MODERN DICTIONARY of ELECTRONICS

SEVENTH EDITION

REVISED AND UPDATED

Rudolf F. Graf

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acoustic transmission system — An assembly of elements adapted for the transmission of sound.

acoustic treatment — Use of certain sound-absorbing materials to control the amount of reverberation in a room, hall, or other enclosure; that is, to make the room less live.

acoustic wave — A traveling vibration by which sound energy is transmitted in air, water, or the earth. The characteristics of these waves may be described in terms of change of pressure, particle displacement, or density.

acoustic wave filter — A device designed to separate sound waves of different frequencies. (Through electroacoustic transducers, such a filter may be associated with electric circuits.)

acoustoelectric effect — Generation of an electric current in a crystal by a traveling longitudinal sound wave.

acousto-optic Bragg cell — A modulation device that impresses analog information on light beams. This transducer is composed of two sets of interleaved electrodes of alternating polarities deposited on an optical waveguide. An electrical signal applied to each pair of adjacent electrodes buckles the film between them. This distortion changes the refractive index of the waveguide and creates physical waves in the film, commonly called surface waves. These waves are generated at a rate equal to that of the applied electrical signal.

acousto-optics — The study of the interactions between sound waves and light in a solid medium. Sound waves can be made to modulate, deflect, and focus light waves — an important characteristic in laser and holographic applications.

ac plate resistance — Also called dynamic plate resistance. Internal resistance of a vacuum tube to the flow of alternating current. Expressed in ohms, the ratio of a small change in plate voltage to the resultant change in plate current, other voltages being held constant.

ac power supply — A power supply that provides one or more ac output voltages, e.g., ac generator, dynamotor, inverter, or transformer.

acquisition — 1. The process of pointing an antenna or telescope so that it is properly oriented to allow gathering of tracking or telemetry data from a satellite or space probe. 2. In radar, the process between the initial location of a target and the final alignment of the tracking equipment on the target. 3. The gathering of data from transducers or a computer.

acquisition and tracking radar — A radar set that locks onto a strong signal and tracks the object emitting or reflecting the signal. May be airborne or on the ground. Tracking radars use a dish-type antenna reflector to produce a searchlight-type beam.

acquisition radar — A radar set that detects an approaching target and feeds approximate position data to a fire-control or missile-guidance radar, which then takes over the function of tracking the target.

acquisition range — Also called capture range. The range of input frequency about f_o under which a phase-locked loop, which is initially unlocked, will become locked. This range is narrower than the normal tracking range and is a function of the loop-filter characteristics and the input amplitude.

acquisition time — 1. Time delay between request for data conversion and the holding of the analog value by a sample-and-hold amplifier. 2. In a sample-and-hold circuit, how long it takes after the sample command is given for the hold capacitor to be charged to a full-scale voltage change and to remain within a specified error band around its final value. 3. The time it takes for the output of a sample-and-hold circuit to change from its previous value to a new value when the circuit is switched from the hold mode to the sample mode. It includes the slew time and settling time to within a certain error band of the final value and is usually specified for a full-scale change.

ac receiver — A radio receiver designed to operate from an ac source only.

ac reclosing relay — A device that controls the automatic reclosing and locking out of an ac circuit interrupter.

ac relay — A relay designed to operate from an alternating-current source.

ac resistance — Total resistance of a device in an ac circuit. *See also* high-frequency resistance.

acronym — A word formed from the first letter or letters of the words describing some item, e.g., FORTRAN from *for*mula *tran*slation.

across-the-line starting — Connection of a motor directly to the supply line for starting. Also called full-voltage starting.

ac signaling — Using ac signals or tones to transmit data and/or control signals.

ACTCRBS — Abbreviation for air traffic control radar beacon system. A control system in use worldwide. Air separation information exchanged between plane and air traffic controller must be sent by radio.

ac time overcurrent relay — A device that has either a definite or an inverse time characteristic and functions when the current in an ac circuit exceeds a predetermined value.

actinic — In radiation, the property of producing a chemical change, such as the photographic action of light.

actinium — A radioactive element discovered in pitchblende by the French chemist Debierne in 1889. Its atomic number is 89, its atomic weight 227, and its symbol Ac.

actinodielectric — A photoconductive dielectric.

actinoelectric — Exhibiting a temporary rise in electrical conductivity during exposure to light.

actinoelectric effect — 1. The property of some special materials whereby when an electric current is impressed on them, their resistance changes with light. 2. The property of certain materials (such as selenium, cadmium sulfide, germanium, and silicon) that causes them to change their electrical resistance or generate a voltage on exposure to light.

actinoelectricity — Electricity produced by the action of radiant energy on crystals.

actinometer — An instrument that measures the intensity of radiation by determining the amount of fluorescence produced by that radiation.

action area — In the rectifying junction of a metallic rectifier, that portion which carries the forward current.

