlocks must be provided to ensure a proper and safe operating sequence.

(SWG/PE/IA/PSE) C37.20.1-1993, C37.100-1992, 141-1986

metal-enclosed power switchgear (ME) (metal-clad and station-type cubicle switchgear) (metal-enclosed low-voltage power circuit-breaker switchgear) A switchgear assembly completely enclosed on all sides and top with sheet metal (except for ventilating openings and inspection windows) containing primary power-circuit switching or interrupting devices or both, with buses and connections. The assembly may include control and auxiliary devices. Access to the interior of the enclosure is provided by doors or removable covers or both. *Note:* Metal-clad switchgear, station-type cubicle switchgear, metal-enclosed interrupter switchgear, and low-voltage power circuit-breaker switchgear are specific types of metal-enclosed power switchgear.
(SWG/PE) C37.20.1-1993r, C37.20.3-1996, C37.100-1992, C37.81-1989r, C37.20.2-1993

metal fog (electrolysis) A fine dispersion of metal in a fused electrolyte. *Synonym:* metal mist. *See also:* fused electrolyte.
(PE/EEC) [119]

metal-graphite brush (rotating machinery) A brush composed of varying percentages of metal and graphite, copper or silver being the metal generally used. *Note:* This type of brush is soft. Grades of brushes of this type have extremely high current-carrying capacities, but differ greatly in operating speed from low to high. *See also:* brush.
(PE/EEC/LB) [9], [101]

metal halide lamp (illuminating engineering) A high intensity discharge (HID) lamp in which the major portion of the light is produced by radiation of metal halides and their products of dissociation possibly in combination with metallic vapors such as mercury. Includes clear and phosphor-coated lamps.
(EEC/IE) [126]

metal-housed equipment *See:* metal-enclosed equipment.

metallic circuit (measuring longitudinal balance of telephone equipment operating in the voice band) A circuit of which the ground (earth) forms no part.
(COM/PE/TA) 455-1985w, 599-1985w

metallic covering A metal sheath or braid used to provide physical protection for heating cable and, in some cases, to provide an electrical ground path. (IA/PC) 515-1997, 515.1-1995

metallic enclosure A grounded, leak-tight enclosure that contains the compressed insulating gas and associated electrical equipment.
(SWG/PE/SUB) C37.100-1992, C37.122-1993, C37.122.1-1993

metallic E-plane line An E-plane line in which there is no insulating substrate. (MTT) 1004-1987w

metallic impedance (measuring longitudinal balance of telephone equipment operating in the voice band) (telephone equipment) Impedance presented by a metallic circuit at any given single frequency, at or across the terminals of one of its transmission ports. (COM/TA) 455-1985w

metallic longitudinal induction ratio The ratio of the metallic-circuit current or noise-metallic arising in an exposed section of open wire telephone line, to the longitudinal-circuit current or noise-longitudinal in sigma. It is expressed in microamperes per milliampere or the equivalent. *Synonym:* M-L ratio. *See also:* inductive coordination; metallic noise.
(EEC/PE) [119]

metallic noise (data transmission) The weighted noise current in a metallic circuit at a given point when the circuit is terminated at that point in the nominal characteristic impedance of the circuit. (PE) 599-1985w

metallic outer covering (electrical heat tracing for industrial applications) A metal sheath or braid used to provide physical protection for heating cable and. in some cases, to provide an electrical ground path. (BT/AV) 152-1953s

metallic rectifier (electric installations on shipboard) A metallic rectifier cell is a device consisting of a conductor and semiconductor forming a junction. The junction exhibits a difference in resistance to current flow in the two directions through the junction. This results in effective current flow in one direction only. A metallic rectifier stack is a single columnar structure of one or more metallic rectifier cells.
(IA/MT) 45-1983s

metallic rectifier cell A device consisting of a conductor and a semiconductor forming a junction. *Notes:* 1. Synonymous with metallic rectifying cells. 2. Such cells conduct current in each direction but provide a rectifying action because of the large difference in resistance to current flow in the two directions. 3. A metallic rectifier stack is a single columnar structure of one or more metallic rectifier cells. *See also:* rectification. (IA/MT) 45-1983s

metallic rectifier stack assembly The combination of one or more stacks consisting of all the rectifying elements used in one rectifying circuit. *See also:* rectification.
(EEC/PE) [119]

metallic rectifier unit An operative assembly of a metallic rectifier, or rectifiers, together with the rectifier auxiliaries, the rectifier transformers, and the essential switchgear. *See also:* rectification. (EEC/PE) [119]

metallic signal (telephone loop performance) (differential) The metallic voltage is the algebraic difference between the voltages to ground in the two conductors (tip and ring). The metallic current is half the algebraic difference between the current in these conductors. (COM/TA) 820-1984r

metallic transmission port (measuring longitudinal balance of telephone equipment operating in the voice band) (telephone equipment) A place of access in the metallic transmission path of a device or network where energy may be supplied or withdrawn, or where the device or network variables may be measured. The terminals of such a port are sometimes referred to as the tip and ring terminals. *Note:* In any particular case, the transmission ports are determined by the way the device is used, and not by its structure alone.
(COM/TA) 455-1985w

metallic voltage (measuring longitudinal balance of telephone equipment operating in the voice band) (telephone equipment) The voltage across a metallic circuit.
(COM/TA) 455-1985w

metallized brush *See:* metal-graphite brush.

metallized paper capacitor A capacitor in which the dielectric is primarily paper and the electrodes are thin metallic coatings deposited thereon. (PE/EM) 43-1974s

metallized screen (cathode-ray tubes) A screen covered on its rear side (with respect to the electron gun) with metallic film, usually aluminized, transparent to electrons and with a high optical reflection factor, which passes on to the viewer a large part of the light emitted by the screen on the electron-gun side. *See also:* cathode-ray tube. (ED) [45], [84]

metal master *See:* original master.

metal mist *See:* metal fog.

metal negative *See:* original master.

metal-nitride-oxide-memory section The portion of an integrated circuit memory built using a MNOS technology.
(ED) 641-1987w

metal-nitride-oxide-semiconductor transistor In analogy with the metal-oxide-semiconductor (MOS) transistor, this acronym derives from the layer sequence in the gate region of the IGFET, namely, Metal-Nitride-Oxide-Semiconductor: MNOS Memory Transistor. Usually it has a variable threshold voltage. Some devices with this layer sequence have fixed threshold voltages. *Synonym:* MNOS transistor.
(ED) 581-1978w, 641-1987w

metalogical value (1) One of the enumeration literals 'U', 'X', 'W', or '-' of the type STD_ULOGIC defined by IEEE Std 1164-1993. (C/DA) 1076.3-1997
(2) One of the enumeration literals, 'U', 'X', 'W', or '-', of the type STD_ULOGIC (or subtype STD_LOGIC) defined by IEEE Std 1164-1993. (C/DA) 1076.6-1999

metal-oxide semiconductor (MOS) A semiconductor technology using field-effect transistors in which the metal gate electrode is isolated from the channel by an oxide film. *Contrast:* bipolar. *See also:* complementary metal-oxide semiconductor
(C) 610.10-1994w

metal-oxide-semiconductor transistor A type of IGFET, referring specifically to the layer sequence in the gate region of the IGFET. (ED) 581-1978w, 641-1987w

metal-oxide surge arrester (MOSA) A surge arrester utilizing valve elements fabricated from nonlinear resistance metal-oxide materials. (SPD/PE) C62.11-1999

metal-plastic laminate A tape made of aluminum, copper, lead, or other metal substrate that is laminated on one or both sides with a tightly adhering plastic film. The film used may consist of either an adhesive polyolefin copolymer that self-bonds to the metal substrate during the laminating process or another polymeric compound that is adhered through the use of a supplemental adhesive. (PE/IC) 1142-1995

metal-to-metal touch voltage (1) The voltage between metallic objects or structures within the substation site that may be bridged by direct hand-to-hand or hand-to-feet contact. (SUB/PE) 1268-1997

(2) The difference in potential between metallic objects or structures within the substation site that may be bridged by direct hand-to-hand or hand-to-feet contact. *Note:* The metal-to-metal touch voltage between metallic objects or structures bonded to the ground grid is assumed to be negligible in conventional substations. However, the metal-to-metal touch voltage between metallic objects or structures bonded to the ground grid and metallic objects internal to the substation site, such as an isolated fence, but not bonded to the ground grid may be substantial. In the case of gas-insulated substations (GIS), the metal-to-metal touch voltage between metallic objects or structures bonded to the ground grid may be substantial because of internal faults or induced currents in the enclosures. In a conventional substation, the worst touch voltage is usually found to be the potential difference between a hand and the feet at a point of maximum reach distance. However, in the case of a metal-to-metal contact from hand-to-hand or from hand-to-feet, both situations should be investigated for the possible worst reach conditions. (PE/SUB) 80-2000

metalworking machine tool A power-driven machine not portable by hand, used to shape or form metal by cutting, impact, pressure, electrical techniques, or a combination of these processes. (NESC/NEC) [86]

metamers (illuminating engineering) Lights of the same color but of different spectral energy distribution. *Note:* The term "metamers" is also used to denote objects that, when illuminated by a given source and viewed by a given observer, produce metameric lights. (EEC/IE) [126]

metamodel A metamodel Vm for a subset of $IDEF_{object}$ is a view of the constructs in the subset that is expressed using those constructs such that there exists a valid instance of Vm that is a description of Vm itself. (C/SE) 1320.2-1998

Meta-TEDS The collection of those Transducer Electronic Data Sheet data fields that pertain to the whole or overall entity or those that are in common or shared with all member entities (channels) comprising the whole transducer product. (IM/ST) 1451.2-1997

metatype A collection of defined linguistic entities that share some common features. (C/TT) 1450-1999

meter (1) (laser maser) A unit of length in the international systems of units: currently defined as a fixed number of wavelengths, in vacuum, of the orange-red line of the spectrum of krypton 86. Typically, the meter is sub-divided into the following units: centimeter (cm) 10^{-2} m, millimeter (mm) 10^{-3} m, micrometer (μm) 10^{-6} m, nanometer (nm) 10^{-9} m. (LEO/QUL) 586-1980w, 268-1982s

(2) A device that measures and records the consumption or usage of the product/service. (AMR/SCC31) 1377-1997

(3) *See also:* watthour meter; electricity meter; demand meter. (ELM) C12.1-1981

meter installation inspection (metering) Examination of the meter, auxiliary devices, connections, and surrounding conditions, for the purpose of discovering mechanical defects or conditions that are likely to be detrimental to the accuracy of the installation. Such an examination may or may not include an approximate determination of the percentage registration of the meter. (ELM) C12.1-1982s

meter laboratory *See:* laboratory.

meter relay Sometimes used for instrument relay. *See also:* relay. (EEC/REE) [87]

meter shop *See:* shop—meter.

meter socket An enclosure that has matching jaws to accommodate the bayonet-type (blade) terminals of a detachable watthour meter and has a means of connections for the termination of the circuit conductors. It may be a single-position socket for one meter or a multiposition trough socket for two or more meters. (ELM) C12.7-1993

meter support That part of a ringless-type meter socket that positions and supports a detachable watthour meter. (ELM) C12.7-1993

method (1) A software procedure associated with a package. (C/BA) 1275-1994

(2) A procedure implementing one of the operations supported by an object class. (C) 1295-1993w

(3) A formal, well-documented approach for accomplishing a task, activity, or process step governed by decision rules to provide a description of the form or representation of the outputs. (C/SE) 1220-1994s

(4) A property of a class that defines a specific behavior. (SCC20) 1226-1998

(5) A statement of how property values are combined to yield a result. (C/SE) 1320.2-1998

method of pulse measurement A method of making a pulse measurement comprises: the complete specification of the functional characteristics of the devices, apparatus, instruments, and auxiliary equipment to be used; the essential adjustments required; the procedure to be used in making essential adjustments; the operations to be performed and their sequence; the corrections that will ordinarily need to be made; the procedures for making such corrections; the conditions under which all operations are to be carried out. *See also:* pulse measurement. (IM/WM&A) 181-1977w

methodology (1) A comprehensive, integrated series of techniques or methods creating a general systems theory of how a class of thought-intensive work ought to be performed. (C/SE) 730.1-1995

(2) A body of methods, rules, and postulates employed by a discipline. (C/SE) 1074-1995s

methods or types of grounding (neutral grounding in electrical utility systems) The equipment, procedure, or scheme used for attaining the particular means. (SPD/PE) C62.92-1987r

method standard A standard that describes the characteristics of the orderly process or procedure used in the engineering of a product or performing a service. (C) 610.12-1990

metric (1) A quantitative measure of the degree to which a system, component, or process possesses a given attribute. (C) 610.12-1990

(2) A value calculated from observed attribute values. (LM/C) 802.1F-1993r

metric algorithm The behaviour of a metric managed object that models a formalized process to calculate specified results. (LM/C) 802.1F-1993r

metric attribute An attribute of a metric managed object whose value is either used as a parameter of one or more metric algorithms or whose value represents the output of such an algorithm. (LM/C) 802.1F-1993r

metric managed object A managed object that contains at least one metric attribute whose value is calculated from values of attributes observed in managed objects. (LM/C) 802.1F-1993r

metrics framework A decision aid used for organizing, selecting, communicating, and evaluating the required quality attributes for a software system. A hierarchical breakdown of quality factors, quality subfactors, and metrics for a software system. (C/SE) 1061-1998

metrics sample A set of metric values that is drawn from the metrics database and used in metrics validation. (C/SE) 1061-1998

metric validation The act or process of ensuring that a metric reliably predicts or assesses a quality factor. (C/SE) 1061-1998

metric value A metric output or an element that is from the range of a metric. (C/SE) 1061-1998

metrology (test, measurement, and diagnostic equipment) The science of measurement for determination of conformance to technical requirements including the development of standards and systems for absolute and relative measurements. (MIL) [2]

metropolitan area network (MAN) (1) A network for connecting a group of individual stations and networks [for example, local area networks (LANS)] located in the same urban area. *Note:* A MAN generally operates at a higher speed than the networks interconnected, crosses network administrative boundaries, may be subject to some form of regulation, and supports several access methods. (LM/C) 8802-6-1994

(2) A computer network in which the geographic span is generally 5–50 km and operates at speeds greater than 1 Mb/s with physical layer data error ratio comparable to a LAN. *See also:* local area network; wide area network; long haul network. (C) 610.7-1995

MEW *See:* microwave early warning.

mezzanine card An electronic card assembly mounted parallel to, and with electrical and/or mechanical connections to, its host. (C/BA) 1301.4-1996

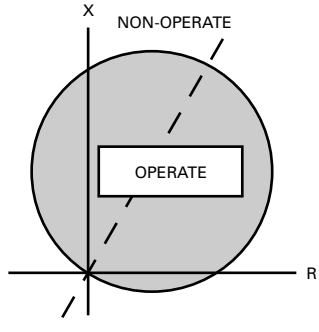
mezzanine card boundary envelope A three dimensional set of separation planes within which a mezzanine card and all its components reside. It will be treated as a single unit. (C/BA) 1301.4-1996

MF *See:* medium frequency.

MFLOPS Millions of floating point operations per second. A measure of computer processing speed. *See also:* MIPS; KOPS. (C) 610.12-1990

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

(SWG/PE) 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. (SWG/PE) C37.100-1992

mho unit A distance relaying unit having a circular impedance tripping locus that passes through the origin on an R-X diagram. (PE/PSR) C37.113-1999

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:* stator; rotor. (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 laminarly into a substantial sheet-like configuration with or without binder, backing, or facing. *See also:* stator; rotor. (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:* stator; rotor. (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) 610.13-1993w

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

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 characterize a given microprogrammed computer. (C) 610.12-1990

(2) The architecture of a microprogrammed computer. (C) 610.10-1994w

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:* camera tube; amplifier. (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) 610.10-1994w

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 mainframe 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) 610.10-1994w

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, micromodule. (GSD) 200-1975w

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) 610.2-1987, 610.10-1994

microfilmer *See:* computer output microfilmer.

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

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/C) 610.2-1987, 610.10-1994w

microinstruction In microprogramming, an instruction that specifies one or more of the basic operations needed to carry out a machine language instruction. Types include diagonal microinstruction, horizontal microinstruction, and vertical microinstruction. *See also:* nanoinstruction; microcode; microprogram. (C) 610.10-1994w, 610.12-1990

micrometer (laser maser) A unit of length equal to 10^{-6} m. In common practice a micrometer is a micron. (LEO) 586-1980w

micron (metric system) The millionth part of a meter. *Note:* According to the set of submultiple prefixes now established in the International System of Units, the preferred term would be micrometer. However, use of the same word to denote a small length, and also to denote an instrument for measuring a small length, could occasionally invite confusion. Therefore it seems unwise to deprecate, at this time, the continued use of the word micron. (Std100) [123]

microoperation In microprogramming, one of the basic operations needed to carry out a machine language instruction. *See also:* microinstruction. (C) 610.12-1990

microphone An electroacoustic transducer that responds to sound waves and delivers essentially equivalent electric waves. (T&D/PE/SP) 539-1990, [32]

microphonics (1) (general) The noise caused by mechanical shock or vibration of elements in a system. (SP) 151-1965w

(2) (interference terminology) Electrical interference caused by mechanical vibration of elements in a signal transmission system. *See also:* signal. (IE) [43]

(3) (electron tube) (microphonic effect) (microphonism) The undesired modulation of one or more of the electrode currents resulting from the mechanical vibration of one or more of the valve or tube elements. *See also:* electron tube. (ED) 161-1971w

microphonics, microphonic noise Electrical noise caused by mechanical or audio induced vibration of the detector assembly. (NPS) 325-1996

microphonism *See:* microphonics.

microphotographics *See:* micrographics.

microprint A positive microcopy photographically printed onto paper. (C) 610.2-1987

microprocessor An integrated circuit that contains the logic elements for manipulating data and for making decisions. *See also:* microcomputer; processor. (C) 610.10-1994w

microprogram (software) A sequence of instructions, called microinstructions, specifying the basic operations needed to carry out a machine language instruction. *See also:* control store; microcode. (C) 610.12-1990, 610.10-1994w

microprogrammable computer A microprogrammed computer in which microprograms can be created or altered by the user. *Contrast:* fixed-instruction computer. (C) 610.12-1990, 610.10-1994w

microprogrammed computer A computer in which machine language instructions are implemented by microprograms rather than by hard-wired logic. *Note:* A microprogrammed computer may or may not be a microcomputer; the concepts are not related despite the similarity of the terms. *See also:* microarchitecture; microprogrammable computer. (C) 610.12-1990, 610.10-1994w

microprogramming (1) The process of designing and implementing the control logic of a computer by identifying the basic operations needed to carry out each machine language instruction and representing these operations as sequences of instructions in a special memory called control store. This method is an alternative to hard wiring the control signals necessary to carry out each machine language instruction. Techniques include bit steering, compaction, residual control, single-level encoding, two-level encoding. *See also:* microinstruction; microcode; microprogram. (C) 610.12-1990

(2) The process of designing and implementing the control logic of a computer by identifying the basic operations needed to carry out each machine language instruction and then representing these operations in appropriate sequence in a special memory, called a control store. (C) 610.10-1994w

micropublishing The production and distribution of information via microform. The information may be original or may have been previously published in another form. (C) 610.2-1987

micropulsation Small magnitude fluctuations (usually much less than 10^{-6} of the Earth's magnetic field) with periods on the order of seconds or minutes ($f<1$ Hz). *Note:* Micropulsations usually result from current fluctuations in the E region. (AP/PROP) 211-1997

microradiometer (radio-micrometer) A thermosensitive detector of radiant power in which a thermopile is supported on and connected directly to the moving coil of a galvanometer. *Note:* This construction minimizes lead losses and stray electric pickup. *See also:* electric thermometer. (EEC/PE) [119]

micrositing Of, or related to, the characteristics of a particular wind-turbine site, as contrasted to those characteristics that prevail over the entire windfarm. (DESG) 1094-1991w

microspark (overhead-power-line corona and radio noise) A spark breakdown occurring in the miniature air gap formed by two conducting or insulating surfaces. (This is sometimes called a "gap discharge.") (T&D/PE) 539-1990

microstrip (1) A class of planar transmission lines consisting of one or more thin conducting strips of finite width parallel to a single extended conducting ground plane. In its common form, the strips are affixed to an insulating substrate attached

to the ground plane. The semi-infinite space above the strips is filled with a medium of relative permittivity and permeability equal or less than the substrate.
(MTT) 1004-1987w

(2) *See also:* strip-type transmission line.

microstrip antenna An antenna that consists of a thin metallic conductor bonded to a thin grounded dielectric substrate. *Note:* The metallic conductor typically has some regular shape; for example, rectangular, circular, or elliptical. Feeding is often by means of a coaxial probe or a microstrip transmission line. (AP/ANT) 145-1993

microstrip array An array of microstrip antennas.
(AP/ANT) 145-1993

microstrip dipole A microstrip antenna of rectangular shape with its width much smaller than its length.
(AP/ANT) 145-1993

microsyn (accelerometer) (gyros) An electromagnetic device often used as a pickoff in single-degree-of-freedom gyros and accelerometers. It has a stator, fastened to the sensor case, containing primary and secondary sets of windings, and a rotor, without windings, that is attached to the float.
(AES/GYAC) 528-1994

microwave Pertaining to the portion of the radio frequency spectrum above 1 GHz. *See also:* microwave link.
(C) 610.7-1995

microwave amplification by stimulated emission of radiation *See:* maser.

microwave backward-wave oscillator *See:* carcinotron.

microwave early warning (MEW) A U.S. high-power, long-distance radar of the WWII era with a number of separate displays giving high resolution and large traffic handling capacity in detecting and tracking targets.
(AES/RS) 686-1990

microwave landing system (MLS) (radar) An airfield approach radar generating a guideline for target landing.
(AES/RS) 686-1982s

microwave link A communications system in which information is conveyed by microwave transmissions.
(C) 610.7-1995

microwave-pilot protection A form of pilot protection in which the communication means between relays is a beamed microwave radio channel. (SWG/PE) C37.100-1992

microwave plumbing *See:* plumbing.

microwaves (data transmission) A term used rather loosely to signify radio waves in the frequency range from about 1000 megahertz (mHz) upwards. (PE) 599-1985w

microwave therapy The therapeutic use of electromagnetic energy to generate heat within the body, the frequency being greater than 100 megahertz. *See also:* electrotherapy.
(EMB) [47]

microword An addressable element in the control store of a microprogrammed computer.
(C) 610.12-1990, 610.10-1994w

midband The part of the electromagnetic frequency spectrum that is located between television Channels 6 and 7.
(LM/C) 802.7-1989r

middle marker A marker facility in an ILS (instrument landing system) that is installed approximately 1000 m (3500 ft) from the approach end of the runway on the localizer course line to provide a fix. (AES/RS) 686-1982s

middle-square function *See:* mid-square function.

