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# **Navy Electricity and Electronics Training Series**

## **Module 20—Master Glossary**

**NAVEDTRA 14192**

Although the words “he,” “him,” and “his” are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

## PREFACE

Special Publications (SPs) are manuals or catalogs that provide information of general benefit and career development. SPs have **no** associated assignments or tests.

*NEETS Module 20—Master Glossary* presents the combined glossaries from modules 1-18, the primary texts in the NEETS series. Definitions of terms used in NEETS are presented. Numbers in parenthesis ( ) indicate more than one definition for the same term. Numbers in brackets [ ] indicate the module number in which more information about the term may be found.

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## **Sailor's Creed**

"I am a United States Sailor.

I will support and defend the  
Constitution of the United States of  
America and I will obey the orders  
of those appointed over me.

I represent the fighting spirit of the  
Navy and those who have gone  
before me to defend freedom and  
democracy around the world.

I proudly serve my country's Navy  
combat team with honor, courage  
and commitment.

I am committed to excellence and  
the fair treatment of all."

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# NAVY ELECTRICITY AND ELECTRONICS TRAINING SERIES

The Navy Electricity and Electronics Training Series (NEETS) was developed for use by personnel in many electrical- and electronic-related Navy ratings. Written by, and with the advice of, senior technicians in these ratings, this series provides beginners with fundamental electrical and electronic concepts through self-study. The presentation of this series is not oriented to any specific rating structure, but is divided into modules containing related information organized into traditional paths of instruction.

The series is designed to give small amounts of information that can be easily digested before advancing further into the more complex material. For a student just becoming acquainted with electricity or electronics, it is highly recommended that the modules be studied in their suggested sequence. While there is a listing of NEETS by module title, the following brief descriptions give a quick overview of how the individual modules flow together.

**Module 1, *Introduction to Matter, Energy, and Direct Current***, introduces the course with a short history of electricity and electronics and proceeds into the characteristics of matter, energy, and direct current (dc). It also describes some of the general safety precautions and first-aid procedures that should be common knowledge for a person working in the field of electricity. Related safety hints are located throughout the rest of the series, as well.

**Module 2, *Introduction to Alternating Current and Transformers***, is an introduction to alternating current (ac) and transformers, including basic ac theory and fundamentals of electromagnetism, inductance, capacitance, impedance, and transformers.

**Module 3, *Introduction to Circuit Protection, Control, and Measurement***, encompasses circuit breakers, fuses, and current limiters used in circuit protection, as well as the theory and use of meters as electrical measuring devices.

**Module 4, *Introduction to Electrical Conductors, Wiring Techniques, and Schematic Reading***, presents conductor usage, insulation used as wire covering, splicing, termination of wiring, soldering, and reading electrical wiring diagrams.

**Module 5, *Introduction to Generators and Motors***, is an introduction to generators and motors, and covers the uses of ac and dc generators and motors in the conversion of electrical and mechanical energies.

**Module 6, *Introduction to Electronic Emission, Tubes, and Power Supplies***, ties the first five modules together in an introduction to vacuum tubes and vacuum-tube power supplies.

**Module 7, *Introduction to Solid-State Devices and Power Supplies***, is similar to module 6, but it is in reference to solid-state devices.

**Module 8, *Introduction to Amplifiers***, covers amplifiers.

**Module 9, *Introduction to Wave-Generation and Wave-Shaping Circuits***, discusses wave generation and wave-shaping circuits.

**Module 10, *Introduction to Wave Propagation, Transmission Lines, and Antennas***, presents the characteristics of wave propagation, transmission lines, and antennas.

**Module 11**, *Microwave Principles*, explains microwave oscillators, amplifiers, and waveguides.

**Module 12**, *Modulation Principles*, discusses the principles of modulation.

**Module 13**, *Introduction to Number Systems and Logic Circuits*, presents the fundamental concepts of number systems, Boolean algebra, and logic circuits, all of which pertain to digital computers.

**Module 14**, *Introduction to Microelectronics*, covers microelectronics technology and miniature and microminiature circuit repair.

**Module 15**, *Principles of Synchros, Servos, and Gyros*, provides the basic principles, operations, functions, and applications of synchro, servo, and gyro mechanisms.

**Module 16**, *Introduction to Test Equipment*, is an introduction to some of the more commonly used test equipments and their applications.

**Module 17**, *Radio-Frequency Communications Principles*, presents the fundamentals of a radio-frequency communications system.

**Module 18**, *Radar Principles*, covers the fundamentals of a radar system.

**Module 19**, *The Technician's Handbook*, is a handy reference of commonly used general information, such as electrical and electronic formulas, color coding, and naval supply system data.

**Module 20**, *Master Glossary*, is the glossary of terms for the series.

**Module 21**, *Test Methods and Practices*, describes basic test methods and practices.

**Module 22**, *Introduction to Digital Computers*, is an introduction to digital computers.

**Module 23**, *Magnetic Recording*, is an introduction to the use and maintenance of magnetic recorders and the concepts of recording on magnetic tape and disks.

**Module 24**, *Introduction to Fiber Optics*, is an introduction to fiber optics.

Embedded questions are inserted throughout each module, except for modules 19 and 20, which are reference books. If you have any difficulty in answering any of the questions, restudy the applicable section.

Although an attempt has been made to use simple language, various technical words and phrases have necessarily been included. Specific terms are defined in Module 20, *Master Glossary*.

Considerable emphasis has been placed on illustrations to provide a maximum amount of information. In some instances, a knowledge of basic algebra may be required.

Assignments are provided for each module, with the exceptions of Module 19, *The Technician's Handbook*; and Module 20, *Master Glossary*. Course descriptions and ordering information are in NAVEDTRA 12061, *Catalog of Nonresident Training Courses*.

Throughout the text of this course and while using technical manuals associated with the equipment you will be working on, you will find the below notations at the end of some paragraphs. The notations are used to emphasize that safety hazards exist and care must be taken or observed.

### **WARNING**

AN OPERATING PROCEDURE, PRACTICE, OR CONDITION, ETC., WHICH MAY RESULT IN INJURY OR DEATH IF NOT CAREFULLY OBSERVED OR FOLLOWED.

### **CAUTION**

AN OPERATING PROCEDURE, PRACTICE, OR CONDITION, ETC., WHICH MAY RESULT IN DAMAGE TO EQUIPMENT IF NOT CAREFULLY OBSERVED OR FOLLOWED.

### **NOTE**

An operating procedure, practice, or condition, etc., which is essential to emphasize.



## **Student Comments**

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NETPDTC 1550/41 (Rev 4-00)



# CHAPTER 1

## MASTER GLOSSARY OF TERMS

### INTRODUCTION

This module presents the combined glossaries from modules 1 through 18, the primary texts in the NEETS series. Definitions of terms used in NEETS are presented in an alphabetical glossary. Numbers in parenthesis ( ) indicate more than one definition for the same term. Numbers in brackets [ ] indicate the module number in which more information about the term may be found.

**ABSORPTION**—(1) Dissipation of radio or sound waves as they interact with matter. (2) The absorbing of light waves without reflection or refraction [10].

**ABSORPTION, LAW OF**—In Boolean algebra, the law which states that the odd term will be absorbed when a term is combined by logical multiplication with the logical sum of that term and another term, or when a term is combined by logical addition with the logical product of one term and another term (for example,  $A(A + B) = A + AB = A$ ) [13].

**ABSORPTION WAVEMETER**—An instrument used to measure audio frequencies [16].

**ACCELERATING ANODE**—An electrode charged several thousand volts positive and used to accelerate electrons toward the front of a cathode-ray tube [6].

**ACCELERATION SERVOSYSTEM**—A servosystem that controls the acceleration (rate of change in velocity) of a load [15].

**ACCELEROMETER**—A device that measures the acceleration to which it is subjected and develops a signal proportional to it [15].

**ACCEPTOR IMPURITY**—An impurity which, when added to a semiconductor, accepts one electron from a neighboring atom and creates a hole in the lattice structure of the crystal. Also called TRIVALENT IMPURITY [7].

**ACORN TUBE**—A very small tube with closely spaced electrodes and no base. The tube is connected to its circuits by short wire pins that are sealed in a glass or ceramic envelope. The acorn tube is used in low-power uhf circuits [6].

**ACOUSTICS**—The science of sound [10].

**ACQUISITION**—Operational phase of a fire-control or track radar during which the radar system searches a small volume of space in a prearranged pattern [18].

**ACTIVE SATELLITE**—A satellite that amplifies the received signal and retransmits it back to earth [17].

**ACTUATOR**—The part of a switch that is acted upon to cause the switch to change contact connections; for example, toggle, pushbutton, and rocker [3].

**AFDS**—An abbreviation for the amphibious flagship data system [17].

**AIR-CONTROL PANEL**—Panel that monitors the dry-air input at each user equipment [18].

**AIR-CORE TRANSFORMER**—A transformer composed of two or more coils that are wound around a nonmetallic core [2].

**ALLOWANCE PARTS LIST (APL)**—Repair parts required for units having the equipment/ component listed [14].

**ALLOYED JUNCTION**—A junction formed by recrystallization of a molten region of P-type material on an N-type substrate, or vice versa [7].

**ALPHA**—The emitter-to-collector current gain in a common-base circuit [7].

**ALTERNATING CURRENT**—An electrical current that constantly changes amplitude and changes polarity at regular intervals [2].

**ALTITUDE**—The vertical distance of an aircraft or object above a given reference, such as ground or sea level [18].

**ALUMINUM CREEP**—(1) The movement of aluminum wire from a point where pressure is applied. (2) The "retreat" of heated aluminum wire as it cools [4].

**AMBIENT TEMPERATURE**—The surrounding temperature such as the temperature of air surrounding a conductor in a compartment or within a piece of equipment [4].

**AMBIGUOUS RETURNS**—Echoes that exceed the prt of a radar and appear at incorrect ranges [18].

**AMERICAN WIRE GAUGE (AWG)**—The standards adopted in the United States for the measurement of wire sizes [4].

**AMMETER**—An instrument for measuring the amount of electron flow (in amperes) [1] [3] [6].

**AMPERE**—The basic unit of electrical current [1].

**AMPERE-TURN**—The magnetomotive force developed by 1 ampere of current flowing through a coil of one turn [8].

**AMPERITE (BALLAST) TUBE**—A current-controlling resistance device designed to maintain substantially constant current over a specified range of variation in applied voltage or resistance of a series circuit [6].

**AMPLIDYNE**—A special dc generator in which a small dc voltage applied to field windings controls a large output voltage from the generator. In effect, an amplidyne is a rotary amplifier that often times produces gain of approximately 10,000 [5].

**AMPLIFICATION**—(1) The process of enlarging a signal in amplitude (as of voltage or current) [8]. (2) The ratio of output magnitude to input magnitude in a device that is intended to produce an output that is an enlarged reproduction of its input [6] [7].

**AMPLIFICATION FACTOR**—The voltage gain of an amplifier with no load on the output [6] [7].

**AMPLIFIER**—The device that provides amplification (the increase in current, voltage, or power of a signal) without appreciably altering the original signal [7] [8].

**AMPLITRON**—See CROSS-FIELD AMPLIFIER [18].

**AMPLITUDE**—The size of a signal as measured from a reference line to a maximum value above or below the line. Generally used to describe voltage, current, or power [8] [12].

**AMPLITUDE DISTORTION**—Distortion that is present in an amplifier when the amplitude of the output signal fails to follow exactly any increase or decrease in the amplitude of the input signal [6] [7].

**AMPLITUDE MODULATION**—Any method of varying the amplitude of an electromagnetic carrier frequency in accordance with the intelligence to be transmitted [12].

**AMPLITUDE STABILITY**—Amplitude stability refers to the ability of the oscillator to maintain a constant amplitude in the output waveform [9].

**AND CIRCUIT**—See AND GATE [13].

**AND GATE**—(1) An electronic gate whose output is energized only when every input is in its prescribed state. An AND gate performs the function of the logical "AND"; also called an AND circuit. (2) A binary circuit, with two or more inputs and a single output, in which the output is a logic 1 *only* when all inputs are a logic 1 and the output is a logic 0 when *any* one of the inputs is a logic 0 [13].

**ANGLE MODULATION**—Modulation in which the angle of a sine-wave carrier is varied by a modulating wave [12].

**ANGLE OF INCIDENCE**—The angle between the incident wave and the normal [10].

**ANGLE OF INCLINATION**—The angular difference between the equatorial plane of the earth and the plane of orbit of the satellite [17].

**ANGLE OF REFLECTION**—The angle between the reflected wave and the normal [10].

**ANGLE OF REFRACTION**—The angle between the normal and the path of a wave through the second medium [10].

**ANGSTROM UNIT**—The unit used to define the wavelength of light waves [10].

**ANISOTROPIC**—The property of a radiator that allows it to emit strong radiation in one direction [10].

**ANODE**—(1) A positive electrode of an electrochemical device (such as a primary or secondary electric cell) toward which the negative ions are drawn [1] [6] [7]. (2) The semiconductor-diode terminal that is positive with respect to the other terminal when the diode is biased in the forward direction [13].

**ANTENNA**—A conductor or set of conductors used to radiate RF energy into space or to collect RF energy from space or to do both [10].

**ANTENNA BEAM WIDTH**—Width of a radar beam measured between half-power points [18].

**ANTENNA COUPLER**—A device used for impedance matching between an antenna and a transmitter or receiver [17].

**ANTENNA SYSTEM**—Routes RF energy from the transmitter, radiates the energy into space, receives echoes, and routes the echoes to the receiver [18].

**ANTIJAMMING CIRCUIT**—An electronic circuit used to minimize the effects of enemy countermeasures, thereby permitting radar echoes to be visible on the indicator [18].

**ANTISEIZE COMPOUND**—A silicon-based, high-temperature lubricant applied to threaded components to aid in their removal after they have been subjected to rapid heating and cooling [4].

**ANTITRANSMIT-RECEIVE TUBE (atr)**—A tube that isolates the transmitter from the antenna and receiver. Used in conjunction with a tr tube [18].

**APERTURE**—See SLOT [11].

**APOGEE**—The point in the orbit of a satellite the greatest distance from the earth [17].

**APPARENT DRIFT**—The effect of the earth's rotation on a gyro that causes the spinning axis to appear to make one complete rotation in one day. Also called APPARENT PRECESSION or APPARENT ROTATION [15].

**APPARENT POWER**—That power apparently available for use in an ac circuit containing a reactive element. It is the product of effective voltage times effective current expressed in volt-amperes. It must be multiplied by the power factor to obtain true power available [2].

**APPARENT PRECESSION**—See APPARENT DRIFT [15].

**APPARENT ROTATION**—See APPARENT DRIFT [15].

**ARC EXTINGUISHER**—The part of a circuit breaker that confines and divides the arc which occurs when the contact of the circuit breaker opens [3].

**ARMATURE**—(1) In a relay, the movable portion of the relay [3]. (2) The windings in which the output voltage is generated in a generator or in which input current creates a magnetic field that interacts with the main field in a motor [5].

**ARMATURE LOSSES**—Copper losses, eddy current losses, and hysteresis losses that act to decrease the efficiency of armatures [5].

**ARMATURE REACTION**—The effect in a dc generator of current in the armature creating a magnetic field that distorts the main field and causes a shift in the neutral plane [5].

**ARRAY OF ARRAYS**—Same as COMBINATION ARRAY [10].

**ARTIFICIAL TRANSMISSION LINE**—An LC network that is designed to simulate characteristics of a transmission line [18].

**ASBESTOS**—A noncombustible, nonconductive, fiber-like mineral used as an insulating material [4].

**ASBESTOSIS**—Fibrosis of the lungs caused by inhalation of asbestos fibers [4].

**A-SCOPE**—A radar display on which slant range is shown as the distance along a horizontal trace [18].

**ASSEMBLY**—A number of parts or subassemblies, or any combination thereof, joined together to perform a specific function [17].

**ASTABLE MULTIVIBRATOR**—A multivibrator that has no stable state. Also called free-running because it alternates between two different output voltage levels during the time it is on. The frequency is determined by the RC time constant of the coupling circuit [9].

**ASWTDS**—An abbreviation for the antisubmarine warfare tactical data system [17].

**ASYMMETRICAL MULTIVIBRATOR**—A multivibrator that generates rectangular waves [18].

**ASYNCHRONOUS**—The teletypewriter operation where the transmitter and receiver do not operate continuously [17].

**ASYNCHRONOUS ORBIT**—One where the satellite does not rotate or move at the same speed as the earth [17].

**ATDS**—An abbreviation for the airborne tactical data system [17].

**ATTENUATION**—The ability of a filter circuit to reduce the amplitude of unwanted frequencies to a level below that of the desired output frequency [9].

**ATTRACTION**—The force that tends to make two objects approach each other. Attraction exists between two unlike magnetic poles (north and south) or between two unlike static charges [1].

**AUDIO AMPLIFIER**—An amplifier designed to amplify frequencies between 15 hertz (15 Hz) and 20 kilohertz (20 kHz) [8].

**AUDIO-FREQUENCY-TONE SHIFT**—A system that uses amplitude modulation to change dc mark and space impulses into audio impulses [17].

**AUTOMATIC GAIN CONTROL**—A circuit used to vary radar receiver gain for best reception of signals that have widely varying amplitudes [18].

**AUTOMATIC TRACKING**—Tracking done by equipment that compares the direction of the antenna axis and the direction of the received signal and uses the difference (error) signal to reposition the antenna [17].

**AUTOMATIC VOLUME/GAIN CONTROL**—A circuit used to limit variations in the output signal strength of a receiver [17].

**AVALANCHE EFFECT**—A reverse breakdown effect in diodes that occurs at reverse voltages beyond 5 volts. The released electrons are accelerated by the electric field, which results in a release of more electrons in a chain or "avalanche" effect [7].

**AVERAGE POWER**—(1) The peak power value averaged over the pulse-repetition time [12]. (2) Output power of a transmitter as measured from the start of one pulse to the start of the next pulse [18].

**AVERAGE VALUE (OF AC)**—The average of all the instantaneous values of one-half cycle of alternating current [2].

**AXIS**—A straight line, either real or imaginary, passing through a body around which the body revolves [15].

**AZIMUTH**—Angular measurement in the horizontal plane in a clockwise direction [18].

**BACK RESISTANCE**—The larger resistance value observed when you are checking the resistance of a semiconductor [16].

**BALANCED MIXER**—A waveguide arrangement that resembles a T and uses crystals for coupling the output to a balanced transformer [18].

**BALANCED PHASE DETECTOR**—A circuit that controls the oscillator frequency (afc) [17].

**BANDPASS FILTER**—A filter that allows a narrow band of frequencies to pass through the circuit. Rejects or attenuates frequencies that are either higher or lower than the desired band of frequencies [9] [16].

**BAND-REJECT FILTER**—A tuned circuit that does not pass a specified band of frequencies [9] [16].

**BANDWIDTH**—The difference between the highest usable frequency of a device (upper frequency limit) and the lowest usable frequency of the device (lower frequency limit) - measured at the half-power points [8] [9] [12] [15].

**BARRETTTER**—A type of bolometer characterized by an increase in resistance as the dissipated power rises [16].

**BASE**—The element in a transistor that controls the flow of current carriers [7].

**BASE**—(1) A reference value. (2) A number that is multiplied by itself as many times as indicated by an exponent. (3) Same as radix. (4) The region between the emitter and collector of a transistor that receives minority carriers injected from the emitter. It is the element that corresponds to the control grid of an electron tube [13].

**BASE-INJECTION MODULATOR**—Similar to a control-grid modulator. The gain of a transistor is varied by changing the bias on its base [12].

**BATTERY**—A device for converting chemical energy into electrical energy [1].

**BATTERY CAPACITY**—The amount of energy available from a battery. Battery capacity is expressed in ampere-hours [1].

**BAUD**—A measurement of speed based on the number of code elements or units per second [17].

**BAY**—Part of an antenna array [10].

**BEAM**—See LOBE [18].

**BEAM-LEAD CHIP**—Semiconductor chip with electrodes (leads) extended beyond the wafer [14].

**BEAM-POWER TUBE**—An electron tube in which the grids are aligned with the control grid. Special beam-forming plates are used to concentrate the electron stream into a beam. Because of this action, the beam-power tube has high power-handling capabilities [6].

**BEARING**—An angular measurement of the direction of an object from a reference direction, such as true north [11].

**BEARING RESOLUTION**—Ability of a radar to distinguish between targets that are close together in bearing [18].

**BEAT FREQUENCIES**—Difference and sum frequencies, which result from the combination of two separate frequencies [18].

**BEAT FREQUENCY**—The difference between the oscillator frequency and the unknown audio frequency [16].

**BEAT-FREQUENCY OSCILLATOR**—An additional oscillator used in a receiver when it is receiving a cw signal. It provides an audible tone [17].



**BEL**—The unit that expresses the logarithmic ratio between the input and output of any given component, circuit, or system [16].

**BETA**—The ratio of a change in collector current to a corresponding change in base current when the collector voltage is constant in a common-emitter circuit [7].

**BEVERAGE ANTENNA**—A horizontal, long-wire antenna designed for reception and transmission of low-frequency, vertically polarized ground waves [10].

**BIAS**—Difference of potential applied to a vacuum tube or transistor to establish a reference operating level [13].

**BIAS CURRENT**—Current that flows through the base-emitter junction of a transistor and is adjusted to set the operating point of the transistor [13].

**BIDIRECTIONAL ARRAY**—An array that radiates in opposite directions along the line of maximum radiation [10].

**BINARY**—(1) A number system that uses a base, or radix, of 2. Two digits (1 and 0) are used in the binary system. (2) Pertaining to a characteristic that involves the selection, choice, or condition in which there are only two possibilities. (3) A bistable multivibrator (flip-flop) is one example of a binary device [13].

**BINARY CODE**—A method of representing two possible conditions (*on* or *off*, high or low, one or zero, the presence of a signal or absence of a signal). Electronic circuits designed to work in such a way that only two conditions are possible [13].

**BINARY-CODED**—The state in which conditions are expressed by a series of binary digits (0's and 1's) [13].

**BINARY DIGIT**—(1) A character that represents one of the two digits in the number system that has a radix of two. (2) Either of the digits 0 or 1 that may be used to represent the binary conditions of *on* or *off* [13].

**BINARY NOTATION**—See BINARY NUMBER SYSTEM [13].

**BINARY NUMBER SYSTEM**—A number system using two digits, symbols, or characters (usually 1 and 0) [13].

**BINARY POINT**—The radix point that separates powers of two and fractional powers of two in a binary number [13].

**BISTABLE**—A device that is capable of assuming either one of two stable states [13].

**BISTABLE MULTIVIBRATOR**—A multivibrator that has two stable states. It remains in one of the states until a trigger is applied. It then flips to the other stable state and remains there until another trigger is applied. Also referred to as a FLIP-FLOP [9] [13].

**BLACK**—The reference color of equipment that passes unclassified information. It normally refers to patch panels [17].

**BLEEDER CURRENT**—The current through a bleeder resistor. In a voltage divider, bleeder current is usually determined by the 10 percent rule of thumb [1].

**BLEEDER RESISTOR**—A resistor used to draw a fixed current [1].

**BLIP**—See PIP [18].

**BLOCK DIAGRAM**—A diagram in which the major components of an equipment or a system are represented by squares, rectangles, or other geometric figures, and the normal order of progression of a signal or current flow is represented by lines [4].

**BLOCKED-GRID KEYING**—A method of keying in which the bias is varied to turn plate current on and off [12].

**BLOCKING**—A condition in an amplifier, caused by overdriving one or more stages, in which the amplifier is insensitive to small signals immediately after reception of a large signal [18].

**BOLOMETER**—A loading device that undergoes changes in resistance as changes in dissipated power occur [16].

**BONDING WIRES**—Fine wires connecting the bonding pads of the chip to the external leads of the package [14].

**BOOLEAN**—(1) Pertaining to the process used in the algebra formulated by George Boole. (2) Pertaining to the operations of formal logic [13].

**BOOLEAN ALGEBRA**—A system of logic dealing with on-off circuit elements associated by such operators as the AND, OR, NAND, NOR, and NOT functions [13].

**BOOLEAN LOGIC**—See BOOLEAN ALGEBRA [13].

**BOUNDARY CONDITIONS**—The two conditions that the E-field and H-field within a waveguide must meet before energy will travel down the waveguide. The E-field must be perpendicular to the walls and the H-field must be in closed loops, parallel to the walls, and perpendicular to the E-field [11].

**BRANCH**—An individual current path in a parallel circuit [1] [4].

**BREAK**—In a switch, the number of breaks refers to the number of points at which the switch opens the circuit; for example, single break and double break [3].

**BREAKDOWN**—The phenomenon occurring in a reverse-biased semiconductor diode. The start of the phenomenon is observed as a transition from a high dynamic resistance to one of substantially lower dynamic resistance. This is done to boost the reverse current [7].

**BRIGHTNESS CONTROL**—The name given to the potentiometer used to vary the potential applied to the control grid of a CRT [6].

**BROADSIDE ARRAY**—An array in which the direction of maximum radiation is perpendicular to the plane containing the elements [10] [18].

**BRUSHES**—Sliding contacts, usually carbon, that make electrical connection to the rotating part of a motor or generator [5].

**BUFFER**—A voltage amplifier used between the oscillator and power amplifier [12].

**BUFFER AMPLIFIER**—An amplifier that isolates one circuit from another. It decreases the loading effect on an oscillator by reducing the interaction between the load and the oscillator [9] [18].

**BUILT-IN TEST EQUIPMENT (BITE)**—A permanently mounted device that is used expressly for testing an equipment or system [14].

**BUNCHER CAVITY**—The input resonant cavity in a conventional klystron oscillator [11].

**BUNCHER GRID**—In a velocity-modulated tube, the grid that concentrates the electrons in the electron beam into bunches [11].

**BURNISHING TOOL**—A tool used to clean and polish contacts on a relay [3].

**BUS BAR**—A heavy copper strap or bar used to connect several circuits together when a large current-carrying capacity is required [4].

**BYPASS CAPACITOR**—A capacitor used to transfer unwanted signals out of a circuit; for example, coupling an unwanted signal to ground. Also called a DECOUPLING CAPACITOR [8].

**CABLE**—Either a stranded conductor (single-conductor cable) or a combination of conductors insulated from one another (multiple conductor cable). Small sizes are commonly referred to as stranded wire or as cords [4].

