SEVENTH EDITION

MODERN DICTIONARY of ELECTRONICS

RUDOLF F. GRAF

Newnes

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coating that acts to repel dust and dirt and changes surface characteristics. Good antistatic sprays will leave a resistivity reading of 20 to 100 megohms per square inch (3–15 MΩ/cm^2) on plastics and 100 megohms or more per square inch on glass surfaces. *See* static eliminators.

antistickoff voltage — A small voltage, usually applied to the rotor winding of the coarse synchro control transformer in a two-speed system. The antistickoff voltage acts to eliminate the possibility of ambiguous behavior in the system.

antitransmit-receive box — A second transmit-receive switch used in a radar antenna system to minimize absorption of the echo signal in the transmitter circuit during the interval between transmitted pulses.

antitransmit-receive switch — Abbreviated atr switch. An automatic device employed in a radar system to prevent received energy from being absorbed in the transmitter.

antitransmit-receive tube — *See* atr tube.

antivoice-operated transmission — A method of radiocommunication in which a voice-activated circuit prevents the operation of the transmitter during reception of messages on an associated receiver.

aperiodic — 1. Having no fixed resonant frequency or repetitive characteristics or no tendency to vibrate. A circuit that will not resonate within its tuning range is often called aperiodic. 2. Not characterized by predictable periods or steps.

aperiodic antenna — An antenna designed to have a constant impedance over a wide frequency range (for example, a terminated rhombic antenna) due to the suppression of reflections within the antenna system.

aperiodic damping — Also called overdamping. The condition of a system when the amount of damping is so large that when the system is subjected to a single disturbance, either constant or instantaneous, the system comes to a position of rest without passing through that position. Although an aperiodically damped system is not strictly an oscillating system, it has such properties that it would become an oscillating system if the damping were sufficiently reduced.

aperiodic function — A function having no repetitive characteristics and not repeatable within a specified period.

aperiodic waveform — A nonrepeating, random, one-shot waveform.

aperture — 1. In a unidirectional antenna, that portion of the plane surface which is perpendicular to the direction of maximum radiation and through which the major part of the radiation passes. 2. In an opaque disc, the hole or window placed on either side of a lens to control the amount of light passing through. 3. Also called aperture time. The amount of certainty about the exact time when the encoder input was at the value represented by a given output code. In general, the aperture is equal to the conversion time; it may be reduced by the use of sample-and-hold circuits. 4. In an electron gun, the opening that determines the size of, and has an effect on, the shape of the electron beam. In television optics, it is the effective diameter of the lens that controls the amount of light reaching the photoconductive or photoemitting image pickup tube. 5. An opening that will pass light, electrons, or other forms of radiation.

aperture antenna — A type of antenna whose beam width is determined by the dimensions of a horn, lens, or reflector.

aperture compensation — Reduction of aperture distortion by boosting the high-frequency response of television-camera video amplifier.

aperture correction — Compensation for the loss in sharpness of detail because of the finite dimensions of a scanning beam in the horizontal dimension.

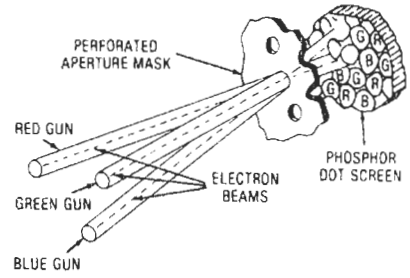
aperture delay time — The time elapsed from the application of the hold (or encode) command until the sampling switch in a sample-and-hold circuit opens fully and the device actually takes the sample. Aperture delay time is a fixed delay time and is normally not an error source since the hold clock edge can be advanced to compensate for it.

aperture distortion — In a television signal, the distortion due to the finite dimension of the camera-tube scanning beam. The beam covers several mosaic globules simultaneously, resulting in a loss of picture detail.

aperture illumination — The field distribution in amplitude and phase through the aperture.

aperture jitter — Also called aperture uncertainty time. 1. In a sample-and-hold circuit, the time variation or uncertainty with which the switch opens, or the time variation in aperture delay. 2. A source of error in a sampling system, which determines the maximum slew rate limitation of the sampled analog input signal for a given system resolution.

aperture mask — Also called shadow mask. A thin sheet of perforated material placed directly behind the viewing screen in a three-gun color picture tube to prevent the excitation of any one color phosphor by either of the two electron beams not associated with that color.



Aperture mask.

aperture plate — A ferrite memory plate containing a large number of uniformly spaced holes arranged in parallel rows and interconnected by plated conductors to provide a magnetic memory plate.

aperture time — 1. In a sample-and-hold circuit, the averaging time of a sample-hold during the sample-to-hold transition. 2. The time required by a sample-and-hold device to go from the sample mode into the hold mode, once the hold command has been received. The aperture time is generally a few nanoseconds, measured from the 50-percent point of the mode-control transition to the time when the output stops tracking the input. *See* aperture, 3.

aperture-time uncertainty — The possible variation in aperture time from one sample-to-hold transition to the next.

APL — Abbreviation for average picture level. The average luminance level of the part of a television line between blanking pulses.

