SEVENTH EDITION

MODERN DICTIONARY of ELECTRONICS

RUDOLF F. GRAF

Newnes

MODERN DICTIONARY of ELECTRONICS

SEVENTH EDITION

REVISED AND UPDATED

Rudolf F. Graf

Newnes

Boston Oxford Auckland Johannesburg Melbourne New Delhi

Newnes is an imprint of Butterworth-Heinemann.

A member of the Reed Elsevier Group.

Recognizing the importance of preserving what has been written, Butterworth-Heinemann prints its books on acid-free paper whenever possible.

Butterworth-Heinemann supports the efforts of American Forests and the Global ReLeaf program in its campaign for the betterment of trees, forests, and our environment.

Library of Congress Cataloging-in-Publication Data

Graf, Rudolf F.
Modern dictionary of electronics / Rudolf F. Graf. — 7th ed., revised and updated.
p. cm.
ISBN 0-7506-9866-7 (alk. paper)
1. Electronics — Dictionaries. I. Title
TK7804.G67 1999
621.381'03 — dc21 99-17889
CIP

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library.

The publisher offers special discounts on bulk orders of this book.
For information, please contact:
Manager of Special Sales
Butterworth-Heinemann
225 Wildwood Avenue
Woburn, MA 01801-2041
Tel: 781-904-2500
Fax: 781-904-2620

For information on all Butterworth-Heinemann publications available, contact our World Wide Web home page at: http://www.bh.com

10 9 8 7 6 5 4 3 2 1

Typeset by Laser Words, Madras, India
Printed in the United States of America

first launched into highly elliptical orbits with apogees of 22,237 miles. When the communication satellite reaches the appropriate apogee, a rocket motor is fired to place the satellite into its permanent circular orbit of 22,237 miles. *Also see* perigee.

A positive (A+ or A plus) — 1. Positive terminal of a battery or positive polarity of any other sources of voltage. 2. The terminal to which the positive side of the filament-voltage source of a vacuum tube should be connected.

A power supply — A power supply used as a source of heating current for the cathode or filament of a vacuum tube.

apparatus — 1. Any complex device. 2. Equipment or instruments used for a specific purpose.

apparatus wire and cable — Insulated wire and cable used in connecting electrical apparatus to a power source, also including wire and cable used in the apparatus itself.

apparent bearing — The direction from which the signal arrives with respect to some reference direction.

apparent power — In an ac circuit, the power value obtained by simple multiplication of current by voltage with no consideration of the effect of phase angle. (Compare with *true power*.)

apparent power loss — For voltage-measuring instruments, the product of nominal end-scale voltage and the resulting current. For current-measuring instruments, the product of the nominal end-scale current and the resulting voltage. For other types of instruments (for example, wattmeters), the apparent power loss is expressed for a stated value of current or voltage. Also called volt-ampere loss.

apparent source — *See* effective acoustic center.

Applegate diagram — A graphical representation of electron bunching in a velocity-modulated tube, showing their positions along the drift space. This bunching is plotted on the vertical coordinate, against time along the horizontal axis.

applet — A small computer program that performs a simple task.

AppleTalk — A networking protocol developed by Apple Computer for communication between Apple Computer products and other computers. This protocol is independent of what network it is layered on.

Appleton layer — In the ionosphere, a region of highly ionized air capable of reflecting or refracting radio waves back to earth. It is made up of the F_1 and F_2 layers.

apple tube — A color-television picture tube in which the three colors of phosphors are laid in fine vertical strips along the screen. The intensity of the electron beam is modulated as its sweeps over them so that each color is produced with appropriate brightness.

appliance — Any electrical equipment used in the home and capable of being operated by a nontechnical person. Included are units that perform some task that could be accomplished by other, more difficult means, but usually not those used for entertainment (radios, TVs, hi-fi sets, etc.).

appliance wire and cable — A classification of Underwriters' Laboratories, Inc., covering insulated wire and cable intended for internal wiring of appliances and equipment. Each construction satisfies the requirements for use in particular applications.