**CABLE HARNESS**—A group of wires or ribbons of wiring used to interconnect electronic systems and subsystems [14].

**CAPACITANCE**—The property of an electrical circuit that opposes changes in voltage [2].

**CAPACITIVE REACTANCE**—The opposition, expressed in ohms, offered to the flow of an alternating current by capacitance. The symbol for capacitive reactance is  $X_C$  [2] [9].

**CAPACITOR**—An electrical device capable of storing electrical energy in an electrostatic field [2].

**CAPACITOR FILTER**—This filter is used on extremely high-voltage, low-current power supplies and also where the ripple frequency is not critical [7].

**CAPACITOR-START MOTOR**—A type of single-phase, ac induction motor in which a starting winding and a capacitor are placed in series to start the motor. The values of  $X_C$  and  $R$  are such that the main-winding and starting-winding currents are nearly 90 degrees apart and the starting torque is produced as in a two-phase motor [5].

**CARBON MICROPHONE**—A microphone in which sound waves vary the resistance of a pile of carbon granules. May be single-button or double-button [12].

**CARDIOPULMONARY RESUSCITATION**—Procedure designed to restore breathing after cardiac arrest. Includes clearing air passages to lungs and heart massage [1].

**CARRIER FREQUENCY**—The frequency of an unmodulated transmitter output [12] [18].

**CARRIER-CONTROLLED APPROACH**—A shipboard radar system used to guide aircraft to safe landings in poor visibility conditions [18].

**CARRY**—(1) One or more digits, produced in connection with an arithmetic operation, that is/are forwarded to another digit place for processing there. (2) The number represented by the digit or digits in (1) above [13].

**CATCHER GRID**—In a velocity-modulated tube, a grid on which the spaced electron groups induce a signal. The output of the tube is taken from the catcher grid [11].

**CATHODE**—(1) In an electron tube the electrode that is the source of current flow [6]. (2) The general name for any negative electrode [1]. (3) The negative terminal of a forward-biased semiconductor diode, which is the source of the electrons [7].

**CATHODE BIAS**—The method of biasing a vacuum tube in which the biasing resistor is placed in the common-cathode return circuit, thereby making the cathode more positive with respect to ground [6].

**CATHODE KEYING**—A system in which the cathode circuit is interrupted so that neither grid current nor plate current can flow [12].

**CATHODE MODULATOR**—Voltage on the cathode is varied to produce the modulation envelope [12].

**CATHODE-RAY TUBE (CRT)**—An electron tube that has an electron gun, a deflection system, and a screen. This tube is used to display visual electronic signals [6].

**CATHODE SPUTTERING**—A process of producing thin film components [14].

**CAVITY RESONATOR**—A space totally enclosed by a metallic conductor and supplied with energy in such a way that it becomes a source of electromagnetic oscillations. The size and shape of the enclosure determine the resonant frequency [11].

**CAVITY WAVEMETER**—An instrument used to measure microwave frequencies [16].

**CELL**—A single unit that transforms chemical energy into electrical energy. Batteries are made up of cells [1].

**CENTER-FEED METHOD**—Connecting the center of an antenna to a transmission line which is then connected to the final (output) stage of the transmitter [10].

**CENTIMETER CUBE**—A unit of volume of large rectangular or square conductors. The cross-sectional area equals 1 square centimeter with a length of 1 centimeter [4].

**CHANNEL**—A carrier frequency assignment, usually with a fixed bandwidth [12].

**CHARACTER**—A letter, digit, or other symbol that is used as part of the organization, control, or representation of information [13].

**CHARACTERISTIC IMPEDANCE**—The ratio of voltage to current at any given point on a transmission line represented by a value of impedance [10].

**CHARGE**—Represents electrical energy. A material having an excess of electrons is said to have a negative charge. A material having a shortage of electrons is said to have a positive charge [1].

**CHARGE CYCLE**—The period of time that a capacitor in an electrical circuit is storing a charge [2].

**CHOKE**—An inductor used to impede the flow of pulsating dc or ac by means of self-inductance [6] [7].

**CHOKE JOINT**—A joint between two sections of waveguide that provides a good electrical connection without power losses or reflections [11].

**CIRCUIT**—The complete path of an electric current [1].

**CIRCULAR MIL**—An area equal to that of a circle with a diameter of 0.001 inch. It is used for measuring the cross-sectional area of wires [1].

**CIRCULAR MIL-FOOT**—A unit of volume of a conductor having a cross-sectional area of 1 circular mil and a length of 1 foot [4].

**CLAMPER**—A circuit in which either the upper or lower extremity of a waveform is fixed at a desired value [9].

**CLASS A AMPLIFIER OPERATION**—The type of operation in which the amplifier is biased so that variations in input signal polarities occur within the limits of cutoff and saturation [7].

**CLASS AB AMPLIFIER OPERATION**—The type of operation in which the amplifier is biased so that collector current is cut off for a portion of the alternation of the input signal [7].

**CLASS B AMPLIFIER OPERATION**—The type of operation in which the amplifier is biased so that collector current is cut off for one-half of the input signal [7].

**CLASS C AMPLIFIER OPERATION**—The type of operation in which the amplifier is biased so that collector current is cut off for more than one-half of the input signal [7] [13].

**CLUTTER**—Confusing, unwanted echoes that interfere with the observation of desired signals on a radar indicator [18].

**COAXIAL CABLE**—Cable in which the center conductor is separated from an outer conductor by a dielectric material; used in RF transmission [4].

**COAXIAL LINE**—A type of transmission line that contains two concentric conductors [10].

**CODE**—In teletypewriter operation, code is a combination of mark and space conditions representing symbols, figures, or letters [17].

**COEFFICIENT OF COUPLING**—An expression of the extent to which two inductors are coupled by magnetic lines of force. This is expressed as a decimal or percentage of maximum possible coupling and represented by the letter K [2].

**COHERENCE**—A definite phase relationship between two energy waves, such as transmitted frequency and reference frequency [18].

**COHERENT**—Radiation on one frequency [17].

**COHERENT OSCILLATOR**—In cw radar an oscillator that supplies phase references to provide coherent video from target returns [18].

**COIL**—An inductive device made by looping turns of wire around a core [2].

**COLD-CATHODE TUBE**—A gas-filled electron tube that conducts without the use of filaments. Cold-cathode tubes are used as voltage regulators [6].

**COLLECTOR**—The element in a transistor that collects the current carriers [7].

**COLLECTOR-INJECTION MODULATOR**—The transistor equivalent of a plate modulator. Modulating voltage is applied to a collector circuit [12].

**COLLINEAR ARRAY**—An array with all the elements in a straight line. Maximum radiation is perpendicular to the axis of the elements [10].

**COMBINATION ARRAY**—An array system that uses the characteristics of more than one array [10].

**COMBINATION CIRCUIT**—A series-parallel circuit [1].

**COMBINATION PEAKING**—A technique in which a combination of peaking coils in series and parallel (shunt) with the output signal path is used to improve high-frequency response [8].

**COMMON BASE**—A transistor circuit in which the base electrode is the common element to both input and output circuits [7].

**COMMON-BASE DETECTOR**—An amplifying detector in which detection occurs in the emitter-base junction and amplification occurs at the output of the collector junction [12].

**COMMON COLLECTOR**—A transistor circuit configuration in which the collector is the element common to both the input and the output circuits [7].

**COMMON EMITTER**—A circuit configuration in which the emitter is the element common to both the input and the output circuits [7].

**COMMON-EMITTER DETECTOR**—Often used in receivers to supply detected and amplified output. The emitter-base junction acts as the detector [12].

**COMMON IDENTITIES LAW**—In Boolean algebra this law states that anytime the expression  $A(A + B) = AB$  or  $A + AB = A + B$  appears, it can immediately be simplified to  $AB$  without going through the process of using the distributive law, complementary law, or the law of union to simplify [13].

**COMMUTATION**—The act of a commutator in converting generator output from an ac voltage to a dc voltage [5].

**COMMUTATIVE LAW**—In Boolean algebra this law states that changing the order of the terms in an equation will not affect the value of the equation. Example:  $A + B = B + A$ ;  $A \cdot B = B \cdot A$  [13].

**COMMUTATOR**—A mechanical device that reverses armature connections in motors and generators at the proper instant so that current continues to flow in only one direction. In effect, the commutator changes ac to dc [5].

**COMPARATOR**—An equipment that compares incoming signals and selects the strongest to be fed to a teletypewriter through a patch panel. This is used in diversity operation [17].

**COMPENSATING WINDINGS**—Windings embedded in slots in pole pieces, connected in series with the armature, whose magnetic field opposes the armature field and cancels armature reaction [5].

**COMPENSATION**—The process of overcoming the problems associated with high frequencies in an amplifier [8].

**COMPLEMENT**—A number or state that is the opposite of a specified number or state. The negative of a number is often represented by its complement [13].

**COMPLEMENTARY (SECONDARY) COLORS OF LIGHT**—The colors of light produced when two of the primaries are mixed in overlapping beams of light. The complementary colors of light are magenta, yellow, and cyan [10].

**COMPLEMENTARY LAW**—In Boolean algebra this law states that the logical addition of a quantity and its complement will result in 1 and the logical multiplication of a quantity and its complement will result in a product of 0 [13].

**COMPLEMENT NUMBER**—A number that when added to another number gives a sum equal to the base of the number system of operation. For example, in the decimal number system, the complement of 1 is 9 [13].

**COMPLEX WAVE**—(1) A waveform other than a sine wave [9]. (2) A wave that is produced by combining two or more pure tones at the same time [10] [12].

**COMPOUND-WOUND MOTORS AND GENERATORS**—Machines that have a series field in addition to a shunt field. Such machines have characteristics of both series- and shunt-wound machines [5].

**COMPRESSION WAVES**—Longitudinal waves that have been compressed (made more dense) as they move away from the source [10].

**COMPUTER**—A data processor that can perform substantial computation, including numerous arithmetic or logic operations, without intervention by a human operator during the run [13].

**CONCURRENT**—Pertaining to the occurrence of two or more events or activities within the same specified interval of time [13].

**CONDUCTANCE**—The ability of a material to conduct or carry an electric current. It is the reciprocal of the resistance of the material and is expressed in mhos or siemens [1] [4] [10].

**CONDUCTION BAND**—A partially filled energy band in which electrons can move freely [7].

**CONDUCTIVITY**—The ease with which a substance transmits electricity [1].

**CONDUCTOR**—(1) A material with a large number of free electrons. (2) A material that easily permits electric current to flow [1].

**CONDUIT**—A tubular raceway, usually metal or plastic, for holding wires or cables [4].

**CONICAL SCANNING**—Scanning in which the movement of the beam describes a cone, the axis of which coincides with that of the reflector [18].

**CONNECTED ARRAY**—Another term for DRIVEN ARRAY [10].

**CONTACT**—In radar, an object that reflects RF energy; target [18].

**CONTINUITY**—An uninterrupted, complete path for current flow [3] [16].

**CONTINUOUS-WAVE KEYING**—The on-off keying of a carrier [12].

**CONTROL DIFFERENTIAL TRANSMITTER (CDX)**—A type of synchro that transmits angular information equal to the algebraic sum or difference of the electrical input supplied to its stator, the mechanical input supplied to its stator, and the mechanical input supplied to its rotor. The output is an electrical voltage taken from the rotor windings [15].

**CONTROL GRID**—The electrode of a vacuum tube, other than a diode, upon which a signal voltage is impressed to regulate the plate current [6].



**CONTROL-GRID MODULATOR**—Uses a variation of grid bias to vary the instantaneous plate voltage and current. The modulating signal is applied to the control grid [12].

**CONTROL SYNCHRO SYSTEMS**—Synchro systems that contain control synchros and are used to control large amounts of power with a high degree of accuracy. The electrical outputs of these systems control servosystems, which in turn generate the required power to move heavy loads [15].

**CONTROL SYSTEM**—A group of components systematically organized to perform a specific control purpose. These systems are categorized as either closed- or open-loop systems. The main difference between the two is that the closed-loop system contains some form of feedback [15].

**CONTROL TRANSFORMER (CT)**—A type of synchro that compares two signals: the electrical signal applied to its stator and the mechanical signal applied to its rotor. The output is an electrical voltage, which is taken from the rotor winding and is used to control a power-amplifying device. The phase and amplitude of the output voltage depends on the angular position of the rotor with respect to the magnetic field of the stator [15].

**CONTROL TRANSMITTER (CX)**—A type of synchro that converts a mechanical input, which is the angular position of its rotor, into an electrical output signal. The output is taken from the stator windings and is used to drive either a CDX or CT [15].

**CONVERTER**—In communications, equipment that changes the audio output of a receiver to dc pulses. These pulses are fed to a tty to indicate marks and spaces [17].

**COOKIE-CUTTER TUNER**—A mechanical magnetron tuning device that changes the frequency by changing the capacitance of the anode cavities [11].

**COPPER LOSS ( $I^2R$  LOSS)**—The power lost because of the resistance of the conductors. In transformers the power lost because of current flow ( $I$ ) through the resistance ( $R$ ) of the windings [2] [10] [11].

**CORDWOOD MODULE**—A method of increasing the number of discrete components in a given space. Resembles wood stacked for a fireplace [14].

**CORE**—Any material that affords a path for magnetic flux lines in a coil [2].

**CORNER-REFLECTOR ANTENNA**—A half-wave antenna with a reflector consisting of two flat metal surfaces meeting at an angle behind the radiator [10] [18].

**CORONA**—The discharge of electricity from a conductor with a high potential [4].

**CORRECTIVE MAINTENANCE**—Includes location and repair of equipment failures [16].

**CORRESPONDENCE**—The term given to the positions of the rotors of a synchro transmitter and a synchro receiver when both rotors are on 0 degree or displaced from 0 degree by the same angle [15].

**COULOMB**—A measure of the quantity of electricity. One coulomb is equal to  $6.28 \times 10^{18}$  electrons [1].

**COULOMB'S LAW**—Also called the LAW OF ELECTRIC CHARGES or the LAW OF ELECTROSTATIC ATTRACTION. Coulomb's Law states that charged bodies attract or repel each other with a force that is directly proportional to the product of their individual charges and inversely proportional to the square of the distance between them [1].

**COUNTER**—A circuit that counts input pulses [9].



**COUNTER EMF**—The voltage generated within a coil by a moving magnetic field cutting across the coil itself. This voltage is in opposition (counter) to the moving field that created it. Counter emf is present in every motor, generator, transformer, or other inductance winding whenever an alternating current flows [2] [5].

**COUNTERPOISE**—A network of wire connected to a quarter-wave antenna at one end. The network provides the equivalent of an additional one-fourth wavelength [10].

**COUPLING**—The process of transferring energy from one point in a circuit to another point, or from one circuit to another [8].

**COUPLING CAPACITOR**—A capacitor used to couple signals [8].

**COUPLING DEVICE**—A coupling coil that connects the transmitter to the feeder [10].

**COVALENT BOND**—A type of linkage between atoms in which the atoms share valence electrons [7].

**CPR**—Cardiopulmonary Resuscitation [1].

**CREST (TOP)**—The peak of the positive alternation (maximum value above the line) of a wave [10].

**CRITICAL ANGLE**—The maximum angle at which radio waves can be transmitted and still be refracted back to earth [10].

**CRITICAL FREQUENCY**—The maximum frequency at which a radio wave can be transmitted vertically and still be refracted back to earth [10].

**CROSSED-FIELD AMPLIFIER**—A high-power electron tube that converts dc to microwave power by a combination of crossed electric and magnetic fields [18].

**CROSS-SECTIONAL AREA**—The area of a "slice" of an object. When applied to electrical conductors it is usually expressed in circular mils [1].

**CROWN-OF-THORNS TUNER**—See SPROCKET TUNER [11].

**CRYSTAL**—A natural substance, such as quartz or tourmaline, that is capable of producing a voltage when under physical stress or of producing physical movement when a voltage is applied [9].

**CRYSTAL FURNACE**—A device for artificially growing cylindrical crystals to be used in the production of semiconductor substrates [14].

**CRYSTAL MICROPHONE**—A microphone that uses the piezoelectric effect of crystalline matter to generate a voltage from sound waves [12].

**CRYSTAL OVEN**—A closed oven maintained at a constant temperature in which a crystal and its holder are enclosed to reduce frequency drift [9].

**CURRENT**—The movement of electrons past a reference point. The passage of electrons through a conductor. Measured in amperes [1].

**CURRENT-FEED METHOD**—Same as CENTER-FEED METHOD [10].

**CURRENT RATING**—The safe current-carrying capacity of a wire or cable on a continuous basis [4].

**CURRENT REGULATOR**—A circuit that provides a constant current output [7].

**CURRENT STANDING-WAVE RATIO (ISWR)**—The ratio of maximum to minimum current along a transmission line [10].

**CUSPS**—Sharp phase reversals [12].

**CUTOFF**—The condition in a tube or transistor whereby the reverse bias prevents current flow [13].

**CUTOFF FREQUENCY**—The frequency at which the attenuation of a waveguide increases sharply and below which a traveling wave in a given mode cannot be maintained. A frequency with a half-wavelength that is greater than the wide dimension of a waveguide [11].

**CW DEMODULATOR**—A circuit that detects the presence of RF oscillations and converts them into a useful form [12].

**CYCLE**—(1) One complete positive and one complete negative alternation of a current or voltage [2] [10].  
(2) A 360-degree rotation of a vector generating a sine wave [12].

**CYLINDRICAL PARABOLIC REFLECTOR**—A parabolically shaped reflector that resembles part of a cylinder [18].

**DAMPED WAVE**—A sinusoidal wave in which the amplitude steadily decreases with time. Often associated with energy loss [9].

**DAMPING**—(1) The process of smoothing out oscillations. (2) In a meter, this process is used to keep the pointer of the meter from overshooting the correct reading [3]. (3) A mechanical or electrical technique used in synchro receivers to prevent the rotor from oscillating or spinning. Damping is also used in servosystems to minimize overshoot of the load [15] [16].

**D'ARSONVAL METER MOVEMENT**—The permanent-magnet moving-coil movement used in most meters [3] [16].

**DATA PROCESSING**—The execution of a systematic sequence of operations performed upon data. Synonymous with information processing [13].

**DATA TRANSMISSION**—The transfer of information from one place to another or from one part of a system to another [15].

**dBm**—An abbreviation used to represent power levels above or below a 1-milliwatt reference [16].

**DEAD SHORT**—A short circuit having minimum resistance [1].

**DECIMAL**—Pertaining to the number representation system with a radix of ten [13].

**DECIMAL DIGIT**—In decimal notation, one of the characters 0 through 9 [13].

**DECIMAL NOTATION**—A fixed radix notation where the radix is ten [13].

**DECIMAL NUMERAL**—A decimal representation of a number [13].

**DECIMAL POINT**—The radix point in decimal representation [13].

**DECOUPLING CAPACITOR**—A capacitor used to transfer unwanted signals out of a circuit; for example, coupling an unwanted signal to ground. Also called a BYPASS CAPACITOR [8].

**DEFLECTION COILS**—In a cathode-ray tube, coils used to bend an electron beam a desired amount [18].

**DEFLECTION PLATES**—Two pairs of parallel electrodes, one pair set forward of the other and at right angles to each other, parallel to the axis of the electron stream within an electrostatic cathode-ray tube [6].

**DEGENERATION**—The process whereby a part of the output signal of an amplifying device is returned to its input circuit in such a manner that it tends to cancel part of the input [7].

**DEGENERATIVE FEEDBACK**—Feedback in which the feedback signal is out of phase with the input signal; also called **NEGATIVE FEEDBACK** [8].

**DEGREE-OF-FREEDOM**—The number of axes about which a gyro is free to precess [15].

**DEIONIZATION POTENTIAL**—The potential at which ionization of the gas within a gas-filled tube ceases and conduction stops; also referred to as extinction potential [6].

**DEIONIZATION TIME**—In a spark gap, the time required for ionized gas to return to its neutral state after the spark is removed [18].

**DELTA**—A three-phase connection in which windings are connected end-to-end, forming a closed loop that resembles the Greek letter delta. A separate phase wire is then connected to each of the three junctions [5].

**DEMODULATION**—The removal of intelligence from a transmission medium [12].

**DEMODULATOR**—A circuit used in servosystems to convert an ac signal to a dc signal. The magnitude of the dc output is determined by the magnitude of the ac input signal, and its polarity is determined by whether the ac input signal is in or out of phase with the ac reference voltage [15].

**DeMORGAN'S THEOREM**—A theorem which states that the inversion of a series of AND applications is equal to the same series of inverted OR applications, or the inversion of a series of OR applications is equal to the same series of inverted AND applications. In symbols,

$$\overline{A \cdot B \cdot C} = \bar{A} + \bar{B} + \bar{C} \text{ or } \overline{A + B + C} = \bar{A} \cdot \bar{B} \cdot \bar{C} \text{ [13]}$$

**DENSITY**—(1) The compactness of a substance. (2) Mass per unit volume [10].

**DEPLETION REGION**—The region in a semiconductor where essentially all free electrons and holes have been swept out by the electrostatic field which exists there [7].

**DEPOT-LEVEL MAINTENANCE (SM&R CODE D)**—Supports SM&R Code I and SM&R Code O activities through extensive shop facilities and equipment and highly skilled personnel [14].

**DESIGNATION**—Operational phase of a fire-control or track radar during which the radar is directed to the general direction of a desired target [18].

**DETECTION**—The separation of low-frequency (audio) intelligence from the high-frequency carrier [17].

**DETECTOR**—A mixer or converter in a superheterodyne receiver [18].

**DICE**—Uncased chips [14].

**DIE BONDING**—Process of mounting a chip to a package [14].

**DIELECTRIC**—An insulator; a term applied to the insulating material between the plates of a capacitor [2].

**DIELECTRIC CONSTANT**—The ratio of a given dielectric to the dielectric value of air [2] [11].

**DIELECTRIC FIELD**—The space between and around charged bodies in which their influence is felt. Also called ELECTRIC FIELD OF FORCE or an ELECTROSTATIC FIELD [1].

**DIELECTRIC HEATING**—The heating of an insulating material by a high-frequency electric field [10].

**DIELECTRIC HYSTERESIS LOSS**—Power loss of a capacitor because of the changes in orientation of electron orbits in the dielectric; the changes in orientation are caused by rapid reversal in polarity of line voltage. The higher the frequency, the greater the loss [2].

**DIELECTRIC LEAKAGE**—Power loss of a capacitor because of the leakage of current through the dielectric. Also relates to leakage resistance; the higher the leakage resistance, the lower the dielectric leakage [2].

**DIELECTRIC LOSSES**—The losses resulting from the heating effect on the dielectric material between conductors [10] [11].

**DIELECTRIC STRENGTH**—The ability of an insulator to withstand a potential difference without breaking down (usually expressed in terms of voltage) [4].

**DIFFERENCE FREQUENCY**—See BEAT FREQUENCY [18].

**DIFFERENCE OF POTENTIAL**—A voltage between two points [6].

**DIFFERENTIAL AMPLIFIER**—A circuit that amplifies the difference between two input signals [8].

**DIFFRACTION**—The bending of waves (as light or RF) when the waves are met with some form of obstruction [10].

**DIFFUSION**—(1) The scattering of reflected light waves from an object, such as white paper [10]. (2) Controlled application of impurity atoms to a semiconductor substrate [14].

**DIGIT**—A symbol that represents one of the nonnegative integers smaller than the radix. For example, in decimal notation a digit is one of the characters from 0 through 9 [13].

**DIGITAL COMPUTER**—(1) A computer in which discrete representation of data is used. (2) A computer that operates on discrete data by performing arithmetic and logic processes on these data [13].

**DIODE**—An electron tube containing two electrodes: a cathode and a plate [6]. (2) A two element, solid-state device made of either germanium or silicon; it is primarily used as a switching device [7] [13].

**DIODE DETECTOR**—A demodulator that uses one or more diodes to provide a rectified output with an average value that is proportional to the original modulation [12] [18].

**DIPOLE**—A common type of half-wave antenna made from a straight piece of wire cut in half. Each half operates at a quarter wavelength of the output [10].

**DIRECT CURRENT**—An electric current that flows in one direction only [1].

**DIRECTIONAL ANTENNA**—An antenna that radiates most effectively in only one direction [18].

**DIRECTIONAL COUPLER**—A device that samples the energy traveling in a waveguide in one direction only [11].

**DIRECTIVITY**—The ability of an antenna to radiate or receive more energy in some directions than in others. The degree of sharpness of the antenna beam [10] [11] [18].

**DIRECTLY HEATED CATHODE**—A wire, or filament, designed to emit the electrons that flow from cathode to plate. The filament is designed so that a current is passed through it; the current heats the filament to the point where electrons are emitted [6].

**DIRECTOR**—The parasitic element of an array that reinforces energy coming from the driver element [10].

**DIRECT SHORT**—Same as SHORT CIRCUIT [3].

**DISCRETE COMPONENTS**—Individual transistors, diodes, resistors, capacitors, and inductors [14].

**DISCRIMINATOR**—A circuit in which amplitude variations are derived in response to phase or frequency variations [18].

**DISPERSION**—The refraction of light waves that causes the different frequencies to bend at slightly different angles [10].

**DISPLACEMENT CURRENT**—The current that appears to flow through a capacitor [2].

**DISTILLED WATER**—Water that has been purified through a process of evaporation and condensation [18].

**DISTORTION**—Any unwanted change between an input signal and output signal [6] [8].

**DISTRIBUTED CONSTANTS**—The constants of inductance, capacitance, and resistance in a transmission line. They are spread along the entire length of the line and cannot be distinguished separately [10].

**DISTRIBUTIVE LAW**—In Boolean algebra the law which states that if a group of terms connected by like operators contains the same variable, the variable may be removed from the terms and associated with them by the appropriate sign of operation (for example,  $A(B + C) = AB + AC$ ) [13].

**DOMAIN THEORY**—A theory of magnetism based upon the electron-spin principle. Spinning electrons have a magnetic field. If more electrons spin in one direction than another, the atom is magnetized [1].

**DOMINANT MODE**—The easiest mode to produce in a waveguide, and the most efficient mode in terms of energy transfer [11].

**DONOR**—An impurity that can make a semiconductor material an N-type by donating extra "free" electrons to the conduction band [7].

**DONOR IMPURITY**—See PENTAVALENT IMPURITY [7].

**DOORKNOB TUBE**—An electron tube that is similar to the acorn tube but larger. The doorknob tube is designed to operate, at high power, in the uhf frequencies [6].