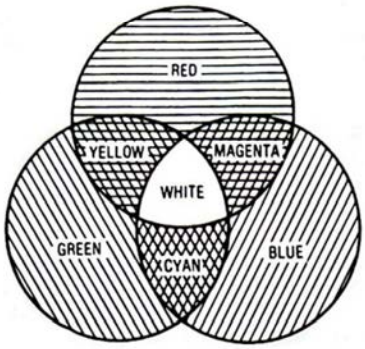
action current — A brief and very small electric current that flows in a nerve during a nervous impulse.

action potential — 1. The instantaneous value of the voltage between excited and resting portions of an excitable living structure. 2. The voltage variations in a nerve or muscle cell when it is excited or fired by an appropriate stimulus. After a short time, the cell recovers its normal resting potential, typically about 80 millivolts. The interior of the cell is negative relative to the outside.

activate — To start an operation, usually by application of an appropriate enabling signal.

activating — 1. Chemically treating a basic metal to remove oxides and other passive films to make it more receptive to electroplating. 2. A treatment that renders nonconductive material receptive to electroless deposition. (Nonpreferred synonyms: seeding, catalyzing, and sensitizing.)

activation — 1. Making a substance artificially radioactive by placing it in an accelerator such as a cyclotron or by bombarding it with neutrons. 2. To treat the cathode or target of an electron tube in order to create or increase its



Chrominance primaries.

the total video signal that contains the color information. Without the chrominance signals, the received TV picture would be in black and white.

chrominance subcarrier — Also called color carrier. An rf signal that has a specific frequency of 3.579545 MHz and that is used as a carrier for the I and Q signals.

chrominance-subcarrier oscillator — In a color TV receiver, a crystal-controlled oscillator that generates the subcarrier signal for use in the chrominance demodulators.

chrominance video signals — Output voltages from the red, green, and blue sections of a color-television camera or receiver matrix.

chromium dioxide — A type of recording-tape coating that produces very good quality at low recording speeds. Because of its magnetic properties, it requires a higher value of bias current in the recorder. The high performance inherent in chromium dioxide tape can only be realized in a tape machine having provision for a CrO_2 bias setting. On a standard recorder, the chromium dioxide tape will appear to have high-frequency emphasis and may likely be difficult to erase. Chromium dioxide has a good dynamic range and a low noise level. Used in the cassette format with a suitable machine equipped with the Dolby system, it can make recordings that meet the best high-fidelity standards.

chronistor — A subminiature elapsed-time indicator that uses electroplating principles to totalize the operating time of equipment up to several thousand hours.

chronograph — An instrument for producing a graphical record of time as shown by a clock or other device.

chronoscope — An instrument for measuring very small intervals of time.

CID — Abbreviation for charge injection device or charge injection imaging device. 1. A memory in which the charge is stored in an X-Y addressable array of potential cells. For image arrays, the charge for each of the cells is generated by an associated photodioide. 2. A solid-state imaging device utilizing an image sensor composed of a two-dimensional array of coupled MOS charge-storage capacitors and designed to convert near infrared energy to electrical signals, providing broad gray shade or tonal rendition. The sensor collects minority carrier charge, generated by photon energy in the substrate near the charge-storage capacitors, and stores it in the surface inversion region. By injecting the stored charge into the substrate, and by monitoring the current, signal readout is achieved.

CIE — Initials of the Commission Internationale de l'Éclairage, or International Commission on Illumination.

CIE source — Standard light source representative of the quality of specified natural or artificial illumination.

CIE standard chromaticity diagram — A chromaticity diagram in which the X and Y chromaticity coordinates are plotted in rectangular coordinates.

