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NTH EDITION

MODERN DICTIONARY *of* ELECTRONICS

RUDOLF F. GRAF



**MODERN
DICTIONARY
of
ELECTRONICS**

**SEVENTH EDITION
REVISED AND UPDATED**



well-known to engineers, technicians, and hobbyists
ronics engineer from Brooklyn Polytechnic Institute
ersity. Mr. Graf has been active in the electronics
is ranging from design and consulting engineer, chief
television schools, and consulting editor. He also
Mr. Graf is the author or co-author of more than 150
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& Descrambling for Satellite & Cable TV, Second Edition* and the *Circuits* series of books, both
published by Newnes. A number of his books have been translated into several European languages
as well as Chinese, Japanese, and Russian.

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**KIRKLAND & ELLIS LLP
LOS ANGELES OFFICE**



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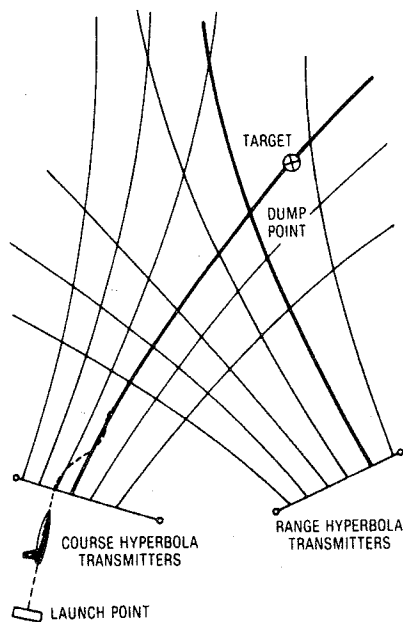
102

*It gives me great pleasure to dedicate this edition to
Allison, Sheryl, Daniel, David, Russell and Scott,
the loveliest children this side of heaven.*

line are parallel, whereby the equiphase path is a cone. Mathematically the equiphase path is a hyperbola.

hyperbolic grind—A shape of tape playback and record heads. It permits good head contact and better response at high frequencies.

hyperbolic guidance system—A method of guidance in which sets of ground stations transmit pulses from which a hyperbolic path can be derived to give range and course information for steering. *See also* hyperbola.



Hyperbolic guidance.

hyperbolic head—A recording head whose pole-piece surfaces (when viewed from the edge of the tape) are shaped like the graph of a mathematical hyperbolic function. This shape offers a good compromise between intimate tape contact at the gap and proximity to the tape of the rest of the pole-piece face (the latter is necessary for good low-frequency response).

hyperbolic horn—A horn in which the equivalent cross-sectional radius increases according to a hyperbolic law.

hyperbolic navigation system—A method of radionavigation (e.g., loran) in which pulses transmitted by two ground stations are received by an aircraft or ship. The difference in arrival time from each station is a measure of the difference in distance between the aircraft or ship and each station. This distance is plotted on one of many hyperbolic curves on a map. A second reading from another pair of stations (or from the same master and a different slave) establishes another point on a different hyperbolic curve. The intersection of the two curves gives the position of the aircraft or ship.

hyperboloidal subreflector—The secondary reflector used in a Cassegrain antenna system. The surface has a hyperbolic shape.

HyperCard—A software tool introduced by Apple computer in 1987 to provide new ways to organize, display, and navigate through data that broadened the capability of the Macintosh computer so noncomputer programmers could design and write their own computer applications.

hyperfocal distance—That object distance at which a camera must be focused so that the far depth of field just extends to infinity. The near limit of the depth of field is then half the hyperfocal distance. For normal photographic work this distance equals 1000 times the lens aperture diameter.

hyperfrequency waves—Microwaves having wavelengths in the range from 1 centimeter to 1 meter.

hyperlink—On a computer screen, a colored section of text (usually blue) that, when clicked, takes one to another web page.

hypersensor—A single-component, reset-table circuit breaker that operates as a majority-carrier tunneling device. It is used to provide overcurrent or overvoltage protection of integrated circuits.

hypersonic—Having five or more times the speed of sound.

hypertext—1. A concept for organizing information made possible by computers, in which keywords or phrases not only reference additional resources but also serve as software links to these resources. When viewing an HTML document with a browser, hypertext links or anchors are displayed (usually in blue) as underlined text. Clicking on this text immediately establishes a network connection to another file (or another place in the same file) containing more information on the underlined subject, and causes the browser to display this information. The other file can be anywhere on the Internet, and may contain almost anything including text, images, movies, or sounds. 2. A system that allows documents to be cross-linked in such a way that the reader can explore related documents by clicking on a highlighted word or symbol. 3. Generally, any text that contains links to other documents—words or phrases in the document that, when selected by a reader, cause another document to be retrieved and displayed.

hypersyn motor—A synchronous motor that combines the desirable features of the induction, hysteresis, and dc-excited synchronous motor, resulting in high efficiency and power factor. It possesses the vigorous starting torque of an induction motor, the synchronization torque of a hysteresis motor, and the stiffness of an externally dc-excited synchronous motor.

hysteresigraph—A device for experimentally presenting or recording the hysteresis loop of a magnetic specimen.

hysteresis—1. A property of all magnetic materials that causes the value of magnetic flux density to lag behind the change in value of the magnetizing force that produces the flux. It is caused by the reluctance of the molecules to change their orientation. Work done to move the molecular magnets is a loss and appears in the form of heat. 2. A type of oscillator behavior in which multiple values of the output power and/or frequency correspond to given values of an operating parameter. 3. The temporary change in the counting rate-versus-voltage characteristic of a radiation-counter tube (caused by previous operation). 4. The difference between the response of a unit or system to an increasing and a decreasing signal. 5. A form of nonlinearity in which the response of a circuit to a particular set of input conditions depends not only on the instantaneous values of those conditions, but also on the immediate past (recent history) of the input and output signal. Hysteretical behavior is characterized by inability to retrace exactly on the reverse swing a particular locus of input/output conditions. 6. The lag in the response of an instrument or process when a force acting on it changes abruptly. 7. The property of a magnetic material by virtue of which the magnetic induction for a given magnetizing force depends on the previous conditions of magnetization. 8. This term literally means to lag behind.