**DOPING**—The process of adding impurities to semiconductor crystals to increase the number of free charges that can be moved by an external, applied voltage. Doping produces N-type or P-type material [7] [14].

**DOPPLER EFFECT**—(1) The apparent change in frequency or pitch when a sound source moves either toward or away from a listener [10]. (2) In radar, the change in frequency of a received signal caused by the relative motion between the radar and the target [18].

**DOPPLER FREQUENCY**—The difference between transmitted and reflected frequencies; caused by the Doppler effect [18].

**DOUBLE-MODING**—In a transmitter output tube, the abrupt and random change from one frequency to another [18].

**DOUBLE NEGATIVE LAW**—In Boolean algebra, the law which states that the complement of a complement is the equivalent of the original term [13].

**DOUBLE RECEIVER**—A fine and coarse synchro receiver enclosed in a common housing with a two-shaft output (one shaft inside the other) [15].

**DOUBLET**—Another name for the dipole antenna [10].

**DOUBLING UP**—This is a type of two-equipment installation where one unit can be substituted for another in the event of failure [17].

**DOWN LINK**—The frequency used to transmit an amplified signal from a satellite or other craft back to earth [17].

**DRIFT SPACE**—In an electron, a region free of external fields in which relative electron position depends on velocity [11].

**DRIVEN ARRAY**—An array in which all of the elements are driven [10].

**DRIVEN ELEMENT**—The element of an antenna connected directly to the transmission line [10].

**DRIVER**—The final stage of amplification [8].

**DRUM-TYPE ARMATURE**—An efficient, popular type of armature designed so that the entire length of the winding is cutting the field at all times. Most wound armatures are of this type [5].

**DRY-AIR SYSTEM**—Provides dehumidified air for electronic equipment that is moisture critical [18].

**DRY CELL**—An electrical cell in which the electrolyte is not a liquid. In most dry cells the electrolyte is in the form of a paste [1].

**DUAL-GATE MOSFET**—A two-gate MOSFET in which either gate can control the conductor independently, a fact which makes this MOSFET very versatile [7].

**DUAL IN-LINE PACKAGE (DIP)**—IC package having two parallel rows of preformed leads [14].

**DUCTILE**—Easily drawn out (as to form filaments or wires) [4].

**DUCTING**—Trapping of an RF wave between two layers of the earth's atmosphere or between an atmospheric layer and the earth [18].

**DUMMY ANTENNA**—See DUMMY LOAD [16].

**DUMMY LOAD**—A dissipative but nonradiating device that has the impedance characteristics of an antenna or transmission line. Also called ARTIFICIAL LOAD [11] [16] [17].

**DUPLEXER**—A radar device that switches the antenna from the transmitter to the receiver and vice versa [18].

**DUTY CYCLE**—In a transmitter, ratio of time on to time off [12] [18].

**DYNAMIC MICROPHONE**—A device in which sound waves move a coil of fine wire that is mounted on the back of a diaphragm and located in the magnetic field of a permanent magnet [12].

**ECHO**—(1) The reflection of the original sound wave as it bounces off a distant surface [10]. (2) The RF signal reflected back from a radar target [18].

**ECHO BOX**—A resonant cavity device that is used to check the overall performance of a radar system. It receives a portion of the transmitted pulse and retransmits it back to the receiver as a slowly decaying transient [18].

**ECLIPSE**—A condition in which the satellite is not in view or in direct line of sight with the sun. This happens when the earth is between them [17].

**EDDY CURRENT**—Induced circulating currents in a conducting material that are caused by a varying magnetic field [2] [5].

**EDDY CURRENT LOSS**—Losses caused by random current flowing in the core of a transformer. Power is lost in the form of heat [2].

**EDISON EFFECT**—Also called RICHARDSON EFFECT. The phenomenon wherein electrons emitted from a heated element within a vacuum tube will flow to a second element that is connected to a positive potential [6].

**EFFECTIVE VALUE**—Same as ROOT-MEAN-SQUARE [2].

**EFFICIENCY**—The ratio of output-signal power compared to the total input power, generally expressed as a percentage [1] [7].

**E-FIELD**—Electric field that exists when a difference in electrical potential causes a stress in the dielectric between two points [11].

**ELASTICITY**—The ability of a substance to return to its original state [10].

**ELECTRIC CURRENT**—The flow of electrons [1].

**ELECTRIC (E) FIELD**—The field of force that is produced as a result of a voltage charge on a conductor or antenna [10] [11].

**ELECTRICAL CHARGE**—Symbol **Q**, **q**. Electric energy stored on or in an object. The negative charge is caused by an excess of electrons; the positive charge is caused by a deficiency of electrons [1].

**ELECTRICAL CHEMICAL**—The action of converting chemical energy into electrical energy [1].

**ELECTRICAL-LOCK**—A synchro zeroing method. This method is used only when the rotors of the synchros to be zeroed are free to turn and their leads are accessible [15].



**ELECTRICAL POWER SYSTEM**—Provides the necessary input power [18].

**ELECTRICAL SYMBOLS**—Graphic symbols used to illustrate the various electrical or electronic components of a circuit [4].

**ELECTRICAL ZERO**—A standard synchro position, with a definite set of stator voltages, that is used as the reference point for alignment of all synchro units [15].

**ELECTRODE**—The terminal at which electricity passes from one medium into another, such as in an electrical cell where the current leaves or returns to the electrolyte [1].

**ELECTRODYNAMIC METER MOVEMENT**—A meter movement using fixed field coils and a moving coil; usually used in ammeters and wattmeters [3].

**ELECTRODYNAMOMETER**—A meter using an electrodynamic movement to measure an electric current [16].

**ELECTROLYSIS**—The process of changing the chemical composition of a material by passing an electric current through it [4] [11].

**ELECTROLYTE**—A solution of a substance that is capable of conducting electricity. An electrolyte may be in the form of either a liquid or a paste [1].

**ELECTROMAGNET**—An electrically excited magnet capable of exerting mechanical force or of performing mechanical work [1].

**ELECTROMAGNETIC**—The term describing the relationship between electricity and magnetism. A quality that combines both magnetic and electric properties [1].

**ELECTROMAGNETIC FIELD**—The combination of an electric (E) field and a magnetic (H) field [10].

**ELECTROMAGNETIC INDUCTION**—The production of a voltage in a coil because of a change in the number of magnetic lines of force (flux linkages) passing through the coil [1] [2].

**ELECTROMAGNETIC INTERFERENCE**—Man-made or natural interference that degrades the quality of reception of radio waves [10] [17].

**ELECTROMAGNETIC RADIATION**—The radiation of radio waves into space [10].

**ELECTROMAGNETISM**—The generation of a magnetic field around a current-carrying conductor [2] [3].

**ELECTROMOTIVE FORCE (emf)**—The force (voltage) that produces an electric current in a circuit [2].

**ELECTRON**—The elementary negative charge that revolves around the nucleus of an atom [1].

**ELECTRON GUN**—An electrode of a CRT that is equivalent to the cathode and control grid of conventional tubes. The electron gun produces a highly concentrated stream of electrons [6].

**ELECTRON ORBITAL MOVEMENT**—The movement of an electron around the nucleus of an atom [11].

**ELECTRON SHELL**—A group of electrons which have a common energy level that forms part of the outer structure (shell) of an atom [1].



**ELECTRONIC COUNTER-COUNTERMEASURES (ECCM) CIRCUITS**—See ANTIJAMMING CIRCUITS [18].

**ELECTRONIC-EQUIPMENT DEHYDRATOR**—A device that provides an alternate dry-air input in the event of failure of the central dry-air system. It may include a compressor [18].

**ELECTRONIC FREQUENCY COUNTER**—An instrument that counts the number of cycles (pulses) occurring during a precise time interval [18].

**ELECTRONIC SCANNING**—Scanning in which the axis of the beam is moved, relative to the antenna axis, in a desired pattern [18].

**ELECTRONIC SWITCH**—A circuit that causes a start-and-stop switching action by electronic means [13].

**ELECTRONICS DRY-AIR BRANCH**—A common line for providing dry air to various electronic equipment, such as search radar, fire-control radar, and repeaters [18].

**ELECTRONIC TUNING**—In a reflex klystron, changing the frequency and output power of the tube by altering the repeller voltage [11].

**ELECTRON SPIN**—The movement of an electron around its axis [11].

**ELECTROSTATIC**—Pertaining to electricity at rest, such as charges on an object (static electricity) [1].

**ELECTROSTATIC DEFLECTION**—The method of deflecting an electron beam by passing it between parallel charged plates mounted inside a cathode-ray tube [6].

**ELECTROSTATIC FIELD**—The field of influence between two differently charged bodies [2].

**ELECTROSTATIC METER MOVEMENT**—A meter movement that uses the electrostatic repulsion of two sets of charged plates (one fixed and the other movable). This meter movement reacts to voltage rather than to current and is used to measure high voltage [3].

**ELECTROSTATIC STRESS**—The force exerted on an insulator by the voltage in a conductor [4].

**ELEMENT**—(1) A substance, in chemistry, that cannot be divided into simpler substances by any means ordinarily available [1]. (2) A part of an antenna that can be either an active radiator or a parasitic radiator [10].

**ELEPHANT TRUNK**—Ducting used for ventilation purposes [4].

**ELEVATION ANGLE**—The angle between the horizontal plane and the line of sight to a target or object [11] [18].

**EMERGENCY POWER**—Temporary source of limited electrical power used upon the loss of the normal power source [18].

**EMF (ELECTROMOTIVE FORCE)**—The force that causes electricity to flow between two points with different electrical charges or when there is a difference of potential between the two points. The unit of measurement is volts [1].

**EMITTER**—The element in a transistor that emits current carriers (electrons or holes) [7] [13].

**EMITTER-INJECTION MODULATOR**—The transistor equivalent of the cathode modulator. The gain is varied by changing the voltage on the emitter [12].

**ENAMEL**—A synthetic compound of cellulose acetate (wood pulp and magnesium). Used to insulate wire in meters, relays, and motor windings [4].

**ENCAPSULATED**—Imbedded in solid material or enclosed in glass or metal [14].

**END-FEED METHOD**—A method in which one end of an antenna is connected through a capacitor to the final output stage of a transmitter [10].

**END-FIRE ARRAY**—An array in which the direction of radiation is parallel to the axis of the array [10].

**ENERGY**—The ability or capacity to do work [1].

**EPHEMERIS**—A table showing the precalculated position of a satellite at any given time [17].

**$E_p$ - $I_p$  CURVE**—The characteristic curve of an electron tube used to graphically depict the relationship between plate voltage ( $E_p$ ) and plate current ( $I_p$ ) [6].

**EPITAXIAL PROCESS**—A method of depositing a thin, uniformly doped crystalline region (layer) on a substrate [14].

**EQUATORIAL ORBIT**—An orbit that occurs when the plane of a satellite coincides with the plane of the earth at the equator [17].

**EQUIVALENT RESISTANCE ( $R_{eq}$ )**—A resistance that represents the total ohmic values of a circuit component or group of circuit components. Usually drawn as a single resistor in a simplified circuit [1].

**ERECTING (A GYRO)**—The positioning of a gyro into a desired position and the maintaining of that position [15].

**ERROR DETECTOR**—The component in a servosystem that determines when the load has deviated from its ordered position, velocity, and so forth [15].

**ERROR REDUCER**—The name commonly given to the servomotor in a servosystem. So named because it reduces the error signal by providing feedback to the error detector [15].

**ERROR SIGNAL**—(1) In servosystems, the signal whose amplitude and polarity or phase are used to correct the alignment between the controlling and the controlled elements. (2) The name given to the electrical output of a control transformer [15].

**E-TRANSFORMER**—A special form of differential transformer employing an E-shaped core. The secondaries of the transformer are wound on the outer legs of the E, and the primary is wound on the center leg. An output voltage is developed across the secondary coils when its armature is displaced from its neutral position. This device is used as an error detector in servosystems that have limited load movements [15].

**E-TYPE T-JUNCTION**—A waveguide junction in which the junction arm extends from the main waveguide in the same direction as the E-field in the waveguide [11].

**EUTECTIC ALLOY**—An alloy that changes directly from a solid to a liquid with no plastic or semiliquid state [14].

**EUTECTIC SOLDER**—An alloy of 63 percent tin and 37 percent lead. Melts at 361° F [14].

**EXCITATION VOLTAGE**—The supply voltage required to activate a circuit [15].

**EXCITING CURRENT**—The current that flows in the primary winding of a transformer when the secondary is open-circuited; it produces a magnetic flux field. Also called magnetizing current [2].

**EXCLUSIVE OR**—A function whose output is a 1 if one and only one of the input variables is a 1 [13].

**EXCLUSIVE-OR GATE**—A gate that produces a logic 1 output when the inputs are different, but not when they are the same [13].

**EXPONENT**—The numeral written in superscript ( $10^2$ ) which indicates the power to which the base is to be raised [13].

**EXPRESSION**—A validated series of variables, constants, and functions that can be connected by operating symbols to describe a desired computation [13].

**EXTERNALLY EXCITED METER**—A term used to describe meters that get their power from the circuit to which they are connected [16].

**EXTERNALLY SYNCHRONIZED RADAR**—A radar system in which timing pulses are generated by a master oscillator external to the transmitter [18].

**EXTREMELY HIGH FREQUENCY**—The band of frequencies from 30 gigahertz to 300 gigahertz [17].

**EXTREMELY LOW FREQUENCY**—The band of frequencies up to 300 hertz [17].

**EXTRINSIC**—A semiconductor in which impurities have been added to create certain charge carrier concentrations [7].

**FACSIMILE**—The method for transmitting and receiving still images. These images can be maps, photographs, and handwritten or printed text [17].

**FACTOR**—Any of the elements, quantities, or symbols that, when multiplied together, form a product [13].

**FADING**—Variations in signal strength by atmospheric conditions [101 [17].

**FARAD**—The basic unit of capacitance. A capacitor has a capacitance of 1 farad when a voltage potential of 1 volt across it produces a charge of 1 coulomb [2].

**FARADAY ROTATION**—The rotation of the plane of polarization of electromagnetic energy when it passes a substance influenced by a magnetic field that has a component in the direction of propagation [11].

**FAST-TIME-CONSTANT CIRCUIT**—Differentiator circuit in the first video amplifier that allows only the leading edges of target returns, no matter how small or large, to be used [18].

**FEEDBACK**—The return of a portion of the output of a circuit to its input [8] [18].

**FEEDER**—A transmission line that carries energy to the antenna [10].

**FEEDHORN**—A horn radiator used to feed a reflector [18].

**FEP**—A synthetic type of insulation (fluorinated ethylene propylene) [4].

**FERRITE**—A powdered and compressed ferric oxide material that has both magnetic properties and light resistance to current flow [11].

**FERRITE SWITCH**—A ferrite device that blocks the flow of energy through a waveguide by rotating the electric field 90 degrees. The rotated energy is then reflected or absorbed [11].

**FERROMAGNETIC MATERIAL**—A highly magnetic material, such as iron, cobalt, nickel, or their alloys [1].

**FERRULES**—The cylindrical metallic ends of a cartridge fuse [3].

**FIBER OPTICS**—Conductors or optical waveguides that readily pass light [17].

**FIBROUS BRAID**—An outer covering used to protect a conductor's insulating material. Commonly made from cotton, linen, silk, rayon, or fiberglass [4].

**FIDELITY**—(1) The faithful reproduction of a signal. (2) The accuracy with which a system reproduces a signal at its output that faithfully maintains the essential characteristics of the input signal [7] [8] [12] [17].

**FIELD**—The electromagnet which furnishes the magnetic field that interacts with the armature in motors and generators [5].

**FIELD-EFFECT TRANSISTOR (FET)**—A transistor consisting of a source, a gate, and a drain. Current flow is controlled by the transverse electric field under the gate [7].

**FIELD EXCITATION**—The creation of a steady magnetic field within the field windings by the application of a dc voltage either from the generator itself or from an external source [5].

**FIELD OF FORCE**—A term used to describe the total force exerted by an action-at-a-distance phenomenon such as gravity upon matter, electric charges acting upon electric charges, and magnetic forces acting upon other magnets or magnetic materials [1].

**FILAMENT**—The cathode of a thermionic tube, usually a wire or ribbon, which is heated by current passing through it [6].

**FILM ICs**—Conductive or nonconductive material deposited on a glass or ceramic substrate. Used for passive circuit components, resistors, and capacitors [14].

**FILTER**—A selective network of resistors, capacitors, and inductors that offers comparatively little opposition to certain frequencies, while blocking or attenuating other frequencies [6] [9].

**FINAL POWER AMPLIFIER (FPA)**—The final stage of amplification in a transmitter [12].

**FIRST DETECTOR**—See MIXER [18].

**FIXED BIAS**—A constant value of bias voltage [6] [7] [13].

**FIXED RESISTOR**—A resistor having a definite resistance value that cannot be adjusted [1].

**FIXED SPARK GAP**—A device used to discharge the pulse-forming network. A trigger pulse ionizes the air between two contacts to initiate the discharge [12].

**FLAT LINE**—A transmission line that has no standing waves. This line requires no special timing devices to transfer maximum power [10].

**FLAT PACK**—An IC package [14].

**FLEMING VALVE**—An earlier name for a diode, or a two-electrode vacuum tube used as a detector [6].

**FLEXIBLE COAXIAL LINE**—A line made with an inner conductor that consists of flexible wire insulated from the outer conductor by a solid, continuous insulating material [10].

**FLIP CHIP**—A monolithic IC packaging technique that eliminates the need for bonding wires [14].

**FLIP-FLOP**—A device having two stable states and two input terminals (or types of input signals), each of which corresponds with one of the two states. The circuit remains in either state until caused to change to the other state by application of a voltage pulse. A similar bistable device with an input that allows it to act as a single-stage binary counter [13].

**FLUX**—(1) In electrical or electromagnetic devices, a general term used to designate collectively all the electric or magnetic lines of force in a region [1]. (2) A solution that removes surface oxides from metals being soldered [2] [14].

**FLUX DENSITY**—The number of magnetic lines of force passing through a given area [1].

**FLYWHEEL EFFECT**—The ability of a resonant circuit to operate continuously because of stored energy or energy pulses [9].

**FOCUSING ANODE**—An electrode of a CRT that is used to focus the electrons into a tight beam [6].

**FOLDED DIPOLE**—An ordinary half-wave antenna (dipole) that has one or more additional conductors connected across the ends parallel to each other [10].

**FORBIDDEN BAND**—The energy band in an atom lying between the conduction band and the valence band. Electrons are never found in the forbidden band but may travel back and forth through it. The forbidden band determines whether a solid material will act as a conductor, a semi-conductor, or an insulator [7].

**FORWARD AGC**—The type of AGC that causes an amplifier to be driven towards saturation [17].

**FORWARD BIAS**—An external voltage that is applied to a PN junction in the conducting direction so that the junction offers only minimum resistance to the flow of current. Conduction is accomplished by majority current carriers (holes in P-type material; electrons in N-type material) [7] [13] [14].

**FORWARD RESISTANCE**—The smaller resistance value observed when you are checking the resistance of a semiconductor [16].

**FOSTER-SEELEY DISCRIMINATOR**—A circuit that uses a double-tuned RF transformer to convert frequency variations in the received FM signal to amplitude variations. Also known as a phase-shift discriminator [12].

**FOUR-ELEMENT ARRAY**—An antenna array with three parasitic elements and one driven element [10].

**FRAMING**—The process of synchronizing a facsimile receiver to a transmitter. This allows proper picture reproduction [17].

**FREE CHARGES**—Those electrons that can be moved by an externally applied voltage [7].

**FREE-SPACE LOSS**—The loss of energy of radio waves caused by the spreading of the wavefront as it travels from the transmitter [10].

**FREQUENCY (f)**—(1) The number of complete cycles per second existing in any form of wave motion, such as the number of cycles per second of an alternating current [2] [10]. (2) The rate at which the vector that generates a sine wave rotates [12].

**FREQUENCY COMPENSATION NETWORK**—Circuit modification used to improve or broaden the linearity of its frequency response [18].

**FREQUENCY CUTOFF**—The frequency at which the filter circuit changes from an action of rejecting the unwanted frequencies to an action of passing the desired frequencies. Conversely, the point at which the filter circuit changes from an action in which it passes the desired frequencies to an action in which it rejects the undesired frequencies [9].

**FREQUENCY-DETERMINING NETWORK**—A circuit that provides the desired response (maximum or minimum impedance) at a specific frequency [8].

**FREQUENCY DEVIATION**—The amount the frequency varies from the carrier frequency [12].

**FREQUENCY DIVERSITY**—Transmitting (and receiving) of radio waves on two different frequencies simultaneously [10].

**FREQUENCY-DIVISION MULTIPLEXING**—Multiplexing that transmits and receives the full 360 degrees of each sine wave [17].

**FREQUENCY METER**—A meter used to measure the frequency of an ac signal [3] [16].

**FREQUENCY MODULATION (fm)**—Angle modulation in which the modulating signal causes the carrier frequency to vary. The amplitude of the modulating signal determines how far the frequency changes, and the frequency of the modulating signal determines how fast the frequency changes [12].

**FREQUENCY MULTIPLIERS**—Special RF power amplifiers that multiply the input frequency [12].

**FREQUENCY RESPONSE**—The measure of a servo's ability to respond to various input frequencies [15].

**FREQUENCY-RESPONSE CURVE**—A curve showing the output of an amplifier (or any other device) in terms of voltage or current plotted against frequency with a fixed-amplitude input signal [8].

**FREQUENCY SCANNING**—Varying the output frequency to achieve electronic scanning [18].

**FREQUENCY-SHIFT KEYING (fsk)**—Frequency modulation somewhat similar to continuous-wave (cw) keying in AM transmitters. The carrier is shifted between two differing frequencies by opening and closing a key [12].

**FREQUENCY SPECTRUM**—In a radar, the entire range of frequencies contained in an RF pulse or signal [18].

**FREQUENCY STABILITY**—Refers to the ability of an oscillator to accurately maintain its operating frequency [9].

**FREQUENCY SYNTHESIS**—A process that uses heterodyning and frequency selection to produce a signal [17].

**FREQUENCY SYNTHESIZER**—(1) A frequency source of high accuracy [17]. (2) A bank of oscillators in which the outputs can be mixed in various combinations to produce a wide range of frequencies [18].

**FRONT-TO-BACK RATIO**—The ratio of the energy radiated in the principal direction compared to the energy radiated in the opposite direction [10].

**FULL-WAVE RECTIFIER**—A circuit that uses both positive and negative alternations in an alternating current to produce direct current [6] [7].

**FULL-WAVE VOLTAGE DOUBLER**—Consists of two half-wave voltage rectifiers and is used to reduce the output ripple amplitude [7].

**FUNCTION**—A specific purpose of an entity; its characteristic action [13].

**FUNDAMENTAL FREQUENCY**—The basic frequency or first harmonic frequency [10].

**FUSED-ALLOY JUNCTION**—See ALLOYED-JUNCTION [7].

**GAIN**—(1) The ratio between the amount of energy propagated from an antenna that is directional compared to the energy from the same antenna that would be propagated if the antenna were not directional [10]. (2) Any increase in the strength of a signal [18].

**GAIN-BANDWIDTH PRODUCT**—The number that results when the gain of a circuit is multiplied by the bandwidth of that circuit. For an operational amplifier, the gain-bandwidth product for one configuration will always equal the gain-bandwidth product for any other configuration of the same amplifier [8].

**GALENA**—A crystalline form of lead sulfide used in early radio receivers [7].

**GALVANOMETER**—A meter used to measure small values of current by electromagnetic or electrodynamic means [3] [4] [16].

**GAMMA ( $\gamma$ )**—The emitter-to-base current ratio in a common-collector configuration [7].

**GANGED TUNING**—The process used to tune two or more circuits with a single control [17].

**GAS**—One of the three states of matter; it has no fixed form or volume [1].

**GATE**—As applied to logic circuitry, one of several different types of electronic devices that will provide a particular output when specified input conditions are satisfied. Also, a circuit in which a signal switches another signal on or off [13].

**GATED AGC**—Circuit that permits automatic gain control to function only during short time intervals [18].

**GATED-BEAM DETECTOR**—An FM demodulator that uses a special gated-beam tube to limit, detect, and amplify the received FM signal. Also known as a quadrature detector [12].

**GATING**—The process of selecting those portions of a wave that exist during one or more selected time intervals or that have magnitudes between selected limits. Also, the application of a specific waveform to perform electronic switching [13].



**GENERAL PURPOSE ELECTRONIC TEST EQUIPMENT (GPETE)**—Test equipment that has the capability, without modification, to generate, modify, or measure a range of electronic functions required to test several equipments or systems of basically different designs [14] [16].

**GENERATOR**—A machine that converts mechanical energy to electrical energy by applying the principle of magnetic induction. A machine that produces ac or dc voltage, depending on the original design [5].

**GENERATOR END**—See INPUT END [10].

**GERMANIUM**—A grayish-white metal having semiconductor properties [7].

**GETTER**—An alkali metal introduced into a vacuum tube during manufacture. It is fired after the tube has been evacuated to react chemically with (and eliminate) any remaining gases [6].

**GIMBAL**—A mechanical frame, with two perpendicular intersecting axes of rotation, used to support and furnish a gyro wheel with the necessary freedom to tilt in any direction [15].

**GLOW DISCHARGE**—Discharge of electricity through a gas in an electron tube [18].

**GRAMME-RING ARMATURE**—An inefficient type of armature winding in which many of the turns are shielded from the field by its own iron ring [5].

**GRAPH**—A pictorial presentation of the relation between two or more variable quantities, such as between an applied voltage and the current it produces in a circuit [1].

**GRID BIAS**—A constant fixed potential applied between the grid and the cathode of a vacuum tube to establish an operating point [6].

**GRID CURRENT**—The current that flows in the grid-to-cathode circuit of a vacuum tube [6].

**GRID-GAP TUNING**—A method of changing the center frequency of a resonant cavity by physically changing the distance between the cavity grids [11].

**GRID-LEAK BIAS**—A self-bias provided by a high resistance connected across the grid capacitor or between the grid and cathode [6].

**GROUND**—(1) The point in a circuit used as a common reference point for measuring purposes. (2) To connect some point of an electrical circuit or some item of electrical equipment to earth or to the conducting medium used in lieu thereof [13].

**GROUND CLUTTER**—Unwanted echoes, from surrounding land masses, that appear on a radar indicator [18].

**GROUND-CONTROLLED APPROACH**—A radar system used to guide aircraft to safe landings in poor visibility conditions [18].

