


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>

impedance characteristic—A graph of impedance versus frequency of a circuit or component.

impedance coil—A coil whose inductive reactance is used to hinder the flow of alternating current in or between circuits.

impedance compensator—1. An electric network used with a line or another network to give the impedance of the combination a certain characteristic over a desired frequency range. 2. A circuit that ensures that a transmission line is a proper electrical load for its communicating devices. It is connected in parallel with the devices.

impedance coupling—A method of coupling using an impedance as the coupling device common to both the primary and secondary circuits. This type of coupling is usually limited to audio systems, where high gain and limited bandpass are required.

impedance drop—The vector sum of the resistance drop and the reactance drop. (For transformers, the resistance drop, the reactance drop, and the impedance drop are, respectively, the sum of the primary and secondary drops reduced to the same terms. They are usually expressed in percent of the secondary-terminal voltage.)

impedance ground—An earth connection made through an impedance of predetermined value usually chosen to limit the current of a short-circuit to ground.

impedance irregularities—Breaks or abrupt changes that occur in an impedance-frequency curve when unlike sections of a transmission line are joined together or when there are irregularities on the line.

impedance match—The condition in which the impedance of a component or circuit is equal to the internal impedance of the source or the surge impedance of a transmission line, thereby giving maximum transfer of energy from sources to load, minimum reflection, and minimum distortion.

impedance matching—1. The connection across a source impedance of another impedance having the same magnitude and phase angle. If the source is a transmission line, reflection is thereby avoided. 2. The process of adjusting the impedances of a load and of its power source so that they are equal. This permits the greatest possible transfer of power. 3. Making the impedance of a terminating device equal to the impedance of the circuit to which it is connected in order to achieve optimum signal transfer.

impedance-matching transformer—A transformer used to match the impedance of a source and load.

impedance plethysmograph—An instrument used to detect the increased blood volume in the tissues of the body during a contraction of the heart. *See also* electrical-impedance cephalography; finger plethysmograph.

impedance transformer—A transformer that transfers maximum energy from one circuit to another.

impedance triangle—A diagram consisting of a right triangle. The sides are proportional to the resistance and reactance in an ac circuit, with the hypotenuse representing the impedance.

imperfect dielectric—A dielectric in which part of the energy required to establish its electric field is converted into heat instead of being returned to the electric system when the field is removed.

imperfection—In a crystalline solid, any deviation in structure from an ideal crystal (one that is perfectly

impedance characteristic — impulse excitation

heart muscle (myocardial electrodes) or the inner surface of the heart chamber (endocardiac electrodes).

implied AND—Also called dot AND or wired AND. A logic element in which the combined outputs are true if and only if all outputs are true. (Sometimes improperly called dot OR or wired OR.)

implied OR—Also called wired OR. A logic element in which the combined outputs are true if one or more of the outputs are true.

implode—The inward bursting of a picture tube due to its high vacuum.

import—To copy data created by one computer program or file into another.

impregnant—1. A substance, usually a liquid, used to saturate the paper dielectric of a capacitor and replace the air between its fibers, thereby increasing the dielectric strength and the dielectric constant of the capacitor. 2. A substance intended to replace the air as dielectric between the electrodes of a capacitor.

impregnate—1. To fill voids and air spaces (of a capacitor or transformer) with a material having good insulating properties commonly called an impregnant. 2. To fill the voids and interstices of a material with a compound. This does not imply complete fill or complete coating of the surfaces by a hole-free film.

impregnated coils—Coils that have been permeated with an electric grade varnish or other protective material to protect them from mechanized vibration, handling, fungus, and moisture.

impregnating—Complete filling of even the smallest voids in a component or closely packed assembly of parts. Low-viscosity compounds, usually liquids, are used. The process is frequently accomplished by a vacuum process in which all air is removed before introducing the impregnating material. Typical examples of impregnating are the filling of capacitors or transformer windings.

impregnation—1. The process of coating the insides of coils and closely packed electronic assemblies by dipping them into a liquid and letting it solidify. 2. The process of completely filling all interstices or a part or assembly with a thin, liquid, electrically insulating material. The process is best accomplished by first removing all air (creating a vacuum), then introducing the impregnant, and finally applying atmospheric or elevated pressures to completely force-fill the system.

impressed voltage—The voltage applied to a circuit or device.

improvement threshold—A characteristic of FM radio receivers that determines the minimum rf signal power required to overcome the inherent thermal noise. For increasing values of rf power above this point, an improvement of signal-to-noise ratio is obtained.

impulse—1. A pulse that begins and ends within so short a time that it may be regarded mathematically as infinitesimal. The change produced in the medium, however, is generally of a finite amount. 2. A current surge of unidirectional polarity. *See also* pulse.

impulse bandwidth—The area divided by the height of the voltage-response selectivity as a function of frequency. It is used in the calculation of broadband interference.