APM — Abbreviation for analog panel meter. A scale-and-pointer meter capable of indicating a continuous, rather than incremental, range of values from zero to the rated full-scale value.

apogee — The point in an elliptical satellite orbit that is farthest from the surface of the earth. Geosynchronous satellites that maintain circular orbits around the earth are

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IPR2023-01456

field — 1. One of the two equal parts into which a frame of a television image is divided in interlaced scanning. With present U.S. standards, pictures are transmitted in two fields of 262.5 lines each, which are interlaced to form 30 complete frames, or images, per second. 2. That area or space in which a particular geophysical effect, such as gravity or magnetism, occurs and can be measured. 3. A group of characters in a computer that is treated as a single unit of information. 4. A region near an electric charge, a source of electromagnetic radiation, or a magnet in which components or materials may be affected. 5. That silicon area on a chip not used or occupied by active transistors. 6. A group of adjacent bits in a microinstruction. 7. A portion of a microprogram word that represents a group of bits dedicated to controlling a specific piece of hardware. 8. A subdivision of a record, usually consisting of a single item of information related to the rest of the record and serving a similar function in all records of that group. The smallest unit normally manipulated by a database management system.

field application relay — A device that automatically controls the application of the field excitation to an ac motor at some predetermined point in the slip cycle.

field circuit breaker — A device that functions to apply, or to remove, the field excitation of a machine.

field control of speed — The varying voltage applied to the field of a shunt-wound motor to control the motor's speed over the extended range.

field density — *See* magnetic induction.

field-discharge protection — A control function or device to limit the induced voltage in the field when the field current attempts to change suddenly.

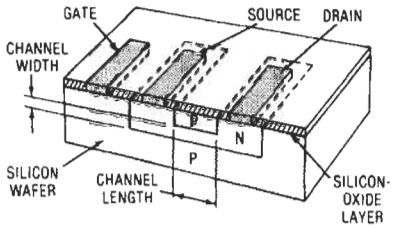
field distortion — Distortion between the north and south poles of a generator due to the counterelectromotive force in the armature winding.

field-effect tetrode — A semiconductor device consisting basically of a thin n region adjacent to a similarly thin p region. Two contacts are made to the n side and two to the p side so that currents can be passed through each thin region parallel to the single junction. The two currents remain separate because reverse bias is maintained on the junction. A current in either side affects the resistance of the other side and hence the current in the other side.

field-effect transistor — Abbreviated FET. 1. A transistor in which current carriers (holes or electrons) are injected at one terminal (the source) and pass to another (the drain) through a channel of semiconductor material whose resistivity depends mainly on the extent to which it is penetrated by a depletion region. The depletion region is produced by surrounding the channel with semiconductor material of the opposite conductivity and reverse-biasing the resulting pn junction from a control terminal (the gate). The depth of the depletion region depends on the magnitude of the reverse bias. Because the reverse-biased junction draws negligible current, the characteristics of the device are similar to those of a vacuum tube. 2. A transistor in which the current through a conducting channel is controlled by an electric field arising from a voltage applied between the gate and source terminals.

field-effect tube — A triode with its grid replaced by a nonintercepting control gate. A high positive voltage is applied to this gate in order to draw sufficient current from the cathode. The result is a strong concentration of the electric field at the gap between the gate and the cathode, producing an electron beam passing through the gate to the anode.

field-effect varistor — A passive, nonlinear, two-terminal semiconductor device that maintains a constant current over a wide range of voltage.



Field-effect transistor.

field emission — Also called cold emission. The liberation of electrons from a solid or liquid by application of a strong electric field at the surface.

field-enhanced photoelectric emission — Increased photoelectric emission resulting from the action of a strong electric field on the emitter.

field-enhanced secondary emission — Increased secondary emission resulting from the action of a strong electric field on the emitter.

field forcing — The effect of a control function or device that temporarily overexcites or underexcites the field of an electrical machine in order to increase the rate of change of flux.

field-free emission current — Also called zero-field emission. The electron current emitted by a cathode when the electric field at the surface of the cathode is zero.

field frequency — Also called field repetition rate. In television, the frame frequency multiplied by the number of fields contained in one frame. In the United States the field frequency is 60 per second, or twice the frame frequency.

field intensity — *See* field strength.

field inversion — Also called parasitic field turn-on. The creation of a channel between two nonassociated diffused beds in the field by voltages on conductors passing over.

field loss relay — *See* motor field-failure relay.

field magnet — An electromagnet or permanent magnet that produces a strong magnetic field in a speaker, microphone, phonograph pickup, generator, motor, or other electrical device.

field-neutralizing coil — A coil encircling the faceplate of a color picture tube. The current through it produces a magnetic field that offsets any effects of the earth's and other stray magnetic fields on the electron beams.

field-neutralizing magnet — Also called rim magnet. A permanent magnet mounted near the edge of the faceplate of a color picture tube to prevent stray magnetic fields from affecting the path of the electron beam.

field of view — 1. The solid angle from which objects can be acceptably viewed, photographed, or otherwise detected. 2. The maximum angle of view that can be seen through a lens or optical instrument.

field oxide — That portion of the oxide on an MOS device that is the thickest when measured perpendicular to the bulk silicon, usually 12 K to 20 K A.

field period — The time required to transmit one television field. In the United States, it is $1/60$th of a second.

field pickup — Also called a remote or nemo. A radio or television program originating outside the studio.

field pole — A structure, made of magnetic material, on which may be mounted a field coil.

field relay — A [illegible] given or abnormally low value or failure of machine field current,

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