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MODERN DICTIONARY of ELECTRONICS

RUDOLF F. GRAF

Newnes

ParkerVision Exhibit 2031
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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 periodic in structure and contains no foreign atoms).

implantable pacemaker — A miniature pulse generator surgically implanted beneath the skin and provided with output leads that connect directly to the heart muscle. The electrodes may contact either the outer wall of the 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. 1. A method of producing oscillatory current in which the duration of the impressed voltage is relatively short compared with that of the current produced. 2. The sudden application of a momentary steep-wavefront voltage to a resonant circuit, resulting in a damped oscillation.

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 L^3TV. Abbreviation for low-light television and low-light-level television. A CCTV system capable of operating with scene illumination less than 0.5 lumen/ft^2.

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 storage with information obtained from auxiliary or external storage. 8. The resistance or impedance that the input of one device offers to the output of another device to which it is connected. *See* input impedance; termination, 1. 9. The circuit or transducer (e.g., speaker) 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.

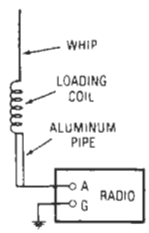
load coil — Also called a work coil. In induction heaters, a coil that, when energized with an alternating current, induces energy into the item being heated.

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.

loaded applicator impedance — In dielectric heating, the complex impedance measured at the point of application with the load material properly positioned for heating and at the specified frequency.

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 that obtains transmitter current from a battery or other current supply circuit individual to the telephone set. The signaling current may be obtained from a local hand-operated generator or from a central power source.

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 provides the local-oscillator signal in a superheterodyne receiver.

local program — A program originating at and released through only one broadcast station.

orthocore — A completely closed flux memory device designed to almost duplicate the geometry of the ferrite core memory, eliminate the wiring of memory cores, and provide a plurality of wires through the memory element. The concept involves the formation of a group of plastic rods around a suitable wiring array.

orthogonal — A term that signifies that two signals (or signal attributes) are mutually transparent and noninterfering with each other. Frequency and amplitude modulation are orthogonal signal attributes.

orthogonal antennas — A pair of radar transmitting and receiving antennas, or a single antenna for transmitting and receiving, designed to permit detection of a difference in polarization between the transmitted and returned energy.

orthogonal axes — Axes that are perpendicular to each other. In an instrument, these axes usually coincide with its axes of symmetry.

OS/2 — One of the first personal computer operating systems to support true multitasking with multiple address spaces and processes. Introduced by IBM in 1990.

OSCAR — Acronym for orbiting satellite carrying amateur radio. Acronym describing amateur satellites generally; with a number attached (e.g., AMSAT-OSCAR-16, or AO-16), the name of a specific ham radio satellite.

osciducer — A transducer in which information pertaining to the stimulus is provided in the form of deviation from the center frequency of an oscillator.

oscillate — To repeat a cycle of motions or to pass through a cycle of state with strict periodicity.

oscillating current — An alternating current; specifically, one that changes according to some law.

oscillating quantity — A quantity that alternately increases and decreases in value, but always remains within finite limits — e.g., the discharge of current from a capacitor through an inductive resistance (provided the inductance is greater than the capacitance times the resistance squared).

oscillating transducer — A transducer in which information pertaining to the stimulus is provided in the form of deviation from the center frequency of an oscillator.

oscillation — 1. The state of a physical quantity when, in the time interval under consideration, the value of the quantity is continually changing in such a manner that it passes through maxima and minima (e.g., oscillating pendulum, oscillating electric current, and oscillating electromotive force). 2. Fluctuations in a system or circuit, especially those consisting of the flow of electric currents alternately in opposite directions; also, the corresponding changes in voltages. 3. *See* hunting, 1. 4. A periodic change in a variable, as in the amplitude of an alternating current.

oscillator — 1. An electronic device that generates alternating-current power at a frequency determined by the values of certain constants in its circuits. An oscillator may be considered an amplifier with positive feedback, with circuit parameters that restrict the oscillations of the device to a single frequency. 2. Something that oscillates. In particular, a self-excited electronic circuit whose output voltage or current is a periodic function of time. 3. A generator of an alternating signal, continuous, sinusoidal, or pulsed.

oscillator circuit — *See* oscillator.

oscillator coil — A radio-frequency transformer that provides the feedback required for oscillation in the oscillator circuit of a superheterodyne receiver or in other oscillator circuits.

oscillator harmonic interference — Interference caused in a superheterodyne receiver by the interaction of incoming signals with harmonics (usually the second harmonic) of the local oscillator.

