

SEVENTH EDITION

MODERN
DICTIONARY
of
ELECTRONICS

RUDOLF F. GRAF



**MODERN
DICTIONARY
of
ELECTRONICS**

SEVENTH EDITION

REVISED AND UPDATED



Rudolf F. Graf is an author whose name is well-known to engineers, technicians, and hobbyists around the world. He graduated as an electronics engineer from Brooklyn Polytechnic Institute and did his graduate work New York University. Mr. Graf has been active in the electronics industry for more than fifty years in capacities ranging from design and consulting engineer, chief engineer, chief instructor at electronics and television schools, and consulting editor. He also held various sales and marketing positions. Mr. Graf is the author or co-author of more than 150 technical articles published by major magazines. He has written about 50 books on electricity and electronics, with more than 2 million copies in print, including the best-selling *Video Scrambling & Descrambling for Satellite & Cable TV, Second Edition* and the *Circuits* series of books, both published by Newnes. A number of his books have been translated into several European languages as well as Chinese, Japanese, and Russian.

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Boston Oxford Auckland Johannesburg Melbourne New Delhi

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unit change in temperature, usually referred to in parts per million (ppm) per degree Celsius and specified over a temperature range. The temperature is that of the resistor itself, not ambient temperature.

temperature coefficient of voltage drop—The change in the voltage drop of a glow-discharge tube, divided by the change in ambient temperature or in the temperature of the envelope.

temperature coefficient value—The expected percentage change per degree of temperature difference from a specified temperature.

temperature-compensated zener diode—A positive-temperature-coefficient reversed-bias zener diode (pn junction) connected in series with one or more negative-temperature forward-biased diodes within a single package.

temperature-compensating capacitor—Abbreviated TC capacitor. A capacitor whose capacitance varies with temperature in a known and predictable manner. Normally this characteristic is specified with a P or N (positive or negative; to indicate the direction of change) followed by a number that indicates the change in parts per million per degree Celsius (centigrade). Such capacitors are used extensively in oscillator circuits to compensate for changes due to temperature variations in the values of other components.

temperature compensation—The process whereby the effects of an increase or decrease in ambient temperature are canceled (e.g., as in the case of an oscillator that is required to maintain a stable output frequency regardless of ambient temperature changes).

temperature control—1. A switch actuated by a thermostat responsive to changes in temperature; used to maintain temperature within certain limits. 2. A control device responsive to temperature.

temperature cycling—A type of accelerated test in which systems or devices are subjected alternately to high and low temperatures to simulate diurnal temperature fluctuations.

temperature derated voltage—The maximum voltage that may be applied continuously to the terminals of a capacitor at a stated temperature between the rated and the maximum temperature.

temperature derating—Lowering the voltage, current, or power rating of a device or component when it is used at elevated temperatures.

temperature detector—An instrument used to measure the temperature of a body. Any physical property that is dependent on temperature may be employed, such as the differential expansion of two bodies, thermoelectromotive force at the junction of two metals, change of resistance of a metal, or the radiation from a hot body.

temperature-limited—The condition of a cathode when all the electrons emitted from it are drawn away by a strong positive field. The only way to increase the flow of electrons is to raise the cathode temperature.

temperature relay—A relay that functions at a predetermined temperature.

temperature rise—Also called T rise. 1. The difference between the initial and final temperature of a component or device. Temperature rise is expressed in degrees Celsius or Fahrenheit, usually referred to an ambient temperature, and equals the hot-spot temperature minus the ambient temperature. 2. Temperature change of a terminal from a no-load condition to a full-current load.

temperature saturation—See filament saturation.

temperature sensor—See thermistor; thermocouple, 3.

temperature shock—A rapid change from one temperature extreme to another.

temperature-wattage characteristic—In a thermistor, the relationship, for a specific ambient temperature, between the temperature of the thermistor and the applied steady-state power.

temporary magnet—A magnetized material having a high permeability and low retentivity.

temporary memory—A read and write memory containing information that can be changed by the internal circuitry of the electronic switching system.

temporary storage—1. Internal storage locations in a computer reserved for intermediate and partial results. 2. Memory locations or registers reserved for immediate and partial results obtained during the execution of a program.