impulse-driven clock—An electric clock in which the hands are moved forward at regular intervals by current impulses from a master clock.

impulse excitation—Also called shock excitation.

lithium—An alkali metal used in the construction of photocells and batteries.

lithium chloride sensor—Also called Dunmore cell. A hygroscopic element that has fast response, high accuracy, and good long-term stability and whose resistance is a function of relative humidity.

lithium-ion—Abbreviated LiON. A rechargeable battery technology that is able to produce considerably more charge than comparable size nickel-cadmium or nickel-metal hydride batteries.

lithography—A method of defining patterns for semiconductor device processing. Patterns are most frequently produced in thin films of materials called resists, which then resist a subsequent processing step being applied to an underlying material in accordance with that pattern. In typical semiconductor integrated-circuit fabrication, many different patterns are used to delineate features in a sequence of processing steps.

litz wire—Also called Litzendraht wire. A conductor composed of a number of fine, separately insulated strands that are woven together so that each strand successively takes up all possible positions in the cross section of the entire conductor. Litz wire gives reduced skin effect, hence, lower resistance to high-frequency currents.

live—1. A term applied to a circuit through which current is flowing. 2. Connected to a source of an electrical voltage. 3. Charged to an electrical potential different from that of the earth. 4. Reverberant, as a room in which there are reflections of sound. 5. A program that is transmitted as it happens, with no delay.

live cable test cap—A protective cap placed over the end of a cable to insulate the cable and seal its sheath.

live end—The end of a radio studio where the reflection of sound is greatest.

live parts—Metallic portions of equipment that are at a potential different from that of the earth.

live room—A room with a minimum of sound-absorptive material, such as drapes, upholstered furniture, rugs, etc. Because of the many reflecting surfaces, any sound produced in the room will have a long reverberation time.

LLTV—Also LLLTV and L³TV. Abbreviation for low-light television and low-light-level television. A CCTV system capable of operating with scene illumination less than 0.5 lumen/ft².

LNA—See low-noise amplifier.

LNB—Abbreviation for low-noise block downconverter. A microwave amplifier that converts a block of frequencies to a lower frequency. LNBs for satellite TV typically convert C- and Ku-band signals to a frequency band of 950 to 1450 MHz for input to the receiver.

LNC—See low-noise converter.

L-network—A network composed of two impedance branches in series. The free ends are connected to one pair of terminals, and the junction point and one free end are connected to another pair.

LO—See local oscillator.

load—1. The power consumed by a machine or circuit in performing its function. 2. A resistor or other impedance that can replace some circuit element. 3. The power delivered by a machine. 4. A device that absorbs power and converts it into the desired form. 5. The impedance to which energy is being supplied. 6. Also called work. The material heated by a dielectric or induction heater. 7. In a computer, to fill the internal

lithium — loaded applicator impedance

connected to the output of an amplifier. The source (e.g., pickup) is loaded by the amplifier's input impedance. 10. The electrical demand placed on a circuit or a system by the utilization equipment connected to it. Also, any piece of electrical utilization equipment of any given rating so connected. 11. To feed a program into a computer system. A common means of loading the program is via a form of magnetic media. The media is inserted into the media drive and the program read into the system's memory.

load and go—In a computer, an operation and compiling technique in which the pseudo language is converted directly to machine language and the program is then run without the creation of an output machine-language program.

load balance—See load division.

loadbreak connector—A connector designed to close and interrupt current on energized circuits.

load cell—1. Transducer that measures an applied load by a change in its properties, such as a change in resistance (strain-gage load cell), pressure (hydraulic load cell), etc. 2. A device that produces an output signal proportional to the applied weight or force.

load circuit—The complete circuit required to transfer power from a source to a load (e.g., an electron tube).

load-circuit efficiency—In a load circuit, the ratio between its input power and the power it delivers to the load.

load-circuit power input—The power delivered to the load circuit. It is the product of the alternating component of the voltage across the load circuit and the current passing through it (both root-mean-square values), times their power factor.

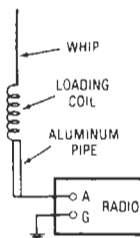
load coil—Also called a work coil. In induction heaters, a coil that, when energized with an alternating current, induces energy into the item being heated.

load curve—A curve of power versus time—i.e., the value of a specified load for each unit of the period covered.

load divider—A device for distributing power.

load division—Also called load balance. A control function that divides the load in a prescribed manner between two or more power sources supplying the same load.

loaded antenna—1. An antenna to which extra inductance or capacitance has been added to change its electrical (but not its physical) length. 2. An antenna employing a loading coil at its base or above its base to achieve the required electrical length using physically shorter elements.