application — 1. The use of a computer for a specific purpose, e.g., designing a brochure or writing a letter. 2. System or problem to which a computer is applied. An application may be of the computational type, in which arithmetic computations predominate, or of the data-processing type, in which data-handling operations predominate. *See also* application program.

application factor — A modifier of the failure rate. It is based on deviations from rated operating stress (usually temperature and one electrical parameter).

application-oriented language — 1. A programming language that is primarily useful in some specialized area. 2. A problem-oriented programming language whose statements resemble or contain the terminology of the computer user.

application program — 1. A computer program intended to solve a problem or do a job, as distinct from systems programs, which control the operations of the computer system. 2. A computer program that performs a data-processing function rather than a control operation. 3. A program used to perform some logical or computational task that is important to the user rather than some internal computer function. 4. Software designed for a specific purpose, such as accounts payable, inventory, payroll, and word processing. 5. A computer program that accomplishes specific tasks, such as word processing.

application schematic diagram — Pictorial representation using symbols and lines to illustrate the interrelation of a number of circuits.

application-specific integrated circuit — *See* ASIC.

applications software — 1. A program that depends on the specific end application and is used to do the real work or apparent work that is visible to the user. Generally this is the software that is used for dedicated computer-based systems (systems designed to perform a single or specific set of functions). Typical applications include food and chemical processing, production control, automotive electronics, computer-controlled sewing machines, photographic equipment (both for computer-controlled cameras and for darkroom computerized processing), energy distribution systems, word processing, mailing lists, payrolls, and inventory. 2. Computer programs that perform specific tasks, such as word processing or database management.

applicators (applicator electrodes) — 1. In dielectric heating, the electrodes between which the dielectric item is placed and the electrostatic field developed. 2. Appropriately shaped conducting surfaces between which an alternating electric field is established for the purpose of producing dielectric heating. 3. In medical electronics, the electrodes applied to a patient undergoing diathermy or ultrasonic therapy.

applied voltage — 1. The potential between a terminal and a reference point in any circuit or device. 2. The voltage obtained when measuring between two given points in a circuit with voltage applied to the complete circuit. 3. The voltage presented to a circuit point or system input, as opposed to the voltage drop resulting from current through an element that results from the applied voltage.

applique circuit — A special circuit provided to modify existing equipment in order to allow for some special usage.

approach-control radar — Any radar set or system used in a ground-controlled approach system, e.g., an airport-surveillance radar, precision approach radar, etc.

approach path — In radio aircraft navigation, that portion of the flight path in the immediate vicinity of a landing area where such a flight path terminates at the touchdown point.

approved circuit — *See* protected wireline distribution system.

APT — Abbreviation for automatically programmed tool. A high-level or simplified programming language.

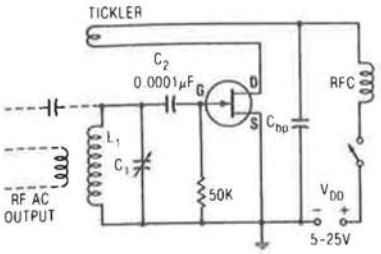
AQL — Abbreviation for acceptable quality level. A statistically defined quality level, in terms of percent defective accepted on an average of 95 percent of the

armor clamp — A fitting for gripping the armor of a cable at the point where the armor terminates or where the cable enters a junction box.

armored cable — Two or more insulated wires collectively provided with a metallic covering, primarily to protect the insulated wires from damage.

Armstrong frequency-modulation system — A phase-shift modulation system originally proposed by E. H. Armstrong.

Armstrong oscillator — An inductive feedback oscillator that consists of a tuned gate circuit and an untuned tickler coil in the drain circuit. Feedback is controlled by varying the coupling between the tickler and the gate circuit.