oscillator-mixer-first-detector — A single stage that, in a superheterodyne receiver, combines the functions of the local oscillator and the mixer-first-detector.

oscillator padder — An adjustable capacitor placed in series with the oscillator tank circuit of a superheterodyne receiver. It is used to adjust the tracking between the oscillator and preselector at the low-frequency end of the tuning range.

oscillator radiation — The amount of voltage available across the antenna terminals of a receiver (or at a distance) traceable to any oscillators incorporated in the receiver.

oscillatory circuit — A circuit containing inductance and/or capacitance and resistance, so arranged or connected that a voltage impulse will produce a current that periodically reverses.

oscillatory current — A current that periodically reverses its direction.

oscillatory discharge — Alternating current of gradually decreasing amplitude which, under certain conditions, flows through a circuit containing inductance, capacitance, and resistance when a voltage is applied. *See also* damped waves.

oscillatory surge — A surge that includes both positive and negative polarity values.

oscillistor — A semiconductor bar that is subjected to a magnetic field and a direct current, and which generates oscillations believed to be due to diffusion of ions toward the surface of the semiconductor as a result of the magnetic field.

oscillogram — 1. The recorded trace produced by an oscillograph. 2. A photograph of the luminous trace or image produced by an oscilloscope. 3. A record formed when the luminous trace or image produced by an oscilloscope is photographed.

oscillograph — 1. An instrument primarily for producing a record of the instantaneous values of one or more rapidly varying electrical quantities as a function of time, or of another electrical or mechanical quantity. 2. An instrument used to record rapidly varying currents or voltages. May consist of a CRT oscilloscope with a camera attachment, or a mirror galvanometer with a lamp and optical system to trace rapid variations of electric current on a moving ribbon of photographic paper. The later type of oscillograph is often a multiple unit capable of recording 20 or more different current variations side by side on the same strip of paper.

oscillograph recorder — A form of mechanical oscillograph in which the waveform is traced on a moving strip of paper by a pen. It is used to record parameters that vary rapidly with time and can record variations in excess of 100 Hz. However, at these higher frequencies, the width of the trace is reduced. Typically such a device with a 40-mm trace width will record a signal up to 40 Hz at full trace width. If the maximum excursion of the recording pen is limited to 8 mm, it will record signals up to 100 Hz faithfully. Above 100 Hz, the signal width will be reduced. These recorders are available in multipen models to record several parameters on a single recorder.

oscillograph tube — *See* oscilloscope tube.

oscillography — The art and practice of utilizing the oscillograph.

oscillometer — An instrument for measuring oscillations (periodic variations) of any kind.

oscilloscope — 1. An instrument in which the horizontal and vertical deflection of the electron beam of a cathode-ray tube are, respectively, proportional to a pair of applied voltages. In the most usual application

pull curves — The characteristics relating force to displacement in the actuating system of a relay.

pull-down resistor — 1. A resistor connected across the output of a device or circuit to hold the output equal to or less than the zero input level of the following digital device. Also used to lower the output impedance of a device. 2. A resistor connected to a negative voltage or to ground.

pull-in current (or voltage) — The maximum current (or voltage) required to operate a relay. *See also* pickup current.

pulling — 1. In an oscillator, the undesired change from the desired frequency. It is caused either by coupling from another source of frequency or by the influence of the load impedance. 2. In television, partial loss of synchronization.

pulling figure — The difference between the maximum and minimum frequencies of an oscillator whenever the phase angle of the load-impedance reflection coefficient varied through 360°. The absolute value of this coefficient is constant and equal to 0.20.

pull-in rate — The maximum stepping rate at which a stepper motor can start its load without missing a step.

pull-in torque — 1. Torque that a synchronous motor can exert to bring its driven load into synchronous speed. There is no corresponding term for induction motors. 2. A measure of the maximum torque that can be applied to the shaft of a stepper motor without causing it to miss a step when starting.

pull-out force — The tensile force required to separate a conductor from a contact or terminal, or to separate a contact from a connector.

pull-out rate — The maximum stepping rate at which a stepper motor can move its load without losing synchronism with the field.

pull-out torque — Also called breakdown torque, or maximum torque. 1. The maximum torque a motor can deliver without stalling. 2. *See* running torque. 3. The maximum torque that a synchronous motor develops at synchronous speed at rated frequency and normal excitation. 4. A measure of the maximum torque that can be applied to the shaft of a stepper motor running at a constant speed within its pull-out ratings before the motor loses synchronism with the field.

pull strength — The values of the pressure achieved in a test in which a pulling stress is applied to determine breaking strength of a lead or bond.

