

SEVENTH EDITION


MODERN  
DICTIONARY  
*of*  
ELECTRONICS

RUDOLF F. GRAF




Newnes is an imprint of Butterworth-Heinemann.

Copyright © 1999 by Rudolf F. Graf

 A member of the Reed Elsevier Group.

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

 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

tions

ition  
specific  
byte,dium  
later  
n be. The  
ge ist has  
may  
splay  
of a  
evice  
is of  
als.n that  
drum  
bolic  
tape.  
rotec-  
ess toc cir-  
puter: stor-  
ce.  
if the  
ch the  
initelyoutput  
um to  
moved.  
istor  
m the  
excess  
en the  
current  
: beeninfor-  
athode  
harges

that stores images on a separate storage screen behind the viewing screen in the tube. Images then remain on the viewing screen until the storage screen is erased. Since a storage tube does not have to be refreshed, it can display an extremely large amount of data without flicker. 3. A cathode-ray tube combined with an electrostatic storage unit that is used to introduce, store, and retrieve information translated into electric charge form. 4. A CRT that retains an image for a considerable period without redrawing.

**store**—1. To retain information in a device from which the information can later be withdrawn. 2. To introduce information into the device in (1) above. 3. A British synonym for storage. *See* storage, 2.

**store and forward**—1. A data communications technique that accepts packets, stores them until they are validated and complete, and then forwards them to the next node on the packet path. 2. Process of message handling used in a message-switching system. 3. Communications system in which messages received at intermediate routing points are recorded for later retransmission to a further routing point or the ultimate recipient.

**stored energy**—The amount of energy stored in the primary of an electronic ignition system. In an inductive system the stored energy is

$$W_p = 1/2LI^2$$

where

$W_p$  = energy stored in the primary field, in joules

$L$  = primary inductance, in henrys

$I$  = current in the primary winding, in amperes

In a capacitor discharge system,

$$W_p = 1/2CE^2$$

where

$W_p$  = energy stored in the primary capacitor, in joules

$C$  = primary capacitance, in farads

$E$  = peak primary voltage, in volts

**stored-energy welding**—A method of welding in which electric energy is accumulated (stored) electrostatically, electromagnetically, or electrochemically at a relatively slow rate and is then released at the required rate for welding.

**stored program**—A set of instructions in the computer memory specifying the operations to be performed and the location of the data on which these operations are to be performed.

**stored-program computer**—Also called general-purpose computer. 1. A computer in which the instructions specifying the program to be performed are stored in the memory section along with the data to be operated on. 2. A digital computer that, under control of its own instructions, can synthesize, and sometimes alter, stored instructions as though they were data and can subsequently execute these new instructions.

**stored program logic**—A program stored in a memory unit containing logical commands to the remainder of the memory so that the same processes are performed on all problems.

**stored-response testing**—Comparison of the actual output responses of the device under test with the expected correct output responses stored within the tester. The expected correct responses can be recorded from a known-good device or determined by manual analysis or software simulation. Stored-response testing often implies

**stored routine**—In computers, a series of stored instructions for directing the step-by-step operation of the machine.

**stored writing rate (of a storage oscilloscope)**—The highest rate of spot movement that will leave behind a stored image on the face of the cathode-ray tube. Faster spot movement will not leave an image, as in step-response displays with no vertical edges or sine-wave displays with the zero-crossing edges missing.

**store transmission bridge**—A transmission bridge that consists of four identical impedance coils (the two windings of the back-bridge relay and the live relay of a connector, respectively) separated by two capacitors. It couples the calling and called telephones together electrostatically for the transmission of voice-frequency (alternating) currents, but separates the two lines for the transmission of direct current for talking purposes (talking current).

**storm loading**—The mechanical loading imposed on the components of a pole line by wind, ice, etc., and by the weight of the components themselves.

**straight dipole**—A half-wave antenna consisting of one conductor, usually centerfed.

**straightforward circuit**—A circuit in which signaling is performed automatically and in one direction.

**straightforward trunking**—In a manual telephone switchboard system, that method of operation in which one operator gives the order to another operator over the trunk that later carries the conversation.

