

SEVENTH EDITION

M O D E R N
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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microphotograph — A small picture of a large subject. The microfilming of a check or other document produces a microphotograph.

microprobe — An extremely sharp and small exploring tool head attached to a positioning handle. Used for testing microelectronic circuits by establishing ohmic contact.

microprocessor — Also called MPU (microprocessor unit). 1. A central processing unit (CPU) fabricated on one or more chips, containing the basic arithmetic, logic, and control elements of a computer that are required for processing data. 2. An integrated circuit that accepts coded instructions, executes the instructions received, and delivers signals that describe its internal status. The instructions may be entered or stored internally. Widely used as control devices for household appliances, business machines, toys, etc., as well as for microcomputers. 3. An electronic integrated circuit, typically a single-chip package, capable of receiving and executing coded instructions.

microprocessor development system — A combination of hardware and software that acts as a tool for micro system design and debugging from concept to final production release. It contains assembler, compiler, and editor programs to assist with the original program writing. It also can simulate the system, both at the concept stage and during the final integration. The larger memory available makes it practical to document programs, that is, to add remarks within the program that will be ignored by the microprocessor and that will indicate to a subsequent user the purposes of specific instructions. These remarks do not, of course, go into the final ROM. The development system is also able to transfer the debugged program that it is already using into PROM or EPROM.

microprocessor emulator — A software routine or device that imitates the functions of a specific microprocessor.

microprogram — 1. A computer program written in the most basic instructions or subcommands that can be executed by the computer. Frequently, it is stored in a read-only memory. *See also* firmware. 2. A special-purpose program, stored in a fixed memory, that is initiated by a single instruction in a system's main program. For example, one instruction in the main program may initiate a stored microprogram of six or seven instructions needed to execute the single main program instruction. 3. In a computer, a subelement of a conventional program built up of a sequence of even smaller operations called microinstructions. Each microinstruction is further subdivided into a collection of microoperations carried out in one basic machine cycle. (For example, the computer program consists of a sequence of instructions that are carried out in a specific order. Each instruction consists of a routine of one or more steps. This sequence of computer machine cycles necessary to execute a single instruction is called a microprogram.) 4. A sequence of instructions held in the control store that determines what operations the processor performs for each command given to it by the main memory. 5. A type of program that directly controls the operation of each function element in a microprocessor. 6. Stored routines in CPU control memory that define machine instructions as a series of elemental steps to be executed by the processor's control section. 7. A special computer program that sequences the control unit of a processor. It implements sequential instruction fetch, plus decoding and execution, by providing the appropriate signals to the required gates. Most MPUs are internally microprogrammed and can be microprogrammed by the user. Bit-slices are user microprogrammable. 8. A machine-executable description of

the elementary steps that are executed in the course of what the software sees as an instruction.

microprogrammable computer — A computer in which the internal CPU control sequence for performing instructions is generated from a read-only memory (ROM). By changing the ROM contents, the instruction set can be changed (as contrasted with a fixed-instruction computer).

microprogramming — 1. The setting up of basic suboperations for a computer to handle, after which the programmer combines them, and they are presented to the computer again in a higher-level program. For example, if a computer has only basic instructions for addition, subtraction, and multiplication, the instruction for division would be defined by microprogramming. 2. A method of operating the control part of a computer in which each instruction is broken into several small steps (microsteps) that form part of a microprogram. 3. A method of organizing a general-purpose computer to perform desired functions, using instructions stored in a control array.

microprogram store — *See* control store.

microradiometer — Also called a radio micrometer. A thermosensitive detector of radiant power. It consists of a thermopile supported on and connected directly to the moving coil of a galvanometer.

microsecond — One millionth of a second: 1×10^{-6} or 0.000001 second. Letter symbol: μs .

Microsoft Windows — An operating environment for IBM PCs and compatibles that features icons, pull-down menus, desk accessories, and the ability to easily move text and graphics from one program to another via a clipboard. It can also operate more than one program at a time.

microstrip — Also called stripline. 1. A microwave transmission component in which a single conductor is supported above a ground plane. 2. Printed-wiring LC resonant circuits or transmission lines. Conductive patterns form inductors. Capacitance is developed between the inductive patterns and the ground plane. 3. (Microstripline) A transmission line consisting of a metallized strip and a solid ground plane metallization separated by a thin, solid dielectric. This transmission line configuration permits accurate fabrication of 50-ohm transmission line elements on a ceramic or printed circuit board substrate.

microsyn — A precise and sensitive pickoff device for converting angular displacement within a small range to an electrical signal.

microsystems electronics — *See* microelectronics.

microvolt — One millionth of a volt. Letter symbol: μV .

microvoltmeter — A highly sensitive voltmeter that measures millionths of a volt.

microvolts per meter — The potential difference in microvolts developed between an antenna system and ground, divided by the distance in meters between the two points.

microvolts/meter/mile — One method of stating the field strength of a radiated field. Radiation from industrial heating equipment, for example, must be suppressed so that the radiated field strength does not exceed 10 microvolts per meter at a distance of 1 mile (1.609 km) from the source.

microwafer — A basic microcircuit building block generally made of beryllia, alumina, or glass. Terminations on the edges are usually of gold on top of chromium, with a heavy nickel overlay for welding.

microwatt — One millionth of a watt. Letter symbol: μW .

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"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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