CIM — Abbreviation for computer-integrated manufacturing. Applying information technology to production processes and organizational structure to streamline operations. Often focused on integrating systems and processes distributed across a company, such as order entry, scheduling, and production.

cinching — Longitudinal slippage between the layers in a tape pack as a result of acceleration or deceleration of the roll.

cipher — Cryptographic system in which arbitrary symbols or groups of symbols represent units of plain text of regular length, usually single letters, or in which units of plain text are rearranged, or both, according to certain predetermined rules.

cipher machine — Mechanical and/or electrical apparatus for enciphering and deciphering.

cipher telephony — A technique by which mechanical and/or electrical equipment is used for scrambling or unscrambling, or enciphering or decoding, radio or voice messages.

ciphertext or cryptogram — A secret form of a message.

ciphony — *See* cipher telephony.

circle cutter — A tool consisting of a center drill with an adjustable extension-arm cutter, used to cut holes in panels and chassis.

circle-dot mode — A method of storage of binary digits in a cathode-ray tube in which one kind of digit is represented by a small circle on the screen, and the other kind is represented by a similar circle with a concentric dot.

circle of confusion — The circular image of a point source due to the inherent aberrations in an optical system.

circlotron amplifier — A one-port, nonlinear crossfield high-power microwave amplifier that uses a magnetron as a negative-resistance element, much as a maser uses an active material.

circuit — 1. Path through which electrical signals flow. 2. An electronic path between two or more points capable of providing a number of channels. 3. A number of conductors connected together for the purpose of carrying an electrical current. 4. The interconnection of a number of devices in one or more closed paths to perform a desired electrical or electronic function. Examples of simple circuits are high- or low-pass filters, multivibrators, oscillators, and amplifiers. 5. A complete path of electron flow from a negative terminal of voltage source through a conductor and back to the positive terminal. 6. An electrical system using two or more wires in which the current flows from the source to one or more electrical devices and back again to the source of supply. 7. A complete, closed path. Confusion between circuit and network is common. *Circuit* refers to a closed path within a network. 8. An array of elements interconnected to perform functions beyond the range of single-element capability. *See* channel, 2.

circuit analysis — Careful determination of the nature and behavior of a circuit and its various parts. The analysis may be theoretical, practical, or both.

circuit analyzer — Also called multimeter. Several instruments or instrument circuits combined in a single enclosure and used in measuring two or more electrical quantities in a circuit.

circuit bonding jumper — The connection between portions of a conductor in a circuit to maintain required ampacity of the circuit.

circuit breaker — 1. An automatic device that, under abnormal conditions, will open a current-carrying circuit

Decimal	*Binary*	*Decimal*	*Binary*
0	0	10	101
1	1	11	1011
2	10	12	1100
3	11	13	1101
4	100	14	1110
5	101	15	1111
6	110	16	10000
7	111	32	100000
8	1000	64	1000000
9	1001	128	10000000

decimetric waves — 1. Electromagnetic waves having wavelengths between 0.1 and 1 meter. 2. Ultrahigh frequency band; 300 MHz to 3 GHz.

decineper — One-tenth of a neper.

decinormal calomel electrode — A calomel electrode containing a decinormal potassium chloride solution.

decision — In a computer, the process of determining further action on the basis of the relationship of two similar items of data.

decision box — On a flowchart, a rectangle or other symbol used to mark a choice or branching in the sequence of programming of a digital computer.

decision element — In computers or data-handling systems, a circuit that performs a logical operation, such as AND, OR, NOT, or EXCEPT, on one or more binary digits in input information that represent "yes" or "no" and that expresses the result in its output. *See also* gate.

decision table — A table of all contingencies that are to be considered in the description of a problem, together with the actions to be taken. Decision tables are sometimes used in place of flowcharts for problem description and documentation.

deck — 1. In computer usage, a collection of cards, usually a complete set of cards punched for a definite purpose. 2. A term usually applied to a tape machine having no built-in power amplifiers or loudspeakers of its own, but intended rather for feeding a separate amplifier and speaker system, as in a component installation.

declination — The offset angle of an antenna from the axis of its polar mount as measured in the meridian plane between the equatorial plane and the antenna main beam.

declination offset angle — The adjustment angle of a polar mount between the polar axis and the plane of a satellite antenna used to aim at the geosynchronous arc.

decode — 1. In a computer, to obtain a specific output when specific character-coded input lines are activated. 2. To use a code to reverse a previous encoding. 3. To determine the meaning of characters or character groups in a message. 4. To determine the meaning of a set of pulses that describes an instruction, a command, or an operation to be carried out.