Armstrong oscillator.

arr — *See* automatic repeat request.

array — 1. In an antenna, a group of elements arranged to provide the desired directional characteristics. These elements may be antennas, reflectors, directors, etc. 2. A series of items, not necessarily arranged in a meaningful pattern. 3. The group of patterns on a wafer or in the artwork or photomask for semiconductor processing. *See* random-access memory.

array antenna — An antenna comprising a number of radiating elements, generally similar, arranged and excited to obtain directional effects.

array device — A group of many similar, basic, complex, or integrated devices without separate enclosures. Each has at least one of its electrodes connected to a common conductor, or all are connected in series.

array noise — Unwanted disturbance in a memory integrated circuit generated by the normal movement of data within the array.

array processor — 1. A computer optimized in architecture and instruction set to handle programs involving computations on large batches of data, such as fast Fourier transforms and large matrix computations. An array processor takes blocks of data and instructions from a host mini or large computer and performs the computations at speeds many times as high as those that are possible through the host computer alone. The host may be considered the data-organizing front end; the array processor is the processing unit. 2. A computer dedicated by its design to performing repetitive arithmetical calculations on large arrays of data with high precision, wide dynamic range, and high throughput. Usually most input/output operations and file management chores are left to the host computer in order to free the peripheral array processor to concentrate on its calculations. 3. A single computer that operates on one piece of data at a time. 4. A processor in a computer that performs matrix arithmetic much faster than is done in a standard computer. Capable of performing operations on all the elements in large matrices at one time. Also called a vector processor.

arrester — Also called a lightning arrester. 1. A protective device used to provide a bypass path directly to ground for lightning discharges that strike an antenna or other conductor. 2. A power-line device capable of reducing the voltage of a surge applied to its terminals, interrupting current, if present, and restoring itself to original operating conditions. 3. Device that diverts high voltages to ground and away from the equipment it protects.

ARRL — Abbreviation for American Radio Relay League.

arrowhead — A linearly polarized, frequency-independent, log-periodic antenna.

ARSR — Abbreviation for air route surveillance radar.

ARTCC — Abbreviation for air route traffic control center. A complex data-handling facility designed by Burroughs, IBM, and Raytheon to computerize as much in-route air traffic control as possible.

articulation — Sometimes called intelligibility. 1. In a communications system, the percentage of speech units understood by a listener. The word *articulation* is customarily used when the contextual relationships among the units of speech material are thought to play an unimportant role; the word *intelligibility* is used when the context is thought to play an important role in determining the listener's perception. 2. A quantitative measurement of the intelligibility of human speech, where 100 percent is completely understandable. For the typical sound reinforcement or other communications system, no more than a 15-percent articulation loss is acceptable. 3. The ability of a mechanism to pivot, grasp, or extend.

articulation equivalent — The articulation of speech reproduced over a complete telephone connection, expressed numerically in terms of the trunk loss of a working reference system that is adjusted to give equal articulation.

artificial antenna — Also called dummy antenna. A device that simulates a real antenna in its essential impedance characteristics and has the necessary power-handling capabilities, but which does not radiate or receive radio waves. Used mainly for testing and adjusting transmitters.

artificial ear — A microphone-equipped device for measuring the sound pressures developed by an earphone. To the earphone it presents an acoustic impedance equivalent to the impedance presented by the human ear.

artificial echo — 1. Received reflections of a transmitted pulse from an artificial target, such as an echo box, corner reflector, or other metallic reflecting surface. 2. A delayed signal from a pulsed radio-frequency signal generator.

artificial horizon — A gyroscopically operated instrument that shows, within limited degrees, the pitching and banking of an aircraft with respect to the horizon. Lines or marks on the face of the instrument represent the aircraft and the horizon. The relative positions of the two are then easily discernible.

artificial intelligence — Abbreviated AI 1. The design of computer and other data-processing machinery to perform increasingly higher-level cybernetic functions. 2. The capability of a device to perform functions that are normally associated with human intelligence, such as reasoning, learning, and self-improvement. Related to machine learning. 3. The imitation by artificial systems of characteristics described as intelligent when observed in humans. Artificial intelligence embraces concepts and theories from many different disciplines, including mathematics, cybernetics, computer science, psychology, biology, and others. 4. Overlapping subsets called expert systems, knowledge representations, inference schemes, program synthesis, scene analysis, and robotics. 5. The ability of a machine to perform certain complex functions

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.