MID page A set of one message identifier value.
(LM/C) 8802-6-1994

mid-peak period (watthour meters) The period of time during which the specified mid-peak rate applies.
(ELM) C12.13-1985s

midrange computer *See:* minicomputer.

mid-split A frequency division scheme that allows two-way traffic on a single cable. Inbound path signals come to the headend from 5 to 108 MHz. Outbound path signals go from the headend from 162 MHz to the upper frequency limit. The guardband is located from 108 to 162 MHz.
(LM/C) 802.7-1989r

mid-square function In hashing, a hash function that returns the middle digits of the square of the original key. For example, in the function below, the middle three digits are returned.

Original key	Calculation	Hash Value
2964	$2964 \times 2964 = 8{,}785{,}296$	852
1119	$1119 \times 1119 = 110{,}781$	78

Synonym: middle-square function. (C) 610.5-1990w

Mie scattering Scattering by spherical particles whose diameters are comparable to or greater than a wavelength. *Synonym:* Lorenz-Mie scattering. (AP/PROP) 211-1997

migrated attribute A foreign key attribute of a child entity.
(C/SE) 1320.2-1998

migrated key *See:* foreign key.

MII *See:* Media Independent Interface; medium independent interface.

MIIT *See:* media-independent information transfer.

mild environment (nuclear power generating station) An environment expected as a result of normal service conditions and extremes (abnormal) in service conditions where seismic is the only design basis event (DBE) of consequence.
(PE/NP) 323-1974s

mile of standard cable (MSC) Two units, both loosely designated as a mile of standard cable, were formerly used as measures of transmission efficiency. One, correctly known as an 800-hertz mile of standard cable, signified an attenuation constant, independent of frequency, of 0.109. The other signified the effect upon speech volume of an actual mile of standard cable, equivalent to an attenuation constant of approximately 0.122. Both units are now obsolete, having been replaced by the decibel. One 800-hertz mile of standard cable is equal to approximately 0.95 decibel. One standard cable mile is equivalent in effect on speech volume to approximately 1.06 decibels. (EEC/PE) [119]

milestone (1) (software) A scheduled event for which some project member or manager is held accountable and which is used to measure progress, for example, a formal review, issuance of a specification, product delivery.
(C/SE) 729-1983s

(2) A scheduled event used to measure progress. Examples of major milestones for software projects may include an acquirer or managerial sign-off, baselining of a specification, completion of system integration, and product delivery. Minor milestones might include baselining of a software module or completion of a chapter of the user's manual.
(C/SE) 1058-1998

milli (m) (mathematics of computing) A prefix indicating one thousandth (10^{-3}). (C) 1084-1986w

millimeter-wave radar A radar whose carrier frequency is from 30–300 GHz (wavelength is 1–10 mm). (AES) 686-1997

milliroentgen (mR) The amount of X-radiation that produces $2.58 \cdot 10^{-7}$ coulomb per kilogram of air.
(SWG/PE) C37.100-1992, 553-1983

mill scale The heavy oxide layer formed during hot fabrication or heat treatment of metals. Especially applied to iron and steel. (IA) [59]

Mills cross antenna system A multiplicative array antenna system consisting of two linear receiving arrays positioned at right angles to one another and connected together by a phase modulator or switch such that the effective angular response of the output is related to the product of the radiation patterns of the two arrays. (AP/ANT) 145-1993

MIMD *See:* multiple instruction, multiple data.

MIMIC A problem-oriented programming language for solving engineering problems, particularly those involving differential equations. (C) 610.13-1993w

mimic bus A single-line diagram of the main connections of a system constructed on the face of a switchgear or control panel, or assembly. (SWG/PE) C37.100-1992

MI mineral-insulated, metal sheathed cable A factory assembly of one or more conductors insulated with a highly compressed refractory mineral insulation and enclosed in a liquidtight and gastight continuous copper sheath. (NESC/NEC) [86]

mine-fan signal system A system that indicates by electric light or electric audible signal, or both, the slowing down or stopping of a mine ventilating fan. *See also:* dispatching system. (EEC/PE) [119]

mine feeder circuit A conductor or group of conductors, including feeder and sectionalizing switches or circuit breakers, installed in mine entries or gangways and extending to the limits set for permanent mine wiring beyond which limits portable cables are used. (EEC/PE) [119]

mine hoist A device for raising or lowering ore, rock, or coal from a mine and for lowering and raising men and supplies.

mine jeep A special electrically driven car for underground transportation of officials, inspectors, repair, maintenance, surveying crews, and rescue workers. (EEC/PE) [119]

mine radio telephone system A means to provide communication between the dispatcher and the operators on the locomotives where the radio impulses pass along the trolley wire and down the trolley pole to the radio telephone set. *See also:* dispatching system. (EEC/PE) [119]

miner's electric cap lamp A lamp for mounting on the miner's cap and receiving electric energy through a cord that connects the lamp with a small battery. (EEC/PE) [119]

miner's hand lamp A self-contained mine lamp with handle for convenience in carrying. (EEC/PE) [119]

mine tractor A trackless, self-propelled vehicle used to transport equipment and supplies and for general service work. (EEC/PE) [119]

mine ventilating fan A motor-driven disk, propeller, or wheel for blowing (or exhausting) air to provide ventilation of a mine. (EEC/PE) [119]

mini *See:* minicomputer.

miniature brush A brush having a cross-sectional area of less than 1/64 square inch with the thickness and width thereof less than 1/8 inch or, in the case of a cylindrical brush, a diameter less than 1/8 inch. *See also:* brush. (EEC/EM/LB) [101]

minicartridge *See:* quarter-inch cartridge.

minicomputer (mini) A computer of smaller size relative to a mainframe, but generally larger and more powerful than a microcomputer. *Note:* The distinction between a microcomputer, minicomputer, and mainframe 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) 610.10-1994w

minifloppy disk A floppy disk that is 5.25 inches wide. *Contrast:* microfloppy disk. (C) 610.10-1994w

minimally conformant network An IEEE 802.11 network in which two stations in a single basic service area (BSA) are conformant with ISO/IEC 8802-11: 1999. (C/LM) 8802-11-1999

minimally consistent object An object that satisfies various conditions set forth in the definition of its class. (C/PA) 1328-1993w, 1224-1993w, 1327-1993w

minimal perceptible erythema The erythemal threshold. *See also:* ultraviolet radiation. (EEC/IE) [126]

minimal ROM format A format for the node-provided ROM. The minimal ROM format provides a 24-bit company_id value; although additional ROM parameters can be provided, their format and meaning are vendor-dependent. (C/MM) 1212-1991s

minimum access code (test, measurement, and diagnostic equipment) A system of coding which minimizes the effect of delays for transfer of data or instructions between storage and other machine units. (MIL) [2]

minimum air insulation distance (MAID) The shortest distance in air between electrical apparatus and/or a line worker's body at different potential. This minimum air insulation distance, with a floating electrode in the gap, is equal to or greater than the sum of the individual minimum approach distances. This is the electrical component and does not include any factor for inadvertent movement. (T&D/PE) 516-1995

minimum approach distance (MAD) (1) The minimum air insulation distance plus a modifier for inadvertent movement. (T&D/PE) 516-1995

(2) The closest distance a qualified employee is permitted to approach either an energized or a grounded object, as applicable for the work method being used. (NESC) C2-1997

minimum bend radius The curvature to which a cable can be bent without sustaining damage or significant degradation of performance. (C) 610.7-1995

minimum clearance between poles (phases) The shortest distance between any live parts of adjacent poles (phases). *Note:* Cautionary differentiation should be made between clearance and spacing or center-to-center distance. (SWG/PE) C37.40-1993, C37.100-1992

minimum clearance to ground The shortest distance between any live part and adjacent grounded parts. (SWG/PE) C37.40-1993, C37.100-1992

minimum conductance function *See:* minimum-resistance (conductance) function.

minimum cut-set A set of components that, if removed from the system, results in loss of continuity to the load point being investigated and that does not contain as a subset any set of components that is itself a cut-set of the system. (IA/PSE) 493-1997

minimum delay programming A programming technique in which storage locations for computer instructions and data are chosen so that access time is minimized. (C) 610.12-1990

minimum delta (power supplies) A qualifier, often appended to a percentage specification to describe that specification when the parameter in question is a variable, and particularly when that variable may approach zero. The qualifier is often known as the minimum delta *V*, or minimum delta *I*, as the case may be. (AES) [41]

minimum demand The lowest demand measured over a selected period of time, such as one month. (AMR/SCC31) 1377-1997

minimum detectable activity That activity giving an indication corresponding to 4.65 times the standard deviation of the indication given by a specific background, divided by the appropriate conversion actor to result in units of activity. (NI) N42.17B-1989r

minimum detectable amount The amount of a radionuclide, which if present in a sample, would be detected with a β probability of non-detection while accepting a probability α of erroneously detecting that radionuclide in an appropriate blank sample. For IEEE Std N42.23-1995, the α and β probabilities are both set at 0.05. (NI) N42.23-1995

minimum detectable concentration The minimum detectable amount expressed in concentration units. (NI) N42.23-1995

minimum detectable signal (MDS) The minimum signal level that gives reliable detection in the presence of white Gaussian noise. *Note:* MDS must be described in terms of a probability of detection and a probability of false alarm, due to its statistical nature. (AES) 686-1997

minimum detectable velocity (MDV) In a Doppler processing radar for detection of moving targets, the minimum target velocity that can be detected. (AES) 686-1997

minimum differential sensitivity The smallest value of peak-to-peak differential (ppd) amplitude at which a receiver is expected to operate, under worst-case conditions, without exceeding the objective bit error ratio. (C/LM) 802.3-1998

minimum discernible signal The minimum detectable signal for a system using an operator and display or aural device for detection. (AES) 686-1997

minimum-distance code (1) (computers) A binary code in which the signal distance does not fall below a specified minimum value. (C) [20], [85]

(2) (mathematics of computing) A BCD code in which the Hamming distance between consecutive numerals does not fall below a specified minimum value. (C) 1084-1986w

minimum-driving-point function (linear passive networks) A driving-point function that is a minimum-resistance, minimum-conductance, minimum-reactance, and minimum-susceptance function. (CAS) 156-1960w

minimum en-route altitude (electronic navigation) The lowest altitude between radio fixes that assures acceptable navigational signal coverage and meets obstruction clearance requirements for instrument flight. *See also:* navigation. (AES/RS) 686-1982s, [42]

minimum firing power (microwave switching tubes) The minimum radio-frequency power required to initiate a radio-frequency discharge in the tube at a specified ignitor current. *See also:* gas tube. (ED) 161-1971w

minimum flashover voltage (impulse) The crest value of the lowest voltage impulse, of a given wave shape and polarity that causes flashover. (PE) [8]

minimum fuel limiter (gas turbines) A device by means of which the speed-governing system can be prevented from reducing the fuel flow below the minimum for which the device is set as required to prevent unstable combustion or blowout of the flame. (PE/EDPG) [5]

minimum gas density The minimum operating gas density at which the gas-insulated substation and its components are certified to meet their assigned electrical ratings. (SWG/PE/SUB) C37.100-1992, C37.122.1-1993, C37.122-1993

minimum illumination (sensitivity) The minimum level, in footcandles of a photoelectric lighting control, at which it will operate. *See also:* photoelectric control. (IA/ICTL/IAC) [60]

minimum impulse flashover voltage (neutral grounding devices) The crest value of the lowest voltage impulse at a given wave shape and polarity that causes flashover. (SPD/PE) 32-1972r

minimum input shaft torque (electric coupling) The minimum input torque required to drive an electric coupling with zero output torque load, either with or without rated excitation as specified. (EM/PE) 290-1980w

minimum melting current The smallest current at which a current responsive fuse element will melt at any specified time. (SWG/PE) C37.40-1993, C37.100-1992

minimum ON-state voltage (thyristor) The minimum positive principal voltage for which the differential resistance is zero with the gate open-circuited. *See also:* principal voltage-current characteristic. (ED) [46]

minimum ON voltage (magnetic amplifier) The minimum output voltage existing before the trip OFF control signal is reached as the control signal is varied from trip ON to trip OFF. (MAG) 107-1964w

minimum output voltage (magnetic amplifier) The minimum voltage attained across the rated load impedance as the control ampere-turns are varied between the limits established by positive maximum control currents flowing through all the corresponding control windings simultaneously and negative maximum control currents flowing through all the corresponding control windings simultaneously. (MAG) 107-1964w

minimum perceptible erythema (illuminating engineering) The erythemal threshold. (EEC/IE) [126]

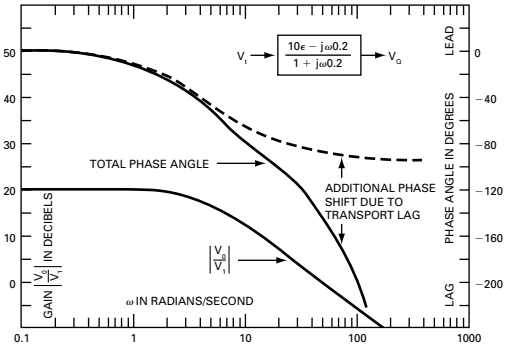
minimum-phase function (linear passive networks) A transmittance from which a nontrivial realizable allpass function cannot be factored without leaving a nonrealizable remainder. *Note:* For lumped-parameter networks, this is equivalent to specifying that the function has no zeros in the interior of the right half of the complex-frequency plane. (CAS) 156-1960w

minimum phase network (1) (data transmission) A network for which the phase shift at each frequency equals the minimum value which is determined uniquely by the attenuation-frequency characteristic in accordance with the following equation:

$$B_c = \frac{1}{\pi}\int_{-\infty}^{+\infty} \frac{dA}{du} \log \coth \frac{|u|}{2}\, du$$

where B_c is phase shift (radians) at a particular frequency f_c, A is attenuation (nepers) as a function of frequency f, and u is $\log(f/f_c)$. *Note:* A ladder network employing lumped impedances, with no coupling between the branches, is an example of a minimum phase network. A bridged T or lattice network of the all-pass type is a nonminimum phase network. (PE) 599-1985w

(2) (excitation systems) See definition above. *Notes:* 1. A network for which the transfer function expressed as a function of s has neither poles nor zeros in the right-hand s plane. Networks (elements) or systems having either poles or zeros in the right half s-plane do not have minimum phase characteristics, assuming there is no right-hand S-plane pole-zero cancellation. 2. Elements whose response is described by transfer functions having transport lags also exhibit non-minimum phase characteristics. The frequency response characteristics of a typical element with transport lag is given in the corresponding figure.



Element with one time constant and a transport lag.

minimum phase network (PE/EDPG) 421A-1978s

(3) (two specified terminals or two branches) A network for which the transfer admittance expressed as a function of p has neither poles nor zeros in the right-hand p plane. *Note:* A simple T section of real lumped constant parameters without coupling between branches is a minimum-phase network, whereas a bridged-T or lattice section of all-pass type may not be. *See also:* network analysis; impedance function. (Std100) 270-1966w

minimum pulse down time In order for all devices to detect the zero state of a signal between the occurrence of two successive one states of the signal, the zero state must last for at least a bus dependent minimum pulse down time. (NID) 960-1993

minimum-reactance function (linear passive networks) A driving-point impedance from which a reactance function cannot be subtracted without leaving a nonrealizable remainder. *Notes:* 1. For lumped-parameter networks, this is equivalent to specifying that the impedance function has no poles on the imaginary axis of the complex-frequency plane, including the point at infinity. 2. A driving-point impedance (admittance) having neither poles nor zeros on the imaginary axis is both a minimum-reactance and a minimum-susceptance function. (CAS) 156-1960w

minimum reception altitude (MRA) (electronic navigation) The lowest en-route altitude at which adequate signals can be received to determine specific radio-navigation fixes. *See also:* navigation. (AES/RS) 686-1982s, [42]

minimum-resistance (conductance) function (linear passive networks) A driving-point impedance (admittance) from which a positive constant cannot be subtracted without leaving a nonrealizable remainder. (CAS) 156-1960w

minimum single-conductor gradient (overhead-power-line corona and radio noise) The minimum value attained by the gradient $E(\theta)$ as given in the definition of "maximum single-conductor (or subconductor) gradient" as θ varies over the range 0 to 2π. *See also:* maximum single-conductor gradient; maximum single-subconductor gradient; minimum single-subconductor gradient. (T&D/PE) 539-1990

minimum single-subconductor gradient (overhead-power-line corona and radio noise) The minimum value attained by the gradient $E(\theta)$ as given in the definition of "maximum single-subconductor gradient" as θ varies over the range 0 to 2π. *See also:* minimum single-conductor gradient; maximum single-conductor gradient; maximum single-subconductor gradient. (T&D/PE) 539-1990

minimum speed (adjustable-speed drive) The lowest speed within the operating speed range of the drive. *See also:* electric drive. (IA/ICTL/IAC) [60]

minimum-susceptance function (linear passive networks) A driving-point admittance from which a susceptance function cannot be subtracted without leaving a nonrealizable remainder. *Notes:* 1. For lumped-parameter networks, this is equivalent to specifying that the admittance function has no poles on the imaginary axis of the complex-frequency plane, including the point at infinity. 2. A driving-point immitance having neither poles nor zeros on the imaginary axis is both a minimum-susceptance and a minimum-reactance function. (CAS) 156-1960w

minimum tasks Those V&V tasks required for the software integrity level assigned to the software to be verified and validated. (C/SE) 1012-1998

minimum test output voltage (magnetic amplifier) (nonreversible output) The output voltage equivalent to the summation of the minimum output voltage plus 33 1/3 percent of the difference between the rated and minimum output voltages. (MAG) 107-1964w

minimum tool distance The minimum distance that must be maintained between tools and energized lines or devices. (T&D/PE) 516-1995

minimum tool-insulation distance The shortest permissible distance between energized electrical apparatus and any part of a worker's body or conducting object while performing live work with an insulating tool in the air gap. (T&D/PE) 516-1995

minimum usable reading speed (storage tubes) The slowest scanning rate under stated operating conditions before a specified degree of decay occurs. *Note:* The qualifying adjectives minimum usable are frequently omitted in general usage when it is clear that the minimum usable reading speed is implied. *See also:* storage tube. (ED) 158-1962w

minimum usable writing time (storage tubes) The time required to write stored information from one specified level to another under stated conditions of operation. *Note:* The qualifying adjectives minimum usable are frequently omitted in general usage when it is clear that the minimum usable writing time is implied. *See also:* storage tube. (ED) 158-1962w, [45]

minitrack (communication satellite) A ground based tracking system for satellites using interferometers. It requires a minimum satellite instrumentation, hence the name. (COM) [24]

minor alarm (telephone switching systems) An alarm indicating trouble which does not seriously impair the system capability. (COM) 312-1977w

minor cycle (electronic computation) In a storage device that provides serial access to storage positions, the time interval between the appearance of corresponding parts of successive words. (C) 162-1963w, 270-1966w

minor failure *See:* failure.

minority carrier (semiconductor) The type of charge carrier constituting less than one half the total charge-carrier concentration. *See also:* semiconductor. (ED) 216-1960w

minority emitter (transistor) An electrode from which a flow of minority carriers enters the interelectrode region. *See also:* transistor; semiconductor. (PE/EEC) [119]

minor key *See:* secondary key.

minor lobe Any radiation lobe except a major lobe. *See also:* side lobe; back lobe. (AP/T&D/PE/ANT) 145-1993, 1260-1996

minor loop A continuous network consisting of both forward elements and feedback elements and is only a portion of the feedback control system. *See also:* feedback control system. (IA/ICTL/IAC) [60]

minor railway tracks Railway tracks included in the following list:

a) Spurs less than 2000 feet long and not exceeding two tracks in the same span.
b) Branches on which no regular service is maintained or which are not operated during the winter season.
c) Narrow-gauge tracks or other tracks on which standard rolling stock cannot, for physical reasons, be operated.
d) Tracks used only temporarily for a period not exceeding one year.
e) Tracks not operated as a common carrier, such as industrial railways used in logging, mining, etc.

(T&D) C2.2-1960

minuend A number from which another number (the subtrahend) is subtracted to produce a result (the difference). (C) 1084-1986w

minus *See:* difference.

minus input *See:* inverted input.