**straight-line capacitance**—The variable-capacitor characteristic obtained when the rotor plates are shaped so that the capacitance varies directly with the angle of rotation.

**straight-line code**—The repetition of a sequence of instructions, with or without address modification, by explicitly writing the instructions for each repetition. Generally straight-line coding will require less execution time and more space than equivalent loop coding. If the number of repetitions is large, this type of coding is tedious unless a generator is used. The feasibility of straight-line coding is limited by the space required as well as the difficulty of coding a variable number of repetitions.

**straight-line frequency**—The variable-capacitor characteristic obtained when the rotor plates are shaped so that the resonant frequency of the tuned circuit containing the capacitor varies directly with the angle of rotation.

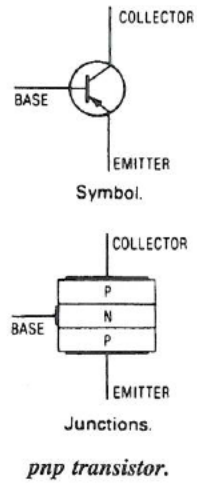
**straight-line tracking arm**—*See* radial tonearm.

**straight-line wavelength**—The variable-capacitor characteristic obtained when the rotor plates are shaped so that the wavelength of resonance in the tuned circuit containing the capacitor varies directly with the angle of rotation.

**strain**—The physical deformation, deflection, or change in length resulting from stress (force per unit area). The magnitude of strain is normally expressed in microinches per inch.

**strain anisotropy**—A force that directs the magnetization of a particle along a preferred direction relative to the strain.

**strain gage**—1. A resistive transducer whose electrical output is proportional to the amount it is deformed under strain. 2. A measuring element for converting force, pressure, tension, etc., into an electrical signal. 3. A device for measuring the expansion or contraction of an object under stress, comprising wires that change resistance with expansion or contraction. *See also* load cell. 4. A sensor that produces a voltage or resistance change when a mechanical force is applied.



**Pockel's effect**—The alternation in the refractive properties of a transparent piezoelectric crystal by the application of an electric field. *See also* modulator crystal.

**Pockel's-effect modulation**—A phenomenon that occurs when a transparent dielectric is a piezoelectric crystal. The crystal tends to strain whenever an electric field is applied, rotating the plane of polarization of the incident wave. Some 7500 V/m causes a 90° rotation of light.

**poïd**—The curve traced by the center of a sphere when it rolls or slides over a surface having a sinusoidal profile.

**point**—Called the binary point in binary notation, and the decimal point in decimal notation. In positional notation, the character or location of an implied symbol that separates the integral part of a number from its fractional part.

**point availability**—The percent of time an equipment is available for use when an operator requires it.

**point-based linearity**—Nonlinearity expressed as the deviation from a straight line that passes through a given point or points.

**point contact**—A pressure contact between a semiconductor body and a metallic point.

**point-contact crystal diode**—A crystal diode whose rectifying activity is determined by the touching of the crystal to a finely pointed wire surrounded by a material of opposite type.

**point-contact diode**—1. A diode that consists of a semiconductor against which the end of a fine wire (cat whisker) is pressed. Such a diode has a very low reactance and can be used as a detector or mixer over most of the microwave range. It has a square-law response at low power levels. 2. Device consisting of a metal whisker making pressure contact with the semiconductor chip, normally tungsten for silicon and phosphorus bronze for germanium and gallium arsenide. Point-contact diodes are generally encapsulated in axial lead glass, axial prong ceramic, cartridge-type ceramic, or metal coaxial enclosures. The electrical characteristics of the device are determined by the size, shape, and pressure of the whisker and the thickness and resistivity of the epitaxial layer.

**point-contact transistor**—A transistor having a base electrode and two or more point-contact electrodes.

**point defect**—An imperfection caused by the presence of an extra atom or the absence of an atom from its proper place in the crystal.

**point effect**—The phenomenon whereby a discharge will occur more readily at sharp points than elsewhere on an object or electrode.

**pointer**—Also called a needle. 1. A slender rod that moves over the scale of a meter. 2. Registers in a CPU that contain memory addresses. *See also* data pointer; program counter.