decoder — 1. A device for translating a combination of signals into one signal that represents the combination. It is often used to extract information from a complex signal. 2. In automatic telephone switching, a relay-type translator that determines from the office code of each call the information required for properly recording the call through the switching train. Each decoder has means, such as a cross-connecting field, for establishing the controls desired and readily changing them. 3. Sometimes called matrix. In an electronic computer, a network or system in which a combination of inputs is excited at one time to produce a single output. 4. A device that converts coded information into a more usable form, for example, a binary-to-decimal decoder. 5. A circuit that accepts coded input data and activates a specific output(s) in accordance with the code present at the input. 6. A circuit built into an FM tuner to enable it to translate stereo signal information into two matched audio outputs. 7. A means to extract and process recorded quadraphonic sound information from a complex signal into four matched outputs. 8. A device consisting of gates that is usually connected to the output of a counter. It provides an output when the counter is at a specific count or range of counts. 9. A logic device that breaks the code of an incoming binary signal; i.e., converts the coded information into a more usable form. 10. A logic device that converts data from one number system to another (e.g., an octal-to-decimal decoder). Decoders are also used to recognize unique addresses, such as a device address, and bit patterns. *See* code converter. 11. A circuit that restores a signal to its original form after it has been scrambled. 12. A device that reconstructs an encrypted signal so that it can be clearly received. 13. A television set-top device that enables the home subscriber to convert an electronically scrambled television picture into a viewable signal. (This should not be confused with a digital coder/decoder, known as a codec, which is used in conjunction with digital transmissions.)

decoding — 1. The process of obtaining intelligence from a code signal. 2. In multiples, a process of separating the subcarrier from the main carrier.

decoding matrix — A device for decoding many input lines into a single output line.

decoding network — A circuit made so that, when a particular combination of inputs is on, an output appears on one of a number of output lines.

decollimated light — In fiber optics, light rays made nonparallel by striae and boundary defects.

decommutation — The process of recovering a signal from the composite signal previously created by a commutation process.

decommutator — Equipment for separating, demodulating, or demultiplexing commutated signals.

decomposition — Breaking down a software specification, in depth and breadth, to determine all required functions and their relationships.

decoupler — A circuit for eliminating the effect of coupling in a common impedance.

decoupling — 1. The reduction of coupling. 2. To isolate two circuits on a common line. A decoupling network is a low-pass filter (*RC* or *RLC*) that does not isolate equally in both directions.

decoupling circuit — A circuit used to prevent interaction of one circuit with another.

decoupling network — A network of capacitors and chokes or resistors placed into leads that are common to two or more circuits, to prevent unwanted, harmful interstage coupling.

decoy — A reflecting object having reflective characteristics of a target, used in radar deception.

decrement — 1. Progressive diminution in the value of a variable quantity; also the amount by which a variable decreases. When applied to damped oscillations, it is usually called damping factor. 2. A specific part of an instruction word in some binary computers; thus, a set of digits. 3. To reduce the numerical contents of a counter. A decrement of one is usually assumed unless specified otherwise. 4. In an oscillating system with damping (each oscillation has less amplitude than the one preceding it), the ratio of the peak values (voltage, distance, etc.) of two successive half-cycles. It is expressed as a decimal fraction less than 1.

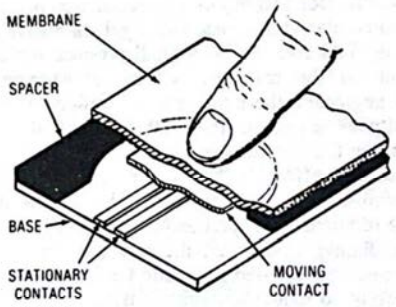
decremeter — An instrument for measurement of the logarithmic decrement (damping) of a wave train.

decryption — The process of "unscrambling" an encrypted or coded message.

melt-quench transistor—A junction transistor made by quickly cooling a meltback region.

membrane potential—The electric potential that exists across the two sides of a membrane.