MIPS A measure of computer processing speed. *See also:* KOPS; MFLOPS. (C) 610.12-1990

mirrored disk array A form of RAID storage, known as level 1, in which each block of data is duplicated on a mirror drive. (C) 610.10-1994w

mirroring The rotation of one or more display elements one hundred and eighty degrees about an axis in the plane of the display surface. (C) 610.6-1991w

MIS *See:* medical information system; management information system.

misaligned frame A frame that erroneously includes a fragmentary byte and that contains a frame check sequence error. *Note:* This term is contextually specific to IEEE Std 802.3. (C) 610.7-1995

misalignment *See:* input-axis misalignment.

misalignment drift (gyros) The part of the total apparent drift component due to uncertainty of orientation of the gyro input axis with respect to the coordinate system in which the gyro is being used. *See also:* navigation. (AES/RS) 686-1982s, [42]

misalignment loss *See:* angular misalignment loss; gap loss; lateral offset loss.

miscellaneous function (numerically controlled machines) An on-off function of a machine such as spindle stop, coolant on, clamp. (IA/EEC) [61], [74]

miscellaneous time The part of up time that is not rerun time, system production time, or system test time, but is time typically used for demonstrations or operator training. *Synonym:* incidental time. (C) 610.10-1994w

MISD *See:* multiple instruction, single data.

misdetection (image processing and pattern recognition) In pattern recognition, the failure to detect the existence of a pattern. (C) 610.4-1990w

misfire (1) (gas tube) A failure to establish an arc between the main anode and cathode during a scheduled conducting period. *See also:* rectification; gas tube. (ED) [45]
(2) The failure of a blasting charge to explode when expected. *Note:* In electric firing, this usually is the result of a broken blasting circuit or insufficient current through the electric blasting cap. *See also:* blasting unit. (EEC/PE/MIN) [119]

mishap An unplanned event or series of events resulting in death, injury, occupational illness, or damage to or loss of equipment or property, or damage to the environment; an accident. (VT/RT) 1483-2000

misidentification In pattern classification, the failure to assign a pattern to its true pattern class. *Synonym:* type I error. *Contrast:* false identification. (C) 610.4-1990w

mismatch The condition in which the impedance of a load does not match the impedance of the source to which it is connected. *See also:* self-impedance. (AP/ANT) [35]

mismatch factors (power meters) Resulting from a combination of interaction factor and reflection factor resulting from reflective source and load impedances which relate incident, absorbed, and delivered power to a nonreflection load. (IM) 544-1975w

mismatch loss *See:* matching loss.

mismatch uncertainty (power meters) Uncertainty in an assigned value that is caused by uncorrected or uncertain values for one or both of the mismatch factors. (IM) 470-1972w, 544-1975w

misordering data A form of unauthorized data modification in which the reception sequence of data units is altered from the original transmission sequence in an unauthorized manner. This can be attempted by a combination of techniques involving deleting, delaying, and reinserting data; or modifying sequence control information; or both. (C/LM) 802.10-1998

misrouted calls A category of call setup irregularities caused by switching system errors. These errors result in a call attempt becoming ineffective after a subscriber has initiated the call correctly (i.e., has gone off-hook, received dial tone, and signaled correctly in the allotted time). This category includes, but is not limited to, calls to the wrong office or wrong number or calls receiving an incorrect tone or announcement or no tone or announcement. Not included in the misrouted calls category are misroutings caused by either erroneous inputs to the switching system, unavailability of service circuits, or failure to establish a network path. (COM/TA) 973-1990w

missing (thyristor converter) (misgating) A condition where the onset of conduction of an arm is substantially delayed from its correct instant of time. *Note:* If an arm fails to turn on during inverter service, there is a commutation failure resulting in a conduction-through. (IA/IPC) 444-1973w

mission (1) The operating objective for which the system was intended. *See also:* system. (SMC) [63]
(2) (nuclear power generating station) The singular objective, task, or purpose of an item or system. (PE/NP) 352-1975s, 933-1999

mission time (nuclear power generating station) The time during which the mission should be performed without interruption. (PE/NP) 933-1999, 352-1975s

mist *See:* fog.

mistake (1) (electronic computation) A human action that produces an unintended result. *Note:* Common mistakes include incorrect programming, coding, manual operation, etc. (C) 162-1963w, [20], [85]
(2) (analog computer) *See also:* error. (C) 165-1977w
(3) (software) A human action that produces an incorrect result. *Note:* The fault tolerance discipline distinguishes between the human action (a mistake), its manifestation (a hardware or software fault), the result of the fault (a failure), and the amount by which the result is incorrect (the error). (C) 610.12-1990

mistrigger (thyristor) (misfire) The failure of a thyristor to conduct at the correct instant of time. (IA/IPC) 428-1981w

misuse Use of processing or communication services for other than official or authorized purposes (e.g., personal gain, espionage). Misuse includes the threats of inadvertent or intentional execution of malicious functions (e.g., computer virus, Trojan horse), performance of undesirable functions (e.g., erasing the file system), and general perpetration of errors of commission, omission, and oversight. Misuse could result in unauthorized disclosure or modification of information, unauthorized receipt of services, or denial of service to legitimate users or critical functions. (C/BA) 896.3-1993w

mixed-base notation *See:* mixed-radix notation.

mixed-base numeration system *See:* mixed-radix notation.

Mixed-Configuration Group A Group to which the member Remote Bridges attach by a mixture of Individual Virtual Ports and Multipeer Virtual Ports. *Note:* It is possible for some members of a Mixed-Configuration Group to attach only by Individual Virtual Ports. (C/LM) 802.1G-1996

mixed frequency fields The superposition of two or more electromagnetic fields of differing frequency. (NIR) C95.1-1999

mixed highs (color television) Those high-frequency components of the picture signal that are intended to be reproduced achromatically in a color picture. (BT/AV) 201-1979w

mixed logic (logic diagrams) The defining of the 1-state of the variables as the more positive or less positive of the two possible levels, depending upon the absence or presence of the polarity indicator symbol. *Synonym:* direct polarity indication. (GSD) 91-1973s

mixed-loop series street-lighting system A street-lighting system that comprises both open loops and closed loops. *See also:* alternating-current distribution; direct-current distribution. (T&D/PE) [10]

mixed mode Pertaining to an expression that contains two or more different data types. For example, $Y := X + N$, where X and Y are floating point variables and N is an integer variable. *Synonym:* mixed type. (C) 610.12-1990

mixed-mode interference Interference that consists of components from both common- and differential-mode interference. (EMC) C63.13-1991

mixed-pressure turbine, condensing or noncondensing (control systems for steam turbine-generator units) Steam enters the turbine at two or more pressures through separate inlet openings with means for controlling the inlet steam pressures or turbine power output. (PE/EDPG) 122-1985s

mixed radix Pertaining to a numeration system that uses more than one radix, such as the biquinary system. (C) [20], [85]

mixed-radix notation A radix notation system in which all digit positions do not have the same radix. For example, biquinary notation in which the digit positions have the radix 2 or 5, alternately. *Synonyms:* mixed-radix numeration system; mixed-base numeration system; mixed-base notation. *Contrast:* fixed-radix notation. (C) 1084-1986w

mixed-radix numeration system *See:* mixed-radix notation.

mixed rain and snow Precipitation consisting of a mixture of rain and wet snow. It usually occurs when the temperature of the air layer near the ground is slightly above freezing. (T&D/PE) 539-1990

mixed-signal circuit A circuit in which some variables are represented by analog (continuously variable) quantities, and some variables are represented by digital (discrete) quantities. (C/TT) 1149.4-1999

mixed sweep (oscilloscopes) In a system having both a delaying sweep and a delayed sweep, a means of displaying the delaying sweep to the point of delay pickoff and displaying the delayed sweep beyond that point. *See also:* oscillograph. (IM/HFIM) [40]

mixed transaction An address beat followed by any number or combination of data write and data read transfers to a single location using the single address transfer mode. This is terminated by the appropriate style of end beat. (C/MM) 896.1-1987s

mixed type *See:* mixed mode.

mixer (A) (data transmission) In a sound transmission, recording or reproducing system, a device having two or more inputs, usually adjustable, and a common output, which operates to combine linearly in a desired proportion the separate input signals to produce an output signal. **(B) (data transmission)** The stage in a heterodyne receiver in which the incoming signal is modulated with the signal from the local oscillator to produce the intermediate-frequency signal. **(C) (data transmission)** A process of intermingling of data traffic flowing between concentration and expansion stages. (PE) 599-1985

mixer tube An electron tube that performs only the frequency-conversion function of a heterodyne conversion transducer when it is supplied with voltage or power from an external oscillator. (ED) 161-1971w

mixing ratio (of water vapor) The ratio of the mass of water vapor to the mass of dry air in a given volume of air. This ratio is generally expressed in grams per kilogram. (AP/PROP) 211-1997

mixing rules Various theoretical and often empirical models to predict the effective medium constitutive parameters. (AP/PROP) 211-1997

mixing segment A medium that may be connected to more than two Medium Dependent Interfaces (MDIs). (C/LM) 802.3-1998

MKSA system of units A system in which the basic units are the meter, kilogram, and second, and the ampere is a derived unit defined by assigning the magnitude $4\pi \times 10^{-7}$ to the rationalized magnetic constant (sometimes called the permeability of space). *Notes:* 1. At its meeting in 1950 the International Electrotechnical Commission recommended that the MKSA system be used only in the rationalized form. 2. The electrical units of this system were formerly called the practical electrical units. 3. If the MKSA system is used in the unrationalized form the magnetic constant is 10^{-7} henry/meter and the electric constant is $10^7/c^2$ farads/meter. Here c, the speed of light, is approximately 3×10^8 meters/second. 4. In this system, dimensional analysis is customarily used with the four independent (basic) dimensions: mass, length, time, current. (Std100) 270-1966w

MLHG *See:* multiline hunt group.

M-L ratio *See:* metallic longitudinal induction ratio.

MLS *See:* microwave landing system.

MMI *See:* man-machine interface; user interface.

MMU *See:* memory management unit.

mnemonic (1) (test, measurement, and diagnostic equipment) Assisting or intending to assist a human memory and understanding. Thus a mnemonic term is usually an abbreviation, that is easy to remember; for example, mpy for multiply and acc for accumulator. (MIL) [2]
(2) An abbreviation or other shortened keyboard notation that is used to substitute for a more complicated action, such as selecting an object or performing an operation on it. (C) 1295-1993w

mnemonic code (test, measurement, and diagnostic equipment) A pseudo code in which information, usually instructions, is represented by symbols or characters which are readily identified with the information. (MIL) [2]

mnemonic symbol (software) A symbol chosen to assist the human memory, for example, an abbreviation such as "mpy" for "multiply." (C/SE) 729-1983s

MNOS Acronym for metal nitride oxide semiconductor. (ED) 641-1987w

MNOS transistor *See:* metal-nitride-oxide-semiconductor transistor.

m:n relationship* *See:* many-to-many relationship.
* Deprecated.

mobile (x-ray) Equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled. (NEC/NESC) [86]

mobile communication system Combinations of interrelated devices capable of transmitting intelligence between two or more spatially separated radio stations, one or more of which shall be mobile. (VT) [37]

mobile home A factory-assembled structure or structures equipped with the necessary service connections and made so as to be readily movable as a unit or unit(s) without a permanent foundation. The phrase "without a permanent foundation" indicates that the support system is constructed with the intent that the mobile home placed thereon will be moved from time to time at the convenience of the owner. (NESC/NEC) [86]

mobile home accessory building or structure Any awning, cabana, ramada, storage cabinet, carport, fence, windbreak or porch established for the use of the occupant of the mobile home upon a mobile home lot. (NESC/NEC) [86]

mobile home lot A designated portion of a mobile home park designed for the accommodation of one mobile home and its accessory buildings or structures for the exclusive use of its occupants. (NESC/NEC) [86]

mobile home park A contiguous parcel of land which is used for the accommodation of occupied mobile homes. (NESC/NEC) [86]

mobile home service equipment The equipment containing the disconnecting means, overcurrent protective devices, and receptacles or other means for connecting a mobile home feeder assembly. (NESC/NEC) [86]

mobile radio service Radio service between a radio station at a fixed location and one or more mobile stations, or between mobile stations. *See also:* radio transmission. (EEC/PE) [119]

mobile station (1) A radio station designed for installation in a vehicle and normally operated when in motion. *See also:* mobile communication system. (COM/VT) [37]
(2) A type of station that uses network communications while in motion. (C/LM) 8802-11-1999

mobile substation equipment Substation equipment mounted and readily movable as a system of transportable devices. (PE/SUB) 1268-1997

mobile telemetering Electric telemetering between points that may have relative motion, where the use of interconnecting wires is precluded. *Note:* Space radio is usually employed as an intermediate means for mobile telemetering, but radio may also be used for telemetering between fixed points. *See also:* telemetering. (EEC/PE) [119]

mobile telephone system (automatic channel access) A mobile telephone system capable of operation on a plurality of frequency channels with automatic selection at either the base station or any mobile station of an idle channel when communication is desired. *See also:* mobile communication system. (VT) [37]

mobile transformer Transformers that are usually mounted on trailers for easy transport to temporarily replace stationary transformers taken out of service because of failure or maintenance. (PE/TR) 1276-1997

mobile transmitter A radio transmitter designed for installation in a vessel, vehicle, or aircraft, and normally operated while in motion. *See also:* radio transmitter. (AP/ANT) 145-1983s

mobile unit substation A unit substation mounted and readily movable as a unit on a transportable device. (SWG/PE) C37.100-1992

mobility *See:* drift mobility.

mobility, Hall *See:* Hall mobility.

mobility spectrum The distribution of ions as a function of mobility. Historically, ions have been classified by mobility

as small (10^{-5} m^2/Vs to 2×10^{-4} m^2/Vs), medium (10^{-7} m^2/Vs to 10^{-5} m^2/Vs), and large (10^{-9} m^2/Vs to 10^{-7} m^2/Vs). (T&D/PE) 539-1990

MOBSSL-UAF *See:* Merritt and Miller's Own Block Structured Simulation Language.

mock-up A full-sized structural, but not necessarily functional, model built accurately to scale, used chiefly for study, testing, or display; for example, a full-sized model of an airplane displayed in a museum. *See also:* physical model. (C) 610.3-1989w

mod *See:* modulo.

modal A state in which the user has to complete the request of the mode before continuing. (C) 1295-1993w

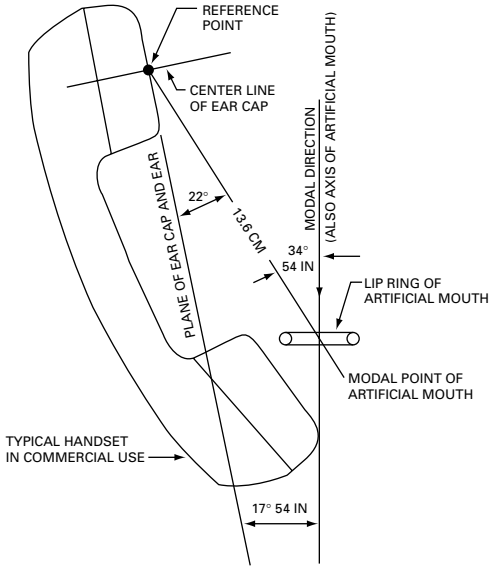
modal analysis (power-system communication) A method of computing the propagation of a wave on a multiconductor power line. (PE) 599-1985w

modal channel (x-ray energy spectrometers) That channel in the distribution containing the largest number of counts. (NPS/NID) 759-1984r

modal direction (transmission performance of telephone sets) The assumed direction of speech transmission on a modal head. Also, the axis of an artificial mouth,. (COM/TA) 269-1983s

modal distance (telephony) The distance between the center of the grid of a telephone-handset transmitter cap and the center of the lips of a human talker (or the reference point of an artificial mouth), when the handset is in the modal position. (COM/TA) 269-1971w

modal head (transmission performance of telephone sets) Head dimensions that are modal for a human population. The modal head is the same as that adopted by the Comité Consultatif International Télégraphique et Téléphonique (CCITT) for the measurement of Affaiblissement équivalent pour netteté (equivalent articulation loss). The applicable dimensions are shown in the correpsonding figure.



modal head

(COM/TA) 269-1983s

modal noise (fiber optics) Noise generated in an optical fiber system by the combination of mode dependent optical losses and fluctuation in the distribution of optical energy among the guided modes or in the relative phases of the guided modes. *Synonym:* speckle noise. *See also:* mode. (Std100) 812-1984w

modal participation factor The magnitude of each structural mode (natural frequency) that participates to compose the final dynamic response of the system. Each participation factor is a function of the system mass distribution and the generalized mode shape at each natural frequency. (SWG/PE) C37.100-1992, C37.81-1989r

modal point (transmission performance of telephone sets) The position of the center of the lips of a modal head. Also, the corresponding reference point of an artificial mouth, the center of the external plane of the lip ring. (COM/TA) 269-1983s

modal position (transmission performance of telephone sets) The position a telephone-set handset assumes when the ear-cap of the handset is held in close contact with the ear of a modal head and the modal direction is in the plane defined by the axes of the transmitter cap and ear-cap. (COM/TA) 269-1983s

mode (1) (radix-independent floating-point arithmetic) (binary floating-point arithmetic) A variable that a user may set, sense, save, and restore to control the execution of subsequent arithmetic operations. The default mode is the mode that a program can assume to be in effect unless an explicitly contrary statement is included in either the program or its specification. The following mode is implemented: 1) Rounding, to control the direction of rounding errors. 2) In certain implementations, rounding precision, to shorten the precision of results. 3) The implementor may, at his option, implement the following modes: traps disabled or enabled, to handle exceptions. (MM/C) 854-1987r, 754-1985r

(2) (electron tube) A state of a vibrating system to which corresponds one of the possible resonance frequencies (or propagation constants). *Note:* Not all dissipative systems have modes. *See also:* oscillatory circuit. (ED) 161-1971w, [45]

(3) (fiber optics) In any cavity or transmission line, one of those electromagnetic field distributions that satisfies Maxwell's equations and the boundary conditions. The field pattern of a mode depends on the wavelength, refractive index, and cavity or waveguide geometry. *See also:* bound mode; linearly polarized mode; single mode optical waveguide; differential mode delay; unbound mode; multimode distortion; transverse magnetic mode; multimode optical waveguide; transverse electric mode; hybrid mode; multimode laser; mode volume; equilibrium mode distribution; leaky mode; cladding mode; fundamental mode; equilibrium mode simulator; differential mode attenuation. (Std100) 812-1984w

(4) (radio-wave propagation) A characteristic solution to the wave equation for specified boundary conditions. Other uses of the term mode are common. *See also:* mode of propagation, ionospheric. (AP/PROP) 211-1990s

(5) (mathematics of computing) A variable that a user may set, sense, save, and restore to control the execution of subsequent arithmetic operations. (C) 1084-1986w

(6) An operating condition of a function, subfunction, or physical element of the system. (C/SE) 1220-1994s

(7) A collection of attributes that specifies a file's type and its access permissions. *See also:* file access permissions. (C/PA) 9945-1-1996, 9945-2-1993, 1003.5-1999

(8) A set of related features or functional capabilities of a product, (e.g., on-line, off-line, and maintenance modes). (C/SE) 1362-1998

mode conversion (waveguide) The transformation of an electromagnetic wave from one mode of propagation to one or more other modes. (MTT) 146-1980w

mode conversion gain (waveguide) The gain due to the conversion of power from one waveguide mode to another. (MTT) 146-1980w

mode conversion loss (waveguide) The loss due to the conversion of power from one waveguide mode to another. (MTT) 146-1980w

mode coupler (waveguides) A coupler that provides preferential coupling to a specific wave mode. *See also:* waveguide. (IM/HFIM) [40]

mode coupling (fiber optics) In an optical waveguide, the exchange of power among modes. The exchange of power may reach statistical equilibrium after propagation over a finite

distance that is designated the equilibrium length. *See also:* equilibrium length; equilibrium mode distribution; mode; mode scrambler. (Std100) 812-1984w

mode dispersion *See:* multimode distortion.

modal distortion *See:* multimode distortion.

mode distortion *See:* multimode distortion.

mode filter (1) (fiber optics) A device used to select, reject, or attenuate a certain mode or modes. (Std100) 812-1984w

(2) (waveguide components) A device designed to pass energy along a waveguide in one or more selected modes of propagation, and substantially to reject energy carried in other modes. (MTT) 147-1979w

mode, higher-order *See:* higher-order mode.