**GROUND PLANE**—The portion of a ground-plane antenna that acts as ground [10].

**GROUND-PLANE ANTENNA**—A type of antenna that uses a ground plane as a simulated ground to produce low-angle radiation [10].

**GROUND PLANES**—Copper planes used to minimize interference between circuits and from external sources [14].

**GROUND POTENTIAL**—Zero potential with respect to the ground or earth [1].



**GROUND RANGE**—The distance on the surface of the earth between a radar and its target. Equal to slant range only if both radar and target are at the same altitude [18].

**GROUND REFLECTION LOSS**—The loss of RF energy each time a radio wave is reflected from the earth's surface [10].

**GROUND SCREEN**—A series of conductors buried below the surface of the earth and arranged in a radial pattern. Used to reduce losses in the ground [10].

**GROUND WAVES**—Radio waves which travel near the surface of the earth [10].

**GROUP**—A collection of units, assemblies, subassemblies, and parts. It is a subdivision of a set or system but is not capable of performing a complete operational function [17].

**GROUP VELOCITY**—The forward progress velocity of a wave front in a waveguide [11].

**GROWN JUNCTION**—A method of mixing P-type and N-type impurities into a single crystal while the crystal is being grown [7].

**GUIDANCE RADAR**—A system which provides information that is used to guide a missile to a target [18].

**GYRO**—Abbreviation for gyroscope [15].

**GYROSCOPE**—A mechanical device containing a spinning mass mounted so that it can assume any position in space [15].

**HALF-POWER POINT**—A point on a waveform or radar beam that corresponds to half the power of the maximum power point [8] [9] [18].

**HALF-WAVE DIPOLE ANTENNA**—An antenna, consisting of two rods (1/4 wavelength each) in a single line, that radiates electromagnetic energy [10].

**HALF-WAVE RECTIFIER**—A rectifier using only one-half of each cycle to change ac to pulsating dc [61] [7].

**HALF-WAVE VOLTAGE DOUBLER**—Two half-wave voltage rectifiers connected to double the input voltage [7].

**HAND OVER**—The operation where one earth terminal yields control to another as a satellite moves out of its area of coverage [17].

**HARD-TUBE MODULATOR**—A high-vacuum electron tube modulator that uses a driver for pulse forming [18].

**HARMONIC**—A frequency that is a whole-number multiple of a smaller base frequency [9] [10] [12] [17].

**HEATER**—Same as a FILAMENT [6].

**HEAT SHUNT**—A device (preferably a clip-on type) used to absorb heat and protect heat-sensitive components during soldering [4].

**HEIGHT-FINDING RADAR**—A radar that provides target altitude, range, and bearing data [18].

**HELIX**—(1) A spirally wound transmission line used in a traveling-wave tube to delay the forward progress of the input traveling wave [11]. (2) A large coil of wire. It acts as a coil and is used with variable inductors for impedance matching of high-power transmitters [17].

**HELIX HOUSE**—A building at a transmitter site that contains antenna loading, coupling, and tuning circuits [17].

**HENRY (H)**—The electromagnetic unit of inductance or mutual inductance. The inductance of a circuit is 1 henry when a current variation of 1 ampere per second induces 1 volt. In electronics, smaller units are used, such as the millihenry (mH), which is one-thousandth of a henry (H), and the microhenry ( $\mu$ H) which is one-millionth of a henry [2].

**HERTZ (Hz)**—A unit of frequency equal to one cycle per second [2].

**HERTZ ANTENNA**—A half-wave antenna that is installed some distance above ground and positioned either vertically or horizontally [10].

**HETERODYNE DETECTION**—The use of an a.f. voltage to distinguish between available signals. The incoming cw signal is mixed with locally generated oscillations to give an a.f. output [12].

**HETERODYNING**—(1) The process of mixing two frequencies across a nonlinear impedance [12]. (2) The process of mixing the incoming signal with the local oscillator frequency. This produces the two fundamentals and the sum and difference frequencies [17].

**HEXADECIMAL**—Same as SEXADECIMAL. A number system with a base of sixteen; also pertains to conditions, choices, or selections that have sixteen possible values or states [13].

**HEXADECIMAL SYSTEM**—Pertaining to the number system with a radix of sixteen. It uses the ten digits of the decimal system and the first six letters of the English alphabet [13].

**H-FIELD**—Any space or region in which a magnetic force is exerted. The magnetic field may be produced by a current-carrying coil or conductor, by a permanent magnet, or by the earth itself [11].

**HIGH FREQUENCY**—The band of frequencies from 3 megahertz to 30 megahertz [17].

**HIGH-FREQUENCY COMPENSATION**—See PEAKING COIL [8].

**HIGH-LEVEL MODULATION**—Modulation produced in the plate circuit of the last radio stage of the system [12].

**HIGH-PASS FILTER**—A filter that passes a majority of the high frequencies on to the next circuit and rejects, or attenuates, the lower frequencies. Also called a LOW-FREQUENCY DISCRIMINATOR [9].

**HITS PER SCAN**—The number of times an RF beam strikes a target per antenna revolution [18].

**HOLE FLOW**—In the valence band, a process of conduction in which electrons move into holes, thereby creating other holes that appear to move toward a negative potential. (The movement of holes is opposite the movement of electrons.) [7]

**HORIZONTAL AXIS**—On a graph, the straight line axis that is plotted from left to right [10].

**HORIZONTAL-DEFLECTION PLATES**—A pair of parallel electrodes that moves the electron beam from side to side in a CRT [6].

**HORIZONTALLY POLARIZED**—Waves radiated with their E field component parallel to the earth's surface [10].

**HORIZONTAL PATTERN**—The part of a radiation pattern that is radiated in all directions along the horizontal plane [10].

**HORIZONTAL PLANE**—An imaginary plane that is tangent (or parallel) to the earth's surface at a given location [11] [18].

**HORN**—A funnel-shaped section of waveguide used as a termination device and as a radiating antenna [11].

**HORN ANTENNA**—See HORN RADIATOR [18].

**HORN RADIATOR**—A tapered, tubular or rectangular microwave antenna that is widest at the open end [18].

**HORSEPOWER**—The English unit of power equal to work done at the rate of 550 foot-pounds per second; equal to 746 watts of electrical power [1].

**HORSESHOE MAGNET**—A permanent magnet or electromagnet bent into the shape of a horseshoe or having a U-shape to bring the two poles near each other [1].

**HOT CARRIER**—A carrier, which may be either a hole or an electron, that has relatively high energy with respect to the carriers normally found in majority-carrier devices [11].

**HOT-CARRIER DIODE**—A semiconductor diode in which hot carriers are emitted from a semiconductor layer into the metal base. Also called HOT-ELECTRON DIODE. An example is the Schottky barrier diode [11].

**HOT-WIRE METER MOVEMENT**—A meter movement that uses the expansion of a heated wire to move the pointer of a meter; measures dc or ac [3].

**H-TYPE T-JUNCTION**—A waveguide junction in which the junction arm is parallel to the magnetic lines of force in the main waveguide [11].

**HYBRID CIRCUIT**—A circuit where passive components (resistors, capacitors) are deposited onto a substrate made of glass, ceramic, or other insulating material. Then the active components (diodes, transistors) are attached to the substrate and connected to the passive components on the substrate with a very fine wire [7].

**HYBRID ICs**—Two or more integrated circuit types, or one or more integrated circuit types and discrete components on a single substrate [14].

**HYBRID JUNCTION**—A waveguide junction that combines two or more basic T-junctions [11].

**HYBRID MIXER**—See BALANCED MIXER [18].

**HYBRID RING**—A hybrid-waveguide junction that combines a series of E-type T-junctions in a ring configuration. When properly terminated, energy is transferred from any one branch into any two of the remaining three branches [11] [18].

**HYDROMETER**—An instrument used to measure specific gravity. In batteries hydrometers are used to indicate the state of charge by the specific gravity of the electrolyte [1].

**HYSTERESIS**—The time lag of the magnetic flux in a magnetic material behind the magnetizing force producing it. Caused by the molecular friction of the molecules trying to align themselves with the magnetic force applied to the material [2].

**HYSTERESIS LOSS**—The power loss in an iron-core transformer or other alternating-current device as a result of magnetic hysteresis [2].

**IC SYNCHROS**—Obsolete synchros with reverse rotation and limited torque capabilities [15].

**IDEMPOTENT LAW**—In Boolean algebra, combining a quantity with itself either by logical addition or logical multiplication will result in a logical sum or product that is the equivalent of the quantity (for example,  $A + A = A$ ;  $A \cdot A = A$ ) [13].

**IDENTITY LAW**—In Boolean algebra, the law which states that any expression is equal to itself (for example,

$$A = A, \text{ or } A = A \text{ [13]}$$

**IDLER FREQUENCY**—In a parametric amplifier, the difference between the input signal and the pump signal frequency. Also called the LOWER-SIDEBAND FREQUENCY [11].

**IF AMPLIFIER**—Usually a narrow-bandwidth IF amplifier that is tuned to one of the output frequencies produced by the mixer [18].

**IGFET**—Any field-effect transistor that has an insulated gate [7].

**IMAGE FREQUENCY**—An undesired frequency capable of producing the desired frequency through heterodyning [17].

**IMPEDANCE**—The total opposition offered to the flow of an alternating current. It may consist of any combination of resistance, inductive reactance, and capacitive reactance. The symbol for impedance is  $Z$  [2] [9].

**IMPLOSION**—The inward bursting of a CRT because of high vacuum. The opposite of explosion [6].

**INCIDENT WAVE**—(1) The wave that strikes the surface of a medium. (2) The wave that travels from the sending end to the receiving end of a transmission line [10].

**IN-CIRCUIT METER**—A meter permanently installed in a circuit; used to monitor circuit operation [3].

**INCOHERENT**—Refers to radiation on a broad band of frequencies [17].

**INDEX OF REFRACTION**—The degree of bending of an RF wave when passing from one medium to another [18].

**INDICATOR**—Equipment in radar that provides a visual presentation of target position information [18].

**INDIRECTLY HEATED CATHODE**—Same as the directly heated cathode with one exception: The hot filament raises the temperature of the sleeve around the filament; the sleeve then becomes the electron emitter [6].

**INDUCED-CHANNEL MOSFET**—A MOSFET in which there is no actual channel between the source and the drain. This MOSFET is constructed by making the channel of the same type of material as the substrate [7].

**INDUCED CHARGE**—An electrostatic charge produced on an object by the electric field that surrounds a nearby object [1].

**INDUCED CURRENT**—Current caused by the relative motion between a conductor and a magnetic field [1].

**INDUCED ELECTROMOTIVE FORCE**—The electromotive force induced in a conductor because of the relative motion between the conductor and a magnetic field [1].

**INDUCED VOLTAGE**—See INDUCED ELECTROMOTIVE FORCE [1].

**INDUCTANCE**—The property of a circuit that tends to oppose a change in the existing current flow. The symbol for inductance is  $L$  [2] [7].

**INDUCTANCE BRIDGE**—An ac bridge circuit used to measure an unknown value of inductance [16].

**INDUCTION**—The act or process of producing voltage and current by the relative motion of a magnetic field across a conductor [1].

**INDUCTION FIELD**—The electromagnetic field that is produced about an antenna when current and voltage are present on the same antenna [10].

**INDUCTION LOSSES**—The losses that occur when the electromagnetic field around a conductor cuts through nearby metallic objects and induces a current into that object [10].

**INDUCTION MOTOR**—A simple, rugged, ac motor with desirable characteristics. The rotor is energized by transformer action (induction) from the stator. Induction motors are used more than any other type [5].

**INDUCTIVE COUPLING**—Coupling of two coils by means of magnetic lines of force. In transformers, coupling applied through magnetic lines of force between the primary and secondary windings [2].

**INDUCTIVE REACTANCE**—The opposition to the flow of an alternating current caused by the inductance of a circuit, expressed in ohms. Identified by the symbol  $X_L$  [2] [9].

**INERTIA**—The physical tendency of a body in motion to remain in motion and a body at rest to remain at rest unless acted upon by an outside force (Newton's First Law of Motion) [15].

**INFINITE**—(1) Extending indefinitely, endless. (2) Boundless, having no limits. (3) An incalculable number [1].

**INFRALOW FREQUENCY**—The band of frequencies from 300 Hz to 3,000 Hz [19].

**INFRASONIC (SUBSONIC)**—Sounds below 15 Hz [10].

**IN PHASE**—Applied to the condition that exists when two waves of the same frequency pass through their maximum and minimum values of like polarity at the same instant [2].

**INPUT**—The current, voltage, power, or driving force applied to a circuit or device [13].

**INPUT END**—The end of a two-wire transmission line that is connected to a source [10].

**INPUT IMPEDANCE**—Impedance presented to the transmitter by the transmission line and its load [10].

**INPUT/OUTPUT**—Pertaining to either input or output or both, especially in data processors [13].

**INSTANTANEOUS AMPLITUDE**—The amplitude at any given point along a sine wave at a specific instant in time [12].

**INSTANTANEOUS AUTOMATIC GAIN CONTROL (IAGC)**—A circuit that can vary the gain of the radar receiver with each input pulse to maintain a nearly constant output peak amplitude [18].

**INSTANTANEOUS VALUE**—The magnitude at any particular instant when a value is continually varying with respect to time [2].

**INSULATION**—A material used to prevent the leakage of electricity from a conductor and to provide mechanical spacing or support as protection against accidental contact with the conductor [1] [4].

**INSULATION RESISTANCE**—The resistance offered by an insulating material to current leakage [4].

**INSULATOR**—(1) Material of such low conductivity that the flow of current through it can usually be neglected. (2) A device having high electrical resistance; used for supporting or separating conductors so as to prevent undesired flow of current from the conductors to other objects [1].

**INTEGRATED CIRCUIT (IC)**—(1) A circuit in which many elements are fabricated and interconnected by a single process (into a single chip), as opposed to a "nonintegrated" circuit in which the transistors, diodes, resistors, and other components are fabricated separately and then assembled [7]. (2) Elements inseparably associated and formed on or within a single substrate [14].

**INTELLIGENCE**—In communications any signal that conveys information (voice, teletypewriter, facsimile) [17].

**INTENSITY (OF SOUND)**—The measurement of the amplitude of sound energy. Generally synonymous with loudness [10].

**INTERACTION SPACE**—The region in an electron tube where the electrons interact with an alternating electromagnetic field [11].

**INTERCEPT**—The point where two lines drawn on a graph cross each other [10].

**INTERELECTRODE CAPACITANCE**—The capacitance between the electrodes of an electron tube [6] [11].

**INTERFERENCE**—Any disturbance that produces an undesirable response or degrades a signal [10].

**INTERMEDIATE FREQUENCY (IF)**—A lower frequency to which an RF echo is converted for ease of amplification [18].

**INTERMEDIATE-LEVEL MAINTENANCE (SM&R Code I)**—Direct support and technical assistance to user organizations. Tenders and shore-based repair facilities [14].

**INTERMEDIATE POWER AMPLIFIER**—The amplifier between the oscillator and final power amplifier [12].

**INTERPOLES**—Small auxiliary poles, placed between main field poles, whose magnetic field opposes the armature field and cancels armature reaction. Interpoles accomplish the same thing as compensating windings [5].

**INTERSECTION LAW**—In Boolean algebra, the law which states that if one input to an AND gate is already TRUE, then the output will depend upon the state of the other inputs only [13].

**INVERSELY**—Inverted or reversed in position or relationship [1].

**INVERT**—To change a physical or logical state to its opposite state [13].

**INVERTER**—A circuit with one input and one output. Its function is to invert or reverse the input. When the input is high, the output is low, and vice versa. The inverter is sometimes called a NOT circuit, since it produces the reverse of the input [13].

**ION**—An electrically charged atom or group of atoms. Negative ions have an excess of electrons; positive ions have a deficiency of electrons [1].

**IONIZATION**—(1) The process of producing ions. (2) The electrically charged particles produced by high-energy radiation, such as light or ultraviolet rays, or by the collision of particles during thermal agitation [6] [10].

**IONIZATION POINT**—The potential required to ionize the gas of a gas-filled tube. Sometimes called firing potential [6].

**IONIZE**—To make an atom or molecule of an element lose an electron, as by X-ray bombardment, and thus be converted into a positive ion. The free electron may attach itself to a neutral atom or molecule to form a negative ion [1].

**IONOSPHERE**—The most important region of the atmosphere extending from 31 miles to 250 miles above sea level. Contains four cloud-like layers that affect radio waves [10].

**IONOSPHERIC STORMS**—Disturbances in the earth's magnetic field that make communications practical only at lower frequencies [10].

**IRIS**—A metal plate with an opening through which electromagnetic waves may pass. Used as an impedance-matching device in waveguides [11].

**I<sup>2</sup>R LOSS**—See COPPER LOSSES [11].

**ISOLATION**—The prevention of unwanted interaction or leakage between components [14].

**ISOMETRIC DIAGRAM**—A diagram showing the outline of a ship, aircraft, or equipment and the location of equipment and cable runs [4].

**ISOTROPIC RADIATION**—The radiation of energy equally in all directions [10].

**JUNCTION**—(1) The connection between two or more conductors. (2) The contact between two dissimilar metals or materials, as in a thermocouple [1].

**JUNCTION BOX**—A box with a cover that serves the purpose of joining different runs of wire or cable and provides space for the connection and branching of the enclosed conductors [4].

**JUNCTION DIODE**—A two-terminal device containing a single crystal of semiconducting material that ranges from P-type at one terminal to N-type at the other [7].

**JUNCTION TRANSISTOR**—A bipolar transistor constructed from interacting PN junctions. The term is used to distinguish junction transistors from other types, such as field-effect and point-contact [7].

**KEEP-ALIVE CURRENT**—See KEEP-ALIVE VOLTAGE [18].



**KEEP-ALIVE VOLTAGE**—DC voltage applied to a triode gap electrode to produce a glow discharge that allows the tube to ionize faster when the transmitter fires [18].

**KEY-CLICK FILTERS**—Filters used in keying systems to prevent key-click interference [12].

**KEY CLICKS**—Interference in the form of "clicks" or "thumps" caused by the sudden application or removal of power [12].

**KEYED-OSCILLATOR TRANSMITTER**—A transmitter in which one stage is used to produce the RF pulse [18].

**KEYER**—(1) A device that changes dc pulses to mark and space modulation for teletypewriter transmissions [17]. (2) A synchronizer [18].

**KEYING RELAYS**—Relays used in radio transmitters where the ordinary hand key cannot accommodate the plate current without excessive arcing [12].

**KILO**—A prefix meaning one thousand [1].

**KINETIC ENERGY**—Energy that a body possesses by virtue of its motion [1].

**KIRCHHOFF'S LAWS**—(1) The algebraic sum of the current flowing toward any point in a circuit and the current flowing away from it is zero. (2) The algebraic sum of the products of the current and resistance in each of the conductors in any closed path in a network is equal to the algebraic sum of the electromotive forces in the path [1].

**KLYSTRON POWER AMPLIFIER**—A multicavity microwave electron tube that uses velocity modulation [18].

**KNEE OF THE CURVE**—The point of maximum curvature of a magnetization curve. (Shaped like the knee of a leg that is bent.) [8]

**LACING SHUTTLE**—A device upon which lacing may be wound to prevent fouling the tape or cord and to aid the lacing process. (Usually made from brass, aluminum, fiber, or plastic) [4].

**LAG**—The amount one wave is behind another in time; expressed in electrical degrees [2].

**LAMINATED CORE**—A core built up from thin sheets of metal insulated from each other and used in transformers [2].

**LANDS**—Conductors or runs on pcbs [14].

**LAP WINDING**—An armature winding in which opposite ends of each coil are connected to adjoining segments of the commutator so that the windings overlap [5].

**LARGE SCALE INTEGRATION (lsi)**—An integrated circuit containing 1,000 to 2,000 logic gates or up to 64,000 bits of memory [14].

**LASER**—An acronym for light amplification by stimulated emission of radiation [17].

**LAW OF MAGNETISM**—Like poles repel; unlike poles attract [1].

**LC CAPACITOR-INPUT FILTER**—This is the most common type of filter. It is used in a power supply where output current is low and load current is relatively constant [7].



**LC CHOKE-INPUT FILTER**—This filter is used in power supplies where voltage regulation is important and where the output current is relatively high and subject to varying load conditions [7].

**LEAD**—The opposite of lag. Also a WIRE or CONNECTION [2].

**LEAD-ACID CELL**—A cell in an ordinary storage battery in which electrodes are grids of lead containing an active material consisting of certain lead oxides that change in composition during charging and discharging. The electrodes or plates are immersed in an electrolyte of diluted sulfuric acid [1].

**LEAD INDUCTANCE**—The inductance of the lead wires connecting the internal components of an electron tube [11].

**LEAD SHEATH**—A continuous jacket of lead molded around a single conductor or multiple conductor cable. Generally used to ensure conductors are protected from water or extensive moisture [4].

**LEAKAGE CURRENT**—The small amount of current that flows through the dielectric between the conductors of a transmission line [10].

**LEAKAGE FLUX**—Magnetic flux lines produced by the primary winding that do not link the turns of the secondary winding [2].

**LEAKAGE RESISTANCE**—The electrical resistance that opposes the flow of current through the dielectric of a capacitor. The higher the leakage resistance, the slower the capacitor discharges or leaks across the dielectric [2].

**LEAST SIGNIFICANT DIGIT (LSD)**—The LSD is the digit whose position within a given number expression has the least weighting power [13].

**LEFT-HAND RULE FOR GENERATORS**—A rule or procedure used to determine the direction of current flow in a generator [2] [5].

**LENZ'S LAW**—The current induced in a circuit, caused by its motion in a magnetic field or a change in its magnetic flux, in such a direction as to exert a mechanical force opposing the motion or to oppose the change in flux [2].

**LIGHT-EMITTING DIODE (LED)**—A PN-junction diode that emits visible light when it is forward biased. Depending on the material used to make the diode, the light may be red, green, or amber [7].

**LIGHTHOUSE TUBE**—An electron tube shaped like a lighthouse that is designed to handle large amounts of power at uhf frequencies [6].

**LIGHT RAYS**—Light waves emitting from a source in straight lines [10].

**LIMITER**—A device that prevents (limits) a waveform from exceeding a specified value [9].

**LINEAR**—Having an output that varies in direct proportion to the input [6].

**LINEAR IMPEDANCE**—An impedance in which a change in current through a device changes in direct proportion to the voltage applied to the device [12].

**LINE OF FORCE**—A line in an electric or magnetic field that shows the direction of the force [1].

**LINE OF SIGHT**—Straight line from a radar antenna to a target [18].

**LINE-PULSING MODULATOR**—Circuit that stores energy and forms pulses in the same circuit element, usually the pulse-forming network (pfn) [18].

**LIN-LOG AMPLIFIER**—An amplifier in which the response is linear for weak signals and logarithmic for large signals [18].

**LIQUID**—One of the three states of matter. It has a definite volume but no definite form (water is a liquid) [1].

**LIQUID-COOLING SYSTEM**—Source of cooling for high-heat producing equipments, such as microwave components, radar repeaters, and transmitters [18].

**LISSAJOUS PATTERN**—A combined, simultaneous display of the amplitude and phase relationships of two input signals on a CRT [17].

**LOAD**—(1) A device through which an electric current flows and which changes electrical energy into another form. (2) Power consumed by a device or circuit in performing its function [1] [13].

**LOAD END**—See OUTPUT END [10].

**LOADING**—See LUMPED-IMPEDANCE TUNING [10].

**LOADING EFFECT**—The effect of a voltmeter upon the circuit being measured that results in an inaccurate measurement. Loading effect is minimized by using a voltmeter with an internal resistance many times higher than the resistance of the circuit being measured [3].

**LOAD ISOLATOR**—A passive attenuator in which the loss in one direction is much greater than that in the opposite direction. One example is a ferrite isolator for waveguides that allows energy to travel in only one direction [11].

**LOBE**—An area of greater signal strength in the transmission pattern of an antenna [10] [18].

**LOCAL ACTION**—A continuation of current flow within a battery cell when there is no external load. Caused by impurities in the electrode [1].

**LOGARITHMIC RECEIVER**—Receiver that uses a linear logarithmic amplifier (lin-log) instead of a normal linear amplifier [18].

**LOGIC**—The basic principles and applications of truth tables, interconnections of off-on circuit elements, and other factors involved in mathematical computation in automatic data processing systems and other devices [13].

**LOGIC CIRCUIT**—The primary control information processor in digital equipment; made up of electronic gates and so named because their operation is described by simple equations of a specialized logic algebra [13].

**LOGIC DIAGRAM**—In computers and data processing equipment, a diagram representing the logical elements and their interconnections without necessarily expressing construction or engineering details [13].

**LOGIC ELEMENT**—The smallest building blocks that can be represented by operators in an appropriate system of symbolic logic. Typical logic elements are the AND-gate and the flip-flop, which can be represented as operators in a suitable symbolic logic. Also a device that performs the logic function [13].

**LOGIC INSTRUCTION**—Any instruction that executes a logic operation that is defined in symbolic logic, such as AND, OR, NAND, or NOR [13].

**LOGIC OPERATION**—A nonarithmetical operation in a computer, such as comparing, selecting, making references, matching, sorting, and merging, where the logical YES or NO quantities are involved [13].

**LOGIC SWITCH**—A diode matrix (See MATRIX) or other switching arrangement that is capable of directing an input signal to one of several outputs [13].

**LOGIC SYMBOL**—A symbol used to represent a logic element graphically. Also a symbol used to represent a logic operator [13].

**LONGITUDINAL WAVES**—Those waves in which the disturbance (back and forth motion) takes place in the direction of propagation. Sometimes called compression waves [10].

**LONG-WIRE ANTENNA**—An antenna that is a wavelength or more long at its operating frequency [10].

**LOOP**—A curved conductor that connects the ends of a coaxial cable or other transmission line and projects into a waveguide or resonant cavity for the purpose of injecting or extracting energy [10] [11].

**LOOSE COUPLING**—Inefficient coupling of energy from one circuit to another that is desirable in some applications. Also called weak coupling [11].

**LOWER-FREQUENCY CUTOFF**—The lowest frequency a circuit will pass [9].

**LOWER SIDEBAND**—All difference frequencies below that of the carrier [12].

**LOWEST USABLE FREQUENCY**—The minimum operating frequency that can be used for communications between two points [10].

**LOW FREQUENCY**—The band of frequencies from 30 kHz to 300 kHz [17].

**LOW-LEVEL MODULATION**—Modulation produced in an earlier stage than the final [12].

**LOW-NOISE AMPLIFIER**—See PREAMPLIFIER [18].

**LOW-PASS FILTER**—A filter that passes a majority of the low frequencies on to the next circuit and rejects, or attenuates, the higher frequencies. Also called a high-frequency discriminator [9] [12].

