IEEE Std 100-1996

The IEEE Standard Dictionary of Electrical and Electronics Terms

Sixth Edition

Standards Coordinating Committee 10, Terms and Definitions
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cess of determining the degree to
gn, or implementation of a model
aspects of the system being mod-
cation. *See also:* fidelity.
(C) 610.3-1989
ing the degree to which a model
of the real world from the per-
(s) of the model.
(C/DIS) 1278.3-1996
ocess of determining the degree
ealization steps of a model; for
rements and the design, or be-
nplementation. *Contrast:* model
(C) 610.3-1989
ng that a model implementation
veloper's conceptual description
(C/DIS) 1278.3-1996
n) A contraction of MOdulator-
t that connects data terminal
on line. (PE) 599-1985w
ta acquisition, and automatic
ulator device that converts serial
the signal form appropriate for
channel.
B) C37.1-1994, C37.100-1992
etworks) A modulator-demod-
encodes digital information onto
rying the amplitude, frequency,
demodulator extracts digital in-
odified carrier. A modem trans-
m suitable for transmission over
(C/LM) 802.7-1989
and demodulates signals trans-
ion facilities. One of the func-
e digital data to be transmitted
ities. (PE/SUB) 999-1992
modulation and demodulation
it signals over communication
ed as an abbreviation for mod-
s: data set; demodulator-mod-
r. *See also:* acoustic coupler.
digital signal received into an
(C) 610.7-1995
of modem status lines.
(C/PA) 2003.1-1992
er.
uits) The characteristic pattern
sequence and duration of com-
: Most thyristor converters and
nodes of operation, which may
e current wave. The particular
depends upon the circuit con-
ectifier circuit element.
(IA) 444-1973r
guides) A form of propagation
cterized by a particular field
the direction of propagation,
ent of position along the axis
case of uniconductor wave-
rticular mode of propagation
ency. *See also:* waveguide.
wave than can advance and
axis of a transmission line
the electromagnetic field pat-
tions (except for a monotonic
direction of propagation, due
s present to some degree in
(MTT) 1004-1987w
ic Representation of a trans-
hops between the end points
rs 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) 211-1990

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) 812-1984w

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. (PE/SWG/SUB) C37.100-1992, C37.122-1983s, C37.122.1-1993

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:* effective mode volume; mode; normalized frequency; power-law index profile; step index profile; V number. (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) 729-1983s

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 document. (C/SE) 1219-1992

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. (PE/SWG) C37.100-1992

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

$$Z^2 = 2K_1Z_{\cos}(\theta - \alpha) = K_2^2 - K_1^2$$

here K_1, K_2, and α are constants and θ is the phase angle by which the input voltage leads the input current. (PE/SWG) C37.100-1992

modified index of refraction (radio-wave propagation) 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) 211-1990

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. (PE/SWG) C37.04E-1985w, C37.100-1992, C37.100B-1986w, C37.4D-1985w

modified-off-the-shelf (MOTS) 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) 1062-1993

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) 450-1995

modified source statements Original source statements that have been changed. (C/SE) 1045-1992

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. (PE/SWG) 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:* cohesion; coupling; demodularization; factoring; functional decomposition; hierarchical decomposition; packaging. (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.

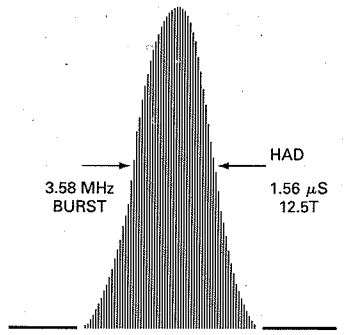
MODUlar LAnguage II (MODULA II) A programming language developed, as an expanded version of Pascal, to support modular design, structured programs, and mathematical calculations. *See also:* block-structured language. (C) 610.13-1993

modular programming (software) A software development technique in which software is developed as a collection of modules. *See also:* data structure-centered design; input-process-output; modular decomposition; object-oriented design; rapid prototyping; stepwise refinement; structured design; transaction analysis; transform analysis. (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) 599-1985w

(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.

(PE/T&D) 539-1990

(5) (broadband local area networks) The method whereby information is superimposed onto a RF carrier to transport signals through a communications channel.

(C/LM) 802.7-1989

(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) (nuclear power generating station) 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) 308-1991, 497-1981w, 603-1991, 622B-1988r

(2) (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

(3) (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 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

(4) (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

(5) Collection of circuitry designed to perform specific functions that includes an interface to Futurebus+.

(BA/C) 10857-1994, 896.3-1993, 896.4-1993

(6) (MULTIBUS) A basic functional unit within an agent.

(C/MM) 1296-1987s

(7) (NuBus) *See also:* board. (C/MM) 1196-1987

(8) 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

(9) A plug-in unit per IEC 50.

(BA/C) 1101.3-1993, 1101.4-1993

(10) 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

(11) 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

(12) A collection of circuitry that is designed to perform a specific operation. This is standard terminology for Futurebus+, while VME64 uses board synonymously.

(BA/C) 1014.1-1994

(13) 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

(14) An electronic circuit assembly that connects to one or more slots on the backplane. It is removable from and re-