MODEL An application-oriented language used widely for simulating digital circuits. (C) 610.13-1993w

model (1) A mathematical or physical representation of the system relationships. (SMC) [63]

(2) (A) (modeling and simulation) An approximation, representation, or idealization of selected aspects of the structure, behavior, operation, or other characteristics of a real-world process, concept, or system. *Note:* Models may have other models as components. **(B) (modeling and simulation)** To serve as a model as in definition (A). **(C) (modeling and simulation)** To develop or use a model as in definition (A). (C) 610.3-1989

(3) (computer graphics) An accurate and complete graphical representation of an object. *See also:* modeling system. (C) 610.6-1991w

(4) A representation of one or more aspects of a system. (C/SE) 1016.1-1993w

(5) An analog representation, which may be conceptual, qualitative, or quantitative. (PE/NP) 1082-1997

(6) A representation of a real world process, device, or concept. (C/SE) 1233-1998

(7) (A) A representation of something that suppresses certain aspects of the modeled subject. This suppression is done in order to make the model easier to deal with and more economical to manipulate and to focus attention on aspects of the modeled subject that are important for the intended purpose of the model. For instance, an accurate model of the solar system could be used to predict when planetary conjunctions will take place and the phases of the moon at a particular time. Such a model would generally not attempt to represent the internal workings of the sun or the surface composition of each planet. **(B)** An interpretation of a theory for which all the axioms of the theory are true. [logic sense]. (C/SE) 1320.2-1998

model a cell The creation of a specific elaboration of a model using `modelSearch`. (C/DA) 1481-1999

model accreditation (or simulation accreditation) The official certification that a model or simulation is acceptable for use for a specific purpose. (DIS/C) 1278.3-1996

mode-less A state that does not interfere with the user performing any other action. (C) 1295-1993w

model glossary The collection of the names and definitions of all defined concepts that appear within the views of a model. (C/SE) 1320.2-1998

model hierarchy The diagrams that correspond to the nodes of the hierarchical graph structure of an IDEF0 model. (C/SE) 1320.1-1998

modeling Technique of system analysis and design using mathematical or physical idealizations of all or a portion of the system. Completeness and reality of the model are dependent on the questions to be answered, the state of knowledge of the system, and its environment. *See also:* system. (SMC) [63]

modeling procedures The action of a circuit with respect to timing and power. These actions include creating segments and nodes, determining the propagation properties, and setting the delay and slew equations to use. (C/DA) 1481-1999

modeling statements Delay calculation language (DCL) statements that map cell configurations to modeling procedures. (C/DA) 1481-1999

modeling system A system in which a computer graphics model can be defined or transformed using world coordinates. (C) 610.6-1991w

model name A unique, descriptive name that distinguishes one IDEF0 model from other IDEF0 models with which it may be associated. An IDEF0 model's model name and model name abbreviation are placed in the A-0 context diagram along with the model's purpose statement and viewpoint statement. (C/SE) 1320.1-1998

model name abbreviation A unique short form of a model name that is used to construct diagram references. (C/SE) 1320.1-1998

model note A textual and/or graphical component of a diagram that records a fact not otherwise depicted by a diagram's boxes and arrows. (C/SE) 1320.1-1998

model note number An integer number, placed inside a small square, that unambiguously identifies a model note in a specific diagram. (C/SE) 1320.1-1998

model page A logical component of an IDEF0 model that can be presented on a single sheet of paper. Model pages include diagram, text, FEO, and glossary pages. (C/SE) 1320.1-1998

model space The coordinate system used by a computer graphics model. (C) 610.6-1991w

MODEL 204 (M204) A database manipulation language with English-like syntax. (C) 610.13-1993w

model validation (1) The process of determining the degree to which the requirements, design, or implementation of a model are a realization of selected aspects of the system being modeled. *Contrast:* model verification. *See also:* fidelity. (C) 610.3-1989w

(2) The process of determining the degree to which a model is an accurate representation of the real world from the perspective of the intended use(s) of the model. (DIS/C) 1278.3-1996

model verification (1) The process of determining the degree of similarity between the realization steps of a model; for example, between the requirements and the design, or between the design and its implementation. *Contrast:* model validation. (C) 610.3-1989w

(2) The process of determining that a model implementation accurately represents the developer's conceptual description and specifications. (DIS/C) 1278.3-1996

modem (1) (data transmission) A contraction of MOdulator-DEModulator, an equipment that connects data terminal equipment to a communication line. (PE) 599-1985w

(2) (supervisory control, data acquisition, and automatic control) A modulator/demodulator device that converts serial binary digital data to and from the signal form appropriate for the respective communication channel. (SWG/PE/SUB) C37.100-1992, C37.1-1994

(3) (broadband local area networks) A modulator-demodulator device. The modulator encodes digital information onto an analog carrier signal by varying the amplitude, frequency, or phase of that carrier. The demodulator extracts digital information from a similarly modified carrier. A modem transforms digital signals into a form suitable for transmission over an analog medium. (LM/C) 802.7-1989r

(4) A device that modulates and demodulates signals transmitted over data communication facilities. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (SUB/PE) 999-1992w

(5) (A) A device that performs modulation and demodulation functions necessary to transmit signals over communication lines. *Note:* This term originated as an abbreviation for modulator-demodulator. *Synonyms:* modulator-demodulator; demodulator-modulator; data set. *See also:* acoustic coupler. **(B)** A device that transforms a digital signal received into an analog signal and vice versa. (C) 610.7-1995

modem control The monitoring of modem status lines. (C/PA) 2003.1-1992

mode mixer *See:* mode scrambler.

mode of operation (rectifier circuits) The characteristic pattern of operation determined by the sequence and duration of commutation and conduction. *Note:* Most thyristor converters and rectifier circuits have several modes of operation, which may be identified by the shape of the current wave. The particular mode obtained at a given load depends upon the circuit constants. *See also:* rectifier circuit element; rectification. (IA/IPC) 444-1973w

mode of propagation (1) (A) (waveguides) A form of propagation of guided waves that is characterized by a particular field pattern in a plane transverse to the direction of propagation, which field pattern is independent of position along the axis of the waveguide. *Note:* In the case of uniconductor waveguides the field pattern of a particular mode of propagation is also independent of frequency. *See also:* waveguide. **(B)** A form of electromagnetic wave than can advance and can transport energy along the axis of a transmission line without change in the form of the electromagnetic field pattern in successive transverse sections (except for a monotonic decrease in amplitude along the direction of propagation, due to energy dissipation, which is present to some degree in every transmission line). (MTT) 148-1959, 146-1980, 1004-1987

(2) A form of propagation of guided waves where the transverse field pattern is invariant with range (i.e., as in a waveguide). *Note:* Inappropriate uses of the term mode are common. *Synonym:* mechanism of propagation. *See also:* ionospheric mode of propagation. (AP/PROP) 211-1997

mode of propagation, ionospheric Representation of a transmission path by the number of hops between the end points of the path, the ionospheric layers producing the ionospheric reflections being indicated for each hop. Example: 1F + 1E represents a hop with an ionospheric reflection in the F region followed by a reflection at the ground, followed, in turn, by a hop with a reflection from the E region. (AP/PROP) 211-1990s

mode of resonance (waveguide) A form of natural electromagnetic oscillation in a resonator, characterized by a particular field pattern. (MTT) 146-1980w

mode of vibration (vibratory body, such as a piezoelectric crystal unit) A pattern of motion of the individual particles due to stresses applied to the body, its properties, and the boundary conditions. Three common modes of vibration are flexural, extensional, and shear. *See also:* crystal. (EEC/PE) [119]

mode scrambler (A) (fiber optics) A device for inducing mode coupling in an optical fiber. *Synonym:* mode mixer. *See also:* mode coupling. **(B) (fiber optics)** A device composed of one or more optical fibers in which strong mode coupling occurs. *Note:* Frequently used to provide a mode distribution that is independent of source characteristics or that meets other specifications. *Synonym:* mode mixer. *See also:* mode coupling. (Std100) 812-1984

mode shape (mechanical) A plot that shows displacements of various points in the vibrating structure at a particular instant in time. There is a characteristic mode shape associated with each natural frequency of a vibrating structure. (SWG/SUB/PE) C37.122-1983s, C37.122.1-1993, C37.100-1992

mode stripper *See:* cladding mode stripper.

mode transducer (waveguide components) A device for transforming an electromagnetic wave from one mode of propagation to another. (MTT) 147-1979w

mode transformer *See:* mode transducer.

mode voltage *See:* glow voltage.

mode volume (fiber optics) The number of bound modes that an optical waveguide is capable of supporting; for $V5$, approximately given by $V^2/2$ and $(V^2/2[g/(g + 2)]$, respectively, for step index and power-law profile waveguides, where g is the profile parameter, and V is normalized frequency. *See also:* step index profile; power-law index profile; normalized frequency; mode; V number; effective mode volume. (Std100) 812-1984w

modification (A) (software) A change made to software. *See also:* software. **(B) (software)** The process of changing software. *See also:* software. (C/SE) 729-1983

modification request (MR) A generic term that includes the forms associated with the various trouble/problem-reporting documents (e.g., incident report, trouble report) and the configuration change control documents [e.g., software change request (SCR)]. (C/SE) 1219-1998

modified calling line disconnect A telephone network feature that, if the end user is off-hook, requires the end user's line to go on-hook before receiving a dial tone from the telephone network. (SCC31) 1390.3-1999, 1390.2-1999

modified circuit transient recovery voltage The circuit transient recovery voltage modified in accordance with the normal-frequency recovery voltage and the asymmetry of the current wave obtained on a particular interruption. *Note:* This voltage indicates the severity of the particular interruption with respect to recovery-voltage phenomena. (SWG/PE) C37.100-1992

modified cosecant-squared antenna pattern A cosecant-squared antenna pattern modified to obtain increased antenna gain at the higher elevation angles so as to provide larger echo signals from targets at high altitude and short range that would normally be too weak to be detected when sensitivity time control (STC) is used along with the conventional cosecant-squared antenna pattern. *Note:* Sometimes called a thumb pattern. Commonly used in 2-D air-traffic control radars. (AES) 686-1997

modified impedance relay An impedance form of distance relay for which the operating characteristic of the distance unit on an *R-X* diagram is a circle having its center displaced from the origin. *Note:* It may be described by the equation

$$Z^2 = 2K_1 Z_{\cos}(\theta - \alpha) = {K_2}^2 - {K_1}^2$$

here K_1, K_2, and α are constants and θ is the phase angle by which the input voltage leads the input current. (SWG/PE) C37.100-1992

modified index of refraction In the troposphere, the sum of the refractive index at a given height h above the mean local surface and the ratio of this height to the geometrical mean radius of the Earth. (AP/PROP) 211-1997

modified inherent transient recovery voltage (transient recovery voltage) The TRV (transient recovery voltage) that results from the interaction of a circuit (that produces the inherent transient recovery voltage) and the impedance (capacitors, resistors, etc.) of an interrupting device without the modifying effects of an arc and its voltage. Modifying impedances, such as capacitors and resistors, are sometimes included as part of a switching device to modify the TRV. (SWG/PE) C37.04E-1985w, C37.4D-1985w, C37.100B-1986w, C37.100-1992

modified-off-the-shelf (MOTS) A software product that is already developed and available, usable either "as is" or with modification, and provided by the supplier, acquirer, or a third party. (C/SE) 1062-1998

modified performance test A test, in the "as found" condition, of a battery's capacity and its ability to provide a high-rate, short-duration load (usually the highest rate of the duty cycle) that will confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. (PE/EDPG) 450-1995

modified source statements Original source statements that have been changed. (C/SE) 1045-1992

modified z transform (data processing) The modified z transform of $f(t)$, denoted $F(z,m)$, is the delayed z transform of f(t) with the substitution $\Delta = 1 - m$; that is,

$$F(z, m) = \sum_{n=0}^{\infty} f[nT - (1 - m)T]u[nT - (1 - m)T]z^{-n}$$

$$0 < m < 1$$

(IM) [52]

modify (A) To change the contents of a database. **(B)** To change the logical structure of a database. *See also:* alter. (C) 610.5-1990

Modula 2 *See:* MODUlar LAnguage II.

MODULA II *See:* MODUlar LAnguage II.

modular (software) Composed of discrete parts. *See also:* modular decomposition; modular programming. (C) 610.12-1990

modular assembly A circuit breaker element consisting of sealed interrupters, mechanism, and connecting terminals. (SWG/PE) C37.59-1996

modular constraint *See:* grid constraint.

modular decomposition (software) The process of breaking a system into components to facilitate design and development; an element of modular programming. *Synonym:* modularization. *See also:* factoring; hierarchical decomposition; demodularization; cohesion; coupling; packaging; functional decomposition. (C) 610.12-1990

modularity (software) The degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components. *See also:* cohesion; coupling. (C) 610.12-1990

modularization *See:* modular decomposition.

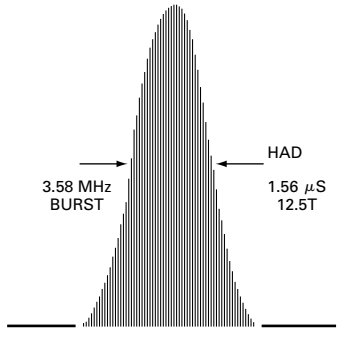
MODUlar LAnguage II (MODULA II) A programming language developed, as an expanded version of Pascal, to support modular design, structured programs, and mathematical calculations. *See also:* block-structured language. (C) 610.13-1993w

modular programming (software) A software development technique in which software is developed as a collection of modules. *See also:* stepwise refinement; data structure-centered design; transaction analysis; rapid prototyping; modular decomposition; input-process-output; structured design; transform analysis; object-oriented design. (C) 610.12-1990

MODULAR II *See:* MODUlar LAnguage II.

modulate (A) To convert voice or data signal for transmission over a communications network. *Contrast:* demodulate. **(B)** To vary one or more attributes of a carrier (amplitude, frequency, phase) such that the frequency information in the modulating signal can be recovered by its inverse process. (C) 610.7-1995

modulated 12.5T pulse (linear waveform distortion) A burst of color subcarrier frequency of nominally 3.58 MHz. The envelope of the burst is $\sin^2$ shaped with a HAD of nominally 1.56 μs. The MOD 12.5T pulse consists of a luminance and a chrominance component. The envelope of the frequency spectrum consists of two parts, namely signal energy concentrated in the luminance region below 0.6 MHz and in the chrominance region from roughly 3 MHz to 4.2 MHz.



Envelope of frequency spectrum of modulated 12.5T pulse

modulated 12.5T pulse

(BT) 511-1979w

modulation (1) (A) (data transmission) *(Carrier).* (i) The process by which some characteristic of a carrier is varied in accordance with a modulating wave. (ii) The variation of some characteristic of a carrier. *See also:* angle modulation; modulation index. **(B) (data transmission)** *(Signal transmission system).* (i) A process whereby certain characteristics of a wave, often called the carrier, are varied or selected in accordance with a modulating function. (ii) The result of such a process. *See also:* angle modulation; modulation index. (PE) 599-1985

(2) (diode-type camera tube) The ratio of the difference between the maximum and minimum signal currents divided by the sum. To avoid ambiguity, the optical input image intensity shall be assumed to be sinusoidal in the direction of scan. (ED) 503-1978w

(3) (fiber optics) A controlled variation with time of any property of a wave for the purpose of transferring information. (Std100) 812-1984w

(4) (overhead-power-line corona and radio noise) The process by which some characteristic of a carrier is varied in accordance with a modulating signal. (T&D/PE) 539-1990

(5) (broadband local area networks) The method whereby information is superimposed onto a RF carrier to transport signals through a communications channel. (LM/C) 802.7-1989r

(6) The process of changing or regulating the characteristics of a carrier that is vibrating at a certain amplitude and frequency so that the variations represent meaningful information. *Contrast:* demodulation. (C) 610.7-1995

modulation contrast (diode-type camera tube) The ratio of the difference between the peak and the minimum values of irradiance to the sum of the peak and the minimum value of irradiance of an image or specified portion of an image. (ED) 503-1978w

modulation index (angle modulation with a sinusoidal modulating function) (data transmission) The ratio of the frequency deviation of the modulated wave to the frequency of the modulating function. *Note:* The modulation index is numerically equal to the phase deviation expressed in radians. (PE) 599-1985w

modulation threshold (illuminating engineering) In the case of a square wave or sine wave grating, manipulation of luminance differences can be specified in terms of modulation and the threshold may be called the modulation threshold.

$$\text{modulation} = \frac{L_{\max} - L_{\min}}{L_{\max} + L_{\min}}$$

Periodic patterns that are not sine wave can be specified in terms of the modulation of the fundamental sine wave component. The number of periods or cycles per degree of visual angle represents the spatial frequency. (EEC/IE) [126]

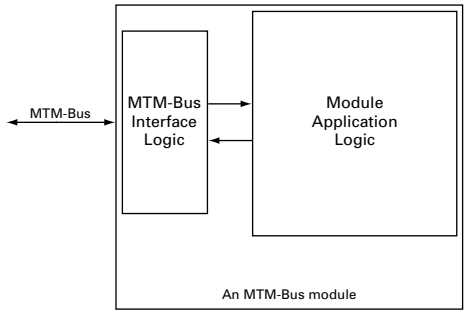
modulator A device that converts a signal into a modulated signal that is suitable for transmission. (C) 610.7-1995

modulation transfer function (diode-type camera tube) $R_o(N)$, the modulus of the optical transfer function (OTF), is synonymous with the sine amplitude response. That is, the response of the imaging sensor to sinewave images. When the modulation transfer functions or MTFs of a linear sensor's components are known, the overall system MTF can be found by multiplying the individual component MTFs together. (ED) 503-1978w

modulator-demodulator *See:* modem.

module (1) (cable penetration fire stop qualification test) An opening in a fire resistive barrier so located and spaced from adjacent modules (openings) that its respective cable penetration fire stop's performance will not affect the performance of cable penetration fire stops in any adjacent module. A module may take on any shape to permit the passage of cables from one or any number of raceways. (ED) 581-1978w

(2) (A) (software) A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example, the input to, or output from, an



NOTE–An MTM-Bus module consists of MTM-Bus interface logic and module application logic.

MTM-Bus module

assembler, compiler, linkage editor, or executive routine. **(B) (software)** A logically separable part of a program. *Note:* The terms "module," "component," and "unit" are often used interchangeably or defined to be sub-elements of one another in different ways depending upon the context. The relationship of these terms is not yet standardized. (C) 610.12-1990

(3) (STEbus) A plug-in unit consisting of one or more boards that contains at least one bus interface conforming to IEEE Std 1000-1987, which plugs into the backplane. (C/MM) 1000-1987r

(4) (MULTIBUS) A basic functional unit within an agent. (C/MM) 1296-1987s

(5) Collection of circuitry designed to perform specific functions that includes an interface to Futurebus+. (C/BA) 10857-1994, 896.4-1993w, 896.3-1993w

(6) (NuBus) *See also:* board. (C/MM) 1196-1987w

(7) A board or board set that comprises a single physical unit. It provides mechanical mounting and protection of electronic components, thermal transfer of heat away from the components to an external heat sink, and electrical and fiber-optic connections. A module is removable and replaceable. (BA/C) 14536-1995

(8) A plug-in unit per IEC 50. (C/BA) 1101.4-1993, 1101.3-1993

(9) A board, or board set, consisting of one or more nodes, that share a physical interface to SCI. If a module has multiple boards with backplane-mating connectors, it only uses one for the logical connection to the node. The others may provide additional power or I/O for their associated boards, but otherwise merely pass the input link signals through to the output link to provide continuity in case the module is plugged into a ring-connected backplane. (C/MM) 1596-1992

(10) Typically a board assembly and its associated mechanical parts, front panel, optional shields, etc., which contains everything required to occupy a slot in a mainframe. A module may occupy one or more slots. (C/MM) 1155-1992

(11) A collection of circuitry that is designed to perform a specific operation. This is standard terminology for Futurebus+, while VME64 uses board synonymously. (C/BA) 1014.1-1994w

(12) A board, or board set, consisting of one or more nodes that share a physical interface. Although only one board in a module connects to bus signals, each board connector could provide power from the bus. (C/MM) 1212-1991s

(13) An electronic circuit assembly that connects to one or more slots on the backplane. It is removable from and replaceable in a backplane assembly via connectors. (C/BA) 896.2-1991w

(14) An addressable unit or interconnected set of units attached to the MTM-Bus and fully supporting the MTM-Bus protocols. The boundary of an MTM-Bus module may correspond to the physical partitioning of the system, but is not required to do so. For the purposes of this document, a module is comprised of an MTM-Bus interface and module application logic, as shown in the figure below. (TT/C) 1149.5-1995

(15) (FASTBUS module) Any FASTBUS Device that can be housed in a FASTBUS crate, that can connect to a crate segment and that conforms with the mandatory specifications for a FASTBUS module. (NID) 960-1993

(16) A packaged functional hardware unit designed for use with other components. (C) 610.10-1994w

(17) The smallest component of physical management; i.e., a replaceable device. (C/MM) 1394-1995

(18) Multiple cells/units in a single assembly. (SB) 1188-1996

(19) A board or board set consisting of one or more nodes that share a physical interface, although only one board in a module connects to bus signals. Each board connection could provide power from the bus. (C/BA) 1156.4-1997

(20) Any assembly of interconnected components that constitutes an identifiable device, instrument, or piece of equipment. A module can be disconnected, removed as a unit, and replaced with a spare. It has definable performance characteristics that permit it to be tested as a unit. A module could be a card, a drawout circuit breaker, or other subassembly of a larger device, provided it meets the requirements of this definition. (PE/NP) 603-1998

module accelerated aging (nuclear power generating station) (advanced life conditioning) The acceleration process designed to achieve an advanced life condition in a short period of time. It is the process of subjecting a module or component to stress conditions in accordance with known measurable physical or chemical laws of degradation in order to render its physical and electrical properties similar to those it would have at an advanced age operating under expected service conditions. In addition, when operations of a device are cyclical, acceleration is achieved by subjecting the device to the number of cycles anticipated during its qualified life. (PE/NP) 381-1977w

module accuracy (nuclear power generating station) Conformity of a measurement value to an accepted standard value or true value. *Note:* For further information, see Process Measurement and Control Terminology SAMA PMC-20.1-1973. (PE/NP) 381-1977w

module address (MA) (1) (FASTBUS acquisition and control) The group of bits assigned in the device address field of a FASTBUS address which identifies the module on its segment. The module address may partially overlap the group address. (NID) 960-1993

(2) An eight-bit value uniquely identifying an MTM-Bus module. (TT/C) 1149.5-1995

module aging (nuclear power generating station) (natural) The change with passage of time of physical chemical, or electrical properties of a component or module under design range operating conditions which may result in degradation of significant performance characteristics. (PE/NP) 381-1977w

module auxiliary connector (FASTBUS acquisition and control) The standard connector that mounts above the module segment connector on a module circuit board. (NID) 960-1993

module calibration (nuclear power generating station) Adjustment of a device, to bring the module's output to a desired value or series of values, within a specified tolerance, for a particular value or series of values of the input or measurements used to establish the input-output function of the module. (PE/NP) 381-1977w

module circuit board The printed board that is the circuit part of a FASTBUS module on which the module segment connector is mounted for mating with the crate segment connector. (NID) 960-1993

module common-mode rejection (nuclear power generating station) The ability of a module with a differential input stage to cancel or reject a signal applied equally to both inputs. (PE/NP) 381-1977w

module components (nuclear power generating station) Items from which the module is assembled (for example, resistors, capacitors, wires, connectors, transistors, springs, etc.). (PE/NP) 381-1977w

module conformity (nuclear power generating station) The closeness with which the curve of a function approximates a specified curve. (PE/NP) 381-1977w

module contact rating (nuclear power generating station) The electrical power-handling capability of relay or switch contacts. This should be specified as continuous or interrupting, resistive or inductive, ac or dc. (PE/NP) 381-1977w

module counter A counter that reverts to zero in the counting sequence after reaching a value of $n - 1$. (C) 1084-1986w

module design range operating conditions (nuclear power generating station) The range of environmental and energy supply operating conditions within which a module is designed to operate. (PE/NP) 381-1977w

module drift (nuclear power generating station) A change in output-input relationship over a period of time, normally determined as the change in output over a specified period of time for one or more input values which are held constant under specified reference operating conditions. (PE/NP) 381-1977w

module electromagnetic interference (nuclear power generating station) Any unwanted electromagnetically transmitted energy appearing in the circuitry of a module. (PE/NP) 381-1977w

module energy supply (nuclear power generating station) Electrical energy, compressed fluid, manual force or other such input to the module that will establish the power for its operation. (PE/NP) 381-1977w