**LSD**—See LEAST SIGNIFICANT DIGIT [13].

**LUMPED CONSTANTS**—The properties of inductance, capacitance, and resistance in a transmission line [10].

**LUMPED IMPEDANCE TUNING**—The insertion of an inductor or capacitor in series with an antenna to electrically lengthen or shorten the antenna [10].

**MACHINE KEYING**—A method of cw keying using punched tape or other mechanical means to key a transmitter [12].

**MAGIC T**—See BALANCED MIXER [18].

**MAGIC-T JUNCTION**—A combination of H-type and E-type T-junctions [11].

**MAGNET WIRE**—Wire coated with an enamel insulation and used in coils, relays, transformers, motor windings, and so forth [4].

**MAGNETIC AMPLIFIER**—An electromagnetic device that uses one or more saturable reactors to obtain a large power gain. This device is used in servosystems requiring large amounts of power to move heavy loads [8] [15].

**MAGNETIC FIELD**—(1) The region in which the magnetic forces created by a permanent magnet or by a current-carrying conductor or coil can be detected [1] [2]. (2) The field that is produced when current flows through a conductor or antenna [10] [11].

**MAGNETIC INDUCTION**—Generating a voltage in a circuit by the creation of relative motion between a magnetic field and the circuit. The relative motion can be the result of physical movement or the rise and fall of a magnetic field created by a changing current [5].

**MAGNETIC LINES OF FORCE**—Imaginary lines used for convenience to designate the direction in which magnetic forces are acting as a result of magnetomotive force [2].

**MAGNETIC MICROPHONE**—A microphone in which the sound waves vibrate a moving armature. The armature consists of a coil wound on the armature and located between the pole pieces of a permanent magnet. The armature is mechanically linked to the diaphragm [12].

**MAGNETIC POLES**—The section of a magnet where the flux lines are concentrated; also where they enter and leave the magnet [1].

**MAGNETIC TRIP ELEMENT**—A circuit breaker trip element that uses the increasing magnetic attraction of a coil with increased current to open the circuit [3].

**MAGNETISM**—The property possessed by certain materials by which these materials can exert mechanical force on neighboring masses of magnetic materials and can cause currents to be induced in conducting bodies moving relative to the magnetized bodies [1].

**MAGNETRON OSCILLATOR**—An electron tube that provides a high power output. Theory of operation is based on interaction of electrons with the crossed electric and magnetic fields in a resonant cavity [18].

**MAINTENANCE**—Work done to correct, reduce, or counteract wear, failure, and damage to equipment [16].

**MAJOR LOBE**—The lobe in which the greatest amount of radiation occurs [10].

**MAJORITY CARRIERS**—The mobile charge carriers (hole or electron) which are predominate in a semiconductor material; for example, electrons in an N-type region [7].

**MARCONI ANTENNA**—A quarter-wave antenna that is operated with one end grounded and is positioned perpendicular to the earth [10].

**MARK**—An interval during which a signal is present. Also the presence of an RF signal in cw keying. The key-closed condition (presence of data) in communications systems [12].

**MARKING**—The state where a circuit is closed and current flows in teletypewriter operation [17].

**MASK**—A device used to deposit materials on a substrate in the desired pattern [14].

**MASTER OSCILLATOR**—In a transmitter, the oscillator that establishes the carrier frequency of the output [18].

**MASTER OSCILLATOR POWER AMPLIFIER (MOPA)**—A transmitter in which the oscillator is isolated from the antenna by a power amplifier [12].

**MATRIX**—In computers, a logic network in the form of an array of input leads and output leads with logic elements connected at some of their intersections [13].

**MATTER**—Any physical entity that possesses mass [1].

**MAXIMUM USABLE FREQUENCY**—Maximum frequency that can be used for communications between two locations for a given time of day and a given angle of incidence [10].

**MEASURE (METROLOGY AUTOMATED SYSTEM FOR UNIFORM RECALL AND REPORTING)**—The Navy data processing system designed to provide a standardized system for the recall, scheduling, and documenting of test equipment into calibration facilities [16].

**MECHANICAL-ROTATION FREQUENCY**—The speed in revolutions per minute of armatures in electric motors and engine-driven generators; blade speed in turbines [16].

**MECHANICAL SCANNING**—The reflector, its feed source, or the entire antenna is moved in a desired pattern [18].

**MECHANIZATION**—Using electric or electro-mechanical switches to represent logic circuits (AND, OR, NOT, NOR, NAND) [13].

**MEDIUM**—The vehicle through which a wave travels from one point to the next. Air, water, and wood are examples [10].

**MEDIUM ALTITUDE ORBIT**—An orbit from 2,000 to 12,000 miles above the earth. The rotation rate of the earth and satellite are quite different, and the satellite moves quickly across the sky [17].

**MEDIUM FREQUENCY**—The band of frequencies from 300 kHz to 3 MHz [17].

**MEGA**—A prefix meaning one million; also MEG [1].

**MEGGER**—Common name for a megohmmeter [3] [16].

**MEGOHMMETER**—A meter that measures very large values of resistance; usually used to check for insulation breakdown in wires [3].

**METALLIC ARMOR**—A protective covering for wires or cables. Made as a woven wire braid, metal tape, or interlocking metal cover. Made from steel, copper, bronze, or aluminum [4].

**METALLIC, INSULATOR**—A shorted quarter-wave section of transmission line [11].

**METALLIC RECTIFIER**—Also known as a DRY-DISC RECTIFIER. A metal-to-semiconductor, large-area, contact device in which a semiconductor is sandwiched between two metal plates. This asymmetrical construction permits current to flow more readily in one direction than the other [7].

**METAL-OXIDE SEMICONDUCTOR FIELD-EFFECT TRANSISTOR**—See MOSFET [7].

**METER**—A device used to measure a specific quantity, such as current, voltage, or frequency [3].

**METER MOVEMENT**—The part of the meter that moves to indicate some value [3] [16].

**METER SHUNT**—A resistor placed in parallel with the meter terminals; used to provide increased range capability [16].

**MHO**—Unit of conductance; the reciprocal of the ohm [1].

**MICRO**—A prefix meaning one-millionth [1].

**MICROCIRCUIT**—A small circuit having high equivalent-circuit-element density, which is considered as a single part composed of interconnected elements on or within a single substrate to perform an electronic-circuit function [14].

**MICROCIRCUIT MODULE**—An assembly of microcircuits or a combination of microcircuits and discrete components that perform one or more distinct functions [14].

**MICROELECTRONICS**—The solid-state concept of electronics in which compact semiconductor materials are designed to function as an entire circuit or subassembly rather than as circuit components [7] [14].

**MICROPHONE**—An energy converter that changes sound energy into electrical energy [12].

**MICROWAVE REGION**—The portion of the electromagnetic spectrum from 1,000 MHz to 100,000 MHz [11].

**MIL**—The diameter of a conductor equal to 1/1000 (.001) inch [4].

**MIL FOOT**—A unit of measurement for conductors (diameter of 1 mil, 1 foot in length.) [4].

**MILITARY SPECIFICATIONS (MIL-SPEC)**—Technical requirements and standards adopted by the Department of Defense that must be met by vendors selling materials to DOD [4].

**MILITARY STANDARDS (MILSTD)**—Standards of performance for components or equipment that must be met to be acceptable for military systems [14].

**MILLI**—A prefix meaning one-thousandth [1].

**MINIATURE ELECTRONICS**—Modules, packages, pcbs, and so forth, composed exclusively of discrete components [14].

**MINIMUM DISCERNIBLE SIGNAL (MDS)**—The weakest input signal that produces a usable signal at the output of a receiver. The weaker the input signal, the more sensitive the receiver [18].

**MINORITY CARRIERS**—Either electrons or holes, whichever is the less dominant carrier in a semiconductor device. In P-type semiconductors, electrons are the minority carriers; in N-type semiconductors, the holes are the minority carriers [7].

**MINORITY CURRENT**—A very small current that passes through the base-to-collector junction when this junction is reverse biased [7].

**MINOR LOBE**—The lobe in which the radiation intensity is less than that of a major lobe [10].

**MIXER**—In radar, a circuit that combines the received RF signal with a local-oscillator signal to effectively convert the received signal to a lower IF frequency signal [18].

**MODE SHIFTING**—In a magnetron, the inadvertent shifting from one mode to another during a pulse [18].

**MODE SKIPPING**—Operation in which the magnetron fires randomly, rather than firing on each successive pulse as desired [18].

**MODIFIED TRANSISTOR OUTLINE (TO)**—An IC package resembling a transistor [14].

**MODULAR CIRCUITRY**—A technique where printed circuit boards are stacked and connected together to form a module [7].

**MODULAR PACKAGING**—Circuit assemblies or subassemblies packaged to be easily removed for maintenance or repair [14].

**MODULATED WAVE**—A complex wave consisting of a carrier and a modulating wave that is transmitted through space [12].

**MODULATING WAVE**—An information wave representing intelligence [12].

**MODULATION**—The process of impressing intelligence upon a transmission medium, such as radio waves [12].

**MODULATION FACTOR (M)**—An indication of relative magnitudes of the RF carrier and the modulating signal [12].

**MODULATION INDEX**—The ratio of frequency deviation to the frequency of the modulating signal [12].

**MODULATOR**—(1) A device that produces modulation; that is, a device that varies the amplitude, frequency, or phase of an ac signal [11] [12]. (2) A circuit used in servosystems to convert a dc signal to an ac signal. The output ac signal is a sine wave at the frequency of the ac reference voltage. The amplitude of the output is directly related to the amplitude of the dc input. The circuit's function is opposite to that of a DEMODULATOR [15]. (3) In radar, it produces a high-voltage pulse that turns the transmitter on and off [18].

**MODULATOR SWITCHING DEVICE**—Controls the on (discharge) and off (charge) time of the modulator [18].

**MODULE**—A circuit or portion of a circuit packaged as a removable unit. A separable unit in a packaging scheme displaying regularity of dimensions [14].

**MOISTURE LAPSE**—Abnormal variation of moisture content at different altitudes because of high moisture located just above large bodies of water [18].

**MONOLITHIC CIRCUIT**—A circuit where all elements (resistors, transistors, and so forth) associated with the circuit are fabricated inseparably within a continuous piece of material (called the substrate), usually silicon [7].

**MONOLITHIC IC**—ICs that are formed completely within a semiconductor substrate. Silicon chips [14].

**MONOPULSE (SIMULTANEOUS) LOBING**—A radar receiving method using two or more (usually four) partially overlapping lobes. Sum and difference locate the target with aspect to the axis of the antenna [18].



**MONOPULSE RADAR**—A radar that gets the range, bearing, and elevation position data of a target from a single pulse [18].

**MONOPULSE RECEIVER**—See MONOPULSE RADAR [18].

**MONOSTABLE MULTIVIBRATOR**—A multivibrator that has one steady state. A signal (trigger) must be applied to cause change of states [9].

**MOSFET**—A semiconductor device that contains diffused source and drain regions on either side of a P- or N-channel area. Also contains a gate insulated from the channel area by silicon-oxide. Operates in either the depletion or the enhancement mode [7].

**MOST SIGNIFICANT DIGIT (MSD)**—The MSD is the digit whose position within a given number expression has the greatest weighting power [13].

**MOTOR**—A machine that converts electrical energy to mechanical energy. It is activated by ac or dc voltage, depending on the design [5].

**MOTOR LOAD**—Any device driven by a motor. Typical loads are drills, saws, water pumps, rotating antennas, generators, and so forth. The speed and power capabilities of a motor must be matched to the speed and power capabilities of the motor load [5].

**MOTOR REACTION**—The force created by generator armature current that tends to oppose the normal rotation of the armature [5].

**MOTOR STARTERS**—Large resistive devices placed in series with dc motor armatures to prevent the armature from drawing excessive current until armature speed develops counter emf. The resistance is gradually removed from the circuit either automatically or manually as motor speed increases [5].

**MOVING-IRON METER MOVEMENT**—Same as MOVING-VANE METER MOVEMENT [3].

**MOVING TARGET INDICATOR**—A device that limits the display of radar information to moving targets [18].

**MOVING-VANE METER MOVEMENT**—A meter movement that uses the magnetic repulsion of the like poles created in two iron vanes by current through a coil of wire; most commonly used movement for ac meters [3].

**MSD**—See MOST SIGNIFICANT DIGIT [13].

**MTDS**—An abbreviation for the marine tactical data system [17].

**MU**—Symbol for amplification factor [6] [7].

**MULTICONDUCTOR**—More than one conductor, as in a cable [4].

**MULTICOUPLERS**—Couplers that patch receivers or transmitters to antennas. They also filter out harmonics and spurious responses and impedance-match the equipment [17].

**MULTIELECTRODE TUBE**—An electron tube normally classified according to its number of electrodes (the multielectrode tube contains more than three electrodes) [6].

**MULTIELEMENT ARRAY**—An array that consists of one or more arrays and is classified as to directivity [10].



**MULTIELEMENT PARASITIC ARRAY**—An array that contains two or more parasitic elements and a driven element [10].

**MULTILOOP SERVOSYSTEM**—A servosystem that contains more than one servo loop; each loop is designed to perform its own function [15].

**MULTIMETER**—A single meter combining the functions of an ammeter, a voltmeter, and an ohmmeter [3].

**MULTIPATH**—The multiple paths a radio wave may follow between transmitter and receiver [10].

**MULTIPHASE**—See POLYPHASE [5].

**MULTIPLICATION FACTOR**—The number of times an input frequency is multiplied [12].

**MULTIPLEXING**—A method for simultaneous transmission of two or more signals over a common carrier wave [17].

**MULTISPEED SYNCHRO SYSTEMS**—Systems that transmit data at different transmission speeds; for example, dual-speed and tri-speed synchro systems [15].

**MULTIUNIT TUBE**—An electron tube containing two or more units within the same envelope. The multiunit tube is capable of operating as a single-unit tube, or each unit can operate as a separate tube [6].

**MULTIVIBRATOR**—A form of relaxation oscillator which comprises two stages that are coupled so that the input of one is derived from the output of the other [9] [13].

**MULTIVIBRATOR MODULATOR**—An astable multivibrator used to provide frequency modulation. The modulating af voltage is inserted in series with the base return of the multivibrator transistors to produce the frequency modulation [12].

**MUTUAL FLUX**—The total flux in the core of a transformer that is common to both the primary and secondary windings. The flux links both windings [2].

**MUTUAL INDUCTANCE**—A circuit property existing when the relative position of two inductors causes the magnetic lines of force from one to link with the turns of the other. The symbol for mutual inductance is M [2].

**NAND**—A logic function of A and B that is true if either A or B is false [13].

**NAND CIRCUIT**—A combination of a NOT function and an AND function in a binary circuit that has two or more inputs and one output. The output is logic 0 only if ALL inputs are logic 1; it is logic 1 if ANY input is logic 0 [13].

**NATURAL FREQUENCY**—See RESONANT FREQUENCY [9].

**NATURAL HORIZON**—The line-of-sight horizon [10].

**NAUTICAL MILE**—The length of a minute of arc of a great circle of the earth (6,076 ft) [18].

**NAUTICAL RADAR MILE**—See RADAR MILE [18].

**NEAR SYNCHRONOUS ORBIT**—An orbit in which the satellite rotates close to but not exactly at the same speed as the earth [17].

**NEGATION**—The process of inverting the value of a function or variable [13].

**NEGATIVE ALTERNATION**—That part of a sine wave that is below the reference level [2] [10] [12].

**NEGATIVE CLAMPER**—A circuit that clamps the upper extremity of the output waveshape to a dc potential of 0 volts [9].

**NEGATIVE ELECTRODE**—A terminal or electrode having more electrons than normal. Electrons flow out of the negative terminal of a voltage source [1].

**NEGATIVE FEEDBACK**—Feedback in which the feedback signal is out of phase with the input signal. Also called DEGENERATIVE FEEDBACK [8].

**NEGATIVE LOGIC**—The form of logic in which the more positive voltage level represents a logic 0, FALSE, or LOW and the more negative voltage represents a logic 1, TRUE, or HIGH [13].

**NEGATIVE-RESISTANCE ELEMENT**—A component having an operating region in which an increase in the applied voltage increases the resistance and produces a proportional decrease in current. Examples include tunnel diodes and silicon unijunction transistors [11].

**NEGATIVE TEMPERATURE COEFFICIENT**—A characteristic of a semiconductor material, such as silver sulfide, in which resistance to electrical current flow decreases as temperature increases [1] [4] [7].

**NETWORK**—A combination of electrical components. In a parallel circuit it is composed of two or more branches [1].

**NEUTRAL**—(1) In a normal condition, hence neither positive nor negative. A neutral object has a normal number of electrons (the same number as protons) [1]. (2) The teletypewriter operation where current flow represents a mark and no flow represents a space [17].

**NEUTRALIZATION**—The process of counteracting or "neutralizing" the effects of interelectrode capacitance [8].

**NEWTON'S SECOND LAW OF MOTION**—If an unbalanced outside force acts on a body, the resulting acceleration is directly proportional to the magnitude of the force, is in the direction of the force, and is inversely proportional to the mass of the body [15].

**NODE**—The fixed minimum points of voltage or current on a standing wave or antenna [10].

**NOISE**—(1) In reference to sound, an unwanted disturbance caused by spurious waves that originate from man-made or natural sources [10]. (2) In radar, erratic or random deflection or intensity of the indicator sweep that tends to mask small echo signals [18].

**NOISE FIGURE**—The ratio of output noise to input noise in a receiver [18].

**NOISE LIMITER**—Circuit that clips the peaks of the noise spikes in a receiver [17].

**NOISE SILENCER**—See NOISE LIMITER [17].

**NOISE SUPPRESSOR**—See NOISE LIMITER [17].

**NO-LOAD CONDITION**—The condition that exists when an electrical source or secondary of a transformer is operated without an electrical load [2].

**NONDEGENERATIVE PARAMETRIC AMPLIFIER**—A parametric amplifier that uses a pump signal frequency that is higher than twice the frequency of the input signal [11].

**NONDIRECTIONAL**—See OMNIDIRECTIONAL [10].

**NONLINEAR DEVICE**—A device in which the output does not rise and fall in direct proportion to the input [6] [7] [12].

**NONLINEAR IMPEDANCE**—An impedance in which the resulting current through the device is not proportional to the applied voltage [12].

**NONLUMINOUS BODIES**—Objects that either reflect or diffuse light that falls upon them [10].

**NONRESONANT LINE**—A transmission line that has no standing waves of current or voltage [10].

**NONTRIP-FREE CIRCUIT BREAKER**—A circuit breaker that can be held in the ON position during an overcurrent condition [3].

**NOR**—A logic function of A and B that is true if both A and B are false [13].

**NOR GATE**—An OR gate that is followed by an inverter to form a binary circuit in which the output is a logic 0 if ANY of the inputs is a logic 1 and the output is a logic 1 only if ALL the inputs are a logic 0 [13].

**NORMAL**—The imaginary line perpendicular to the point at which the incident wave strikes the reflecting surface. Also called the perpendicular [10].

**NOT CIRCUIT**—A binary circuit with a single output that is always the opposite of the input. Also called an INVERTER CIRCUIT [13].

**NPN**—An NPN transistor is formed by introducing a thin region of P-type material between two regions of N-type material [7].

**NULL**—On a polar-coordinate graph, the area that represents minimum or 0 radiation [10].

**NUMBER**—(1) A mathematical entity that may indicate quantity or amount of units. (2) Loosely, a numeral. An abstract mathematical symbol for expressing a quantity. In this sense, the manner of representing the number is immaterial. Take 26, for example; this is its decimal form - but it could be expressed as a binary (base 2), octal (base 8), or hexadecimal (base 16) number [13].

**NUMBER REPRESENTATION**—The representation of numbers by agreed sets of symbols according to agreed rules [13].

**NUMBER SYSTEM**—Loosely, a number representation system. Any system for the representation of numbers (see POSITIONAL NOTATION) [13].

**NUMERAL**—(1) A discrete representation of a number. For example, twelve, 12, XII,  $1100_2$  are four different numerals that represent the same number. (2) A numeric word that represents a number [13].

**NUTATING**—Moving an antenna feed point in a conical pattern so that the polarization of the beam does not change [18].

**OCTAL NUMBER SYSTEM**—A number system based on powers of eight. This system is used extensively in computer work [13].

**OFF-LINE TEST EQUIPMENT**—Equipment that tests and isolates faults in modules or assemblies removed from systems [14].

**OHM**—The unit of electrical resistance. That value of electrical resistance through which a constant potential difference of 1 volt across the resistance will maintain a current flow of 1 ampere through the resistance [1].

**OHMIC VALUE**—Resistance in ohms [1].

**OHMMETER**—A meter used to measure resistance [3] [16].

**OHM'S LAW**—The current in an electrical circuit is directly proportional to the electromotive force in the circuit. The most common form of the law is  $E = IR$ , where  $E$  is the electromotive force or voltage across the circuit,  $I$  is the current flowing in the circuit, and  $R$  is the resistance of the circuit [1].

**OHMS PER SQUARE**—The resistance of any square area of thin film resistive material as measured between two parallel sides [14].

**OILCAN TUBE**—A type of planar tube, similar to the lighthouse tube, which has cooling fins. The oilcan tube is designed to handle large amounts of power at uhf frequencies [6].

**OMNIDIRECTIONAL ANTENNA**—An antenna that radiates and receives equally in all directions (nondirectional) [10] [18].

**ON-LINE TEST EQUIPMENT**—Continuously monitors the performance of electronic systems [14].

**OPAQUE**—Those substances that do not transmit (pass) any light rays; that is, the light rays are either absorbed or reflected [10].

**OPEN CIRCUIT**—(1) The condition of an electrical circuit caused by the breaking of continuity of one or more conductors of the circuit; usually an undesired condition. (2) A circuit that does not provide a complete path for the flow of current [1].

**OPEN-ENDED LINE**—A transmission line that has a terminating impedance that is infinitely large [10].

**OPERATIONAL AMPLIFIER (OP AMP)**—An amplifier designed to perform computing or transfer operations and that has the following characteristics: (1) very high gain, (2) very high input impedance, and (3) very low output impedance [8].

**OPTICAL COUPLER**—A coupler composed of an LED and a photodiode and contained in a light-conducting medium. Suitable for frequencies in the low-megahertz range [7].

**OPTIMUM WORKING FREQUENCY**—The most practical operating frequency that can be used with the least amount of problems and is roughly 85 percent of the maximum usable frequency [10].

**OPTOELECTRONIC DEVICES**—Devices that either produce or use light in their operation [7].

**ORDER-WIRE CIRCUIT**—A circuit between operators used for operations control and coordination [17].

**ORGANIZATIONAL-LEVEL MAINTENANCE (SM & R CODE O)**—Responsibility of the user organization [14].

**OR GATE**—A gate that performs the logic OR function. It produces an output 1 whenever any or all of its inputs is/are 1 [13].

**ORIGIN**—The point on a graph where the vertical and horizontal axes cross each other [10].

**OSCILLATOR**—An oscillator is a nonrotating device that produces alternating current. The frequency is determined by the characteristics of the device [9].

**OUT-OF-CIRCUIT METER**—A meter that is not permanently installed in a circuit. Usually portable and self-contained, these meters are used to check the operation of a circuit or to isolate troubles within a circuit [3].

**OUTPUT END**—The end of a transmission line that is opposite the source; receiving end [10].

**OUTPUT IMPEDANCE**—The impedance that is presented to the load by the transmission line and its source [10].

**OVERDRIVEN**—When the input signal amplitude is increased to the point that the transistor goes into saturation and cutoff [7].

**OVERMODULATION**—A condition that exists when the peaks of the modulating signal are limited [12].

**PACKAGING LEVELS**—A system developed to assist maintenance personnel in determining the reparability of components, printed circuit boards, modules, and so forth [14].

**PAGE PRINTER**—A high-speed printer that prints teletypewriter characters one at a time in a full-page format [17].

**PARABOLIC REFLECTOR**—An antenna reflector in the shape of a parabola. It converts spherical wavefronts from the radiating element into plane wavefronts [18].

**PARALLAX ERROR**—The error in meter readings that results when you look at a meter from some position other than directly in line with the pointer and meter face. A mirror mounted on the meter face aids in eliminating parallax error [3].

**PARALLEL CIRCUIT**—Two or more electrical devices connected to the same pair of terminals so separate currents flow through each; electrons have more than one path to travel from the negative to the positive terminal [1].

**PARALLEL-CONNECTED DUPLEXER**—Configuration in which the tr spark gap is connected across the two legs of the transmission line one-quarter wavelength from the T-junction [18].

**PARALLEL LIMITER**—A resistor and diode, connected in series with the input signal, in which the output is taken across (parallel to) the diode [9].

**PARALLEL-NEGATIVE LIMITER**—A resistor and diode, connected in series with the input signal, in which the output is taken across the diode and the negative alternation is eliminated [9]

**PARALLEL-POSITIVE LIMITER**—A resistor and diode connected in series with the input signal, in which the output is taken across the diode and the positive alternation is eliminated [9].

**PARALLEL-RESONANT CIRCUIT**—A resonant circuit in which the source voltage is connected across a parallel circuit (formed by a capacitor and an inductor) to furnish a high impedance to the frequency at which the circuit is resonant. Often referred to as a tank circuit [9] [10].

**PARALLEL-WIRE**—A type of transmission line consisting of two parallel wires [10].

**PARASITIC ARRAY**—An antenna array containing one or more elements not connected to the transmission line [10] [18].

**PARASITIC ELEMENT**—The passive element of an antenna array that is connected to neither the transmission line nor the driven element [10].

**PART**—A part is one component or two or more components joined together. It is not normally subject to disassembly without destruction [17].

**PASSIVE SATELLITE**—A satellite that reflects radio signals back to earth [17].

**PATCH PANEL**—A panel used to tie a receiver or transmitter to its associated equipment [17].

**PEAK AMPLITUDE**—The maximum value above or below the reference line [12].

**PEAK CURRENT**—The maximum current that flows during a complete cycle [6].

**PEAK DETECTION**—Detection that uses the amplitude of pam or the duration of pdm to charge a holding capacitor and restore the original waveform [12].