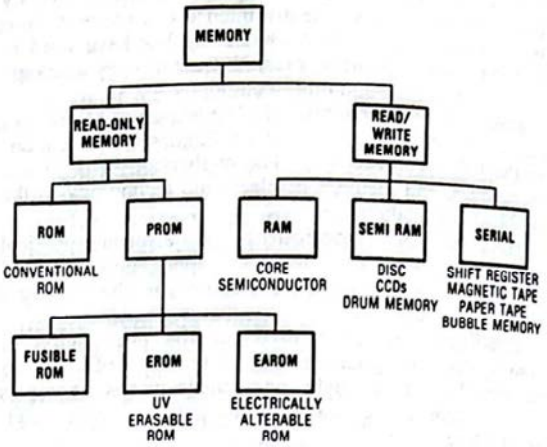
membrane switch—1. A thin, flat, lightweight panel containing one or more individual touch-activated switches. An upper membrane with a flexible, conductive material on the lower side is separated by a shimlike spacer from a lower substrate that contains one or more sets of switch contact points. Depressing the membrane touches the conductive surfaces on the lower side of the membrane to the contact points to close the circuit. When the switch is released, the flexible membrane returns to its original position and breaks contact. 2. Contacts and interconnections deposited on two outside layers separated by a third layer that acts as a spacer and maintains the contact gap. A decorative graphic overlay is generally secured to the top layer of the switch with adhesive. The flexible top layer acts as a key cap. The bottom layer can be made of the same flexible material, or it can be a rigid printed circuit board that provides mechanical support. 3. A sandwich of three polyester films. The front layer is the membrane, with a moving contact on its inner surface. Stationary contacts are on the front surface of the rear layer or base. The middle layer contains openings that expose the moving contacts to the stationary ones. Pushing the front sheet over a cut-out area flexes the membrane toward the rear layer, closing the contacts. Only a few thousandths of an inch movement and a few ounces of pressure are required to make contact.



Membrane switch.

memistor—A nonmagnetic memory device composed of a resistive substrate in an electrolyte. When the device is used in an adaptive system, a dc signal deposits copper from an anode on the substrate, thus reducing the resistance of the substrate. Reversing the current reverses the process, increasing the resistance of the substrate.

memory—1. The equipment and media used to hold machine-language information in electrical or magnetic form. Usually, the word *memory* means storage within a control system, whereas *storage* is used to refer to magnetic drums, MOS devices, disks, cores, tapes, punched cards, etc., external to the control system. Either term means collecting and holding pertinent information until it is needed by the computer. 2. The tendency of a material to return to its original shape after having been deformed. 3. Any device or circuit capable of storing a digital word or words. 4. The component of a computer, control system, guidance system, instrumented satellite, or the like designed to provide ready access to data or instructions previously recorded so as to make them bear upon an immediate problem. 5. That part of a computer that holds data and instructions. Each instruction or datum is assigned a unique address that is used by the CPU when fetching or storing the information. 6. The storage capability or location in a computer system that receives and holds information for later use. Also, the storage arrangement, such as RAM or other type.



Memory types.

memory addressing modes—The method of specifying the memory location and an operand. Common addressing modes are direct, immediate, relative, indexed, and indirect. (These modes are important factors in program efficiency.)

memory address register—1. The CPU register in a computer, which holds the address of the memory location being accessed. 2. A multiple-bit register that keeps track of where instructions are stored in the main memory.

memory allocation—In a computer, a technique of allocating memory to processes or devices.

memory array—In a computer, the memory cells arranged in a rectangular geometric pattern on a chip and organized in rows and columns.

memory buffer register—In a computer, a register in which a word is stored as it comes from memory (reading) or just prior to its entering memory (writing).

memory bus—A dedicated bus through which a central processing unit accesses the memory of a computer system.

memory capacity—*See* storage capacity.

memory cell—A single storage element of a memory, together with the associated circuits for inserting and removing one bit of information.

memory circuit—A circuit that, having been placed in a particular state by an input signal, will remain in that state after the removal of the input signal.

memory counter—Also called rewind. A system that allows recording tape to be rewound automatically to any predetermined point on the tape.

memory cycle—1. In a computer, an operation consisting of reading from and writing into memory. 2. The operations required for addressing, reading, writing, and/or reading and writing data in memory.

memory dump—1. In a computer, a process of writing the contents of memory consecutively in such a form that it can be examined for computer or program errors. 2. A computer printout showing the contents of memory.

performed continuously, with the time sequence of events preserved between input and output.

real-time system — 1. A computer system in which data processing is performed so that the results are available in time to influence the controlled or monitored process. 2. An information system whose input or output rate is not controlled by the system, but depends on external factors. 3. A system in which transactions are processed as they occur.

rear projection — A projection television system in which the picture is projected on a ground-glass screen to be viewed from the opposite side of the screen.

rear suspension — In moving-coil speakers, a pliable support situated near the apex of the cone. Assists in keeping the coil in a concentric position in the air gap between the magnet poles.

rebatron — A relativistic electron-bunching accelerator that produces a very tightly bunched beam with little velocity modulation, but high harmonic content. The beam can be used to excite structures that are large compared to a wavelength.