Module Fail Status (MFS) bit A bit in the Slave Status register of every S-module that is set by the S-module when the module's built-in test has failed or is currently executing. (TT/C) 1149.5-1995

module failure trending (nuclear power generating station) Systematic documentation and analysis of the frequency of a particular failure mode. (PE/NP) 381-1977w

module frequency response (nuclear power generating station) The frequency-dependent relation, in both amplitude and phase, between steady-state sinusoidal inputs and the resulting fundamental sinusoidal outputs. (PE/NP) 381-1977w

module header A structure attached to or integral to the top of a module's frame that is used for structural performance, marking, and optional component-mounting. (C/BA) 1101.4-1993, 1101.7-1995

module input overrange constraints (nuclear power generating station) The upper and/or lower values of the input signal which may be applied to a module without causing damage or otherwise altering permanent characteristics of the module or causing undesired saturation effects. (PE/NP) 381-1977w

module input signal range (nuclear power generating station) The region between the limits within which a quantity is measured or received, expressed by stating the lower and upper values of the input signal. (PE/NP) 381-1977w

module interface All aspects of the electrical, fiber optic, protocol, mechanical, and thermal interfaces of a module to associated modules, the backplane, I/O connections, module cage and cabinet mounting, conduction and/or convection cooling, and power and ground. (C/BA) 14536-1995

module interface plane An assigned plane on the bottom surface of the connector, from which the connector's electrical pins protrude, forming the mating surface. This surface is used as a reference for module dimensions. (C/BA) 1101.4-1993

module interference plane An assigned plane on the bottom surface of the connector from which the connector's electrical pins protrude, forming the mating surface. (C/BA) 1101.7-1995

module isolation characteristics (nuclear power generating station) provisions for electrical isolation of particular sections of a module from each other; such as input and output circuitry, control and protection circuitry, and redundant protection circuitry. (PE/NP) 381-1977w

module load capability (nuclear power generating station) The range of load values within which a module will perform to its specified performance characteristics. (PE/NP) 381-1977w

module output impedance (nuclear power generating station) The internal impedance presented by a module at its output terminals to a load. (PE/NP) 381-1977w

module output ripple (nuclear power generating station) The ac component of a dc output signal harmonically related in frequency to either the supply voltage or a voltage generated within the module (for example, carrier demodulation). (PE/NP) 381-1977w

module output signal range (nuclear power generating station) The region between the limits within which a quantity is transmitted, expressed by stating the lower and upper values of the output signal. (PE/NP) 381-1977w

module pulse characteristics (nuclear power generating station) Information such as pulse duration, amplitude, rise time, decay time, separation, and shape. (PE/NP) 381-1977w

module qualified life (nuclear power generating station) The life expectancy in years (or cycles of operation, if applicable) over which the module has been demonstrated to be qualified for use, as established by type tests, analysis or other qualification method. (PE/NP) 381-1977w

module range and characteristics of adjustments (nuclear power generating station) Such information as upper and lower range-limits of calibration capability and where applicable, their relationship to the calibrated range of the module. (PE/NP) 381-1977w

module reference operating conditions (nuclear power generating station) The range of environmental operating conditions of a module within which environmental influences are negligible. (PE/NP) 381-1977w

module reproducibility (nuclear power generating station) The closeness of agreement among repeated measurements of the output for the same value of input made under the same operating conditions over a period of time, approaching from both directions. (PE/NP) 381-1977w

module response time (nuclear power generating station.) The time required for an output change from an initial value to a specified percentage of the final steady-state value, resulting from the application of a specified input change under specified conditions. For digital equipment (that is, relays, solid state logic, delay networks, etc.). Response time is the time required for a change from an initial state to a specified final state resulting from application of specified input under specified conditions. (PE/NP) 381-1977w

module retainer The device used to secure the module in the chassis and to hold module guide ribs against the chassis webs

to attain a good thermal interface. *Synonym:* expansion element. (C/BA) 1101.4-1993, 1101.3-1993, 1101.7-1995

modules (electric pipe heating systems) Any assembly of interconnected components that constitutes an identifiable device, instrument, or piece of equipment that can be disconnected, removed as a unit and replaced with a spare, and has definable performance characteristics which permit it to be tested as a unit. A module can be a card or other subassembly. (PE/EDPG) 622A-1984r

module segment connector (FASTBUS acquisition and control) The standard connector that mounts on a FASTBUS module and mates with the crate segment connector for connection of the module to the segment. (NID) 960-1993

module signal to noise rato (nuclear power generating station) The output signal with input signal applied minus the output signal with no input signal applied divided by the output signal with no input signal applied. (PE/NP) 381-1977w

Module Status register A status register that is recommended to be implemented in the MTM-Bus interface circuitry of every S-module. The bits in this register are defined by the manufacturer of the MTM-Bus interface circuitry of an S-bits. The bits of such a register may serve to record error-condition detection or the module's application-related status. (TT/C) 1149.5-1995

module strength *See:* cohesion.

module supplementary board Any board in a FASTBUS module that does not make direct connection with the crate segment. (NID) 960-1993

module testing *See:* component testing.

module-type tests (nuclear power generating station) Tests made on one or more production units to demonstrate that the performance characteristics of the module(s) conform to the module's specifications. (PE/NP) 381-1977w

modulo An arithmetic operation that yields the remainder of an integer division problem. For example 39-3 modulo 6. (C) 1084-1986w

modulo *N* check (data transmission) A form of check digits, such that the number of ones in each number *A* operated upon is compared with a check number *B*, carried along with *A* and equal to the remainder of *A* when divided by *N*; for example, in a modulo 4 check, the check number will be 0, 1, 2, or 3 and the remainder of *A* when divided by 4 must equal the reported check number *B*, or else an error or malfunction has occurred; a method of verification by congruences; for example, casting out nines. *See also:* residue check. (COM) [49]

modulo-n counter A counter in which the state represented reverts to zero after reaching a maximum value of n-1. (C) 610.10-1994w

modulo-*n* residue The remainder obtained by dividing a number by *n*. (C) 1084-1986w

modulo-two sum *See:* exclusive OR.

modulus (1) (mathematics of computing) The number of integers that can be represented in a numeration system. For example, in a system with a modulus of five, the only integers that can be represented are 0, 1, 2, 3, and 4. (C) 1084-1986w

(2) (phasor) Its absolute value. The modulus of a phasor is sometimes called its amplitude. (Std100) 270-1966w

MOE *See:* measure of effectiveness.

MOF *See:* maximum observed frequency.

Moho (mohorovicic discontinuity) Seismic discontinuity situated about 35 km below the continents and about 10 km below the oceans. Crudely speaking, it separates the earth's crust and mantle. (COM) 365-1974w

moiré (television) The spurious pattern in the reproduced picture resulting from interference beats between two sets of periodic structures in the image. *Note:* The most common cause of moiré is the interference between scanning lines and some other periodic structure such as a line pattern in the original scene, a mesh or dot pattern in the camera sensor (for example, the target mesh in an image orthicon), or the phosphor dots or other structure in a shadow-mask picture tube. Moiré may result from the interference between the subcarrier elements of the chrominance signal and another periodic structure. In systems using an fm carrier, such as magnetic or video-disc record-playback systems, moire may also be caused by interference between the upper sidebands of the fm carrier and lower sidebands of harmonics of the fm carrier. In general, moiré may be caused by interference beats between any two periodic structures that are not perfectly aligned and not of the same frequency. (BT/AV) 201-1979w

moisture barrier A metal barrier that prevents moisture from permeating radially into the cable core. (PE/IC) 1142-1995

moisture block A means for preventing moisture from migrating longitudinally along the cable core, either through the conductor or within the space allowable between the extruded insulation shield and the jacket. (PE/IC) 1142-1995

moisture content The amount of water in parts per million by volume (ppmv) that is in the gaseous state and mixed with the insulating gas. *Synonym:* moisture content. (SWG/PE/SUB) C37.100-1992, C37.122.1-1993, C37.122-1993

moisture-resistant (1) (packaging machinery) So constructed or treated that exposure to a moist atmosphere will not readily cause damage. (IA/PKG) 333-1980w

(2) Not readily injured by exposure to a moist atmosphere. (SWG/PE) C37.100-1992

molded-case circuit breaker (MCCB) (1) One that is assembled as an integral unit in a supporting and enclosing housing of molded insulating material. (SWG/PE) C37.100-1992

(2) A circuit breaker assembled as an integral unit in a supporting and enclosing housing of insulating material; the overcurrent and tripping means being of the thermal type, the magnetic type, the electronic type, or a combination thereof. (IA/MT) 45-1998

(3) A circuit breaker that is assembled as an integral unit in a supporting and enclosing housing of insulating material. (IA/PSP) 1015-1997

mole (metric practice) The amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon-12 (adopted by 14th General Conference on Weights and Measures). *Note:* When the mole is used, the elementary entities must be specified and may be atoms, molecules, ions, electrons, other particles, or specified groups of such particles. (QUL) 268-1982s

molecular data element *See:* composite data element.

momentary When used as a modifier to quantify the duration of a short duration variation, refers to a time range at the power frequency from 30 cycles to 3 s. (SCC22) 1346-1998

momentary current The current flowing in a device, an assembly, or a bus at the major peak of the maximum cycle as determined from the envelope of the current wave. *Note:* The current is expressed as the rms value, including the dc component, and may be determined by the method shown in IEEE Std C37.09-1979. (SWG/PE) C37.100-1992

momentary disturbance A variation in the level of the steady-state supply voltage that results from surges, sags, faults, circuit and equipment switching, or from the operation of circuit breakers or reclosers resulting from their response to abnormal circuit conditions. *See also:* transient. (T&D/PE) 1250-1995

momentary event interruption An interruption of duration limited to the period required to restore service by an interrupting device. *Note:* Such switching operations must be completed in a specified time not to exceed 5 min. This definition includes all reclosing operations that occur within 5 min of the first interruption. For example, if a recloser or

breaker operates two, three, or four times and then holds, the event shall be considered one momentary interruption event. (PE/T&D) 1366-1998

momentary interruption (1) (electric power system) An interruption of duration limited to the period required to restore service by automatic or supervisory-controlled switching operations or by manual switching at locations where an operator is immediately available. *Note:* Such switching operations must be completed in a specified time not to exceed 5 minutes. (PE/PSE) 346-1973w

(2) Single operation of an interrupting device which results in a voltage zero. For example, two breaker or recloser operations equals two momentary interruptions. (PE/T&D) 1366-1998

(3) A type of short duration variation. The complete loss of voltage (<0.1 pu) on one or more phase conductors for a time period between 0.5 cycles and 3 s. (SCC22) 1346-1998

(4) (A) (power quality monitoring) A type of short duration variation. **(B) (power quality monitoring)** The complete loss of voltage (< 0.1 pu) on one or more phase conductors for a time period between 0.5 cycles and 3 s. (IA/PSE) 1100-1999

momentary rating (x-ray) A rating based on an operating interval that does not exceed five seconds. (NESC/NEC) [86]

monadic (mathematics of computing) Pertaining to an operation involving a single operand. *Contrast:* dyadic. (C) 1084-1986w

monadic Boolean operation A logical operation involving one operand. For example, the NOT operation. *Contrast:* dyadic Boolean operation. (C) 1084-1986w

monadic operation An operation involving one operand. For example, the square root operation. *Synonym:* unary operation. *Contrast:* dyadic operation. (C) 1084-1986w

monadic operator An operator that specifies an operation on one operand. For example, the square root operator. *Synonym:* unary operator. *Contrast:* dyadic operator. (C) 1084-1986w

monadic selective construct An if-then-else construct in which processing is specified for only one outcome of the branch, the other outcome resulting in skipping this processing. *Contrast:* dyadic selective construct. (C) 610.12-1990

monarch A processor that has the responsibility for initializing a part of the system, such as a ringlet. If a system has multiple monarchs, they eventually defer to an emperor that coordinates the initialization process. (C/MM) 1596-1992

monarch processor (1) The processor selected to manage the configuration and initialization of all modules on one logical bus. *See also:* monarch; emperor processor. (C/BA) 896.3-1993w, 896.4-1993w, 10857-1994

(2) The processor that is selected to partially initialize the local-bus resources and fetch the initial boot code. (C/BA/MM) 896.2-1991w, 1212-1991s, 896.10-1997

monitor (1) (token ring access method) That function that recovers from various error situations. It is contained in each ring station; however, only the monitor in one of the stations on a ring is the active monitor at any point in time. The monitor function in all other stations on the ring is in standby mode. (LM/C) 802.5-1985s

(2) (radioactivity monitoring instrumentation) An instrument that provides a continual measurement of one or more parameters and generates a signal to record or transmit that measurement. (NI) N42.17B-1989r

(3) (software) A software tool or hardware device that operates concurrently with a system or component and supervises, records, analyzes, or verifies the operation of the system or component. *Synonym:* execution monitor. *See also:* hardware monitor; software monitor. (C) 610.12-1990, 610.10-1994w

(4) (A) A device that observes and records selected activities with a computer system for analysis. **(B)** A generic term refering to any kind of display device. (C) 610.10-1994

(5) Continual or periodic testing with comparison to observe or determine trends. (SWG/PE) C37.10-1995

monitor direction In T101, refers to transmission from the controlled station (RTU/IED) to the controlling station (master/RTU). (PE/SUB) 1379-1997

monitor functions The functions that recover from various error situations and are contained in each ring station. In normal operation only one of the stations on a ring is the active monitor at any point in time. The monitor functions in all other stations on the ring ensures that the active monitor function is being performed. (C/LM) 8802-5-1998

monitor hazard current (health care facilities) The hazard current of the line isolation monitor alone. *See also:* hazard current. (EMB) [47]

monitoring (1) (data transmission) In communication, an observation of the characteristics of transmitted signals. (PE) 599-1985w

(2) (electric pipe heating systems) To check the operation and performance of an equipment or system by sampling the results of the operation. Monitoring with respect to electric pipe heating systems usually consists of checking system temperatures or operation of the heater circuits; voltage, current, etc. (PE/EDPG) 622A-1984r

(3) (electric heat tracing systems) To check the operation and performance of an equipment or system by sampling the results of the operation. Monitoring with respect to electric heat tracing systems usually consists of checking system temperatures or operation of the heater circuits; voltage, current, etc. (PE/EDPG) 622B-1988r

(4) The process of observing a system to verify that its parameters are within prescribed limits. (PE/EM) 1129-1992r

(5) That aspect of performance management concerned with tracking the system activities in order to gather the appropriate data for determining performance. (LM/C) 802.1F-1993r

monitoring amplifier (electroacoustics) An amplifier used primarily for evaluation and supervision of a program. *See also:* amplifier. (BT/AV) [34]

monitoring laboratory An accredited laboratory that prepares and distributes test materials to a service laboratory for the purpose of monitoring the day-to-day operation of the service laboratory. The service laboratory may also be a monitoring laboratory providing third party testing materials to another service laboratory or a special QA function within the service laboratory not involved in the routine processing of samples. (NI) N42.23-1995

monitoring relay A relay that has as its function to verify that system or control-circuit conditions conform to prescribed limits. (SWG/PE) C37.100-1992

monkey tail *See:* running board.

monochromatic (1) (color) (television) Having spectral emission over an extremely small region of the visible spectrum. (BT/AV) 201-1979w

(2) (fiber optics) Consisting of a single wavelength or color. In practice, radiation is never perfectly monochromatic but, at best, displays a narrow band of wavelengths. *See also:* spectral width; line source; coherent. (Std100) 812-1984w

monochromator (fiber optics) An instrument for isolating narrow portions of the spectrum. (Std100) 812-1984w

monochrome (television) Having only one chromaticity, usually achromatic. (BT/AV) 201-1979w

monochrome channel (television) Any path that is intended to carry the monochrome signal. (BT/AV) 201-1979w

monochrome channel bandwidth (television) The bandwidth of the path intended to carry the monochrome signal. (BT/AV) 201-1979w

monochrome display device A display device that can display only one color, or shades of that color, in addition to the background color. *Contrast:* color display device. *See also:* gray scale display device. (C) 610.10-1994w, 610.6-1991w

monochrome signal* (television) (monochrome television) A signal wave for controlling the luminance values in the picture. *See also:* luminance signal.

* Deprecated.

monochrome television The electric transmission and reception of transient visual images in only one chromaticity, usually achromatic. *Note:* Also termed black-and-white television. (BT/AV) 201-1979w

monochrome transmission (television) The transmission of a signal wave for controlling the luminance values in the picture, but not the chromaticity values. *Note:* Also termed black-and-white transmission. (BT/AV) 201-1979w

monoclinic system (piezoelectricity) A monoclinic crystal has either a single axis of twofold symmetry or a single plane of reflection symmetry, or both. Either the twofold axis or the normal to the plane of symmetry (they are the same if both exist, and this direction is called the unique axis in any case) is taken as the *b* or *Y* axis. Of the two remaining axes, the smaller is the *c* axis. In class 2, $+Y$ is chosen so that d_{22} is positive; $+Z$ is chosen parallel to c (sense trivial), and $+X$ such that it forms a right-handed system with $+Z$ and $+Y$. In class m, + Z is chosen so that d_{33} is positive, and $+X$ so that d_{11} is positive, and $+Y$ to form a right−handed system. *Note:* "Positive" and "negative" may be checked using a carbon-zinc flashlight battery. The carbon anode connection will have the same effect on meter deflection as the + end of the crystal axis upon release of compression. *See also:* crystal systems. (UFFC) 176-1978s

monocular visual field (illuminating engineering) The field for a single eye. (EEC/IE) [126]

monolithic integrated circuit An integrated circuit formed in a single piece of the substrate material. *Contrast:* hybrid circuit. (C) 610.10-1994w

monomode optical waveguide *See:* single mode optical waveguide.

monopinch Single-axis monompulse used in search radars to provide effective beam narrowing by displacing the displayed azimuth by the target angle off axis. Also called "ECS (electrical correction system)" and "EBS (electrical beam sharpening)." (AES/RS) 686-1990

monopolar ion density (dc electric-field strength and ion-related quantities) The number of ions of a given polarity per unit volume. The preferred unit is m^{-3}; another commonly used unit is cm^{-3}. (T&D/PE) 539-1990, 1227-1990r

monopolar space-charge density (overhead power lines) The space charge density of one polarity. The preferred unit is C/m^3. (T&D/PE) 539-1990, 1227-1990r

monopole An antenna, constructed above an imaging plane, that produces a radiation pattern approximating that of an electric dipole in the half-space above the imaging plane. (AP/ANT) 145-1993

monoprocessor architecture *See:* single processor architecture.

monopulse (1) Simultaneous lobing whereby direction-finding information is obtainable from a single pulse. (AP/ANT) 145-1993

(2) A radar technique in which information concerning the angular location of a target is obtained by comparison of signals received in two or more simultaneous antenna beams. *Notes:* 1. The simultaneity of the beams makes it possible to obtain a 2-D angle estimate from a single pulse (hence the term "monopulse"), although multiple pulses are usually employed to improve the accuracy of the estimate or to provide Doppler resolution. 2. The simultaneous lobe technique used in continuous wave (CW) radars is also referred to as monopulse, although pulses are not used. (AES) 686-1997

monostable Pertaining to a circuit or device that is capable of assuming one of two states, one of which is stable. *Synonym:* one-shot. *See also:* monostable circuit; bistable. (C) 610.10-1994w

monostable circuit A trigger circuit that has one stable and one quasistable state. (C) 610.10-1994w

monostatic cross section (1) The scattering cross section in the direction toward the source. *Synonym:* backscattering cross section. *Contrast:* bistatic cross section. (AP/ANT) 145-1993

(2) The scattering cross-section of a target in the retro-direction. (AP/PROP) 211-1997

monostatic radar (1) A radar where the transmit and receive antennas are collocated. (AP/PROP) 211-1997

(2) A radar system that transmits and receives through either a common antenna or through collocated antennas. (AES) 686-1997

monostatic reflectivity Reflectivity in which the reflected and incident waves follow the same path but in opposite directions. The transmit and receive antennas are in the same location, and normal incidence occurs at the reflecting surface. (EMC) 1128-1998

monotonic recorder A recorder that has output codes that do not decrease (increase) for a uniformly increasing (decreasing) input signal, disregarding random noise. (IM/WM&A) 1057-1994w

Monte Carlo method (1) In modeling and simulation, any method that employs Monte Carlo simulation to determine estimates for unknown values in a deterministic problem. (C) 610.3-1989w, 1084-1986w

(2) A numerical statistical technique that simulates random propagation and scattering processes by repeatedly calculating outcomes using parameters chosen at random from the processes' parameter space. (AP/PROP) 211-1997

Monte Carlo simulation A deterministic simulation in which random statistical sampling techniques are employed such that the result determines estimates for unknown values. (C) 610.3-1989w

month A service observing month, which is not generally a calendar month. *See also:* time-consistent traffic measures. (COM/TA) 973-1990w

month-end processing The operations required to complete a monthly cycle. For example, monthly ledger processing. (C) 610.2-1987

monthly cycle One complete execution of a data processing function that must be performed once a month. *See also:* daily cycle; annual cycle; weekly cycle. (C) 610.2-1987

monthly peak duration curve (power operations) A curve showing the total number of days within the month during which the net 60 min clock-hour integrated peak demand equals or exceeds the percent of monthly peak values shown. *See also:* generating station. (PE/PSE) 858-1987s, 346-1973w

monument *See:* hub.

MOP *See:* measure of performance.

mortising *See:* kerning.

MOS *See:* metal-oxide semiconductor.

MOSA *See:* metal-oxide surge arrester.