Loaded antenna.

load-transfer switch—A switch for connecting either a generator or a power source to one load circuit or another.

lobe—Also called directional, radiation, or antenna lobe. One of the areas of greater transmission in the pattern of a directional antenna. Its size and shape are determined by plotting the signal strength in various directions. The area with the greatest signal strength is known as the major lobe, and all others are called minor lobes.

lobe frequency—The number of times a lobing pattern is repeated per second.

lobe front—The major lobe of a directional antenna. The lobe in the direction of preferred reception or transmission.

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

lobe penetration—The penetration of the radar coverage of a station that is not limited by the pulse-repetition frequency, scope limitations, or the screening angle at the azimuth of penetration.

lobe switching—A form of scanning in which the maximum radiation or reception is periodically switched to each of two or more directions in turn.

lobing—The formation of maxima and minima at various angles of the vertical-plane antenna pattern by the reflection of energy from the surface surrounding the radar antenna. These reflections reinforce the main beam at some angles and tend to cancel it at other angles, producing fingers of energy.

local action—In a battery, the loss of otherwise usable chemical energy by currents that flow within regardless of its connections to an external circuit.

local alarm—An alarm that when activated makes a loud noise at or near the protected area or floods the site with light, or both.

local alarm system—An alarm system that when activated produces an audible or visible signal in the immediate vicinity of the protected premises or object. This term usually applies to systems designed to provide only a local warning of intrusion and not to transmit to a remote monitoring station. However, local alarm systems are sometimes used in conjunction with a remote alarm.

local area network—Abbreviated LAN. A data-communications system, usually owned by a single organization, that allows similar or dissimilar digital devices to talk to each other over a common transmission medium. Communications can also take place among diverse equipment types: mainframes, minicomputers, microcomputers, work processors, personal computers, intelligent terminals, workstations, printers, and disk drives. A local network provides such communications over a limited geographical area: a floor, a section of a building, an entire building or a cluster of buildings, or in a multistory building or factory complex. Distances can vary from a few hundred feet to several miles.

local battery—1. A battery made of single dry cells located at the subscriber's station. 2. A battery that actuates the recording instruments at a telegraph station (as distinguished from the battery that furnishes current to the line). 3. A telephone circuit power source, usually in the form of dry cells, located at the customer's end of the line.

local-battery telephone set—A telephone set

local cable—A handmade cable form for circuit terminations at an attendant's switchboard, at unit equipment, and at other locations where wiring is routed inside the section or unit.

local central office—A central office arranged for termination of subscriber lines and provided with trunks for making connections to and from other central offices.

local channel—1. In private line services, that portion of a through channel within an exchange that is provided to connect the main station with an interexchange channel. 2. A standard broadcast channel in which several stations, with powers not in excess of 1000 watts daytime or 250 watts nighttime, may operate. 3. A channel connecting a communications subscriber to a central office.

local control—Also referred to as manual control. 1. Control of a radio transmitter directly at the transmitter, as opposed to remote control. 2. Manual control of a transmitter, with the control operator monitoring the operation on duty at the control point located at a station transmitter with the associated operating adjustments directly accessible. (Direct mechanical control, or direct wire control of a transmitter from a control point located on board an aircraft, vessel, or on the same premises on which the transmitter is located, is also considered local control.) 3. A method whereby a device is programmable by means of its local (front or rear panel) controls in order to enable the device to perform different tasks.

localizer—A radio facility that provides signals for guiding aircraft onto the center line of a runway.

localizer on-course line—A vertical line passing through a localizer. Indications of opposite sense are received on either side of the line.

localizer station—A ground radionavigation station that provides signals for the lateral guidance of aircraft with respect to the center line of a runway.

local loop—1. The access line from either a user terminal or a computer port to the first telephone office along the line path. 2. The teletype circuit containing a power source, the selector magnets, and a keyboard. This connection allows local copy on the teleprinter. 3. A telephone circuit that connects a subscriber's station equipment to the switching equipment in the telephone company local office.

local memory—Also called buffer RAM or sequence processor. A high-speed random-access memory used to store sequential data patterns that cannot be generated by a hardware pattern generator. Local memory often includes the capability to process data stores in RAM as if they were instructions, thereby modifying data in the buffer.

local oscillator—Abbreviated LO. Also called beat oscillator. 1. An oscillator used in a superheterodyne circuit to reproduce a sum or difference frequency equal to the intermediate frequency of the receiver. This is done by mixing its output with the received signal. 2. The oscillator whose output is mixed with the incoming signal in superheterodyne receivers to produce an intermediate frequency for signal processing (i.e., filtering, amplifying, detecting, etc.).

local-oscillator injection—An adjustment used to vary the magnitude of the local-oscillator signal that is coupled into the mixer.

local-oscillator radiation—Radiation of the fundamental or harmonics of the local oscillator of a superheterodyne receiver.

local-oscillator tube—The vacuum tube that pro-

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.