**PEAKING COIL**—An inductor used in an amplifier to provide high-frequency compensation, which extends the high-frequency response of the amplifier [8].

**PEAK POWER**—The maximum value of the transmitted pulse [12].

**PEAK-REVERSE VOLTAGE**—The peak ac voltage that a rectifier tube will withstand in the reverse direction [6].

**PEAK-TO-PEAK**—The measure of absolute magnitude of an ac waveform, measured from the greatest positive alternation to the greatest negative alternation [2].

**PEAK VALUE**—The maximum instantaneous value of a varying current, voltage, or power. It is equal to 1.414 times the effective value of a sine wave [2].

**PEAK VOLTAGE**—The maximum value present in a varying or alternating voltage. This value may be positive or negative [6].

**PENTAVALENT IMPURITY**—A type of impurity that contains five valence electrons and donates one electron to the doped material. Also called DONOR IMPURITY [7].

**PENTODE TUBE**—A five-electrode electron tube containing a plate, a cathode, a control grid, and two grids [6].

**PERCENT OF MODULATION**—The degree of modulation defined in terms of the maximum permissible amount of modulation [12].

**PERFORATOR**—A device that stores a teletypewriter message on a paper tape [17].

**PERIGEE**—The point in the orbit of a satellite closest to the earth [17].

**PERIOD TIME**—The time required to complete one cycle of a waveform [2] [10] [12].

**PERIODIC WAVE**—A waveform that undergoes a pattern of changes, returns to its original pattern, and then repeats the same pattern of changes. Examples are square waves, rectangular waves, and sawtooth waves [9].

**PERMANENT MAGNET SPEAKER**—A speaker with a permanent magnet mounted on soft iron pole pieces [17].

**PERMEABILITY**—The measure of the ability of a material to act as a path for magnetic lines of force [1] [8].

**PERSISTENCE**—The length of time a phosphor dot glows on a CRT before disappearing [6] [18].

**PHANTASTRON**—A variable-length sawtooth generator often used to produce a sweep on an A-scope [18].

**PHASE**—The angular relationship between two alternating currents or voltages when the voltage or current is plotted as a function of time. When the two are in phase, the angle is zero; both reach their peak simultaneously. When out of phase, one will lead or lag the other; that is, at the instant when one is at its peak, the other will not be at peak value and (depending on the phase angle) may differ in polarity as well as magnitude [2].

**PHASE ANGLE**—The number of electrical degrees of lead or lag between the voltage and current waveforms in an ac circuit [2] [12].

**PHASE MODULATION (pm)**—Angle modulation in which the phase of the carrier is controlled by the modulating waveform. The amplitude of the modulating wave determines the amount of phase shift, and the frequency of the modulation determines how often the phase shifts [12].

**PHASE-SHIFT DISCRIMINATOR**—See FOSTER-SEELEY DISCRIMINATOR [12].

**PHASE SHIFTER**—A device used to change the phase relationship between two ac signals [11].

**PHASE-SHIFT KEYING**—Similar to ON-OFF cw keying in AM systems and frequency-shift keying in FM systems. Each time a mark is received, the phase is reversed. No phase reversal takes place when a space is received [12].

**PHASE SPLITTER**—A device that provides two output signals from a single input signal. The two output signals differ from each other in phase (usually by 180 degrees) [8].

**PHOSPHOR**—The material used to convert the energy of electrons into visible light [6].

**PHOTOCELL**—A light-controlled variable resistor which has a light-to-dark resistance ratio of 1:1000. Used in various types of control and timing circuits [7].

**PHOTODIODE**—A light-controlled PN junction. Current flow increases when the PN junction is exposed to an external light source [7].

**PHOTOELECTRIC VOLTAGE**—A voltage produced by light [1].

**PHOTOETCHING**—Chemical process of removing unwanted material in producing printed circuit boards [14].

**PHOTOTRANSISTOR**—An optoelectronic device that conducts current when exposed to light. Produces more current and is much more sensitive to light than the photodiode [7].

**PHOTOVOLTAIC CELL (SOLAR CELL)**—A device that acts much like a battery when exposed to light and converts light energy into electrical energy [7].



**PICO**—A prefix adopted by the National Bureau of Standards meaning  $10^{-12}$  [1].

**PICTORIAL DIAGRAM**—A diagram showing actual pictorial sketches of the various parts of an equipment and the electrical connections between the parts [4].

**PIEZOELECTRIC EFFECT**—The effect of producing a voltage by placing a stress, either by compression, expansion, or twisting, on a crystal and, conversely, producing a stress in a crystal by applying a voltage to it [1].

**PIP (BLIP)**—On a CRT display, a spot of light or a baseline irregularity representing the radar echo [18].

**PITCH**—A term used to describe the frequency of a sound heard by the human ear [10].

**PLANAR TUBE**—An electron tube, constructed with parallel electrodes and a ceramic envelope, that is used at uhf frequencies. It is commonly referred to as a lighthouse tube [6].

**PLANE OF POLARIZATION**—The plane (vertical or horizontal), with respect to the earth, in which the E field propagates [10].

**PLANE WAVEFRONTS**—Waves of energy that are flat, parallel planes and are perpendicular to the direction of propagation [18].

**PLANNED-POSITION INDICATOR**—A radar display in which range is indicated by the distance of a bright spot or pip from the center of the screen and the bearing is indicated by the radial angle of the spot [18].

**PLATE**—(1) One of the electrodes in a storage battery [1]. (2) One of the electrodes in a capacitor [2]. (3) The principal electrode to which the electron stream is attracted in an electron tube [6].

**PLATE DISSIPATION**—The amount of power lost as heat in the plate of a vacuum tube [6].

**PLATE KEYING**—A keying system in which the plate supply is interrupted [12].

**PLATE MODULATOR**—An electron-tube modulator in which the modulating voltage is applied to the plate circuit of the tube [12].

**PLATE RESISTANCE**—The plate voltage change divided by the resultant plate current change in a vacuum tube, all other conditions being fixed [6].

**POINT BENDER**—A tool used to adjust the contact spacing on a relay [3].

**POINT-CONTACT DIODE**—A diode in which the end of a fine wire is pressed against a semiconductor. Used as a detector or mixer over the microwave region [7].

**POINT OF ZERO DISPLACEMENT**—See REFERENCE LINE [10].

**POINT-TO-POINT WIRING**—Individual wires run from terminal to terminal to complete a circuit [14].

**POLAR**—The teletypewriter operation in which current flow of one polarity represents a mark, and current of the opposite polarity represents a space [17].

**POLAR-COORDINATE GRAPH**—A graph with a pair of axes. One consists of a series of circles with a common center, and the other consists of a rotating radius extending from the center of the concentric circles [10].



**POLARITY**—(1) The condition in an electrical circuit by which the direction of the flow of current can be determined. Usually applied to batteries and other direct voltage sources. (2) Two opposite charges, one positive and one negative. (3) A quality of having two opposite magnetic poles, one north and the other south [1] [13].

**POLARIZATION**—(1) The effect of hydrogen surrounding the anode of a cell, which increases the internal resistance of the cell [1]. (2) The magnetic orientation of molecules in a magnetizable material in a magnetic field, whereby tiny internal magnets tend to line up in the field [2].

**POLAR ORBIT**—An orbit that has an angle of inclination of or near 90 degrees [17].

**POLE**—(1) The number of points at which current can enter a switch; for example, single pole, double pole, and three pole [3]. (2) The sections of a field magnet where the flux lines are concentrated; also where they enter and leave the magnet [5].

**POLE PIECE**—(1) A piece of ferromagnetic material used to control the distribution of magnetic lines of force; that is, it concentrates the lines of force in a particular place or evenly distributes the lines of force over a wide area [3]. (2) The shaped magnetic material upon which the stator windings of motors and generators are mounted or wound [5].

**POLYMER FUME FEVER**—A flu-like condition caused by a person breathing the vapors of fluorocarbons when they are heated. Sometimes called FOUNDRYMAN'S FEVER [4].

**POLYPHASE**—A term that describes systems or units of a system that are activated by or which generate separate out-of-phase voltages. Typical polyphase systems are 2-phase and 3-phase; their voltages are 90- and 120-degrees out of phase, respectively. This term means the same as MULTIPHASE [5].

**POSITIONAL NOTATION**—A numbering system in which a number is represented by means of a stated set of symbols or digits, such that the value contributed by each symbol or digit depends upon its position as well as upon its value [13].

**POSITIONAL WEIGHTING**—The value given a digit based on the digit's position within a given number [13].

**POSITION SENSOR**—A component in a servosystem that measures position and converts the measurement into a form convenient for transmission as a feedback signal [15].

**POSITION SERVOSYSTEM**—A servosystem whose end function is to control the position of the load it is driving [15].

**POSITIVE ALTERNATION**—The part of a sine wave that is above the reference line [2] [10] [12].

**POSITIVE CLAMPER**—A circuit that clamps the lower extremity of the output waveshape to a dc potential of 0 volts [9].

**POSITIVE FEEDBACK**—Feedback in which the feedback signal is in phase with the input signal. Also called REGENERATIVE FEEDBACK [8].

**POSITIVE LOGIC**—The form of logic in which the more positive logic level represents 1 and the more negative level represents 0 [13].

**POSITIVE TEMPERATURE COEFFICIENT**—The characteristic of a conductor in which the resistance increases as temperature increases [7].

**POTENTIAL ENERGY**—Energy caused by the position of one body with respect to another body or to the relative parts of the same body [1].

**POTENTIOMETER**—A variable resistor, used as a position sensor in servosystems, having a terminal connected to each end of a resistive element and a third terminal connected to a wiper contact. The output is a voltage that is variable depending upon the position of the wiper contact. The potentiometer is commonly referred to as a variable voltage divider. It, in effect, converts mechanical information into an electrical signal [1] [15].

**POWER**—The rate of doing work or the rate of expending energy. The unit of electrical power is the watt [1].

**POWER AMPLIFIER**—An amplifier in which the output-signal power is greater than the input-signal power [8].

**POWER-AMPLIFIER (CHAIN) TRANSMITTER**—Transmitter that uses a series of power amplifiers to create a high level of power [18].

**POWER FACTOR**—The ratio of the actual power of an alternating or pulsating current, as measured by a wattmeter, to the apparent power, as indicated by ammeter and voltmeter readings. The power factor of an inductor, capacitor, or insulator is an expression of their losses [2] [16].

**POWER GAIN**—In an antenna, the ratio of its radiated power to that of a reference [11] [18].

**POWER LOSS**—(1) The electrical power, supplied to a circuit, that does no work and is usually dissipated as heat [2] [4]. (2) The heat loss in a conductor as current flows through it [10].

**POWER PENTODE**—A special purpose tube used to provide high-current gain or power amplification. Each grid wire is directly in line with the one before and after it, a fact which allows more electrons to reach the plate [6].

**POWER RATIO**—See POWER GAIN [11].

**POWER STANDING-WAVE RATIO (PSWR)**—The ratio of the square of the maximum and minimum voltages of a transmission line [10].

**POWER SUPPLY**—A unit that supplies electrical power to another unit. It changes ac to dc and maintains a constant voltage output within limits [6] [7].

**PREAMPLIFIER (PREAMP)**—An amplifier that raises the output of a low-level source for further processing without appreciable degradation of the signal-to-noise ratio [18].

**PRECESSION**—The rotation of the spin axis of a gyro in response to an applied force. The direction of precession is always perpendicular to the direction of applied force [15].

**PRECESSION VECTOR**—In a gyro, a vector representing the angular change of the spin axis when torque is applied. The precession vector represents the axis about which precession occurs [15].

**PRESTANDARD NAVY SYNCHROS**—Synchros that are designed to meet Navy, rather than servicewide, specifications [15].

**PREVENTIVE MAINTENANCE**—Visual, mechanical, electrical, and electronic checks that are made to determine whether or not equipment is functioning properly [16].

**PRIMARIES (OF LIGHT)**—The three primary colors of light from which all other colors can be derived. The colors are red, green, and blue [10].

**PRIMARY CELL**—An electrochemical cell in which the chemical action eats away one of the electrodes, usually the negative electrode [1].

**PRIMARY LOOP**—In a cooling system, the primary source of cooling for the distilled water [18].

**PRIMARY WINDING**—The winding of a transformer connected to the electrical source [2].

**PRIME MOVER**—The source of the turning force applied to the rotor of a generator. This may be an electric motor, a gasoline engine, a steam turbine, and so forth [5].

**PRINTED CIRCUIT BOARD**—A flat, insulating surface upon which printed wiring and miniaturized components are connected in a predetermined design and attached to a common base [7] [14].

**PRISM**—A triangular-shaped glass that refracts and disperses light waves into component wavelengths [10].

**PROBE COUPLER**—A resonant conductor placed in a waveguide or cavity to insert or extract energy [18].

**PROGRAMMED TRACKING**—The method that uses known satellite orbital parameters to generate antenna pointing angles [17].

**PROPAGATION**—Waves traveling through a medium [10].

**PULSE**—Signal characterized by a steep rise from and decay toward an initial level [9] [12].

**PULSE-AMPLITUDE MODULATION (PAM)**—Pulse modulation in which the amplitude of the pulses is varied by the modulating signal [12].

**PULSE-CODE MODULATION (PCM)**—A modulation system in which the standard values of a quantized wave are indicated by a series of coded pulses [12].

**PULSE DURATION (PD)**—The period of time during which a pulse is present [12].

**PULSE-DURATION MODULATION (PDM)**—Pulse modulation in which the time duration of the pulses is changed by the modulating signal [12].

**PULSE-FORMING NETWORK (PFN)**—An lc network that alternately stores and releases energy in an approximately rectangular wave [12] [18].

**PULSE-FREQUENCY MODULATION (PFM)**—Pulse modulation in which the modulating voltage varies the repetition rate of a pulse train [12].

**PULSE MODULATION**—A form of modulation in which one of the characteristics of a pulse train is varied [12].

**PULSE OSCILLATOR**—A sine-wave oscillator that is turned on and off at specific times. Also known as a ringing oscillator [9].

**PULSE-POSITION MODULATION (PPM)**—Pulse modulation in which the position of the pulses is varied by the modulating voltage [12].

**PULSE-REPETITION FREQUENCY (PRF)**—The rate, in pulses per second, at which the pulses occur [9] [12] [18].

**PULSE-REPETITION RATE (PRR)**—Same as PULSE-REPETITION FREQUENCY (PRF) [9] [12] [18].

**PULSE-REPETITION TIME (PRT)**—Interval between the start of one pulse and the start of the next pulse; reciprocal of pulse-repetition frequency [18].

**PULSE-TIME MODULATION (PTM)**—Pulse modulation that varies one of the time characteristics of a pulse train (pwm, pdm, ppm, or pfm) [12].

**PULSE WIDTH**—Duration of time between the leading and trailing edges of a pulse [12] [18].

**PULSE-WIDTH MODULATION (PWM)**—Pulse modulation in which the duration of the pulses is varied by the modulating voltage [12].

**PULSING**—Allowing oscillations to occur for a specific period of time only during selected intervals [12].

**PUMP**—Electrical source of the energy required to vary the capacitance of a parametric amplifier [11].

**PUSH-PULL AMPLIFIER**—An amplifier that uses two transistors (or electron tubes) whose output signals are in phase opposition [8].

**Q**—(1) Figure of merit of efficiency of a circuit or coil. (2) Ratio of inductive reactance to resistance in servos. (3) Relationship between stored energy (capacitance) and rate of dissipation in certain types of electric elements, structures, or materials [2] [9].

**QUALITY (OF SOUND)**—The factor that distinguishes tones of pitch and loudness [10].

**QUANTIZED WAVE**—A wave created by the arbitrary division of the entire range of amplitude (or frequency, or phase) values of an analog wave into a series of standard values. Each sample takes the standard value nearest its actual value when modulated [12].

**QUANTIZING NOISE**—A distortion introduced by quantizing the signal [12].

**QUANTUM-MECHANICAL TUNNELING**—The action of an electron crossing a PN junction because of tunnel effect [7].

**QUARTER-WAVE ANTENNA**—Same as the MARCONI ANTENNA [10].

**QUIESCENCE**—(1) The state of an amplifier with no signal applied. (2) The operating conditions that exist in a circuit when no input signal is applied to the circuit [6] [71] [13].

**QUIESCENT STATE**—The period during which a transistor, tube, or other circuit element is not performing an active function in the circuit [9] [13].

**RADAR**—An acronym for **RA**dio **D**etecting **A**nd **R**anging [18].

**RADAR ALTIMETER**—Airborne radar that measures the distance of the aircraft above the ground [18].

**RADAR BEAM**—The space in front of a radar antenna where a target can be effectively detected or tracked. Defined by areas that contain half or more of the maximum power transmitted [18].

**RADAR DETECTOR**—A detector that, in its simplest form, only needs to be capable of producing an output when RF energy (reflected from a target) is present at its input [12].

**RADAR DISTRIBUTION SWITCHBOARD**—An electrical switching panel used to connect inputs from any of several radars to repeaters (indicators) [18].

**RADAR MILE**—Time interval (12.36 microseconds) for RF energy to travel out from a radar to a target and back to the radar; radar nautical mile [18].

**RADAR TEST SET**—A combination of several test circuits and equipment used to test various characteristics of a radar [18].

**RADIATION FIELD**—The electromagnetic field that radiates from an antenna and travels through space [10].

**RADIATION LOSSES**—The losses that occur when magnetic lines of force about a conductor are projected into space as radiation and are not returned to the conductor as the cycle alternates [10].

**RADIATION PATTERN**—A plot of the radiated energy from an antenna [10].

**RADIATION RESISTANCE**—The resistance that if inserted in place of the antenna would consume the same amount of power as that radiated by the antenna [10].

**RADIO COMMUNICATIONS**—The term describing teletypewriter, voice, telegraphic, and facsimile communications. [17].

**RADIO FREQUENCY (RF)**—(1) Any frequency of electromagnetic energy capable of propagation into space [2]. (2) The frequencies that fall between 3 kilohertz and 300 gigahertz used for radio communications [10].

**RADIO FREQUENCY CARRIER SHIFT**—The system that uses a keyer to shift a radio frequency signal above or below an assigned frequency. These shifts correspond to marks and spaces [17].

**RADIO HORIZON**—The boundary beyond the natural horizon in which radio waves cannot be propagated over the earth's surface [10].

**RADIO SET CONTROL UNIT**—Equipment used to remotely control certain transmitter and receiver functions [17].

**RADIO WAVES**—(1) A form of radiant energy that can neither be seen nor felt. (2) An electromagnetic wave that is generated by a transmitter [10].

**RADIX**—Also called the base. The number of distinct symbols used in a number system. For example, since the decimal number system uses ten symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, 9), the radix is 10. In the binary number system, the radix is 2 because it uses only two symbols (0, 1) [13].

**RADIX POINT**—Also called BINARY POINT, OCTAL POINT, DECIMAL POINT, and so forth, depending on the number system [13].

**RANGE**—The length of a straight line between a radar set and a target [11] [18].

**RANGE-GATE**—A movable gate used to select radar echoes from a very short range interval [18].

**RANGE-HEIGHT INDICATOR**—A radar display on which slant range is shown along the X axis and height along the Y axis [18].

**RANGE MARKER**—A movable vertical pulse on an A-scope or a ring on a PPI scope used to measure the range of an echo or to calibrate the range scale [18].

**RANGE RESOLUTION**—Ability of a radar to distinguish between targets that are close together [18].

**RANGES**—The several upper limits a meter will measure as selectable by a switch or by jacks; for example, a voltmeter may have ranges of 1 volt, 2.5 volts, 10 volts, 25 volts, and 100 volts [3].

**RANGE STEP**—On an A-scope sweep, a vertical displacement used to measure the range of an echo [18].

**RAREFIED WAVE**—A longitudinal wave that has been expanded or rarefied (made less dense) as it moves away from the source [10].

**RATE GYRO**—A gyro used to detect and measure angular rates of change [15].

**RATIO**—The value obtained when one number is divided by another. This value indicates the relative proportions of the two numbers [2].

**RATIO DETECTOR**—A detector that uses a double-tuned transformer to convert the instantaneous frequency variations of the FM input signal to instantaneous amplitude variations [12].

**RATIO OF TRANSMITTED POWERS**—The power ratio (FSK versus AM) that expresses the overall improvement of FSK transmission when compared to AM under rapid-fading and high-noise conditions [12].

**RC CONSTANT**—Time constant of a resistor-capacitor circuit; equal in seconds to the resistance value in ohms multiplied by the capacitance value in farads [2] [9].

**RC DIFFERENTIATOR**—An RC circuit in which the output is taken from the resistor [9].

**RC FILTER**—A filter used in applications where load current is low and constant, and voltage regulation is not necessary [7].

**RC INTEGRATOR**—An RC circuit in which the output is taken from the capacitor [9].

**RC NETWORK**—A circuit containing resistance and capacitance arranged in a particular manner to perform a specific function [9].

**RC OSCILLATOR**—An oscillator in which the frequency is determined by resistive and capacitive elements [9].

**REACTANCE**—The opposition offered to the flow of an alternating current by the inductance, capacitance, or both, in any circuit [2].

**REACTANCE AMPLIFIER**—A low-noise amplifier that uses a nonlinear variable reactance as the active element instead of a variable resistance. Also called a parametric amplifier [11].

**REACTANCE TUBE**—A tube connected in parallel with the tank circuit of an oscillator. Provides a signal that will either lag or lead the signal produced by the tank [12].

**REACTANCE-TUBE MODULATOR**—An FM modulator that uses a reactance tube in parallel with the oscillator tank circuit [12].

**RECEIVER**—(1) The object that responds to the wave or disturbance. Same as DETECTOR [10]. (2) Equipment that converts electromagnetic energy into a visible or an audible form [17]. (3) In radar, a unit that converts RF echoes to video and/or audio signals [18].

**RECEIVER SENSITIVITY**—(1) The degree to which a receiver can usefully detect a weak signal. (2) The lower limit of useful signal input to the receiver [18].

**RECEIVER TRANSFER SWITCHBOARD**—Equipment used to transfer receiver audio outputs to remote control station audio circuits [17].

**RECEIVING ANTENNA**—The device used to pick up the RF signal from space [10].

**RECEIVING END**—See OUTPUT END [10].

**RECEPTION**—The instant when an electromagnetic wave passes through a receiver antenna and induces a voltage in that antenna [17].

**RECIPROCAL (OF A QUANTITY)**—The value obtained by dividing the number 1 by that quantity [1].

**RECIPROCITY**—The property of interchangeability of the same antenna for transmitting and receiving [10] [11].

**RECOVERY TIME**—In a radar, the time interval between the end of the transmitted pulse and the time when echo signals are no longer attenuated by the tr gap [18].

**RECTIFIER**—A device used to convert ac to pulsating dc [3] [6] [7].

**RECTANGULAR-COORDINATE GRAPH**—A graph in which straight-line axes (horizontal and vertical) are perpendicular [10].

**RED**—The reference color of equipment that passes classified information. It normally refers to patch panels [17].

**REFERENCE LINE**—The position of zero displacement in a wave [10].

**REFERENCE POINT**—A point in a circuit to which all other points in the circuit are compared [1].

**REFLECTED WAVE**—(1) The wave that reflects back from a medium. (2) The wave moving back to the source from the termination of a transmission line after reflection has occurred [10].

**REFLECTING OBJECT**—In radar a air or surface contact that provides an echo [18].

**REFLECTION WAVES**—Waves that are neither transmitted nor absorbed, but are reflected from the surface of the medium they encounter [10].

**REFLECTOR**—The parasitic element of an array that causes maximum energy radiation in a direction toward the driven element [10].

**REFLEX KLYSTRON**—A klystron with a reflector (repeller) electrode in the place of a second resonant cavity used to redirect the velocity-modulated electrons back through the cavity that produced the modulation [11]. (2) A microwave oscillator that is tuned by changing the repeller voltage [18].

**REFRACTION**—The changing of direction of a wave as it leaves one medium and enters another medium of a different density [10] [18].



**REFRACTIVE INDEX**—In a wave-transmission medium, the ratio between the phase velocity in free space and in the medium [11] [18].

**REGENERATION**—See FEEDBACK [18].

**REGENERATIVE DETECTOR**—A detector circuit that produces its own oscillations, heterodynes them with an incoming signal, and deflects them [12].

**REGENERATIVE FEEDBACK**—The process by which a portion of the output signal of an amplifying device is fed back in phase to reinforce the input. Also called POSITIVE FEEDBACK [8] [9].

**REGULATOR**—The section in a basic power supply that maintains the output of the power supply at a constant level in spite of large changes in load current or input line voltage [6] [7].

**RELATIVE BEARING**—Bearing of a target measured in a clockwise direction from "dead ahead" of a ship or plane [18].

**RELAY**—An electromagnetic device with one or more sets of contacts that change position by the magnetic attraction of a coil to an armature [3].

**RELUCTANCE**—A measure of the opposition that a material offers to magnetic lines of force [1].

**REMOTE-CUTOFF TUBE**—An electron tube in which the control grid wires are farther apart at the centers than at the ends. This arrangement allows the tube to amplify large signals without being driven into cutoff. This tube is also called a VARIABLE-MU TUBE [6].

**REPEATER**—(1) Another name for an active satellite [17]. (2) Also, a common name for remote radar indicators.

**REPELLER**—Sometimes called a REFLECTOR. An electrode in a reflex klystron with the primary purpose of reversing the direction of the electron beam [11].

**REPERFORATOR**—Equipment that converts the incoming TTY signal and stores it on paper tape [17].

**REPRODUCTION**—The process of converting electrical signals to sound waves. This sound is speech, music, and so on [17].

**REPULSION**—The mechanical force tending to separate bodies having like electrical charges or like magnetic polarity [1].

**RERADIATION**—The reception and retransmission of radio waves that is caused by turbulence in the troposphere [10].

**RESIDUAL MAGNETISM**—Magnetism remaining in a substance after removal of the magnetizing force [1].

**RESISTANCE**—(1) The opposition a device or material offers to the flow of current. The effect of resistance is to raise the temperature of the material or device carrying the current. (2) A circuit element designed to offer a predetermined resistance to current flow. A resistance of 1 ohm will allow a current of 1 ampere to flow through it when a potential of 1 volt is applied. [1].

**RESISTIVITY**—See SPECIFIC RESISTANCE. The reciprocal of conductivity [4].



**RESISTOR**—The electrical component that offers resistance to the flow of current. It may be a coil of fine wire or a composition rod [1].