MOS transistor *See:* metal-oxide-semiconductor transistor.

most significant Within a group of data items (e.g., bits or bytes) that, taken as a whole, represents a numerical value, the item within the group with the greatest numerical weighting. (C/BA) 1275-1994

most significant bit (1) (mathematics of computing) The bit having the greatest effect on the value of a binary numeral; usually the leftmost bit. (TT/C) 1149.5-1995, 1084-1986w

(2) (test access port and boundary-scan architecture) The digit in a binary number representing the greatest numerical value. For shift-registers, the bit furthest from the serial output, or the last bit to be shifted out. Logic values expressed in binary form are shown with their most significant bit on the left. (TT/C) 1149.1-1990

(3) In an *n* bit binary word its contribution is (0 or 1 times 2^{n-1}) toward the maximum word value of 2^{n-1}.
(SWG/PE/SUB) C37.100-1992, C37.1-1987s

(4) The bit in the binary notation of a number that is the coefficient of the highest exponent possible.
(IM/ST) 1451.2-1997

most significant character The character in the leftmost position in a character string. *Contrast:* least significant character.
(C) 610.5-1990w

most significant digit The digit having the greatest effect on the value of a numeral; usually the leftmost digit; for example, the 7 in 756.4. *Contrast:* least significant digit.
(C) 610.5-1990w, 1084-1986w

most significant word (msw) In a multiword representation of a binary number, the word containing the msb of that number.
(TT/C) 1149.5-1995

motherboard The printed circuit board on which an SBus Card is mounted through the connectors specified by this standard.
(C/BA) 1496-1993w

(2) (A) The main circuit board within a computer, bearing the primary components of a computer system, including the processor, main storage, support circuitry, bus controller and bus connector. *See also:* backplane; daughter board. **(B)** A standard size printed circuit board to which are attached one or more daughterboards that add functionality and provide a selection of interface buffering. (C) 610.10-1994

motion To move the pointer while a mouse button is pressed.
(C) 1295-1993w

motion picture display *See:* cine-oriented image.

MOTIS The set of ISO standards for Message-Oriented Text Interchange Systems. (C/PA) 1224.1-1993w

MOTS *See:* modified-off-the-shelf.

motive power (valve actuators) The electric, fluid, air, nitrogen, or mechanical energy required to operate the actuator.
(PE/NP) 382-1985

motor A rotating machine that converts electrical energy into mechanical energy. As used in IEEE Std 1068-1996, the term can also be used to mean a generator. (IA/PC) 1068-1996

motor branch circuit A branch circuit that supplies energy to one or more motors and associated motor controllers.
(IA/MT) 45-1998

motor-circuit switch (1) A switch, rated in horsepower, capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage. (NESC/NEC) [86]

(2) (packaging machinery) A switch intended for use in a motor branch circuit. It is rated in horsepower and is capable of interrupting the maximum operating overload current of a motor of the same rating at the rated voltage.
(IA/PKG) 333-1980w

motor conduit box (packaging machinery) An enclosure on a motor for the purpose of terminating a conduit run and joining motor to power conductors. (IA/PKG) 333-1980w

motor control center (MCC) (1) (nuclear power generating station) A floor mounted assembly of one or more enclosed vertical sections having a common horizontal power bus and principally containing combination motor starting units. These units are mounted one above the other in the vertical sections. The sections may incorporate vertical buses connected to the common power bus, thus extending the common power supply to the individual units. Units may also connect directly to the common power bus by suitable connections.
(PE/NP) 649-1980s

(2) A group of devices assembled for the purpose of switching and protecting a number of load circuits. The control center may contain transformers, contactors, circuit breakers, protective devices, and other devices intended primarily for energizing or de-energizing load circuits. (IA/MT) 45-1998

motor control circuit The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current. Motor control circuits tapped from the load side of the motor branch-circuits, short-circuit protective devices shall not be considered to be branch circuits and shall be permitted to be protected by either supplementary or branch-circuit overcurrent protective devices. (NESC/NEC) [86]

motor-generator set A machine that consists of one or more motors mechanically coupled to one or more generators to convert electric power from one frequency to another, or to create an isolated power source. (IA/MT) 45-1998

motor home A vehicular unit designed to provide temporary living quarters for recreational, camping or travel use built on or permanently attached to a self-propelled vehicle chassis or on a chassis cab or van which is an integral part of the completed vehicle. *See also:* recreational vehicle.
(NESC/NEC) [86]

motoring An induction or synchronous generator operating as a motor and drawing power from the grid.
(PE/EDPG) 1020-1988r

motor lead extension cable (electric submersible pump cable) Three-conductor cable running from above the pump to the motor including motor connecting plug.
(IA/PC) 1017-1985s

motor meter A meter comprising a rotor, one or more stators, and a retarding element by which the resultant speed of the rotor is made proportional to the quantity being integrated (for example, power or current) and a register connected to the rotor by suitable gearing so as to count the revolutions of the rotor in terms of the accumulated integral (for example, energy or charge). *See also:* electricity meter.
(ELM) C12.1-1982s

motor parts (electric) A term applied to a set of parts of an electric motor. Rotor shaft, conventional stator-frame (or shell), end shields, or bearings may not be included, depending on the requirements of the end product into which the motor parts are to be assembled. (PE) [9]

motor reduction unit A motor with an integral mechanical means of obtaining a speed different from the speed of the motor. *Note:* Motor reduction units are usually designed to obtain a speed lower than that of the motor, but may also be built to obtain a speed higher than that of the motor.
(IA/MT) 45-1998

motor starting reactor A current limiting reactor used to limit the starting current of a machine. (PE/TR) C57.16-1996

motor supply line (rotating machinery) The source of electric power to which the windings of a motor are connected. *See also:* direct-current commutating machine; asynchronous machine. (PE) [9]

motor synchronizing Synchronizing by means of applying excitation to a machine running at slightly below synchronous speed. *See also:* asynchronous machine. (PE) [9]

motor-type watthour meter A motor in which the speed of the rotor is proportional to the power, with a readout device that counts the revolutions of the rotor. (ELM) C12.1-1982s

mount (1) (switching tubes) The flange or other means by which the tube, or tube and cavity, are connected to a waveguide. *See also:* gas tube. (ED) 161-1971w, [45]

(2) (A) To place a data medium in a position and condition so that it can be accessed; for example, to mount a magnetic tape on a tape drive and connect the tape drive to an application. **(B)** To insert a removable storage medium into place so that it can be accessed. (C) 610.10-1994

(3) The action of making a cartridge, side, partition, or volume accessible.

a) Mounting a *volume* is a logical action that implies mounting the one or more partitions that make up the volume.
b) Mounting a *partition* is a logical action that implies mounting the underlying side of a cartridge and engaging a software interface to gain access to that partition.
c) Mounting a *side* is the physical action of mounting a cartridge in a drive in a particular orientation.

d) Mounting a *cartridge* is the physical action of moving a cartridge to a drive and loading it into the drive.

(C/SS) 1244.1-2000

mounted plow (static or vibratory plows) (cable plowing) A unit which, to be operable, is semipermanently attached to and dependent upon a prime mover.

mounting lug, stator *See:* stator mounting lug.

mounting pitch (mp) (1) The interval of distance between repeated features, parts, or assemblies in a given space. (C/BA) 1301.2-1993

(2) The interval of distance between parts or assemblies in a given space. (C/MM) 1301.3-1992r

(3) The pitch used to arrange parts or assemblies in a given space. (C/MM) 1301.1-1991

mounting position (of a switch or fuse support) A position determined by, and corresponding to, the position of the base of the device. *Note:* The usual positions are

a) Vertical
b) Horizontal upright (when the fuse holder or fuse unit is mounted above the supporting insulators)
c) Horizontal underhung (when the fuse holder or fuse unit is mounted below the supporting insulators)
d) Angle (from vertical)

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

mounting rabbet (1) (packaging machinery) Any channel for holding wires, cables, or bus bars; designed expressly for, and used solely for, this purpose. (IA/PKG) 333-1980w

(2) (rotating machinery) A male or female pilot on a face or flange type of end shield of a machine, used for mounting the machine with a mating rabbet. The rabbet may be circular, or of other configuration and need not be continuous. (PE) [9]

mounting ring (rotating machinery) A ring of resilient or nonresilient material used for mounting an electric machine into a base at the end shield hub. (PE) [9]

mounting structure A structure for mounting an insulating support. (PE/SUB) 605-1998

mount point Either the root directory or a directory for which the *st_dev* field of the POSIX.1 *struct stat* differs from that of its parent directory. (C/PA) 9945-2-1993

mouse (1) A cursor control device, used as a locator, consisting of a hand-held control box within some sort of motion-sensing component such that the position or movement of the mouse on a surface controls the position of a cursor on a display. It is used to provide coordinate input data to a display device. *See also:* puck. (C) 610.6-1991w

(2) An electronic or mechanical input device that allows manipulation of the screen pointer. Mice also generally have one or more buttons that allow selection and manipulation of objects. (C) 1295-1993w

(3) A cursor control device used as a locator, consisting of a hand-held control box with some sort of motion-sensing component such that the position or movement of the mouse on a surface controls the motion of a cursor on a display device. *Note:* A mouse usually includes one or more buttons which provide additional input information. *See also:* mechanical mouse; shaft recorder; track ball; puck; bus mouse; optical mouse; serial mouse. (C) 610.10-1994w

mouse port A port used to interface with a mouse. (C) 610.10-1994w

mouth reference point (MRP) (1) A point on the axis of the artificial mouth, 25 mm in front of the center of the external plane of the lip ring. (COM/TA) 269-1992

(2) The point on the reference axis, 25 mm in front of the lip plane. (COM/TA) 1206-1994

(3) The point on the reference axis of the mouth simulator, 25 mm in front of the lip plane. (COM/TA) 1329-1999

mouth simulator A device consisting of a loudspeaker mounted in an enclosure and having a directivity and radiation pattern similar to those of the average human mouth. (COM/TA) 1329-1999

***m*–out–of–*n* code** A binary code in which *m* of the *n* digits that represent a word, character, or digit are in one state, and the other digits are in the opposite state. *See also:* two-out-of-five code. (C) 1084-1986w

movable bridge coupler (drawbridge coupler) A device for engaging and disengaging signal or interlocking connections between the shore and a movable bridge span. (EEC/PE) [119]

movable bridge rail lock (drawbridge)A mechanical device used to insure that the movable bridge rails are in proper position for the movement of trains. *See also:* interlocking. (EEC/PE) [119]

movable head *See:* floating head.

movable relay contact The member of a contact pair that is moved directly by the actuating system. (EEC/REE) [87]

move (1) (A) To read data from a source, altering the contents of the source location, and to write the same data elsewhere in a physical form that may differ from that of the source. For example, to move data from one file to another. *Contrast:* copy. **(B)** Sometimes, a synonym for **copy.** *See also:* store; load; fetch. (C) 610.12-1990

(2) The physical action of moving a cartridge from one location to another, where a location is a slot, a drive, or a port. (C/SS) 1244.1-2000

movement authority The authority for a train to enter and travel through a specific section of track, in a given travel direction. Movement authorities are assigned, supervised, and enforced by a communications-based train control system to maintain safe train separation, and to provide protection through interlockings. (VT/RT) 1474.1-1999

moving average An average calculated on a selected, changing subset of a time series of data. For example, a four-point moving average would be the average of the last four data points in the time series. (C) 1084-1986w

moving-base navigation aid An aid that requires cooperative facilities located upon a moving vehicle other than the one being navigated. *Notes:* 1. The cooperative facilities may move along a predictable path that is referenced to a specified coordinate system such as in the case of a nongeostationary navigation satellite. 2. Such an aid may also be designed solely to permit one moving vehicle to home upon another. *See also:* navigation. (AES/RS) 686-1982s, [42]

moving-base-derived navigation data Data obtained from measurements made at moving cooperative facilities located external to the navigated vehicle. *See also:* navigation. (AES/RS) 686-1982s, [42]

moving-base-referenced navigation data Data in terms of a coordinate system referenced to a moving vehicle other than the one being navigated. *See also:* navigation. (AES/RS) 686-1982s, [42]

moving-coil loudspeaker (dynamic loudspeaker) A moving-conductor loudspeaker in which the moving conductor is in the form of a coil conductively connected to the source of electric energy. (PE/EEC) [119]

moving-coil microphone (dynamic microphone) A moving-conductor microphone in which the movable conductor is in the form of a coil. *See also:* microphone. (EEC/PE) [119]

moving-conductor loudspeaker (moving conductor) A loudspeaker in which the mechanical forces result from magnetic reactions between the field of the current and a steady magnetic field. (EEC/PE) [119]

moving-conductor microphone A microphone the electric output of which results from the motion of a conductor in a magnetic field. *See also:* microphone. (EEC/PE) [119]

moving contact A conducting part that bears a contact surface arranged for movement to and from the stationary contact. (SWG/PE) C37.100-1992

moving-contact assembly (rotating machinery) That part of the starting switch assembly that is actuated by the centrifugal mechanism. *See also:* centrifugal starting switch. (EEC/PE) [119]

moving element (instrument) Those parts that move as a direct result of a variation in the quantity that the instrument is measuring. *Notes:* 1. The weight of the moving element includes one-half the weight of the springs, if any. 2. The use of the term movement is deprecated. (EEC/ERI/AII) [111], [102]

moving-iron instrument An instrument that depends for its operation on the reactions resulting from the current in one or more fixed coils acting upon one or more pieces of soft iron or magnetically similar material at least one of which is movable. *Note:* Various forms of this instrument (plunger, vane, repulsion, attraction, repulsion-attraction) are distinguished chiefly by mechanical features of construction. *See also:* instrument. (EEC/PE) [119]

moving-magnet instrument An instrument that depends for its operation on the action of a movable permanent magnet in aligning itself in the resultant field produced either by another permanent magnet and by an adjacent coil or coils carrying current, or by two or more current-carrying coils, the axes of which are displaced by a fixed angle. *See also:* instrument. (EEC/PE) [119]

moving-magnet magnetometer A magnetometer that depends for its operation on the torques acting on a system of one or more permanent magnets that can turn in the field to be measured. *Note:* Some types involve the use of auxiliary magnets (Gaussian magnetometer), others electric coils (sine or tangent galvanometer). *See also:* magnetometer. (EEC/PE) [119]

moving target detector (MTD) A low pulse-repetition frequency (PRF) pulsed Doppler system usually characterized by employing a filter bank, adaptive thresholds, clutter map, and more than one coherent processing interval at different PRFs. (AES) 686-1997

moving-target indicator improvement factor *See:* moving-target indication improvement factor.

moving-target indication (MTI) A technique that enhances the detection and display of moving radar targets by suppressing fixed targets. *Note:* Doppler processing is one method of implementation. (AES) 686-1997

moving-target indication improvement factor The signal-to-clutter power ratio at the output of the clutter filter divided by the signal-to-clutter power ratio at the input of the clutter filter, averaged uniformly over all target radial velocities of interest. *Synonym:* clutter improvement factor. (AES) 686-1997

MP A dialect of ALGOL 60 having extensible language features; used largely as a programming language for system software. (C) 610.13-1993w

mp *See:* mounting pitch.

MPE *See:* minimum perceptible erythema.

M peak (closed loop) (1) (control system feedback) The maximum value of the magnitude of the return transfer function for real frequencies, the value at zero frequency being normalized to unity. *See also:* feedback control system. (PE/EDPG) [3]

(2) (excitation systems) Mp is the maximum value of the closed-loop amplitude response. *See also:* bandwidth. (PE/EDPG) 421A-1978s

m-phase circuit A polyphase circuit consisting of m distinct phase conductors, with or without the addition of a neutral conductor. *Note:* In this definition it is understood that m may be assigned the integral value of three or more. For a two-phase circuit, see: two-phase circuit; two-phase, three-wire circuit; two-phase, four-wire circuit; two-phase, five-wire circuit. *See also:* network analysis. (Std100) 270-1966w

MPRF *See:* medium-pulse-repetition-frequency waveform.

MPSX *See:* Mathematical Programming System Extended.

MR *See:* modification request.

MRA *See:* minimum reception altitude.

MRP *See:* mouth reference point.

msb *See:* most significant bit.

MSB *See:* most significant bit.

MSC *See:* mile of standard cable; multistrip coupler.

M scan *See:* M-display.

M-scope A cathode-ray oscilloscope arranged to present an M-display. (AES/RS) 686-1990

MSDU *See:* MAC service data unit.

MSE *See:* maximum static error.

MSFN *See:* manned space flight network.

MSI *See:* medium scale integration.

msw *See:* most significant word.

MT *See:* machine translation.

M-T *See:* magneto-telluric.

MTBF (meantime between failure, mean time between failure) *See:* mean time before failures; mean time between failures.

MTE *See:* manual test equipment.

MTF *See:* mean time between failures.

m^3/s (cubic meters per second) Volume of water or liquid discharged per second under standard conditions. (T&D/PE) 957-1987s, 957-1995

MTI *See:* moving-target indication.

MTI improvement factor *See:* moving-target indication improvement factor.

MT interface The X.400 Gateway API. (C/PA) 1224.1-1993w

MTM-Bus A serial, backplane, test and maintenance bus, consisting of one or more logic boards, that can be used to integrate modules from different design teams or vendors into testable and maintainable subsystems, as specified in this Standard. (TT/C) 1149.5-1995

MTM-Bus interface logic The portion of a module that is designed for the purpose of MTM-Bus-compliant communication and through which takes place all the communication between the given module and any other on a given MTM-Bus implementation. MTM-Bus interface logic need not be defined on the basis of physical package boundaries. (TT/C) 1149.5-1995

MTM-Bus Master The module in control of the MTM-Bus. This is the module that, at a given time, is sourcing MCTL and MMD. (TT/C) 1149.5-1995

MTM-Bus mastership Property of being the current MTM-Bus Master module. (TT/C) 1149.5-1995

MTM-Bus Slave An MTM-Bus module that cannot command actions of other modules on the bus, but that may be selected by the MTM-Bus Master module to participate in a message. (TT/C) 1149.5-1995

MTTD *See:* mean time to diagnosis.

MTTF *See:* mean time to fix; mean time to repair.

MTTR *See:* mean time to repair.

MTU *See:* maximum transfer unit.

M204 *See:* MODEL 204.

M-type backward-wave oscillator *See:* carcinotron.

mu circuit (feedback amplifier) (μ circuit) That part that amplifies the vector sum of the input signal and the fed-back portion of the output signal in order to generate the output signal. *See also:* feedback. (EEC/PE) [119]

Mueller matrix The matrix that relates the Stokes vector of the scattered wave to the Stokes vector of the incident wave. *Synonym:* Stokes matrix. (AP/PROP) 211-1997

MUF *See:* maximum usable frequency.

mu factor (n-terminal electron tubes) (μ factor) The ratio of the magnitude of infinitesimal change in the voltage at the jth

electrode to the magnitude of an infinitesimal change in the voltage at the *l* th electrode under the conditions that the current to the *m* th electrode remain unchanged and the voltages of all other electrodes be maintained constant. *See also:* electron-tube admittances. (ED) 161-1971w, [45]

muffler (of a fuse) An attachment for the vent of a fuse, or a vented fuse, that confines the arc and substantially reduces the venting from the fuse. (SWG/PE) C37.100-1992

multi-access contention protocol The protocol used on the Aloha network by which a station transmits a message at will and then listens for an acknowledgment. If no ACK is received within a randomly selected timeout interval, the message is re-transmitted. (C) 610.7-1995

multiaddress *See:* multiple-address.

multiaddress format An address format that contains more than one address field; for example, a three-address instruction. (C) 610.10-1994w

multiaddress instruction (1) A computer instruction that contains more than one address field. *Synonym:* multiple-address instruction. *Contrast:* one-address instruction. (C) 610.12-1990

(2) A computer instruction that contains more than one address. *Synonym:* multiple instruction. (C) 610.10-1994w

multianode tank (multianode tube) An electron tube having two or more main anodes and a single cathode. *Note:* This term is used chiefly for pool-cathode tubes. (ED) [45]

multiaperture core A magnetic core, usually used for non-destructive reading, with two or more holes through which wires may be passed in order to create more than one magnetic path. *Synonym:* multiple aperture core. (C) 610.10-1994w

multiband image A set of images of the same scene, each formed by radiation from a different segment of the spectrum. (C) 610.4-1990w

multibeam antenna An antenna capable of creating a family of major lobes from a single non-moving aperture, through use of a multiport feed, with one-to-one correspondence between input ports and member lobes, the latter characterized by having unique main beam pointing directions. *Note:* Often, the multiple main beam angular positions are arranged to provide complete coverage of a solid angle region of space. (AP/ANT) 145-1993

multibeam oscilloscope An oscilloscope in which the cathode-ray tube produces two or more separate electron beams that may be individually or jointly controlled. *See also:* oscillograph; dual-beam oscilloscope. (IM/HFIM) [40], 311-1970w

multibit point interface Multibit (e.g., BCD, gray code) point. Master Station or RTU (or both) element(s) that inputs a series of multibit quantities in parallel. (SUB/PE) C37.1-1994

multicable penetrator A device consisting of multiple nonmetallic cable seals assembled in a surrounding metal frame, for insertion in openings in decks, bulkheads, or equipment enclosures and through which cables may be passed to penetrate decks or bulkheads or to enter equipment without impairing their original fire or watertight integrity. (IA/MT) 45-1998

multicast (1) A transmission mode in which a single message is sent to multiple network destinations, (i.e., one-to-many). (DIS/C) 1278.1-1995, 1278.2-1995

(2) A mode of operation in which the M-module transmits data simultaneously (i.e., during a single message) to a predefined subset of the S-modules currently connected to the bus. Also, a message transmitted in this mode. (TT/C) 1149.5-1995

(3) A technique that allows copies of a single packet to be passed to a selected subset of all possible destinations. *Contrast:* broadcast. (C) 610.7-1995