**pointer address**—The address of a core-memory location that contains the actual effective address.

**pointer register**—A register that contains the absolute address of an item of data in its memory. Data can be accessed at this address or relative to it via the pointer register. The value of the pointer register can be updated to access a different block of data, where the data can be one or several bytes.

**point impedance**—Ratio of the maximum *E*-field to the maximum *H*-field observed at a given point in a waveguide or transmission line.

**pointing**—A method of allowing a nontypist operator to enter data items. A menu of items is displayed on the screen; the operator chooses one by pointing at it with a system device, such as a lightpen, stylus, or even the terminal's cursor.

**pointing and flying**—The method of navigating through virtual reality when wearing a virtual reality glove by pointing and then "flying" in that indicated direction.

**point-junction transistor**—A transistor having a base electrode and both point-contact and junction electrodes.

**point-of-sale terminal**—Abbreviated POS terminal. 1. An intelligent input/output device that is used to capture data in retail stores, i.e., supermarkets or department stores. POS is a term used to indicate that data regarding a sale is entered directly into the computerized system without having to be converted to another form first. 2. Electronic terminal that can serve as a conventional cash register but has the capacity to capture sales data and store or transmit it to a computer.

**point-plane rectifier**—*See* glow-tube rectifier.

**point source**—1. A radiation source whose dimensions are small compared with the distance from which it is observed. 2. Radiation source whose maximum dimension is less than 1/10 the distance between source and receiver.

**point-to-point**—1. Describing communication between two fixed stations. 2. A limited network configuration with communication between two terminal points only, as opposed to multipoint and multidrop.

**point-to-point network**—A communications network consisting of a single communications link that connects two terminals and is not shared by other terminals.

**point-to-point radio communication**—Radio communication between two fixed stations.

**point-to-point transmission**—Direct transmission of data between two points without using an intermediate terminal or computer.

**point-to-point wiring**—1. A method of forming circuit paths by connecting the various devices, components, modules, etc., with individual pieces of wire or ribbon. May be soldered, welded, or attached by other means. 2. Wiring done in a direct path from one point to another without dressing wiring in parallel runs. Crosstalk is thus reduced. Used for high-speed logic panels.

**point transposition**—Transposition, usually in an open-wire line, that is executed within a distance comparable to the wire separation, without material distortion of the normal wire configuration outside this distance.

**Poisson distribution**—A statistical distribution similar to the normal distribution except that the standard deviation is equivalent to the square root of the mean.

**Poisson's ratio**—The ratio of the longitudinal strain to the transverse strain in a material under longitudinal stress.

**polar**—Pertaining to a pole (e.g., the poles of a magnet).

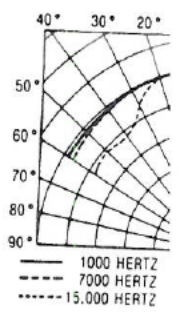
**polar capacitor**—A capacitor with a direct voltage indicated on the terminals.

**polar circuit**—A circuit in which current flows in one direction in the opposite direction in the other.

**polar coordinate**—A coordinate system in which a point is located by its distance from a fixed point (pole) and its angle from a fixed polar axis.

**polar crystals**—Crystals that produce an electric field of alternate positive and negative charges.

**polar diagram**—A diagram in which the magnitude of a quantity is shown by the length of a line from the origin.



Pol

**polar grid**—A type of coordinate system in which the angle and azimuth are represented.

**polarimetry**—The study of the plane of polarization of light.

**polarity**—1. A condition in which current can be determined by the direction of two opposite charges, or the other way around. 2. Having two opposite poles. 3. The direction of the other south. 4. The direction of the other south. 5. The direction of the other south. 6. The direction of the other south. 7. The direction of the other south. 8. The direction of the other south. 9. The direction of the other south. 10. The direction of the other south.

**polarity of picture**—The direction of the signal relative to the potential relative to the potential relative to the potential.

**polarization**—1. The direction of the other south. 2. The direction of the other south. 3. The direction of the other south. 4. The direction of the other south. 5. The direction of the other south. 6. The direction of the other south. 7. The direction of the other south. 8. The direction of the other south. 9. The direction of the other south. 10. The direction of the other south.