**RESOLVER**—A rotary, electromechanical device used to perform trigonometric computations by varying the magnetic couplings between its primary and secondary windings. It is generally used in circuits that solve vector problems, such as analog computers and conversion equipment. The resolver solves three different type problems: (1) Resolution - separating a vector into two mutually perpendicular components; (2) Composition - combining two components of a vector to produce a vector sum; and (3) Combination - the process of resolution and composition taking place simultaneously [15].

**RESONANCE**—The condition in a circuit containing inductance and capacitance in which the inductive reactance is equal and opposite to the capacitive reactance. This condition occurs at only one frequency and the circuit in that condition is said to be in resonance [2] [9] [10].

**RESONANCE CHAMBER**—See ECHO BOX [18].

**RESONANT CIRCUIT**—A circuit that contains both inductance and capacitance and is resonant at one frequency ( $X_L = X_C$ ) [9].

**RESONANT FREQUENCY**—That frequency in a given resonant circuit at which the inductive and capacitive reactance values are equal and cancel each other [9].

**RESONANT LINE**—A transmission line that has standing waves of current and voltage [10].

**REST FREQUENCY**—The carrier frequency during the constant-amplitude portions of a phase modulation signal [12].

**REST POSITION**—See REFERENCE LINE [10].

**REST TIME (RT)**—The time when there is no pulse; nonpulse time [12].

**RESULTANT MAGNETIC FIELD**—The magnetic field produced in a synchro by the combined effects of the three stator magnetic fields [15].

**RETENTIVITY**—The ability of a material to retain its magnetism [1].

**RETURN**—The RF signal reflected back from a radar target; echo [18].

**REVERBERATION**—The multiple reflections of sound waves [10].

**REVERSE AGC**—The type of AGC that causes an amplifier to be driven toward cut-off [17].

**REVERSE BIAS**—An external voltage applied to a diode or semiconductor junction to reduce the flow of electrons across the junction. Also called BACK BIAS [7] [13].

**RF RADIATION HAZARD**—A health hazard caused by exposure to electromagnetic radiation or high-energy particles (ions). Abbreviated RADHAZ [18].

**RF (RADIO FREQUENCY) AMPLIFIER**—An amplifier designed to amplify signals with frequencies between 10 kilohertz (10 kHz) and 100,000 megahertz (100,000 MHz) [8].

**RF (RADIO FREQUENCY) TRANSFORMER**—A transformer specially designed for use with RF (radio frequencies). An RF transformer is wound onto a tube of nonmagnetic material and has a core of either powdered iron or air [8].

**RGK**—The symbol used to express the resistance between the grid and the cathode of an electron tube [6].

**RHEOSTAT**—A variable resistor used for the purpose of adjusting the current in a circuit [1] [4].

**RHO**—Greek letter "rho" ( $\rho$ ). Used in the field of electricity and electronics to represent the specific resistance of a substance [4].

**RHOMBIC ANTENNA**—A diamond-shaped antenna used widely for long-distance, high-frequency transmission and reception [10].

**RIGID COAXIAL LINE**—A coaxial line consisting of a central insulated wire (inner conductor) mounted inside of a tubular outer conductor [10].

**RIGIDITY**—The tendency of the spin axis of a gyro wheel to remain in a fixed direction in space if no force is applied to it [15].

**RINGING**—RF oscillations caused by shock excitation of a resonant circuit or cavity [18].

**RING TIME**—In radar, the time during which the output of an echo box remains above a specified level [18].

**RIPPLE FREQUENCY**—The frequency of the ripple current. In a full-wave rectifier it is twice the input-line frequency [6].

**RIPPLE VOLTAGE**—The alternating component of unidirectional voltage. (This component is small compared to the direct component.) [6]

**RLC CIRCUIT**—An electrical circuit that has the properties of resistance, inductance, and capacitance [2].

**RL DIFFERENTIATOR**—An RL circuit in which the output is taken from the inductor [9].

**RL INTEGRATOR**—An RL circuit in which the output is taken from the resistor [9].

**RMS**—Abbreviation of root mean square [2].

**ROOT MEAN SQUARE (RMS)**—The equivalent heating value of an alternating current or voltage, as compared to a direct current or voltage. It is 0.707 times the peak value of a sine wave [2].

**ROTARY CAP**—A spark gap, similar to a mechanically driven rotary switch, used to discharge a pulse-forming network [12].

**ROTARY SWITCH**—A multicontact switch with contacts arranged in a circular or semicircular manner [3].

**ROTATING FIELD**—The magnetic field in a multiphase ac motor that is the result of field windings being energized by out-of-phase currents. In effect, the magnetic field is made to rotate electrically rather than mechanically [5].

**ROTATING JOINT**—A joint that permits one section of a transmission line or waveguide to rotate continuously with respect to another while passing energy through the joint. Also called a rotary coupler [11].

**ROTOR**—(1) The revolving part of a rotating electrical machine. The rotor may be either the field or the armature, depending on the design of the machine [5]. (2) The rotating member of a synchro that consists of one or more coils of wire wound on a laminated core. Depending on the type of synchro, the rotor functions similarly to the primary or secondary winding of a transformer [15].

**RPK**—The symbol used to represent the resistance between the cathode and plate of a tube [6].

**RUNNING OPEN**—The teletypewriter condition where the type hammer constantly strikes the type box but does not print or move across the page [17].

**SATELLITE ECLIPSE**—An eclipse where the rays of the sun do not reach the satellite. This prevents recharging of the solar cells of the satellite and decreases the power to the transmitter [17].

**SATELLITE-SUN CONJUNCTION**—A period when the satellite and sun are close together and the noise from the sun prevents or hampers communications [17].

**SATURABLE-CORE REACTOR**—A coil in which the reactance is controlled by changing the permeability of the core [8].

**SATURATION**—(1) The condition existing in any circuit in which an increase in the input signal produces no further change in the output [13]. (2) The operating point of a vacuum tube or transistor at which a further increase in grid or base current no longer produces an increase in plate or collector current [6] [7]. (3) In a magnetic core, the condition in which a magnetic material has reached a maximum flux density and the permeability has decreased to a value of (approximately) 1 [8].

**SCALING FACTOR**—The term used to describe the use of unequal resistors in a servo's summing network to compensate for differences between input and output signal levels [15].

**SCANNING**—(1) The process of subdividing a picture in an orderly manner into segments. This is used in facsimile transmission [17]. (2) Systematic movement of a radar beam to cover a definite pattern or area in space [18].

**SCAT CODE**—A four-digit subcategory code used to identify the functional measurement parameters that can be satisfied by any one of many pieces of test equipment [16].

**SCATTER ANGLE**—The angle at which the receiving antenna must be aimed to capture the scattered energy of tropospheric scatter [10].

**SCHEMATIC**—A diagram which shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement [1] [4].

**SCHEMATIC SYMBOLS**—A letter, abbreviation, or design used to represent specific characteristics or components on a schematic diagram [1].

**SCINTILLATION**—Apparent change in target reflectivity. Motion of the target causes successive radar pulses to bounce off different parts of the target, such as fuselage and wingtip [18].

**SCREEN GRID**—A grid placed between a control grid and the plate and usually maintained at a fixed positive potential [6].

**SCREENING**—Process of applying nonconductive or semiconductive materials to a substrate to form thick film components [14].

**SEA CLUTTER**—Unwanted echoes from the irregular surface of the sea that appear on a radar indicator [18].

**SEARCH RADAR SYSTEM**—An early-warning device that searches a fixed volume of space [18].

**SECAS (SHIP EQUIPMENT CONFIGURATION ACCOUNTING SYSTEM)**—The Navy system that keeps track of the configuration of equipment in the fleet [16].

**SECONDARY**—The output coil of a transformer [2].

**SECONDARY CELL**—A cell that can be recharged by a current being passed through the cell in a direction opposite to the discharge current [1].

**SECONDARY EMISSION**—The liberation of electrons from an element, other than the cathode, as a result of being struck by other high-velocity electrons [6].

**SECONDARY LOOP**—In a cooling system, the loop that transfers the heat from the heat source, such as electronic equipment, to the primary loop; usually distilled water [18].

**SECOND DETECTOR (DEMODULATOR)**—The part of the receiver that separates the audio or video component from the modulated intermediate frequency [18].

**SECOND-SWEEP ECHOES**—See AMBIGUOUS RETURNS [18].

**SELECTIVITY**—The ability of a receiver to select the desired signal and reject unwanted signals [9] [17].

**SELENIUM**—A chemical element with light-sensitive properties that makes it useful as a semiconductor material in metallic rectifiers [7].

**SELF-BIAS**—In a vacuum tube circuit, the voltage developed by the flow of current through a resistor in the grid or cathode leads [6].

**SELF-EXCITED GENERATORS**—DC generators in which the generator output is fed to the field to produce field excitation [5].

**SELF-EXCITED METER**—A term used to describe meters that operate from their own power sources [16].

**SELF-INDUCTION**—(1) The production of a counterelectromotive force in a conductor when its own magnetic field collapses or expands with a change in current in the conductor [2]. (2) The phenomenon caused by the expanding and collapsing fields of an electron that encircle other electrons and retard the movement of the encircled electrons [10].

**SELF-LUMINOUS BODIES**—Objects that produce their own light [10].

**SELF-SYNCHRONIZED RADAR**—A type of radar in which the timing pulses are generated within the transmitter [18].

**SENDING END**—See INPUT END [10].

**SENSITIVITY**—(1) For an ammeter, the amount of current that will cause full-scale deflection of the meter. (2) For a voltmeter, the ratio of the voltmeter resistance divided by the full-scale reading of the meter; expressed in ohms per volt [3] [16]. (3) The ability of a receiver to reproduce very weak signals. The greater the receiver sensitivity, the weaker the signal that can be reproduced [17]. (4) Efficiency of a microphone. Describes microphone power delivered to a matched-impedance load as compared to the sound level being converted. Usually expressed in terms of the electrical power level [12].

**SENSITIVITY TIME CONTROL (STC)**—A circuit that varies the gain of a receiver as a function of time [18].

**SERIES CIRCUIT**—An arrangement where electrical devices are connected so that the total current must flow through all the devices; electrons have one path to travel from the negative terminal to the positive terminal [1].

**SERIES-CONNECTED DUPLEXER**—A configuration in which the tr spark gap is connected in series in one leg of the transmission line one-half wavelength away from the T-junction [18].

**SERIES-DIODE DETECTOR**—The semiconductor diode in series with the input voltage and the load impedance. Sometimes called a VOLTAGE-DIODE DETECTOR [12].

**SERIES-FED OSCILLATOR**—An oscillator in which dc power is supplied to the amplifier through the tank circuit or a portion of the tank circuit [9].

**SERIES LIMITER**—A diode connected in series with the output, in which the output is taken across the resistor. Either the positive or negative alternation of the input wave is eliminated [9].

**SERIES-NEGATIVE LIMITER**—A diode connected in series with the output, in which the output is taken across the resistor. It eliminates the negative alternation of the input wave [9].

**SERIES-PARALLEL CIRCUIT**—A circuit that consists of both series and parallel networks [1] [9].

**SERIES PEAKING**—A technique used to improve high-frequency response in which a peaking coil is placed in series with the output signal path [8].

**SERIES-POSITIVE LIMITER**—A diode connected in series with the output, in which the output is taken across a resistor. It eliminates the positive alternation of the input wave [9].

**SERIES-RESONANT CIRCUIT**—A resonant circuit in which the source voltage is connected in series with a capacitor and an inductor (also in series) to furnish a low impedance at the frequency at which the circuit is resonant [9] [10].

**SERIES VOLTAGE REGULATOR**—A regulator with a regulating device that is in series with the load resistance [7].

**SERIES-WOUND MOTORS AND GENERATORS**—Machines in which the armature and field windings are connected in series with each other [5].

**SERVOAMPLIFIER**—Either ac or dc amplifiers used in servosystems to build up signal strength. These amplifiers usually have relatively flat gain versus frequency response, minimum phase shift, low output impedance, and low noise level [15].

**SERVOMOTOR**—An ac or dc motor used in servosystems to move a load to a desired position or at a desired speed. The ac motor is usually used to drive light loads at a constant speed, while the dc motor is used to drive heavy loads at varying speeds [15].

**SERVOSYSTEM**—An automatic feedback control system that compares a required condition (desired value, position, and so forth) with an actual condition and uses the difference to drive a control device to achieve the required condition [15].

**SET**—A unit or units and the assemblies, subassemblies, and parts connected or associated together to perform a specific function [17].

**SEXADECIMAL**—Same as HEXADECIMAL [13].

**SHADOW**—A dead spot (minimum radiation) caused by the physical obstruction of transmitted waves by a feed horn [18].

**SHAPING CIRCUIT**—A circuit that alters the shapes of input waveforms [9].

**SHARP-CUTOFF TUBE**—The opposite of a remote-cutoff tube. An electron tube that has evenly spaced grid wires. The amplification of the sharp-cutoff tube is limited by the bias voltage and tube characteristics [6].

**SHELF LIFE**—The period of time that a cell or battery may be stored and still be useful [1].

**SHIELDED PAIR**—A line consisting of parallel conductors separated from each other and surrounded by a solid dielectric [10].

**SHIELDING**—(1) A metallic covering used to prevent magnetic or electromagnetic fields from affecting an object [1]. (2) Technique designed to minimize internal and external interference [14].

**SHORT CIRCUIT**—An unintentional current path between two components in a circuit or between a component and ground; usually caused by a circuit malfunction [1] [3] [16].

**SHORT-CIRCUITED LINE**—A transmission line that has a terminating impedance equal to 0 [10].

**SHUNT**—A resistive device placed in parallel with another component. Appreciable current may flow through it and an appreciable voltage may exist across it [12].

**SHUNT-DIODE DETECTOR**—A diode detector in which the diode is in parallel with the input voltage and the load impedance. Also known as a current detector because it operates with smaller input levels [12].

**SHUNT-FED OSCILLATOR**—An oscillator that receives its dc power for the transistor or tube through a path both separate from and parallel to the tank circuit [9].

**SHUNT PEAKING**—A technique used to improve high-frequency response in which a peaking coil is placed in parallel (shunt) with the output signal path [8].

**SHUNT RESISTOR**—A resistor in parallel. In an ammeter, shunt resistors are used to provide multiple ranges [3].

**SHUNT VOLTAGE REGULATOR**—A regulator whose regulating device is in parallel with the load resistance [7].

**SHUNT-WOUND MOTORS AND GENERATORS**—Machines in which the armature and field windings are connected in parallel (shunt) with each other [5].

**SIEMENS**—The new and preferred term for MHO [1].

**SIGNAL**—A general term used to describe any ac or dc of interest in a circuit; for example, input signal [8] [15].

**SIGNAL DISTORTION**—Any unwanted change to the signal [12].

**SIGNIFICANT SIDEBANDS**—Those sidebands with significantly large amplitude [12].

**SILICON**—A metallic element which, in its pure state, is used as a semiconductor [7].

**SILICON-CONTROLLED RECTIFIER (SCR)**—A semiconductor device that functions as an electrically controlled switch [7].

**SINE WAVE**—(1) The curve traced by the projection on a uniform time scale of the end of a rotating arm, or vector. Also known as a sinusoidal wave [2]. (2) The basic synchronous alternating waveform for all complex waveforms [12].

**SINGLE-ENDED MIXER**—See UNBALANCED CRYSTAL MIXER [18].

**SINGLE LINE DIAGRAM**—A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein [4].

**SINGLE, STATIONARY-LOBE SCANNING SYSTEM**—Antenna (with a single, stationary beam) that is rotated to obtain 360-degree coverage [18].

**SINK**—See OUTPUT END [10].

**SKIN EFFECT**—The tendency for alternating current to concentrate in the surface layer of a conductor. The effect increases with frequency and serves to increase the effective resistance of the conductor [10] [11].

**SKIP DISTANCE**—The distance from a transmitter to the point where the sky wave is first returned to earth [10].

**SKIP ZONE**—A zone of silence between the point where the ground wave becomes too weak for reception and the sky wave is first returned to earth [10].

**SKY WAVES**—Radio waves reflected back to earth from the ionosphere [10].

**SLANT RANGE**—See RANGE [18].

**SLIP**—The difference between rotor speed and synchronous speed in an ac induction motor [5].

**SLIP RINGS**—Contacts that are mounted on the shaft of a motor or generator to which the rotor windings are connected and against which the brushes ride [5]. Devices for making electric connections between stationary and rotating contacts.

**SLOPE DETECTOR**—A tank circuit tuned to a frequency, either slightly above or below an FM carrier frequency, that is used to detect intelligence [12].

**SLOT**—Narrow opening in a waveguide wall used to couple energy in or out of the waveguide. Also called an aperture or a window [11].

**SNAP-ACTING**—Changing position quickly with the aid of a spring [3].



**SOLENOID**—An electromagnetic device that changes electrical energy into mechanical motion; based upon the attraction of a movable iron plunger to the core of an electromagnet [3].

**SOLID**—One of the three states of matter; it has definite volume and shape (ice is a solid) [1].

**SOLID-STATE DEVICE**—An electronic device that operates by the movement of elections within a solid piece of semiconductor material [7].

**SONIC**—Pertaining to sounds capable of being heard by the human ear [10].

**SOURCE**—(1) The object that produces the waves or disturbance. (2) The name given to them end of a two-wire transmission line that is connected to a source [10]. (3) The device which furnishes the electrical energy used by a load [1].

**SOURCE, MAINTENANCE, AND RECOVERABILITY CODE (SM & R CODE)**—Specifies maintenance level for repair of components or assemblies [14].

**SPACE**—Absence of an RF signal in cw keying. Key-open condition or lack of data in communications systems. Also a period of no signal [12].

**SPACE CHARGE**—An electrical charge distributed throughout a volume or space [6].

**SPACE DIVERSITY**—Reception of radio waves by two or more antennas spaced some distance apart [10].

**SPACE WAVE**—Radio waves that travel directly from the transmitter to the receiver and remain in the troposphere [10].

**SPACING**—The condition in teletypewriter operation where a circuit is open and no current flows [17].

**SPARK-GAP MODULATOR**—A modulator that consists of a circuit for storing energy, a circuit for rapidly discharging the storage circuit (spark gap), a pulse transformer, and a power source [12].

**SPECIAL PURPOSE ELECTRONIC TEST EQUIPMENT (SPETE)**—Test equipment that is specifically designed to generate, modify, or measure a range of electronic functions of a specific or peculiar nature on a single system or equipment [16].

**SPECIFIC GRAVITY**—The ratio between the density of a substance and that of pure water at a given temperature [1].

**SPECIFIC RESISTANCE**—The resistance measured in ohms of a unit volume of a substance to the flow of electric current. (The unit volume used is generally the circular mil-foot.) [4]

**SPECTRUM**—(1) The entire range of electromagnetic waves arranged in order of their frequencies. (2) The range of frequencies considered in a system [10].

**SPECTRUM ANALYSIS**—The display of electromagnetic energy arranged according to wavelength or frequency [12].

**SPECTRUM ANALYZER**—A test instrument that provides a visual display of the frequency distribution of an RF signal such as a transmitter output [18].

**SPIN VECTOR**—In a gyro, a vector representing the angular velocity of the gyro rotor. The spin vector lies along the spin axis of the rotor [15].



**SPHERICAL WAVEFRONTS**—Waves of energy that spread out in concentric circles [18].

**SPLATTER**—Unwanted sideband frequencies that are generated from overmodulation [12].

**SPLICE**—A joint formed by the connecting of two or more conductors [4].

**SPORADIC E LAYER**—Irregular, cloud-like patches of unusually high ionization. Often forms at heights near the normal E layer [10].

**SPREADER**—Insulator used with transmission lines and antennas to keep the parallel wires separated [10].

**SPROCKET TUNER**—A mechanical tuning device for magnetron tubes that changes the frequency of the cavities by changing the inductance. Also called a CROWN-OF-THORNS TUNER [11].

**SQUARE MIL**—The area of a square, the sides of which are each equal to 1 mil. One square mil is equal to 1.2732 circular mils [4].

**SQUELCH**—A circuit that cuts off the output of a receiver when there is no input [17].

**SQUIRREL-CAGE WINDINGS**—A type of rotor winding in which heavy conductors are imbedded in the rotor body. The conductors are shorted together at the ends by continuous rings. It is widely applied in ac induction motors. Physically, it appears as a rotating squirrel-cage, thus the name [5].

**STABILITY**—In a magnetron, the ability to maintain normal operating characteristics [18].

**STAGE**—One of a series of circuits within a single device; for example, first stage of amplification [8].

**STAGGER TUNING**—A method of klystron tuning in which the resonant cavities are tuned to slightly different frequencies to increase the bandwidth of the amplifier [11].

**STANDING WAVE**—The distribution of voltage and current, formed by the incident and reflected waves, that has minimum and maximum points on a resultant wave that appear to stand still [10].

**STANDING-WAVE RATIO (SWR)**—The ratio of the maximum (voltage, current) to the minimum (voltage, current) points of a transmission line. Indicates the impedance matching quality of the termination of the line [10] [11].

**START**—The first unit of a teletypewriter signal. It is always a space [17].

**STATIC**—(1) A fixed nonvarying condition, without motion [13]. (2) Atmospheric noise, as in a receiver.

**STATIC ELECTRICITY**—Stationary electricity that is in the form of a charge. The accumulated electric charge on an object [1].

**STATOR**—(1) The stationary part of a rotating electrical machine. The stator may be either the field or the armature, depending on the design of the machine [5]. (2) The stationary member of a synchro that consists of a cylindrical structure of slotted laminations on which three Y-connected coils are wound with their axes 120 degrees apart. Depending on the type of synchro, the stator's functions are similar to the primary or secondary windings of a transformer [15].

**STATUTE MILE**—5,280 feet [18].

**STEP-BY-STEP COUNTER**—A counter that provides an output for each cycle of the input in one-step increments [9].

**STEP-TRANSMISSION SYSTEM**—A data transmission system that operates on direct current. It consists of a step transmitter (rotary switch) and a step motor interconnected to transmit data (information) between remote locations [15].

**STICKOFF VOLTAGE**—A low voltage used in multispeed synchrosystems to prevent false synchronizations [15].

**STOP**—The last unit of a teletypewriter signal. It is always a mark [17].

**STRANDED CONDUCTOR**—A conductor composed of a group of wires. The wires in a stranded conductor are usually twisted together and not insulated from each other [4].

**STRANDS**—Fine metallic filaments twisted together to form a single wire [4].

**STRATOSPHERE**—Located between the troposphere and the ionosphere; it has little effect on radio waves [10].

**STROBOSCOPE**—An instrument that allows viewing of rotating or reciprocating objects by producing the optical effect of a slowing down or stopping motion [16].

**STUB**—Short section of a transmission line used to match the impedance of a transmission line to an antenna. Can also be used to produce desired phase relationships between connected elements of an antenna [10] [18].

**SUBASSEMBLY**—Consists of two or more parts that form a portion of an assembly or a unit [17].

**SUBHARMONIC**—An exact submultiple of the fundamental frequency. Even subharmonics are one-half, one-quarter, and so on. Odd subharmonics are one-third, one-fifth, and so on of the fundamental frequency [17].

**SUBSTRATE**—Mounting surface for integrated circuits. May be semiconductor or insulator material depending on type of IC [14].

**SUDDEN IONOSPHERIC DISTURBANCE**—An irregular ionospheric disturbance that can totally blank out hf radio communications [10].

**SUMMING NETWORK**—A combination of two or more parallel resistors used in servosystems as an error detector. The output of the network is the algebraic sum of the inputs [15].

**SUPERHETERODYNE RECEIVER**—A type of receiver that uses a mixer to convert the RF echo to an IF signal for amplification [18].

**SUPERHIGH FREQUENCY**—The band of frequencies from 3 gigahertz to 30 gigahertz [17].

**SUPERSONIC**—(1) Speed greater than the speed of sound [10]. (2) Ultrasonic.

**SUPPORT SYSTEM**—For a radar, a system that provides an auxiliary input, such as dry air, electrical power, or liquid cooling [18].

**SUPPRESSION**—The process of eliminating an undesired portion of a signal [17].

**SURFACE WAVE**—Radio waves that travel along the contours of the earth, thereby being highly attenuated [10].

**SWAMPING RESISTOR**—A resistor used to increase or "broaden" the bandwidth of a circuit [8].

**SWITCH**—(1) A device used to connect, disconnect, or change the connections in an electrical circuit [1].  
(2) A device used to open or close a circuit [3].

**SYMMETRICAL MULTIVIBRATOR**—A circuit that generates square waves [18].

**SYMPTOM ELABORATION**—Using built-in indicating instruments or other aids to define equipment malfunction [16].

**SYMPTOM RECOGNITION**—Recognition of a situation in equipment operation that is not normal [16].

**SYNCHRO**—A small motorlike analog device that operates like a variable transformer and is used primarily for the rapid and accurate transmission of data among equipments and stations [15].

**SYNCHRO CAPACITOR**—A unit containing three delta-connected capacitors. The synchro capacitor is used in synchro systems to increase the system's accuracy by cancelling or reducing the phase shift introduced by synchro inductance [15].

**SYNCHRONIZER**—A circuit that supplies timing signals to other radar components [18].

**SYNCHRONIZING NETWORK**—A circuit, also called a crossover or switching network, used in servosystems to sense how far the load is from the point of correspondence; it then functions to switch the appropriate signal into control [15].

**SYNCHRONOUS**—A type of teletypewriter operation where both transmitter and receiver operate continuously [17].

**SYNCHRONOUS MOTOR**—An ac motor whose rotor is activated by dc. It is characterized by constant speed and requires squirrel-cage windings or some other method to be self-starting [5].

**SYNCHRONOUS ORBIT**—An orbit in which the satellite moves or rotates at the same speed as the earth [17].

**SYNCHRONOUS SPEED**—The speed at which the rotating field in an ac motor revolves. This speed is a function of the number of poles in the field and the frequency of the applied voltage [5].

**SYNCHRONOUS TUNING**—In a klystron amplifier, a method of tuning that tunes all the resonant cavities to the same frequency. High gain is achieved, but the bandwidth is narrow [11].

**SYNCHRO SYSTEM**—Two or more synchros interconnected electrically. The system is used to transmit data among equipments and stations [15].

**SYNCHRO TESTER**—A synchro receiver with a calibrated dial. This receiver is used primarily for locating defective synchros. It can also be used for zeroing synchros [15].