(4) A medium access control (MAC) address that has the group bit set. A multicast MAC service data unit (MSDU) is one with a multicast destination address. A multicast MAC protocol data unit (MPDU) or control frame is one with a multicast receiver address. (C/LM) 8802-11-1999

multicast address A special address indicating a specific group of end nodes.local area networks. (C) 8802-12-1998

multicast select bit 0; multicast select bit 1 Those bits in the Slave Status register of every S-module by means of which the S-module is programmed to be a member of one of the four possible multicast select groups. (TT/C) 1149.5-1995

multicast select group A group of S-modules that may be addressed simultaneously in a multicast. Four such groups are possible. Each has an address defined by IEEE 1149.5-1995. The multicast select group of an S-module is programmable. (TT/C) 1149.5-1995

multicavity magnetron A magnetron in which the circuit includes a plurality of cavities. *See also:* magnetron. (ED) 161-1971w

multicellular horn (electroacoustics) A cluster of horns with juxtaposed mouths that lie in a common surface. *Note:* The purpose of the cluster is to control the directional pattern of the radiated energy. (SP) [32]

multichannel analyzer (MCA) (x-ray energy spectrometers) An instrument which digitizes analog amplitude signal pulses and stores them in a memory as a function of their analog amplitude. (NPS/NID) 759-1984r

multichannel pulse-height analyzer (MCA) An electronic device that records and stores pulses according to their height. It consists of three function segments: an ADC to provide a means of measuring pulse amplitude; memory registers (one for each channel of the spectrum) to tally the number of pulses having an amplitude within a given voltage increment; an input/output section that permits transfer of the spectral information to other devices, such as a computer, oscilloscope display, or permanent storage media (disk or magnetic tape storage). *Synonym:* multichannel analyzer. (NI) N42.14-1991

multichannel radio transmitter A radio transmitter having two or more complete radio-frequency portions capable of operating on different frequencies, either individually or simultaneously. *See also:* radio transmitter. (AP/ANT) 145-1983s

multicharacter collating element A sequence of two or more haracters that collate as an entity. For example, in some coded character sets, an accented character is represented by a (nonspacing) accent, followed by the letter. Another example is the Spanish elements “ch” and “ll.” (C/PA) 9945-2-1993

multichip integrated circuit An integrated circuit whose elements are formed on or within two or more semiconductor chips that are separately attached to a substrate. *See also:* integrated circuit. (ED) 274-1966w

multicomputer *See:* multiprocessor.

multiconductor bundle *See:* bundle.

multiconstant speed motor (rotating machinery) A multispeed motor whose two or more definite speeds are constant or substantially constant over its normal range of loads; for example A synchronous or an induction motor with windings capable of various pole groupings. (PE) [9]

multidimensional system A system whose state vector has more than one element. *See also:* control system. (PE/EDPG) [3]

multidrop (1) Said of the configuration of a bus with a single shared medium segment that allows one or more of its module connectors to be unoccupied without disturbing bus operation. (TT/C) 1149.5-1995

(2) Pertaining to a communication arrangement where several devices share a common transmission channel. *Contrast:* multipoint. *See also:* point-to-point. (C) 610.7-1995

multielectrode tube An electron tube containing more than three electrodes associated with a single electron stream. (ED) 161-1971w

multi-element conduction interval (thyristor) That part of the conduction interval when ON-state current flows in more than one basic control element simultaneously. (IA/IPC) 428-1981w

multifamily dwelling A building containing three or more dwelling units. (NESC/NEC) [86]

multifiber cable (fiber optics) An optical cable that contains two or more fibers, each of which provides a separate information channel. *See also:* optical cable assembly; fiber bundle. (Std100) 812-1984w

multifiber joint (fiber optics) An optical splice or connector designed to mate two multifiber cables, providing simultaneous optical alignment of all individual waveguides. *Note:* Optical coupling between aligned waveguides may be achieved by various techniques including proximity butting (with or without index matching materials), and the use of lenses. (Std100) 812-1984w

multifield key *See:* concatenated key.

multiframe A cyclic set of consecutive frames in which the relative position of each frame can be identified. (COM/TA) 1007-1991r

multiframe alignment *See:* frame alignment.

multiframe alignment signal *See:* frame alignment signal.

multifrequency test A broad band test motion, simulating a typical seismic motion, that can produce a simultaneous response from all applicable modes of a multidegree-of-freedom system. (SWG/PE) C37.100-1992, C37.81-1989r

multifrequency transmitter A radio transmitter capable of operating on two or more selectable frequencies, one at a time, using present adjustments of a single radio-frequency portion. *See also:* radio transmitter. (AP/BT/ANT) 145-1983s, 182-1961w

multigrounded neutral system (power and distribution transformers) A distribution system of the four-wire type where all transformer neutrals are grounded, and neutral conductors are directly grounded at frequent points along the circuit. (PE/TR) C57.12.80-1978r

multilateration The location of an object by means of two or more range measurements from different reference points. It is a useful technique with radar because of the inherent accuracy of radar range measurement. *Note:* The use of three reference points to obtain target location is known as trilateration. (AES) 686-1997

multilayer Pertaining to a printed circuit board with several layers of printed circuit etched or patterned, one over the other and interconnected by electroplated holes which can also receive component leads. (C) 610.10-1994w

multilayer filter *See:* interference filter.

multilevel address *See:* indirect address.

multilevel network subject A network subject that causes information to flow through a network at two or more security levels without risk of compromise by transmitting sensitivity labels along with the data. *Contrast:* single-level network subject. (C) 610.7-1995

multilevel security (1) (software) A mode of operation permitting data at various security levels to be concurrently stored and processed in a computer system when at least some users have neither the clearance nor the need-to-know for all data contained in the system. *See also:* data; security; computer system. (C/SE) 729-1983s

(2) The capability of simultaneously separating and protecting information of two or more security levels during processing. (C/BA) 896.3-1993w

multilevel storage *See:* virtual storage.

multiline hunt group (MLHG) A group of lines that have a fixed alternate routing should one or more of the lines in the group be busy. (SCC31/AMR) 1390.3-1999, 1390.2-1999, 1390-1995

multilist A technique for organizing records in which records that have equivalent values for a given secondary key form a linked list. *Synonym:* multiple threaded list.

Student	Name	Homeroom	Link
1	MARY	25	4
2	JOE	27	15
3	JOHN	10	6
4	ANNE	25	5
5	SUSAN	25	–
6	KIM	10	21
7	BOB	26	16
•	•	•	•

multilist

(C) 610.5-1990w

multimedia A form of hypermedia consisting of a combination of two or more forms of the following: text, audio, graphics, animation, and full-motion video. (C) 610.10-1994w

multimode distortion (fiber optics) In an optical waveguide, that distortion resulting from differential mode delay. *Note:* The term "multimode dispersion" is often used as a synonym; such usage, however, is erroneous since the mechanism is not dispersive in nature. *Synonyms:* mode distortion; intermodal distortion. *See also:* distortion. (Std100) 812-1984w

multimode fiber (interferometric fiber optic gyro) An optical fiber waveguide that will allow more than one bound mode to propagate. (AES/GYAC) 528-1994

multimode group delay *See:* differential mode delay.

multimode laser (fiber optics) A laser that produces emission in two or more transverse or longitudinal modes. *See also:* mode; laser. (Std100) 812-1984w

multi-mode optical fiber An optical fiber that has a relatively large core in which the light bounces off the walls of the core. This results in multiple signal paths through the fiber which limits the maximum signaling rate more and more as the fiber length increases. *See also:* single-mode optical fiber. (C) 610.7-1995

multimode optical waveguide (fiber optics) An optical waveguide that will allow more than one bound mode to propagate. *Note:* May be either a graded index or step index waveguide. *See also:* mode; bound mode; single mode optical waveguide; power-law index profile; multimode distortion; mode volume; step index optical waveguide; normalized frequency. (Std100) 812-1984w

multimode SAW oscillator A surface acoustic wave oscillator in which more than one frequency satisfies the oscillation conditions. (UFFC) 1037-1992w

multimode waveguide A waveguide used to propagate power in more than one mode at a frequency of interest. (MTT) 146-1980w

multinomial A linear sum of terms involving powers of more than one variable.

$$\sum_{i_1=0}^{N_1}\sum_{i_2=0}^{N_2}\cdots\sum_{i_m=0}^{N_m} A(i_1, i_2, \ldots i_m)X_1^{i_2}X_2^{i_2}\ldots X_m^{i_m}$$

(IM/ST) 1451.2-1997

multioffice exchange (telephone switching systems) A telecommunications exchange served by more than one local central office. (COM) 312-1977w

multiorder lag (automatic control) In a linear system or element, lag of energy storage in two or more separate elements of the system. *Note:* It is evidenced by a differential equation of order higher than one, or by more than one time-constant. It may sometimes be approximated by a delay followed by a first-order or second-order lag. *See also:* lag. (PE/EDPG) [3]

multioutlet assembly A type of surface or flush raceway designed to hold conductors and receptacles, assembled in the field or at the factory. (NESC/NEC) [86]

multipactor limiter (nonlinear, active, and nonreciprocal waveguide components) A high-vacuum device that uses the multipacting phenomenon to limit high microwave power levels. (MTT) 457-1982w

multiparty ringing (telephone switching systems) By custom, any arrangement that provides for the individual ringing of more than four parties. (COM) 312-1977w

multipath (1) The propagation of a wave from one point to another by more than one path. When multipath occurs in radar, it usually consists of a direct path and one or more indirect paths by reflection from the surface of the earth or sea or from large man-made structures. At frequencies below approximately 40 MHz, it may also include more than one path through the ionosphere. (AES) 686-1997

(2) (facsimile) *See also:* multipath transmission.

multipath error The error in a radar-observed parameter caused by multipath. (AES) 686-1997

multipath transmission The propagation phenomenon that results in signals reaching the receiving antenna by two or more paths. When two or more signals arrive simultaneously, wave interference results. The received signal fades if the wave interference is time varying or if one of the terminals is in motion. (AP/PROP) 211-1997

multiphase transducer An interdigital transducer having more than two connections and that is driven in different phases; usually used for unidirectional transducers. (UFFC) 1037-1992w

Multipeer Virtual Port A Subgroup Port that represents the capability for communication with more than one other Remote Bridge in the Remote Bridge Group to which the Port attaches. *Note:* A Multipeer Virtual Port always has Multipeer Virtual Ports as its peer Ports. (C/LM) 802.1G-1996

multiple (1) A group of terminals arranged to make a circuit or group of circuits accessible at a number of points at any one of which connection can be made.

(2) To connect in parallel, or to render a circuit accessible at a number of points at any one of which connection can be made. (EEC/PE) [119]

(3) (analog computer) A junction into which patch cords may be plugged to form a common connection. (C) 165-1977w

multiple access (communication satellite) The capability of having simultaneous access to one communication satellite from a number of ground stations. (COM) [19]

multiple-address (multiaddress) (computers) Pertaining to an instruction that has more than one address part. (C) 162-1963w

multiple-address instruction *See:* multiaddress instruction.

multiple aperture core *See:* multiaperture core.

multiple arithmetic A system or method of performing ordinary arithmetic with a digital computer where several parts of one or more numbers are utilized in an arithmetic operation, yielding several results. (C) 1084-1986w

multiple-beam headlamp (illuminating engineering) A headlamp so designed as to permit the driver of a vehicle to use any one of two or more distributions of light on the road. (EEC/IE) [126]

multiple-beam klystron (microwave tubes) An O-type tube having more than one electron beam, and resonators coupled laterally but not axially. (ED) [45]

multiple-break relay contacts Contacts that open a circuit in two or more places. (EEC/REE) [87]

multiple-choice interaction An instruction method employed by some computer-assisted instruction systems, in which the student is asked to choose one of a set of multiple choice answers in response to a question. (C) 610.2-1987

multiple circuit Two or more circuits connected in parallel. *See also:* center of distribution. (PE/T&D) [10]

multiple-conductor cable A combination of two or more conductors cabled together and insulated from one another and from sheath or armor where used. *Note:* Specific cables are referred to as 3-conductor cable, 7-conductor cable, 50-conductor cable, etc. (T&D/PE) [10]

multiple-conductor concentric cable A cable composed of an insulated central conductor with one or more tubular stranded conductors laid over it concentrically and insulated from one another. *Note:* This cable usually has only two or three conductors. Specific cables are referred to as 2-conductor concentric cable, 3-conductor concentric cable, etc. (T&D/PE) [10]

multiple-current generator A generator capable of producing simultaneously currents or voltages of different values, either alternating-current or direct-current. (PE) [9]

multiple data stream *See:* multiple instruction, single data; multiple instruction, multiple data.

multiple ESD event An ESD event in which more than one discharge occurs. The time interval between successive discharges may be several microseconds to several tens of milliseconds. Related terms include multiple ESD, multiple discharge, and multiple. (SPD/PE) C62.47-1992r

multiple exclusive selective construct *See:* case.

multiple feeder A feeder that is connected to a common load in multiple with one or more feeders from independent sources. (SWG/PE) C37.100-1992

multiple frame transmission A transmission where more than one frame is transmitted when a token is captured. (C/LM) 8802-5-1998

multiple-gun cathode-ray tube A cathode-ray tube containing two or more separate electron-gun systems. (ED) [45]

multiple hoistway (elevators) A hoistway for more than one elevator or dumbwaiter. *See also:* hoistway. (PE/EEC) [119]

multiple inclusive selective construct A special instance of the case construct in which two or more different values of the control expression result in the same processing. For example, values 1 and 2 cause one branch, 3 and 4 cause another, and so on. (C) 610.12-1990

multiple independent outages Outage occurrences, each having distinct and separate initiating incidents, where no outage occurrence is the consequence of any other, but the outage states overlap. (PE/PSE) 859-1987w

multiple inheritance The ability of a subclass to inherit responsibilities from more than one superclass. (C/SE) 1320.2-1998

multiple instruction *See:* multiaddress instruction.

multiple instruction, multiple data Pertaining to a computer architecture in which the processors receive both instructions and data from separate sources. *See also:* multiple instruction, single data; single instruction, multiple data. (C) 610.10-1994w

multiple instruction, single data Pertaining to a computer architecture in which all processors receive instructions from separate (multiple) sources but receive data from a single (common) source. *See also:* single instruction, single data; multiple instruction, multiple data. (C) 610.10-1994w

multiple lampholder (current tap) A device that by insertion in a lampholder, serves as more than one lampholder. (EEC/PE) [119]

multiple lightning stroke A lightning stroke having two or more components. *See also:* direct-stroke protection. (T&D/PE) [10]

multiple list insertion sort *See:* address calculation sort.

multiple metallic rectifying cell An elementary metallic rectifier having one common electrode and two or more separate electrodes of the opposite polarity. *See also:* rectification. (EEC/PE) [119]

multiple modulation A succession of processes of modulation in which the modulated wave from one process becomes the modulating wave for the next. *Note:* In designating multiple-

modulation systems by their letter symbols, the processes are listed in the order in which the modulating function encounters them. For example, PPM-AM means a system in which one or more signals are used to position-modulate their respective pulse subcarriers which are spaced in time and are used to amplitude-modulate a carrier. (AP/ANT) 145-1983s

multiple outage event An outage event involving two or more components, or two or more units. (PE/PSE) 859-1987w

multiple outstanding transactions A state where more than one transaction has been issued and is pending completion. (C/MM) 1284.4-2000

multiple-packet error rejection Error handling and rejection notification occurs on a message-by-message basis. (C/MM) 1284.1-1997

multiple plug (cube tap) (plural tap) A device that, by insertion in a receptacle, serves as more than one receptacle. (PE/EEC) [119]

multiple-pointer form demand register (metering) An indicating demand register from which the demand is obtained by reading the position of the multiple pointers relative to their scale markings. The multiple pointers are resettable to zero. (ELM) C12.1-1982s

multiple precision (data management) (mathematics of computing) Pertaining to the use of two or more computer words to represent a number in order to preserve or gain precision. *Synonyms:* multiprecision; extended precision. *Contrast:* single precision. *See also:* triple precision; double precision. (C) 610.5-1990w, 1084-1986w

multiple-precision arithmetic Computer arithmetic performed with operands that are expressed in multiple-precision representation. (C) 1084-1986w

multiple punching Punching more than one hole in the same card column by several keystrokes, usually in order to extend the character set of the keypunch. (C) 610.10-1994w

multiple query error A word-serial protocol error that occurs when a servant receives a command requiring it to output a response to its data low register, and is unable to respond because of an unread response to a previous command. (C/MM) 1155-1992

multiple rectifier circuit A rectifier circuit in which two or more simple rectifier circuits are connected in such a way that their direct currents add, but their commutations do not coincide. *See also:* rectifier circuit element; rectification. (IA) [62]

multiple rho (electronic navigation) A generic term referring to navigation systems based on two or more distance measurements for determination of position. *See also:* navigation. (AES/RS) 686-1982s, [42]

multiple scatter A calculation of wave scattering from a surface or a collection of particles for which the field exciting each surface element or particle consists of the incident field plus the fields scattered by all the other surface elements or particles in their many interactions. A full multiple scattering solution is an exact solution to the problem. (AP/PROP) 211-1997

multiple-secondary current transformer (1) One that has three or more secondary windings, each on a separate magnetic circuit, with all magnetic circuits excited by the same primary winding. (PE/TR) C57.13-1993, C57.12.80-1978r **(2)** One that has two or more secondary coils each on a separate magnetic circuit with all magnetic circuits excited by the same primary winding. (PE/PSR) C37.110-1996

multiple-shot blasting unit A unit designed for firing a number of explosive charges simultaneously in mines, quarries, and tunnels. *See also:* blasting unit. (EEC/PE) [119]

multiple sound track Consists of a group of sound tracks, printed adjacently on a common base, independent in character but in a common time relationship, for example, two or more have been used for stereophonic sound recording. *See also:* phonograph pickup; multitrack recording system. (SP) [32]

multiple speed floating *See:* control system, multiple-speed floating.

multiple-speed floating control system (automatic control) A form of floating control system in which the manipulated variable may change at two or more rates each corresponding to a definite range of values of the actuating signal. (PE/EDPG) [3]

multiple spot scanning (facsimile) The method in which scanning is carried on simultaneously by two or more scanning spots, each one analyzing its fraction of the total scanned area of the subject copy. *See also:* scanning. (COM) 168-1956w

multiple street-lighting system A street-lighting system in which street lights, connected in multiple, are supplied from a low-voltage distribution system. *See also:* direct-current distribution; alternating-current distribution. (T&D/PE) [10]

multiple-supply-type ballast A ballast designed specifically to receive its power from an approximately constant-voltage supply circuit and that may be operated in multiple (parallel) with other loads supplied from the same source. *Note:* The deviation in source voltage ordinarily does not exceed plus or minus 5%, but in the case of ballasts designed for a stated input voltage range, the deviation may by greater as long as it is within the stated range. (EEC/LB) [97]

multiple switchboard (telephone switching systems) A telecommunications switchboard having each line connected to two or more jacks so that the line is within the reach of several operators. (COM) 312-1977w

multiple system (electrochemistry) The arrangement in a multielectrode electrolytic cell whereby in each cell all of the anodes are connected to the positive bus bar and all of the cathodes to the negative bus bar. *See also:* electrorefining. (EEC/PE) [119]

multiple threaded list *See:* multilist.

multiple thyristor converter A thyristor converter in which two or more simple thyristor converters are connected in such a way that their direct currents add, but their commutations do not coincide. (IA/IPC) 444-1973w

multiple-time-around echo *See:* second-time-around echo.

multiple transit signals Spurious signals having delay time related to the main signal delay by small odd integers. Specific multiple transit signals may be labeled the third transit (triple transit), fifth transit, etc. There is often a tradeoff available between multiple transit signal levels and bandwidth, delay time, insertion loss, and VSWR (dispersive and nondispersive delay lines). (UFFC) 1037-1992w, [22]

multiple transmission line A planar transmission-line configuration employing more than one parallel guiding structure, each of which could form a single planar transmission line. (MTT) 1004-1987w

multiple tube A space-charge-controlled tube or valve containing within one envelope two or more units or groups of electrodes associated with independent electron streams, through sometimes with one or more common electrodes. Examples: Double diode, double triode, triode-heptode, etc. *Synonym:* multiple valve. *See also:* multiple-unit tube. (ED) 161-1971w

multiple tube counts Spurious counts induced by previous tube counts. (NI/NPS) 309-1999

multiple-tuned antenna An antenna designed to operate, without modification, in any of a number of pre-set frequency bands. (AP/ANT) 145-1993

multiple twin quad (telephony) A quad in which the four conductors are arranged in two twisted pairs, and the two pairs twisted together. *See also:* cable. (EEC/PE) [119]

multiple unit A system of simultaneous control of all vehicles in a consist from one master control through the means of trainlines. (VT) 1475-1999

multiple-unit control (electric traction) A control system in which each motive-power unit is provided with its own controlling apparatus and arranged so that all such units operating

together may be controlled from any one of a number of points on the units by means of a master controller. (EEC/PE) [119]

multiple-unit electric car An electric car arranged either for independent operation or for simultaneous operation with other similar cars (when connected to form a train of such cars) from a single control station. *Note:* A prefix diesel-electric, gas-electric, etc., may replace the word electric. *See also:* electric motor car. (EEC/PE) [119]

multiple-unit electric locomotive A locomotive composed of two or more multiple-unit electric motive-power units connected for simultaneous operation of all such units from a single control station. *Note:* A prefix diesel-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

multiple-unit electric motive-power unit An electric motive-power unit arranged either for independent operation or for simultaneous operation with other similar units (when connected to form a single locomotive) from a single control station. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

multiple-unit electric train A train composed of multiple-unit electric cars. *See also:* electric motor car. (EEC/PE) [119]

multiple-unit tube *See:* multiple tube.

multiple valve *See:* multiple tube.

multiple-valve unit (MVU) A single structure comprising more than one valve. (SUB/PE) 857-1996

multiplex To interleave or simultaneously transmit two or more messages on a signal channel. (C/PE) 610.10-1994w, 599-1985w

multiplex equipment, asynchronous A transmission interconnection device that interleaves nonsynchronous low bit-rate digital signals to form a single high bit-rate digital signal. It also performs the reverse function of dividing a high bit-rate digital signal into multiple nonsynchronous low bit-rate signals. The two processes are referred to in this document as multiplexing (combining signals) and demultiplexing (separating signals). Similarly, the mechanisms used to perform these functions are referred to as multiplex equipment. (COM/TA) 1007-1991r

multiplex equipment, digital The equipment for combining digital signals from one digital level to a higher digital level. (COM/TA) 1007-1991r

multiplex equipment, primary The equipment for combining analog (vf) signals, or digital data signals, to a primary rate digital signal and vice versa. (COM/TA) 1007-1991r

multiplexer (A) (supervisory control, data acquisition, and automatic control) A device that allows the interleaving of two or more signals to a single line or terminal. **(B) (supervisory control, data acquisition, and automatic control)** A device for selecting one of a number of inputs and switching its information to the output. (SWG/PE/SUB) C37.1-1987, C37.100-1992

(2) (A) A device that allows the transmission of a number of different signals simultaneously over a single channel or transmission facility. *Synonym:* multiplexor. **(B)** A device capable of interleaving the events of two or more activities or of distributing the events of an interleaved sequence to their respective activities. *Contrast:* demultiplexer. (C) 610.7-1995

multiplexing (1) (modulation systems) (data transmission) The combining of two or more signals into a single wave (the multiplex wave) from which the signals can be individually recovered. (PE) 599-1985w

(2) The division of a transmission facility into two or more channels, either by splitting the frequency band transmitted by the channel into narrower bands, each of which is used to constitute a distinct channel (frequency division multiplexing) or by allotting this common channel to several different information channels one at a time (time-division multiplexing). (SUB/PE) 999-1992w

(3) Subdivision of a common channel to make two or more channels by splitting the frequency band transmitted by the common channel into narrower bands, by allotting this common channel to several different information channels, or by other means, one at a time. *Contrast:* demultiplexing. *See also:* time compression multiplexing; frequency-division multiplexing; time-division multiplexing; synchronous time division multiplexing; time multiplexed switching. (C) 610.7-1995

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

multiplexor (hybrid computer linkage components) An electronic multiposition switch under the control of a digital computer, generally used in conjunction with an analog-to-digital converter (ADC), that allows for the selection of any one of a number of analog signals (up to the maximum capacity of the multiplexor), as the input to the ADC. A device that allows the interleaving of two or more signals to a single line or terminus. (C) 166-1977w

multiplex printing telegraphy That form of printing telegraphy in which a line circuit is employed to transmit in turn one character (or one or more pulses of a character) for each of two or more independent channels. *See also:* time-division multiplexing; telegraphy; frequency-division multiplexing. (EEC/PE) [119]

multiplex radio transmission The simultaneous transmission of two or more signals using a common carrier wave. *See also:* radio transmission. (AP/ANT) 145-1983s

multiplex wave winding (rotating machinery) A wave winding in which the number of parallel circuits is equal to a multiple of two, whatever the number of poles. (BT) 204-1961w

multiplicand A number to be multiplied by another number (the multiplier) to produce a result (the product). (C) 1084-1986w

multiplication factor (1) (power operations) A measure of the change in the neutron population in a reactor core from one generation to the subsequent generation. *See also:* effective multiplication factor; infinite multiplication factor. (PE/PSE) 858-1987s

(2) (multiplier type of valve or tube) (thermionics) The ratio of the output current to the primary emission current. *See also:* electron emission. (ED) [45], [84]

multiplication time *See:* multiply time.

multiplication transformation function In hashing, a hash function that returns the original key multiplied by some value. For example, in the function below, the original key is multiplied by the length of the record in which it is found.