pull test — A test for bond strength of a lead, interconnecting wire, or a conductor.

pull the plug — CB radio term for shut off the radio.

pull-up — 1. The placing of the output voltage of a logic circuit at the high level by means of an internal current sink or source. 2. A dc voltage imposed on the input of an amplifier to move the amplifier's operating point out of the offset range. Pull-up is usually accomplished by means of a voltage divider network.

pull-up resistor — 1. A resistor connected to the positive supply voltage of a transistor circuit, as from the collector supply to the output collector. 2. A resistor connected across the output of a device or circuit to hold the output voltage equal to or greater than the input transition level of a digital device. It is usually connected to a positive voltage or to the plus supply.

pull-up torque — 1. The minimum torque developed by an alternating-current motor during the period of acceleration from rest to the speed at which breakdown torque occurs. For motors that do not have a definite breakdown torque, the pull-up torque is the minimum torque developed up to rated speed. 2. Lowest value of torque produced by a motor between zero speed and full-load speed.

pulsating current — Current that varies in amplitude but does not change polarity.

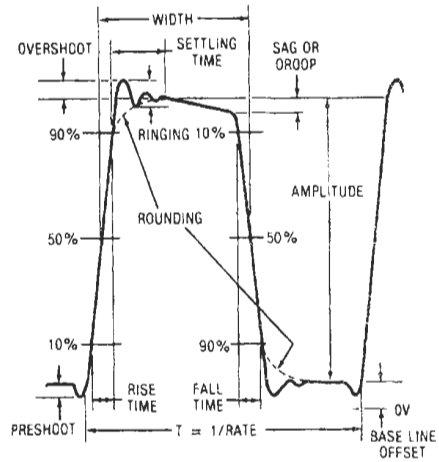
pulsating direct current — A direct current that changes its value at regular or irregular intervals but flows in the same direction at all times.

pulsating electromotive force — A direct electromotive force and an alternating electromotive force combined.

pulsating quantity — A periodic quantity that can be considered the sum of a continuous component and an alternating component in the quantity.

pulsation welding — A form of resistance welding in which the power is alternately applied and removed.

pulse — 1. A variation of a quantity whose value is normally constant; this variation is characterized by a rise and a decay and has finite amplitude and duration. 2. An abrupt change in voltage, either positive or negative, that conveys information to a circuit. *See also* impulse. 3. A brief excursion of a quantity from normal. 4. Signal characterized by the rise and decay in time of a quantity whose value is normally constant. 5. Voltage level, typically 5 volts of very short duration, used in computers to represent a bit. 6. Single impulse of a telephone dial. Generally transmitted in groups of one to ten to represent dialed digits or unique tones to represent digits. 7. A sudden and abrupt jump in an electrical quantity from its usual level to a higher or lower value, quickly followed by an equally abrupt return. 8. A voltage or current that lasts for a short period and is square or Gaussian in shape.



Pulse, 1.

pulse amplification — The compression and intensification of a laser pulse of a specific width into a smaller pulse width. A spherical cavity, in conjunction with a beam compressor, is efficient for pulse amplification. Cones and flats are highly effective when used in conjunction with swept-line foci.

pulse amplifier — A wideband amplifier used to amplify square waves without appreciably changing their shape.

pulse amplitude — A general term for the magnitude of a pulse. For more specific designation, adjectives such as average, instantaneous, peak, rms (effective), etc., should also be used.

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simultaneous transmission — Transmission of control characters or data in one direction at the same time that information is being received in the opposite direction.

SINAD or **sinad** — Abbreviation for signal-to-noise and distortion. 1. A measurement of the signal-to-noise ratio of a receiver system in which the signal level measurement includes the system noise and distortion: (s + n + d)/n.

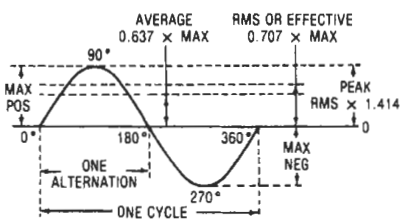
sine — The sine of an angle of a right triangle is equal to the side opposite that angle divided by the hypotenuse (the long side opposite the right angle).

sine galvanometer — An instrument resembling a tangent galvanometer except that its coil is in the plane of the deflecting needle. The sine of the angle of deflection will then be proportionate to the current.

sine law — The law which states that the intensity of radiation in any direction from a linear source varies in proportion to the sine of the angle between a given direction and the axis of the source.

sine potentiometer — A dc voltage divider (potentiometer) whose output is proportionate to the sine of the shaft-angle position.

sine wave — 1. A wave that can be expressed as the sine of a linear function of time, space, or both. 2. A waveform (often viewed on an oscilloscope) of a pure alternating current or voltage. It is drawn on a graph of amplitude versus time or radial degrees and follows the rules of sine and cosine values in relation to angular rotation of an alternator. It can be simulated by means of an electronic oscillator. 3. The only waveform that cannot be considered to be a pulse. All other waveforms consist of more than one frequency, all harmonically related. A sine wave has a single frequency and therefore occupies a very small bandwidth. It passes through circuitry of any bandwidth with no change in waveform, but it may be changed in amplitude.