Rebecca — An airborne interrogator-responsor of the British Rebecca-Eureka navigation system. It can also be used with a special ground beacon known as Babs to provide low-approach facilities.

Rebecca-Eureka system — A British radar navigational system employing an airborne interrogator (Rebecca) and a ground transponder beacon (Eureka). It provides homing to an airfield from distances of up to 90 miles (145 km).

rebond — A second bonding attempt after a bond has been removed or failed to bond on the first attempt.

rebonding-over bond — A second bond made on top of a removed or damaged bond or a second bond immediately adjacent to the first bond.

reboot — 1. To restart a computer by reloading the operating system. 2. To restart a computer after it has been operating for some time, usually in an attempt to clear an error condition.

rebroadcast — The reception and the simultaneous or subsequent retransmission of a radio or television program by a broadcast station.

recalescent point — The temperature at which heat is suddenly liberated as the temperature of a heated metal drops.

recall — In a calculator, to retrieve from a register a previously entered number, for checking or use in further calculations.

receive current — The amount of current drawn by a transceiver when receiving radio signals.

received power — The power of a returned target signal received at the radar antenna.

received signal level — The strength of an intercepted radio signal at the antenna terminals of the receiver, expressed in microvolts or dBm.

receive only — Abbreviated RO. A teletypewriter-type terminal having no keyboard or tape reader.

receive-only typing reperforator — Also called rotor. A teletypewriter receiver whose output is a perforated tape that has characters along the edge of the tape.

receiver — 1. The portion of a communications system that converts electric waves into a visible or audible form. 2. An electromechanical device for converting electrical energy into sound waves. *See also* earphone. 3. A device for the reception and, if necessary, demodulation of electronic signals. 4. The electromagnetic unit in a telephone handset used to convert electrical energy to sound energy.

receiver bandwidth — The spread in frequency between the half-power points on the response curve of a receiver.

receiver gating — Application of operating voltages to one or more stages of a receiver only during the part of a cycle when reception is desired.

receiver images — Undesired signals in a receiver caused by the heterodyning process.

receiver incremental tuning — A control feature to permit receiver tuning (of a transceiver) up to 3 kHz to either side of the transmitter frequency.

receiver lockout system — In mobile communications, an arrangement of control circuits whereby only one receiver can feed the system at one time, to avoid distortion.

receiver noise figure — The ratio of noise voltage in a given receiver to that of a theoretically perfect receiver.

receiver noise threshold — The level that must be exceeded by the minimum discernible signal. External noise reaching the front end of a receiver and the noise added by the receiver itself determine the noise threshold.

receiver primaries — Constant-chromaticity, variable-luminance colors that are produced by a television receiver and that when mixed in proper proportions produce other colors. Usually three primaries — red, green, and blue — are used.

receiver radiation — Radiation of interfering electromagnetic signals by any oscillator of a receiver.

receiver sensitivity — The lower limit of useful signal input to the receiver. It is set by the signal-to-noise ratio at the output.

receiving amplifier — The amplifier used at the receiving end of a system to raise the level of the signal.

receiving antenna — A device for converting received space-propagated electromagnetic energy into electrical energy.

receiving circuit — An apparatus and connections used exclusively for the reception of messages at a radiotelephone or radiotelegraph station.

receiving equipment — The equipment (amplifiers, filters, oscillator, demodulator, etc.) associated with incoming signals.

receiving-loop loss — That part of the repetition equivalent assignable to the station set, subscriber line, and battery-supply circuit on the receiving end of a telephone line.

receiving margin — Also called range or operating range. In telegraphy, the usable range of adjustment of the range finder; for a machine that is adjusted properly, approximately 75 points on a 120-point scale.

receiving perforator — In printing telegraph systems, an apparatus that punches a paper strip automatically in accordance with the arriving signals. When the paper strip is later passed through a printing telegraph machine, the signals will be reproduced as printed messages, ready for delivery to the customer.

receptacle — 1. Usually the fixed or stationary half of a two-piece multiple-contact connector. Also, the connector half usually mounted on a panel and containing socket contacts. 2. A contact device installed at the outlet. Allows the connection of external electric cords from lamps or appliances.

receptacle connector — An electrical connector intended to be mounted or installed onto a fixed structure, such as a panel, electrical case, or chassis, and which couples or mates to a plug connector.

reception — Listening to, copying, recording, or viewing any form of emission.

rechargeable — Capable of being recharged. Usually used in reference to secondary cells or batteries.