TEM wave—Abbreviation for transverse electromagnetic wave.

tens complement—1. An arithmetic process employed in a computer to perform decimal subtractions through the use of addition techniques. The tens-complement negative of a number is obtained by individually subtracting each digit in the number from 9 and adding 1 to the result. 2. The radix complement in decimal notation.

tensitized tape—A variety of polyester backing that has been "prestretched" to prevent further severe elongation when subjected to excessive tension. A tape that does not stretch before breaking can be spliced back together without loss of program material.

tensiometer—A device for determining the tautness of a supporting wire or cable.

tension—1. Mechanical—the condition of strain that tends to stretch. 2. Electrical—the potential or electrostatic voltage.

tension arm—An arm, or feeler, over which a recording tape rides as it enters or leaves the heads. It is lightly spring loaded to take up any tape slack and maintain a uniform tension in order to reduce flutter. Should the tape end or break, the arm causes the transport to shut off.

tenth-power width—In a plane containing the direction of the maximum of a lobe, the full angle between the two directions in that plane, about the maximum, in which the radiation intensity is one-tenth the maximum value of the lobe.

tera—Abbreviated T. Prefix for the numerical quantity of 10^{12} .

terabyte—A unit of memory equal to approximately 1 trillion bytes.

terahertz—One million megahertz, or 10^{12} hertz. Letter symbol: THz.

teraohm—One million megohms, or 10^{12} ohms.

teraohmmeter—An instrument used to measure extremely high resistance.

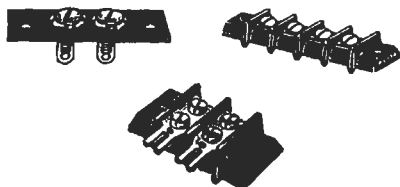
terminal—1. A point of connection for two or more conductors in an electrical circuit. 2. A device attached to a conductor to facilitate connection with another conductor. 3. A point in a system or communication network at which data can be either inserted or removed. 4. A device that permits access to a central computer, usually including a typewriterlike keyboard and either CRT or typing device (teletypewriter) on which the operator's input and the computer's output can be displayed. 5. Any device capable of sending and/or receiving information over a communications channel. 6. The means by which data is entered into a computer system and by which the decisions of the system are communicated to the environment it affects. A wide variety of terminal devices have been built, including teleprinters, special keyboards, light displays, cathode-ray tubes, thermocouples, pressure gauges and other instrumentation, radar units, and telephones. 7.

A device designed to terminate a conductor that is to be affixed to a post, stud, chassis or another conductor, or the like, to establish an electrical connection. Types of terminals include ring, tongue, spade, flag, hook, blade, quickconnect, offset, and flanged.

terminal area—1. A portion of a microelectronic circuit used for making electrical connections to the conductor pattern—e.g., an enlarged pad (area) on a semiconductor die. 2. A portion of a printed circuit used for making electrical connections to the conductive pattern, such as the enlarged portion of conductor material surrounding a component mounting hole.

terminal block—An insulating base or slab equipped with one or more terminal connectors for the purpose of making electrical connections thereto.

terminal board—Also called a terminal strip. 1. An insulating base or slab equipped with terminals for connecting wiring. 2. Board fabricated from an insulating material containing a single or multiple row or arrangement of termination points for the purpose of making connections. 3. An insulated mounting for terminal connections. Terminal strips are available with threaded holes to accept threaded screws or with threaded studs to accept fastening washers and nuts. If terminal areas are separated by an insulating barrier, the terminal strips are called barrier blocks.



Terminal boards.

terminal box—A housing in which cable pairs are brought out to terminations for connections.

terminal brush—A brush with long bristles for cleaning fuses and terminals in a terminal box.

terminal connector—A connector that joins a conductor to a lead, terminal pad (solid or laminated block), or round terminal stud of electrical apparatus.

terminal cutout pairs—Numbered, designated pairs brought out of a cable at a terminal.

terminal emulation—1. A situation in which special software makes a computer behave as though it were a terminal connected to another computer. 2. The process by which an asynchronous terminal, such as a PC, can communicate with a synchronous computer system, such as a mainframe or minicomputer. This is done by imitating (emulating) the operations of the mainframe's or mini's synchronous terminals.

terminal equipment—1. At the end of a communications channel, the equipment essential for controlling the transmission and/or reception of messages. 2. Telephone and teletypewriter switchboards and other centrally located equipment to which wire circuits are terminated. 3. Assemblage of communications-type equipment required to transmit and/or receive a signal on a channel or circuit, whether it be delivery or relay. 4. In radio relay systems, usually refers to equipment used at points where intelligence is inserted or derived, as distinct from equipment used to relay a reconstituted signal. 5. Any equipment at the end of communications lines that sends and/or receives certain signals for specific services.