Sine wave.

sine-wave modulated jamming — A jamming signal consisting of a cw signal modulated by one or more sine waves.

singing — 1. An undesired self-sustained oscillation at a frequency in or above the passband of a system or component. 2. An unwanted self-sustained audio-frequency oscillation in an audio system or device.

singing margin — Also called gain margin. The excess of loss over gain around a possible singing path at any frequency, or the minimum value of such excess over a range of frequencies.

singing point — 1. The condition of a circuit or transmission path where the sum of the gains exceeds the sum of the losses. When expressed in decibels, it is the gain that can be added to the circuit equivalent before singing will begin. 2. The amount of total gain in the transmission system (most commonly used in connection with two-wire repeaters) that causes the system to begin to lose efficiency of performance because the self-oscillating point is too closely approached. 3. The singing point of a circuit that is coupled back to itself is the point at which the gain is just sufficient to make the circuit break into oscillation.

singing-stovepipe effect — Reception and reproduction of radio-signal modulation by ordinary pieces of metal, such as sections of stovepipe, in contact with each other. It is caused by mechanically poor connections, such as rusty bolts or faulty welds, that act as nonlinear diodes and produce intermodulation distortion when subjected to strong radiated fields near transmitters.

single-address code — An instruction that contains the location of the data as well as the operation or sequence of operations to be performed on this data.

single amplitude — With reference to vibratory conditions, the peak displacement of an oscillating structure from its average or mean position.

single-anode tank — *See* single-anode tube.

single-anode tube — Also called a single-anode tank. An electron tube with one anode (used chiefly for pool-cathode tubes).

single-assignment language — A programming language that allows only one value to be assigned to a variable in a single expression.

single-axis gyro — A type of gyro in which the spinning rotor is mounted in a gimbal arranged so as to tilt about only one axis relative to the stable element.

single-board microcomputer — Also called monoboard microcomputer. A single printed circuit board containing, as a minimum, processor, memory (ROM and/or RAM), and input/output — usually a combination of serial and parallel ports. May also include a counter/timer function and bus interconnection scheme. A single-board microcomputer family may also include other functional system elements (such as memory and I/O functions) on circuit boards of the same format as the microcomputer board.

single-button carbon microphone — A microphone having a carbon-filled buttonlike container on one side of its flexible diaphragm. As the sound waves move the diaphragm, the resistance of the carbon changes, and the microphone current constitutes the desired audio-frequency signal.

single-carrier FM recording — The method of recording in which the input signal is frequency modulated onto a carrier and the carrier is recorded on a single track at saturation and without bias.

single-channel — A carrier-only or single-tone modulated radio control transmitter and matching receiver installation.

single-channel monopulse tracking system — *See* monopulse tracking.

single-channel simplex — Nonsimultaneous communication between stations over the same frequency channel.

single circuit — A telegraph circuit capable of nonsimultaneous two-way communication.

single-circuit system — An alarm circuit that routes only one side of the circuit through each sensor. The return may be through either ground or a separate wire.

single-conversion receiver — A receiver employing a superheterodyne circuit in which the input signal is downconverted once.

single crystal — A piece of material in which the crystallographic orientation of all the basic groups of atoms is the same.

single-degree-of-freedom system — A system for which only one coordinate is required to define the configuration of the system.

material for the film is ejected from the surface of the bulk source when the source is subjected to ion bombardment. 3. Dislocation of surface atoms of a material bombarded by high-energy atomic particles. 4. A method of depositing a thin film or material onto a substrate. The substrate is placed in a large demountable vacuum chamber having a cathode made of the metal or ceramic to be sputtered. The chamber is then operated so as to bombard the cathode with positive ions. As a result, small particles of the material fall uniformly on the substrate. 5. A deposition process wherein a surface, or target, is immersed in an inert-gas plasma and is bombarded by ionized molecules that eject surface atoms. The process is based on the disintegration of the target material under ion bombardment. Atoms broken away from the target material by gas ions deposit on the part (substrate), forming a thin film.

