



**SECOND EDITION**  
COMPREHENSIVE  
DICTIONARY  
OF

# **ELECTRICAL ENGINEERING**

EDITOR-IN-CHIEF  
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# Editor-in-Chief

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**Phillip A. Laplante, Ph.D.** is associate professor of software engineering at Pennsylvania State's Great Valley Graduate Center. In this capacity he conducts research and teaches graduate courses in software and computer systems engineering. He also serves as the chief technology officer for the Eastern Technology Council and founded and leads its CIO community of practice, the CIO Institute.

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In addition to his academic career, Dr. Laplante spent almost 8 years as a software engineer and project manager working on avionics (including the space shuttle), computer-aided design (CAD), and software test systems. He has published more than 120 papers and articles and 20 books, including *Dictionary of Computer Science, Engineering, and Technology* and *Software Engineering for Image Processing Systems*, both through CRC Press. He also edits two book series, including the Image Processing series for CRC Press, and cofounded the journal *Real-Time Imaging*, which he edited for 5 years.

Dr. Laplante earned his B.S., M.Eng., and Ph.D. in computer science, electrical engineering, and computer science, respectively, from Stevens Institute of Technology, and an M.B.A. from the University of Colorado. He is a senior member of IEEE and a member of numerous other professional societies, program committees, and boards, and is a licensed professional engineer in Pennsylvania.



microchannel plate. The resulting charge pattern will in turn affect the second layer, which is the  $\text{LiNbO}_3$  crystal plate having electro-optic effect. The refractive index of the crystal plate is now modulated by the electric charge pattern. When output light passes through the crystal plate, the phase of output light is modulated by the varying refractive index of the crystal plate. Since the  $\text{LiNbO}_3$  is birefringence, phase modulation becomes polarization modulation. Polarization modulation is visualized as intensity variation using a polarizer. The generation of electric charge and its effect to the crystal layer are nonlinear. Their combined effect has thresholding capability that can be utilized for constructing optical logic gates.

**microchannel-plate spatial light modulator logic gate** an optical logic gate utilizing thresholding capability of a microchannel-plate spatial light modulator (MSLM).

**microcode** a collection of low-level operations that are executed as a result of a single instruction being issued.

**microcommand** an n-bit field specifying some action within the control structure of a CPU, such as a gate open or closed, function enabled or not, control path active or not, etc.

**microcomputer** a computer whose CPU is a microprocessor chip, and its memory and I/O interface are LSI or VLSI chips.

**microcontroller** an integrated circuit chip that is designed primarily for control systems and products. In addition to a CPU, a microcontroller typically includes memory, timing circuits, and I/O circuitry. The reason for this is to permit the realization of a controller with a minimal quantity of chips, thus achieving maximal possible miniaturization. This in turn, will reduce the volume and the cost of the controller. The microcontroller is normally not used for general-purpose computation as is a microprocessor.

**microelectromechanical system (MEMS)** micrometer-scale devices fabricated as discrete devices or in large arrays using integrated circuit fabrication techniques. Movable compact micromechanical or optomechanical structures and microactuators made using batch processing techniques.

**microelectromechanical system (MEMS) for microwave** a new multidisciplinary technology field with enormous potential for various applications, including microwave. MEMS are fabricated by integrated circuit processing methods and commonly include sensors and actuators with physical dimensions of less than 1 mm on a side.

**microinstruction** the set of microcommands to be executed or not, enabled or not. Each field of a microinstruction is a microcommand.

**microlithography** lithography involving the printing of very small features, typically on the order of micrometers or below in size.

**micromachine** a fabrication process that uses integrated circuit fabrication techniques such as diffusion, oxidation, wet and dry etching to realize mechanical and electrical structures such as resonators, membranes, cavities, waveguide structures and a variety of thermal, medical, and chemical transducers.

**micromemory** See control memory.

**microphone** a device that converts acoustical signals into electrical signals.

**microprocessor** a CPU realized on an LSI or VLSI chip.

**microprogram** a set of microcode associated with the execution of a program.

**microprogramming** the practice of writing microcode for a set of microinstructions.