For example, telephones and teletypewriters are terminal devices; so are many datasets.

terminal guidance—1. Guidance applied to a guided missile between midcourse guidance and arrival at the target. 2. Electronic, mechanical, visual, or other assistance given an aircraft pilot to facilitate arrival at, landing upon, or departure from an air landing or air-drop facility.

terminal hole—Also called component hole. A hole used for the attachment and electrical connection of component terminations, including pins and wires, to a printed board.

terminal impedance—1. The complex impedance seen at the unloaded output or input terminals of transmission equipment or a line in otherwise normal operating condition. 2. *See* terminal resistance.

terminal leg—*See* terminal stub.

terminal lug—1. A threaded lug to which a wire may be fastened in a terminal box. 2. A cylindrical piece of metal, either solid or hollow and of two or more diameters, that can be stacked, flared, swaged, or pressed into a hole for the purpose of connecting leads or external wires to the conductive pattern.

terminal mode—Condition of a PC when it is connected to a host computer.

terminal pad—An alternate term for terminal area.

terminal pair—An associated pair of accessible terminals (e.g., the input or output terminals of a device or network.)

terminal repeater—1. An assemblage of equipment designed specifically for use at the end of a communication circuit—as contrasted with the repeater, which is designed for an intermediate point. 2. Two microwave terminals arranged to provide for the interconnection of separate systems, or separate sections of a system.

terminal resistance—Also called terminal impedance. The total resistance measured between the input terminals of a meter. For an ac meter, it is the effective dc resistance measured by the voltage-doubling or substitution technique with rated end-scale input of the appropriate frequency applied.

terminal resistor—A resistor used as a terminating device.

terminal room—In telephone practice, a room associated with a central office, private branch exchange, or private exchange that contains distributing frames, relays, and similar apparatus.

terminal station—The microwave equipment and associated multiplex equipment employed at the ends of a microwave system.

terminal strip—*See* terminal board.

terminal stub—Also called terminal leg. A piece of cable that comes with a cable terminal for splicing into the main cable.

terminal unit—Abbreviated TU. 1. An apparatus that terminates the considered interface system and by means of which a connection (and translation, if required) is made between the considered interface system and another external interface system. 2. The RTTY equivalent of a modem. It contains a modulator, demodulator, and loop power supply. 3. Equipment usable on a communication channel for either input or output.

terminal VHF omnirange—Very high frequency omnirange, normally low powered, complete with a local monitoring device that will automatically shut down the facility if it is not operating properly.

terminated line—A transmission line terminated in a resistance equal to the characteristic impedance of the line, so that there is no reflection or standing waves.

terminating—The closing of the circuit at either end of a line or transducer by connection to some device.

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RUDOLF F. GRAF

"How do you improve on a classic? Rudy Graf has done just that in the fully updated seventh edition of his **Modern Dictionary of Electronics**. In his elegantly practical style he defines over 28,000 terms drawn from a broad range of fields. In a world where electronics technology is growing so rapidly, this authoritative book belongs on everyone's reference shelf!"

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For easy reference, the author has provided definitions for standard abbreviations and equations as well as tables of SI (International System of Units) units, measurements, and schematic symbols.

Rudolf F. Graf is an author whose name is familiar to electronics professionals and hobbyists alike. Mr. Graf graduated from Brooklyn Polytechnic Institute as an electronics engineer, and did his graduate work at New York University. He has been active in the electronics industry for more than fifty years in capacities ranging from design and consulting engineer to chief instructor at electronics and television schools, as well as in sales and marketing. He currently lives in New York. His many books offer a practical and enjoyable approach to often complex material. Other Newnes titles by Mr. Graf include **Video Scrambling and Descrambling, Second Edition**, and his full five-book series on electronics circuits.

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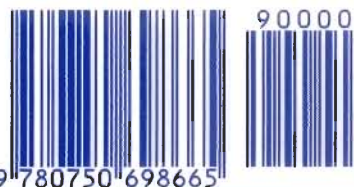


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