Original Record	Calculation	Hash Value
35 Bob White	$35 \times 13 = 448$	448
41 Richard Doe	$41 \times 17 = 697$	697

See also: mid-square function. (C) 610.5-1990w

multiplicative array antenna system A signal-processing antenna system consisting of two or more receiving antennas and circuitry in which the effective angular response of the output of the system is related to the product of the radiation patterns of the separate antennas. (AP/ANT) 145-1993

multiplier (1) (general) A device that has two or more inputs and whose output is a representation of the product of the quantities represented by the input signals. (Std100) 270-1966w

(2) (analog computer) In an analog computer, a device capable of multiplying one variable by another. (C) 165-1977w

(3) (mathematics of computing) A number by which another number (the multiplicand) is multiplied to produce a result (the product). (C) 1084-1986w

(4) A device capable of multiplying one variable by another. *Contrast:* divider. *See also:* two-quadrant multiplier; one-quadrant multiplier; analog multiplier; four-quadrant multiplier. (C) 610.10-1994w

(5) *See also:* normal linearity; servo multiplier; constant multiplier.

multiplier, constant *See:* constant multiplier.

multiplier, electronic *See:* electronic multiplier.

multiplier, four-quadrant *See:* four-quadrant multiplier.

multiplier, one-quadrant *See:* one-quadrant multiplier.

multiplier phototube A phototube with one or more dynodes between its photocathode and output electrode. *See also:* amplifier; photocathode. (ED/NPS) 161-1971w, 398-1972r

multiplier potentiometer (analog computer) Any of the ganged potentiometers of a servo multiplier that permit the multiplication of one variable by a second variable. (C) 165-1977w, 166-1977w

multiplier section, electron *See:* electron multiplier.

multiplier servo An electromechanical multiplier in which one variable is used to position one or more ganged potentiometers across which the other variable voltages are applied. *See also:* electronic analog computer; multiplier. (C) 165-1977w, 166-1977w, 610.10-1994w

multiplier, two-quadrant *See:* two-quadrant multiplier.

multiplying-digital-to-analog converter *See:* digital-to-analog multiplier.

multiplying punch *See:* calculating punch.

multiply time The elapsed time required to perform one multiplication operation, not including the time required to obtain the operands or to return the result to storage. *Synonym:* multiplication time. *Contrast:* subtract time; add time. (C) 610.10-1994w

multipoint Pertaining to a circuit or a communication arrangement where one line connects several stations. *Contrast:* multidrop. *See also:* point-to-point. (C) 610.7-1995

multipoint circuit (data transmission) A circuit interconnecting several stations. (PE) 599-1985w

multipoint connection (1) A configuration in which more than two stations are connected to a shared communications channel. (LM/COM) 168-1956w

(2) A connection between two data stations using one or more intermediate stations. (C) 610.7-1995

multipole fuse (1) (high-voltage switchgear) An assembly of two or more single-pole fuses. (SWG/PE) C37.40-1993

(2) *See also:* pole. (SWG/PE) C37.100-1981s

multipole operation (of a circuit breaker or switching device) A description term indicating that all poles of the device are linked mechanically, electrically, or by other means such that they change state (open or close) substantially simultaneously. Devices may have capability for multipole opening, multipole closing, or both. (SWG/PE) C37.100-1992

multi-port *See:* fan-out box.

multiport bridge A bridge that interconnects two or more DQDB subnetworks. (LM/C) 8802-6-1994

multiport memory A type of memory that can be simultaneously read or written to by two or more devices through the use of separate address and data buses. (C) 610.10-1994w

multi-port module A module that has a special pin assignment to connect to multiple other modules. Examples of multi-port modules are switch modules and multi-port memory modules. (C/BA) 14536-1995

multiposition relay A relay that has more than one operate or nonoperate position, for example, a stepping relay. *See also:* relay. (EEC/REE) [87]

multiposition switches (A) (self-returning switch) A switch that returns to a stated position when it is released from any one of a stated set of other positions. **(B)** (spring return switch) A switch in which the self-returning function is effected by the action of a spring. **(C)** (gravity-return switch) A switch in which the self-returning function is effected by the action of weight. **(D)** (self-positioning switch) A switch that assumes a certain operating position when it is placed in the neighborhood of the position. *See also:* switch. (IA/ICTL/IAC) [60]

multiprecision *See:* multiple precision.

multipressure-zone pothead (electric power distribution) A pressure-type pothead intended to be operated with two or more separate pressure zones that may be at different pressures. *See also:* pressure-type pothead; single-pressure-zone potheads. (PE) 48-1975s

multipressure zone termination *See:* pressure-type termination.

multiprocessing (1) (computers) Pertaining to the simultaneous execution of two or more programs or sequences of instructions by a computer network consisting of two or more processors. *See also:* parallel processing; multiprogramming. (C) [20]

(2) (software) A mode of operation in which two or more processes are executed concurrently by separate processing units that have access (usually) to a common main storage. *Contrast:* multiprogramming. *See also:* time sharing; multitasking. (C) 610.12-1990

multiprocessor (computers) A computer capable of multiprocessing. (C) [20], [85]

(2) (A) A computer or network of computers that can execute two or more programs concurrently under integrated control. **(B)** A computer that has more than one processor. *Contrast:* uniprocessor. (C) 610.10-1994

multiprocessor architecture An architecture employing two or more stand-alone processors whose activities are coordinated under a central control. *Contrast:* single processor architecture. (C) 610.10-1994w

multiprogramming (1) (computers) Pertaining to the interleaved execution of two or more programs by a computer. *See also:* parallel processing. (C) [20], [85]

(2) (software) A mode of operation in which two or more computer programs are executed in an interleaved manner by a single processing unit. *Contrast:* multiprocessing. *See also:* multitasking; time sharing. (C) 610.12-1990

multi-radio-frequency-channel transmitter *See:* multichannel radio transmitter.

multirange amplifier An amplifier that has a switchable, programmable, or automatically set amplification factor in order to adapt different analog signal ranges to a specified output range. (C) 610.10-1994w

multirate meter A meter that registers at different rates or on different dials at different hours of the day. *See also:* electricity meter. (EEC/PE) [119]

multi-ratio current transformer (1) (instrument transformers) (power and distribution transformers) One from which more than one ratio can be obtained by the use of taps on the secondary winding. (PE/PSR) C37.110-1996, C57.12.80-1978r

(2) One with three or more ratios obtained by the use of taps on the secondary winding. (PE/TR) C57.13-1993

multirestraint relay A restraint relay so constructed that its operation may be restrained by more than one input quantity. (SWG/PE) C37.100-1992

multisection coil (rotating machinery) A coil consisting of two or more coil sections or a group of turns, each section or group being individually insulated. (PE) [9]

multisegment magnetron A magnetron with an anode divided into more than two segments, usually by slots parallel to its axis. *See also:* magnetron. (ED) 161-1971w

multispeed motor A motor that can be operated at any one of two or more definite speeds, each being practically independent of the load. For example, a dc motor with two armature windings, or an induction motor with windings capable of various pole groupings. (IA/MT) 45-1998

multistage tube (x-ray tubes) An x-ray tube in which the cathode rays are accelerated by multiple ring-shaped anodes at progressively higher potential. (ED) [45]

multistate indication *See:* supervisory control functions.

multistatic radar A radar system having two or more transmitting or receiving antennas with all antennas separated by

large distances when compared to the antenna sizes. *See also:* bistatic radar. (AES) 686-1997

multistator electromechanical watthour meter A multistator meter (polyphase electromechanical watthour meter or multielement watthour meter) is a watthour meter containing more than one stator. (ELM) C12.10-1987

multi-step control *See:* step control system.

multi-step control system *See:* step control system.

multistream computer A computer that is capable of executing multiple streams of instructions simultaneously. *See also:* multiple instruction, multiple data; multiple instruction, single data. (C) 610.10-1994w

multistrip coupler (MSC) An array of metal strips deposited on a piezoelectric substrate with lengths transverse to the propagation direction, which transfers acoustic power from one acoustic path to an adjacent parallel path. (UFFC) 1037-1992w

multi-tap (1) A passive distribution component composed of a directional coupler and a splitter with two or more output connections. *See also:* tap. (LM/C) 802.7-1989r

(2) *See also:* fan-out box. (C) 610.7-1995

multitasking (1) A mode of operation in which two or more tasks are executed in an interleaved manner. *See also:* time sharing; multiprogramming; multiprocessing. (C) 610.12-1990

(2) A mode of operation that provides for concurrent performance or interleaved execution of two or more tasks. (C) 610.10-1994w

multiterminal A transmission line with more than two terminals having a source of power. (PE/PSR) C37.113-1999

multiterminal surge-protective device A protective device that has three or more terminals, usually containing both series and parallel elements between the terminals. (SPD/PE) C62.62-2000

multitrace (oscilloscopes) A mode of operation in which a single beam in a cathode-ray tube is shared by two or more signal channels. *See also:* chopped display; alternate display; oscillograph. (IM/HFIM) [40]

multitrack recording system A system that provides two or more recording tracks on a medium, resulting in either related or unrelated recordings in common time relationship. *See also:* multiple sound track; phonograph pickup. (SP) [32]

multivalent function If to any value of u there corresponds more than one value of x (or more than one set of values of $x_1, x_2, \ldots, x_n$) then u is a multivalent function. Thus $u = \sin x$, $u = x^2$ are multivalent. (Std100) 270-1966w

multivalued A mapping that is not a function. *Contrast:* function; single-valued. (C/SE) 1320.2-1998

multivalued dependency A type of dependency among three attributes A, B, and C in relation R, in which B is multivalued dependent on A if, and only if, the set of values of B that match a given pair of values for A and C depends only on the value for A and is independent of the value for C. *See also:* fourth normal form. (C) 610.5-1990w

multivalued function If to any value of x (or any set of values of $x_1, x_2, \ldots, x_n$) there corresponds more than one value of u, then u is a multivalued function. Thus $u = \cos^{-1} x$ is multivalued. (Std100) 270-1966w

multivalued property A property with a multi-valued mapping. *Contrast:* single-valued property. (C/SE) 1320.2-1998

multivariable function generator (analog computer) A function generator with more than one input. (C) 165-1977w

multivariable system A system whose input vector and.or output vector has more than one element. (CS/PE/EDPG) [3]

multivibrator A relaxation oscillator employing two electron tubes to obtain the in-phase feedback voltage by coupling the output of each to the input of the other through, typically, resistance-capacitance elements. *Notes:* 1. The fundamental frequency is determined by the time constants of the coupling elements and may be further controlled by an external voltage. 2. A multivibrator is termed free-running or driven, according to whether its frequency is determined by its own circuit constants or by an external synchronizing voltage. The name multivibrator was originally given to the free-running multivibrator, having been suggested by the large number of harmonics produced. 3. When such circuits are normally in a nonoscillating state and a trigger signal is required to start a single cycle of operation, the circuit is commonly called a one-shot, a flip-flop, or a start-stop multivibrator. *See also:* oscillatory circuit. (AP/ANT) 145-1983s

multivoltage control (elevators) A system of control that is accomplished by impressing successively on the armature of the driving-machine motor a number of substantially fixed voltages such as may be obtained from multicommutator generators common to a group of elevators. *See also:* control. (EEC/PE) [119]

multiway merge sort A merge sort in which the set to be sorted is divided into two or more ordered subsets that are merged by comparing the smallest items of each subset, outputting the smallest of those, then repeating the process. *See also:* two-way merge sort. (C) 610.5-1990w

multiway radix trie search A radix trie search using a trie of order greater than 2, in which more than one digit is considered on each branch. *See also:* binary radix trie search. (C) 610.5-1990w

multiway tree A tree of order greater than 2. (C) 610.5-1990w

multiwire branch circuit A branch circuit consisting of two or more ungrounded conductors having a potential difference between them, and a grounded conductor having equal potential difference between it and each ungrounded conductor of the circuit and which is connected to the neutral conductor of the system. (NESC/NEC) [86]

multiwire element A radiating element composed of several wires connected in parallel, the assemblage being the electrical equivalent of a single conductor larger than any one of the individual wires. (AP/ANT) 145-1993

MUMPS *See:* Massachusetts General Hospital Utility Multi-Programming System.

municipal fire-alarm system A manual fire-alarm system in which the stations are accessibly located for operation by the public, and the signals of which register at a central station maintained and operated by the municipality. *See also:* protective signaling. (EEC/PE) [119]

municipal police report system A system of strategically located stations from any one of which a patrolling policeman may report his presence to a supervisor in a central office maintained and operated by the municipality. *See also:* protective signaling. (EEC/PE) [119]

M-unit *See:* refractive modulus.

Munsell chroma (1) (illuminating engineering) The index of perceived (Y) and chromaticity coordinates (x,y) for CIE Standard Illuminant C and the CIE 1931 Standard Observer. (EEC/IE) [126]

(2) (television) The dimension of the Munsell system of color that corresponds most closely to saturation. *Note:* Chroma is frequently used, particularly in English works, as the equivalent of saturation. (BT/AV) 201-1979w

Munsell color system (illuminating engineering) A system of surface-color specification based on perceptually uniform color scales for the three variables: Munsell hue, Munsell value, and Munsell chroma. For an observer of normal color vision, adapted to daylight, and viewing the specimen when illuminated by daylight and surrounded with a middle gray to white background, the Munsell hue, value, and chroma of the color correlate well with the hue, lightness, and perceived chroma. *Note:* A number of other color specification systems have been developed, usually for specific commercial purposes. (IE/EEC/BT/AV) [126], 201-1979w

Munsell hue (1) (H illuminating engineering) The index of the hue of the perceived object color defined in terms of the luminance factor (V) and chromaticity coordinates (x,y) for

CIE Standard Illuminant C and the CIE 1931 Standard Observer. (EEC/IE) [126]

(2) (television) The index of the hue of the perceived object color defined in terms of the Y value and chromaticity coordinates (x,y) of the color of the light reflected or transmitted by the object. (BT/AV) 201-1979w

Munsell value (1) (V illuminating engineering) The index of the lightness of the perceived object color defined in terms of the luminance factor (Y) for CIE Standard Illuminant C and the CIE 1931 Standard Observer. *Note:* The exact definition gives Y as a 5th power function of V so that tabular or iterative methods are needed to find V as a function of Y. However, V can be estimated within ±0.1 by V11.6 (Y/100)1/3-1.6 or within ±0.6 by VY1/2 where Y is the luminance factor expressed in percent. (IE/EEC) [126]

(2) (television) The index of the lightness of the perceived object color defined in terms of the Y value. *Note:* Munsell value is approximately equal to the square root of the reflectance expressed in percent. (BT/AV) 201-1979w

musa antenna *See:* antenna.

must operate value *See:* relay-must-operate value.

mutable class A class for which the set of instances is not fixed; its instances come and go over time. *Contrast:* immutable class. *See also:* state class. (C/SE) 1320.2-1998

mutation *See:* program mutation.

mutation testing A testing methodology in which two or more program mutations are executed using the same test cases to evaluate the ability of the test cases to detect differences in the mutations. (C) 610.12-1990

mutex (1) A synchronization object used to allow multiple threads to serialize their access to shared data. This term is derived from the capability it provides, namely, mutual exclusion. The thread that has locked a mutex becomes its owner and remains the owner until that same thread unlocks the mutex. (C/PA) 9945-1-1996

(2) A synchronization object used to allow multiple tasks (possibly in different processes) to serialize their access to shared data or other shared resources. The name derives from the capability it provides, namely, mutual exclusion. (C) 1003.5-1999

(3) A mechanism for implementing mutual exclusion. (IM/ST) 1451.1-1999

mutex owner The task that last locked a mutex, until that same task unlocks the mutex. (C) 1003.5-1999

Mutex Service An instance of the class `IEEE1451_MutexService` or of a subclass thereof. (IM/ST) 1451.1-1999

mutual capacitance The capacitance between two conductors in a pair when the rate of change of the charges on the two are equal in magnitude but opposite in sign, and the potentials of the remaining conductors in the cable are held constant. (PE/PSC) 789-1988w

mutual coherence function The normalized coherence function. *See also:* coherence function. (AP/PROP) 211-1997

mutual conductance The control-grid-to-anode transconductance. *See also:* ON period. (ED) [45], [84]

mutual coupling effect (A) (on input impedance of an array element) The change in input impedance of an array element from the case when all other elements are present but open circuited to the case when all other elements are present and excited. **(B)** (on the radiation pattern of an array antenna) The change in antenna pattern from the case when a particular feeding structure is attached to the array and mutual impedances among elements are ignored in deducing the excitation, to the case when the same feeding structure is atached to the array and mutual impedances among elements are included in deducing the excitation. (AP/ANT) 145-1993

mutual impedance (1) The mutual impedance between any two terminal pairs in a multielement array antenna is equal to the open-circuit voltage produced at the first terminal pair divided by the current supplied to the second when all other terminal pairs are open circuited. *See also:* antenna. (AP/ANT) [35], 149-1979r, 145-1993

(2) The ratio of the total induced open-circuit voltage on the disturbed circuit to the disturbing electric supply system phase current, with the effect of all conductors taken into account. (PE/PSC) 367-1996

mutual inductance The common property of two electric circuits whereby an electromotive force is induced in one circuit by a change of current in the other circuit. *Notes:* 1. The coefficient of mutual inductance M between two windings is given by the following equation

$$M = \frac{\partial i}{\partial \lambda}$$

where λ is the total flux linkage of one winding and i is the current in the other winding. 2. The voltage e induced in one winding by a current i in the other winding is given by the following equation

$$e = -\left[M \frac{\mathrm{d}i}{\mathrm{d}t} + i \frac{\mathrm{d}M}{\mathrm{d}t} \right]$$

If M is constant

$$e = -M \frac{\mathrm{d}i}{\mathrm{d}t}$$

(CHM) [51]

mutual inductor An inductor for changing the mutual inductance between two circuits. (Std100) 270-1966w

mutual information The amount of information about one event, say $x = a$, provided by another event, say $y = b$, for example, $I_{x,y}^{(a;b)} = \log P_{x\,y}^{(a\,b)}$ over $P_x^{(a)}$, where $P_x^{(a)}$ is the probability that $x = a$ and $P_{x\,y}^{(a\,b)}$ is the probability that $x = a$ and $P_{x\,y}^{(a\,b)}$ is the conditional probability that $x = a$ given that $y = b$. *Note:* This quantity is symmetric in its two arguments; that is, $I_{y,x}^{(b;a)} = I_{x,y}^{(a;b)}$. *See also:* information. (IT) [123]

mutual interference chart A plot or matrix, with ordinate and abscissa representing the tuned frequencies of a single transmitter-receiver combination, that indicates potential interference to normal receiver operation by reason of interaction of the two equipments under consideration at any combination of tuned transmit/receive frequencies. *Note:* This interaction includes transmitter harmonics and other spurious emissions, and receiver spurious responses and images. *See also:* electromagnetic compatibility. (EMC) [53]

mutually exclusive events (nuclear power generating station) (reliability analysis of nuclear power generating station safety systems) Events that cannot exist simultaneously. (PE/NP) 352-1987r

mutual resistance of grounding electrodes Equal to the voltage change in one of them produced by a change of one ampere of direct current in the other, and is expressed in ohms. (PE/PSIM) 81-1983

mutual surge impedance (surge arresters) The apparent mutual impedance between two lines, both of infinite length. *Note:* It determines the relationship between the surge voltage induced into one line by a surge current of short duration in the other. (PE) [8], [84]

MUX *See:* multiplexer.

MVU *See:* multiple-valve unit.