SQ — A matrix system developed by CBS, Inc.

s-quad — Also called simple quad. An arrangement of two parallel paths, each of which contains two elements in series.

square — A unit area, i.e., the ratio of length/width = 1.

square-law demodulator — *See* square-law detector.

square-law detection — Detection in which the output voltage is substantially proportional to the square of the input voltage over the useful range of the detector.

square-law detector — Also called square-law demodulator. A detector in which the output signal current is proportional to the square of the radio-frequency input voltage. Operation of this circuit depends on nonlinearity of the detector characteristic, rather than on rectification.

square-law scale meter — A meter in which the deflection is proportional to the square of the applied energies.

square-loop ferrite — A ferrite with a rectangular hysteresis loop.

square-loop material — Ferromagnetic material having a squareness ratio approaching 1. *Compare* rectangular loop.

squareness — The ratio of the residual induction to the maximum induction obtained at the maximum magnetizing field being used. It can be considered as a figure of merit of the flatness of the decaying magnetizing curve.

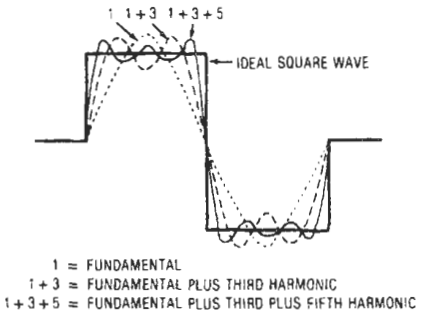
squareness ratio — 1. For a magnetic material in a symmetrically cyclically magnetized condition, the ratio of the flux density at zero magnetizing force to the maximum flux density. 2. The ratio of the flux density to the maximum flux density when the magnetizing force has changed halfway from zero toward its negative limiting value.

square wave — 1. A square- or rectangular-shaped periodic wave that alternately assumes two fixed values for equal lengths of time, the transition time being negligible in comparison with the duration of each fixed value. 2. An ac periodic waveform in which voltage alternates rapidly from a positive peak value to the negative peak value, and vice versa, after a delay.

square-wave amplifier — A resistance-coupled amplifier (in effect, a wideband video amplifier) that amplifies a square wave with a minimum of distortion.

square-wave generator — A signal generator for producing square or rectangular waves. It is useful for testing the frequency response of wideband devices. *See also* square-wave testing.

square-wave response — In camera tubes, the ratio of the peak-to-peak signal amplitude given by a test pattern consisting of alternate black and white bars of equal widths to the difference in signal between large areas of black and white having the same illuminations



Square wave showing harmonic composition.

as the bars. Horizontal square-wave response is measured if the bars are perpendicular to the horizontal scan, and vertical square-wave response is measured if they are parallel.

square-wave testing — The use of a square wave signal to test the frequency response of a wideband device. The output wave seen on an oscilloscope will show how much the square wave was distorted in passing through the device.

squaring circuit — 1. A circuit that changes a sine wave or other wave into a square wave. 2. A circuit that contains nonlinear elements and that produces an output voltage proportional to the square of the input voltage.

squawker — The midrange speaker of a three-way system.

squeal — 1. Audible tape vibrations, primarily in the longitudinal node, caused by a frictional excitation at the heads and guides. 2. In a radio receiver, a high-pitched tone heard together with the wanted signal.

squealing — The high-pitched noise heard along with the desired intelligence in a radio receiver. It is due to interference between stations or to oscillation in one of the receiver circuits.

squeegee — The part of a screen printer used in thick-film circuit manufacturing that pushes the composition across the screen and through the mesh onto the substrate.

squeezable waveguide — In radar, a variable-width waveguide for shifting the phase of the radio-frequency wave traveling through it.

squeeze section — A length of waveguide whose critical dimension can be altered to correspond to changes in the electrical length.

squeeze track — A variable-density sound track in which variable width with greater signal-to-noise ratio is obtained by means of adjusting masking of the recording light beam and simultaneously increasing the electric signal applied to the light modulator.

squegger — A self-quenching oscillator in which the suppression occurs in the grid circuit.

squegging — A self-blocking condition in an oscillator circuit.

squegging oscillator — *See* blocking oscillator, 1.

squelch — To automatically quiet a receiver by reducing its gain in response to a specified characteristic of the input.

squelch circuit — 1. A circuit for preventing a radio receiver from producing an audio-frequency output in the absence of a signal having predetermined characteristics. A squelch circuit may be operated by signal energy in the receiver passband, by noise quieting, or by a combination of the two (ratio squelch). It may also be