**SYSTEM**—A combination of sets, units, assemblies, subassemblies, and parts joined together to form a specific operational function or several functions [17].

**TACHOMETER**—(1) A small ac or dc generator, sometimes referred to as a rate generator, that converts its shaft speed into an electrical output. The tachometer is frequently used in servosystems to sense the velocity of a load [15]. (2) An instrument that measures the rate at which a shaft is turning [16].

**TANK CIRCUIT**—A tuned circuit used to temporarily store energy. Also referred to as a parallel-resonant circuit [9].

**TAPPED RESISTOR**—A wire-wound, fixed resistor having one or more additional terminals along its length, generally for voltage-divider applications [1].

**TARGET**—In radar, a specific object of radar search or detection [18].

**TARGET RESOLUTION**—The ability of a radar to distinguish between two or more targets that are close to each other [18].

**TELECOMMUNICATIONS**—The transmission, emission, or reception of signs, signals, writings, images, or sounds. This is done by visual, oral, wire, radio, or other means [17].

**TELETYPEWRITER**—A machine that can transmit and/or receive letters, numbers, or symbols. It may have a keyboard similar to a typewriter [17].

**TEMPERATURE COEFFICIENT**—The amount of change of resistance in a material per unit change in temperature [1] [4].

**TEMPERATURE INVERSION**—The condition in which warm air is formed above a layer of cool air that is near the earth's surface [10].

**TEMPEST**—A term normally used to describe compromising emanations. These emanations are unintentionally radiated signals that could disclose classified information [17].

**TENSILE STRENGTH**—The greatest stress a substance can withstand along its length without tearing apart [4].

**TERMINAL**—An electrical connection [1] [4].

**TERMINAL BOARD**—Also called a terminal strip. An insulating base or slab equipped with terminals for connecting wiring [4].

**TERMINAL DIAGRAM**—A diagram of a switch, relay, terminal board, or other component showing the connections to the equipment [4].

**TERMINAL LUG**—A device attached to a conductor to permit connection to a terminal [4].

**TEST EQUIPMENT**—A general term applied to devices used to test electrical and electronic circuits [3].

**TEST EQUIPMENT INDEX**—The Navy guide used to assist in identifying portable electrical/ electronic test equipment required for support of prime electrical/electronic, IC, weapons, and reactor instrumentation systems [16].

**TEST POINTS**—Locations in equipment that are accessible to the technician's test probes where operating voltages or signals can be monitored [16].

**TETRODE TUBE**—A four-electrode electron tube containing a plate, a cathode, a control grid, and a screen grid [6].

**THERMAL INERTIA**—The capacity of a soldering iron to generate and maintain a satisfactory soldering temperature while giving up heat to the material being soldered [4].

**THERMAL-MAGNETIC TRIP ELEMENT**—A single circuit breaker trip element that combines the action of a thermal and a magnetic trip element [3].

**THERMAL RUNAWAY**—A conduction that exists when heat causes more electron-hole pairs to be generated, which, in turn, causes more heat and which may eventually cause diode destruction [7].

**THERMAL TRIP ELEMENT**—A circuit breaker trip element that uses the increased bending of a bimetallic strip caused by increased current to open a circuit [3].

**THERMIONIC EMISSION**—Emission of electrons from a solid body as a result of elevated temperature [6].

**THERMISTOR**—(1) A semiconductor device whose resistance varies with temperature [4]. (2) A type of bolometer characterized by a decrease in resistance as the dissipated power increases [16].

**THERMOCOUPLE**—A junction of two dissimilar metals that produces a voltage when heated [1].

**THERMOCOUPLE METER MOVEMENT**—A meter movement that uses the current induced in a thermocouple by the heating of a resistive element to measure the current in a circuit; used to measure ac or dc [3].

**THERMOPLASTIC**—A synthetic mixture of rosins that is flexible and used as an insulating material. Generally used as an insulator for low- and medium-range voltages [4].

**THETA**—The Greek letter ( $\theta$ ) used to represent phase angle [2].

**THICK FILM COMPONENTS**—Passive circuit components (resistors and capacitors) having a thickness of 0.001 centimeter [14].

**THIN FILM COMPONENTS**—Passive circuit elements (resistors and capacitors) deposited on a substrate to a thickness of 0.0001 centimeter [14].

**THREE-ELEMENT ARRAY**—An array with two parasitic elements (reflector and director) and a driven element [10].

**THREE-DIMENSIONAL RADAR (3D)**—A radar set that measures the range, bearing and altitudes of a target [18].

**THROW**—In a switch, the number of different circuits each pole can control; for example, single throw and double throw [3].

**THYRATRON**—A gas tube used as a modulator switching device [18].

**THYRATRON TUBE**—A gas-filled triode in which a sufficiently large positive pulse applied to the control grid ionizes the gas and causes the tube to conduct, after which the control grid has no effect in conduction [6] [12].

**TICKLER COIL**—A small coil connected in series with the collector or plate circuit of a transistor or tube and inductively coupled to the base or grid-circuit coil to establish feedback (regeneration) [9].

**TIME CONSTANT**—Time required for an exponential quantity to change by an amount equal to 63.2 percent of the total change that can occur [2] [9].

**TIME-DIVISION MULTIPLEXING**—The process that periodically samples the full 360 degrees of each sine wave. The sample can be of a received signal or of a signal to be transmitted [17].

**TIME LAG**—The delay in a servosystem between the application of the input signal and the actual movement of the load [15].

**TIMER**—See SYNCHRONIZER [18].

**TINNING**—The process of applying a thin coat of solder to materials prior to their being soldered; for example, application of a light coat of solder to the filaments of a conductor to hold the filaments in place prior to soldering of the conductor [4].

**TOLERANCE**—(1) The maximum permissible error or variation from the standard in a measuring instrument. (2) A maximum electrical or mechanical variation of specifications that can be tolerated without impairing the operation of a device [1].

**TONES**—Musical sounds [10].

**tone-TERMINAL SET**—Equipment that converts TTY dc pulses into audio tones for modulation of a transmitter in audio-frequency-tone shift transmissions [17].

**TOP-HAT**—An antenna that is center-fed and capacitively loaded [17].

**TORQUE**—A measure of how much load a machine can turn. This measurement is expressed either in ounce-inches for torque synchro systems or in pound-feet for heavy machinery [15].

**TORQUE DIFFERENTIAL RECEIVER (TDR)**—A type of differential synchro that takes two electrical inputs, one to the rotor and one to the stator, and produces a mechanical output. The output is the angular position of the rotor that represents the algebraic sum or difference of the two electrical inputs [15].

**TORQUE DIFFERENTIAL SYNCHRO SYSTEM**—A synchro system containing either a TDX or a TDR. This system is used in applications where it is necessary to compare two signals, add or subtract the signals, and furnish an output proportional to the sum or difference between the two signals [15].

**TORQUE DIFFERENTIAL TRANSMITTER (TDX)**—This type of synchro is functionally the same as the CDX, except that it is used in torque systems rather than control systems [15].

**TORQUE GRADIENT**—A term used in the rating of torque synchros. It is expressed in the number of inch-ounces of torque required to pull a specific synchro 1 degree away from its normal position; for example, 0.4 inch-ounce per degree [15].

**TORQUE RECEIVER (TR)**—A type of synchro that converts the electrical input supplied to its stator back to a mechanical angular output through the movement of its rotor [15].

**TORQUE SYNCHRO SYSTEM**—A synchro system that uses torque synchros to move light loads such as dials, pointers, and other similar devices [15].

**TORQUE TRANSMITTER (TX)**—This type of synchro is functionally the same as the CX, except that it is used in torque synchro systems [15].

**TORQUE VECTOR**—In a gyro, a vector representing the rotary motion applied to change the direction of the rotor axis. The torque vector represents the axis about which the applied force is felt [15].

**TOTAL RESISTANCE**—( $R_T$ ) The equivalent resistance of an entire circuit. For a series circuit:  $R_T = R_1 + R_2 + R_3 \dots R_n$ . For parallel circuits:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots \frac{1}{R_n} \quad [1]$$

**TOXIC VAPORS**—Vapors emitted by a substance that can do bodily harm [4].

**TR RECOVERY TIME**—Time required for a fired tr or atr tube to deionize to a normal level of conductance [18].

**TRACK**—Operational phase of a fire-control or track radar during which the radar beam is kept on the target [18].

**TRACK RADAR**—Radar that provides continuous range, bearing, and elevation data by keeping the RF beam on the target [18].

**TRANSCONDUCTANCE**—Transconductance is a ratio of the change in plate current to a change in grid voltage with the plate voltage held constant. Transconductance ( $g_m$ ) is usually expressed in micromhos or millimhos. Mathematically,

$$g_m = \frac{I_p}{E_g} \quad [6] \quad [16]$$

**TRANSFORMER**—A device composed of two or more coils, linked by magnetic lines of force, used to transfer energy from one circuit to another [2].

**TRANSFORMER EFFICIENCY**—The ratio of output power to input power, generally expressed as a percentage.

$$\text{Efficiency} = \frac{P_{\text{out}}}{P_{\text{in}}} \times 100 \quad [2]$$

**TRANSFORMER, STEP-DOWN**—A transformer so constructed that the number of turns in the secondary winding is less than the number of turns in the primary winding. This construction will provide less voltage in the secondary circuit than in the primary circuit [2].

**TRANSFORMER, STEP-UP**—A transformer so constructed that the number of turns in the secondary winding is more than the number of turns in the primary winding. This construction will provide more voltage in the secondary circuit than in the primary circuit [2].

**TRANSISTOR**—A semiconductor device with three or more elements [7].

**TRANSITION**—The time it takes to shift from a mark to a space condition or from a space to a mark condition [17].

**TRANSIT TIME**—The time an electron takes to cross the distance between the cathode and the plate [6] [11].



**TRANSLATION**—In a gyro, a force acting through the center of gravity of the gyro that causes no torque on the gyro rotor. Translation forces do not change the angle of the plane of rotation but move the gyroscope as a unit [15].

**TRANSLUCENT**—Those substances, such as frosted glass, through which some light rays can pass but through which objects cannot be seen clearly [10].

**TRANSMISSION LINE**—A device designed to guide electrical or electromagnetic energy from one point to another [10].

**TRANSMISSION MEDIUM**—A means of transferring intelligence from point to point; includes light, smoke, sound, wire lines, and radio-frequency waves [10] [12].

**TRANSMIT-RECEIVE TUBE (TR)**—A gas-filled RF switch that is used as a duplexer [18].

**TRANSMITTER**—Equipment that generates and amplifies an RF carrier, modulates the RF carrier with intelligence, and radiates the signal into space [17] [18].

**TRANSMITTER DISTRIBUTOR**—A device that reads Baudot code from paper tape and allows a message to be printed on a page printer [17].

**TRANSMITTER END**—See INPUT END [10].

**TRANSMITTER FREQUENCY (CARRIER FREQUENCY)**—The frequency of the unmodulated output of a transmitter [18].

**TRANSMITTER TRANSFER SWITCHBOARD**—Equipment that selectively transfers remote station functions and signals to transmitters [17].

**TRANSMITTING ANTENNA**—The device used to send the transmitted signal energy into space [10].

**TRANSPARENT**—Those substances, such as glass, that pass almost all of the light waves falling upon them [10].

**TRANSVERSE ELECTRIC MODE**—A waveguide mode in which the entire electric field is perpendicular to the wide dimension and the magnetic field is parallel to the length. Also called the TE mode [11].

**TRANSVERSE MAGNETIC MODE**—A waveguide mode in which the entire magnetic field is perpendicular to the wide dimension and some portion of the electric field is parallel to the length. Also called the TM mode [11].

**TRANSVERSE WAVE MOTION**—The up and down motion of a wave as the wave moves outward [10].

**TRAVERSE (BEARING) SIGNAL**—In a monopulse radar system, the combination of individual lobe signals that represents target-offset direction and amplitude from the antenna axis [18].

**TREMENDOUSLY HIGH FREQUENCY**—The band of frequencies from 300 gigahertz to 3,000 gigahertz.

**TRIAC**—A three-terminal device that is similar to two SCRs back to back with a common gate and common terminals. Although similar in construction and operation to the SCR, the triac controls and conducts current flow during both alternations of an ac cycle [7].



**TRIATIC**—A special type of monopole antenna array [17].

**TRIGGER**—A short pulse, either positive or negative, that can be used to cause an electronic function to take place [9].

**TRIGGER GENERATOR**—See SYNCHRONIZER [18].

**TRIGGER PULSES**—In radar, pulses that are used to initiate specific events [18].

**TRIODE TUBE**—A three-electrode electron tube containing a plate, a cathode, and a control grid [6].

**TRIP-ELEMENT**—The part of a circuit breaker that senses any overload condition and causes the circuit breaker to open the circuit [3].

**TRIP-FREE CIRCUIT BREAKER**—A circuit breaker that will open a circuit even if the operating mechanism is held in the ON position [3].

**TRIVALENT IMPURITY**—Acceptor impurities containing only three valence electrons [7].

**TROPOSPHERE**—The portion of the atmosphere, closest to the earth's surface, where all weather phenomena take place [10].

**TROPOSPHERIC SCATTER**—The propagation of radio waves in the troposphere by means of scatter [10].

**TROUBLE INDICATORS**—Signal lights used to aid maintenance personnel in locating troubles quickly [15].

**TROUBLESHOOTING**—The process of locating and diagnosing faults in equipment by means of systematic checking or analysis [3] [15] [16].

**TROUBLE TABLES**—Tables of trouble symptoms and probable causes, furnished by many manufacturers to help technicians isolate problems [15].

**TROUGH (BOTTOM)**—The peak of the negative alternation (maximum value below the line) of a sine wave [10].

**TRUE BEARING**—Angle between a target and true north measured clockwise in the horizontal plane [18].

**TRUE NORTH**—Geographic north [18].

**TRUE POWER**—The power dissipated in the resistance of the circuit, or the power actually used in the circuit [2].

**TRUNCATED PARABOLOID**—A paraboloid reflector that has been cut away at the top and bottom to increase beam width in the vertical plane [18].

**TRUTH TABLE**—A table that describes a logic function by listing all possible combinations of input values and indicating, for each combination, the true output values [13].

**TUBE DYNAMIC CONDITION**—Refers to the testing condition in which a vacuum tube is actually performing its function [16].

**TUBE STATIC CONDITION**—Refers to the testing condition in which a tube has certain voltages applied but is not in its normal operating condition [16].

**TUNED CIRCUIT**—(1) A circuit consisting of inductance and capacitance that can be adjusted for resonance at a desired frequency [9]. (2) A circuit that is used as a filter which passes or rejects specific frequencies [16]. (3) An LC circuit used as a frequency-determining device [8].

**TUNED LINE**—Another name for the resonant line. This line uses tuning devices to eliminate the reactance and transfer maximum power from the source to the line [10].

**TUNNEL DIODE**—A heavily doped semiconductor device that has high gain and fast switching capabilities [7]. See NEGATIVE-RESISTANCE ELEMENT [11].

**TUNNELING**—The piercing of a potential barrier in a semiconductor by a particle (current carrier) that does not have sufficient energy to go over the barrier [11].

**TURN**—One complete loop of a conductor about a core [2].

**TURNS RATIO**—The ratio of the number of turns in the primary winding to the number of turns in the secondary winding of a transformer [2].

**TURNSTILE ANTENNA**—A type of antenna used in vhf communications that is omnidirectional and consists of two horizontal half-wave antennas mounted at right angles to each other in the horizontal plane [10].

**TWISTED PAIR**—A line consisting of two insulated wires twisted together to form a flexible line without the use of spacers [10].

**TWO-DIMENSIONAL RADAR (2D)**—Measures the range and bearing to a target [18].

**TWO-M (2M)**—Miniature/microminiature repair program [14].

**TWO-WIRE OPEN LINE**—A parallel line consisting of two wires that are generally spaced from 2 to 6 inches apart by insulating spacers [10].

**TWO-WIRE RIBBON (TWIN LEAD)**—A parallel two-wire line in which uniform spacing is assured by two wires imbedded in a low-loss dielectric [10].

**ULTRAHIGH FREQUENCY**—The band of frequencies from 300 megahertz to 3 gigahertz [17].

**ULTRASONIC**—(1) Sounds above 20,000 hertz [10]. (2) Supersonic.

**UNBALANCED CRYSTAL MIXER**—A circuit consisting of a section of coaxial transmission line one-half wavelength long that is tuned to the difference (intermediate) frequency between the local oscillator and RF echo signals [18].

**UNIDIRECTIONAL**—In one direction only [1].

**UNIDIRECTIONAL ARRAY**—An antenna array that radiates in only one general direction [10].

**UNIJUNCTION TRANSISTOR (UJT)**—A three-terminal, semiconductor device with a negative resistance characteristic that is used in switching circuits, oscillators, and wave-shaping circuits [7].

**UNIT**—(1) An assembly or any combination of parts, subassemblies, and assemblies mounted together. Normally capable of independent operation [17]. (2) A single object or thing [13].

**UNIT SIZE**—The standards adopted to make comparisons between things of like value (for example, the unit size for conductors is the mil-foot) [4].

**UNIVERSAL TIME CONSTANT CHART**—A chart used to find the time constant of a circuit if the impressed voltage and the values of R and C or R and L are known [2].

**UNTUNED LINE**—Another name for the flat or nonresonant line [10].

**UP LINK**—The frequency used to transmit a signal from earth to a satellite [17].

**UPPER-FREQUENCY CUTOFF**—The highest frequency a circuit can pass [9].

**UPPER SIDEBAND**—All of the sum frequencies above the carrier [12].

**VACUUM EVAPORATION**—Process of producing thin film components [14].

**VALENCE**—The measure of the extent to which an atom is able to combine directly with other atoms. It generally depends on the number and arrangement of the electrons in the outermost shell of the atom [1].

**VALENCE SHELL**—The electrons that form the outermost shell of an atom [1].

**V ANTENNA**—A bidirectional antenna, shaped like a V, which is widely used for communications [10].

**VAR**—Abbreviation for volt-amperes reactive [2].

**VARACTOR**—A PN junction semiconductor, designed for microwave frequencies, in which the capacitance varies with the applied voltage [7] [11] [12].

**VARACTOR FM MODULATOR**—An FM modulator that uses a voltage-variable capacitor (varactor) [12].

**VARIABLE**—A representative symbol that can assume any of a given set of values [13].

**VARIABLE ATTENUATOR**—An attenuator for reducing the strength of an ac signal either continuously or in steps, without causing signal distortion [11].

**VARIABLE-MU-TUBE**—Same as REMOTE-CUTOFF TUBE [6].

**VARIABLE RESISTOR**—A wire-wound or composition resistor, the value of which may be changed over a designed range [1].

**VARNISHED CAMBRIC**—Cotton cloth coated with insulation varnish. An insulation used on high-voltage conductors [4].

**VECTOR**—A line used to represent both direction and magnitude [2] [12].

**VEITCH DIAGRAM**—A diagram consisting of joined squares, which is used to give a graphic representation of basic logic relations [13].

**VELOCITY**—The rate at which a disturbance travels through a medium [10].

**VELOCITY MODULATION**—Modification of the velocity of an electron beam by the alternate acceleration and deceleration of electrons [11].

**VELOCITY SERVOSYSTEM**—A servosystem which controls the speed of the load it is driving [15].

**VERTICAL AXIS**—On a graph, the straight line axis that is plotted from bottom to top [10].

**VERTICAL DEFLECTION PLATES**—A pair of parallel electrodes in a CRT that moves the electron beam up and down [6].

**VERTICAL PATTERN**—The part of a radiation pattern that is radiated in the vertical plane [10].

**VERTICAL PLANE**—An imaginary plane that is perpendicular to the horizontal plane [11] [18].

**VERTICALLY POLARIZED**—Waves that are radiated with the E field component perpendicular to the earth's surface [10].

**VERY HIGH FREQUENCY**—The band of frequencies from 30 megahertz to 300 megahertz [17].

**VERY LARGE SCALE INTEGRATION (vlsi)**—An integrated circuit containing over 2,000 logic gates or 64,000 bits of memory [14].

**VERY LOW FREQUENCY**—The band of frequencies from 3 kilohertz to 30 kilohertz [17].

**VIDEO AMPLIFIER**—An amplifier designed to amplify the entire band of frequencies from 10 hertz (10 Hz) to 6 megahertz (6 MHz). Also called a WIDE-BAND AMPLIFIER [8].

**VIDEO ENHANCEMENT FEATURES**—See ANTIJAMMING CIRCUITS [18].

**VINCULA**—Plural of vinculum (see below) [13].

**VINCULUM**—A straight horizontal line placed over one or more members of a compound logic expression to negate or complement. Also, used to join two or more members together [13].

**VIRTUAL GROUND**—A point in a circuit that is at ground potential (0 V) but is not connected to ground [8].

**VOLT**—The unit of electromotive force or electrical pressure. One volt is the pressure required to send 1 ampere of current through a resistance of 1 ohm [1].

**VOLTAGE**—(1) The term used to signify electrical pressure. Voltage is a force that causes current to flow through an electrical conductor. (2) The voltage of a circuit is the greatest effective difference of potential between any two conductors of the circuit [1].

**VOLTAGE AMPLIFIER**—An amplifier in which the output-signal voltage is greater than the input-signal voltage [8].

**VOLTAGE-DIODE DETECTOR**—A series-diode detector in which the diode is in series with the input voltage and the load impedance [12].

**VOLTAGE DIVIDER**—A series network in which desired portions of the source voltage may be tapped off for use in the circuit [1].

**VOLTAGE DROP**—The difference in voltage between two points. It is the result of the loss of electrical pressure as a current flows through a resistance [1] [4].

**VOLTAGE-FEED METHOD**—Same as END-FEED METHOD [10].

**VOLTAGE GAIN**—The ratio of output voltage to input voltage in an amplifier [6].

**VOLTAGE MULTIPLIERS**—Methods of increasing voltages; used primarily where low current is required [7].

**VOLTAGE REGULATION**—A measure of the ability of a generator or power supply to maintain a constant output voltage from no-load to full-load operation. Expressed as a percentage of full-load voltage; the better the regulation, the lower the percent [5].

**VOLTAGE STANDING WAVE RATIO (VSWR)**—In a waveguide, the ratio of the electric field (voltage) at a maximum point to that of an adjacent minimum point [10] [18].

**VOLTMETER**—A meter used to measure voltage [3] [16].

**WAFER**—A slice of semiconductor material upon which monolithic ICs are produced [14].

**WAFER SWITCH**—A rotary switch in which the contacts are arranged on levels. Each level (wafer) is electrically independent but mechanically connected by the shaft of the switch [3].

**WATT**—The unit of electrical power that is the product of voltage and current [16].

**WATTAGE RATING**—A rating expressing the maximum power that a device can safely handle [1].

**WATT-HOUR**—A practical unit of electrical energy equal to one watt of power for one hour [1].

**WATT-HOUR METER**—A meter used to measure electrical energy [3].

**WATTMETER**—A meter used to measure electrical power [3] [16].

**WAVE ANTENNA**—Same as BEVERAGE ANTENNA [10].

**WAVEFORM**—The shape of the wave obtained when instantaneous values of an ac quantity are plotted against time in rectangular coordinates [2].

**WAVEFORM ANALYSIS**—Observation displays of voltage and current variations with respect to time or by harmonic analysis of complex signals [16].

**WAVEFRONT**—A small section of an expanding sphere of electromagnetic radiation that is perpendicular to the direction of travel of the energy [10].

**WAVEGUIDE**—A rectangular, circular, or elliptical metal pipe designed to transport electromagnetic waves through its interior [10] [11].

**WAVEGUIDE DUPLEXER**—TR and atr tubes housed in a resonant cavity attached to a waveguide system.

**WAVEGUIDE MODE OF OPERATION**—Any particular field configuration in a waveguide that satisfies the boundary conditions. Usually divided into two broad types: the transverse electric (TE) and the transverse magnetic (TM) modes [11].

**WAVEGUIDE POST**—A rod of conductive material used as impedance changing devices in waveguides [11].

**WAVEGUIDE SCREW**—A screw that projects into a waveguide for the purpose of changing the impedance [11].

**WAVELENGTH**—The distance, usually expressed in meters, traveled by a wave during the time interval of one complete cycle. It is equal to the velocity divided by the frequency [2] [10] [12].

**WAVEMETERS**—Calibrated resonant circuits that are used to measure frequency [16]. An instrument for measuring the wavelength of an RF wave [18].

**WAVE MOTION**—A recurring disturbance advancing through space with or without the use of a physical medium [10].

**WAVE TRAIN**—A continuous series of waves with the same amplitude and wavelength [10].

**WAVE WINDING**—An armature winding in which the two ends of each coil are connected to commutator segments separated by the distance between poles [5].

**WEBER'S THEORY**—A theory of magnetism which assumes that all magnetic material is composed of many tiny magnets. A piece of magnetic material that is magnetized has all of the tiny magnets aligned so that the north pole of each magnet points in one direction [1].

**WHEATSTONE BRIDGE**—An ac bridge circuit used to measure unknown values of resistance, inductance, or capacitance [16].

**WIDE-BAND AMPLIFIER**—An amplifier designed to pass an extremely wide band of frequencies, such as a video amplifier [8].

**WINDOW**—See SLOT [11].

**WIRE**—An insulated conductor, with low resistance to current flow, that is either solid or stranded [1] [4].

**WIRING DIAGRAM**—A diagram that shows the connections of an equipment or its component devices or parts. It may cover internal or external connections, or both, and contains such detail as is needed to make or trace connections that are involved [4].

**WOBBLE FREQUENCY**—The frequency at which an electron wobbles on its axis under the influence of an external magnetic field of a given strength [11].

**WORDS-PER-MINUTE**—An approximate rate of speed. It means the number of five letter words with a space between them that can be transmitted or received in a one-minute period [17].

**WORK**—The product of force and motion [1].

**WORKING VOLTAGE**—The maximum voltage that a capacitor may operate at without the risk of damage [2].

**WYE (Y)**—A 3-phase connection in which one end of each phase winding is connected to a common point. Each free end is connected to a separate phase wire. The diagram of this connection often resembles the letter Y [5].

**X-AXIS**—In a gyro, the spin axis of the gyro [15].

**X-RAY EMISSION**—Penetrating radiation similar to light, but with shorter wavelength, that can penetrate human tissue [18].

**YAGI ANTENNA**—A multielement parasitic array. The elements lie in the same plane as those of the end-fire array [10].

**Y-AXIS**—In a gyro, an axis through the center of gravity and perpendicular to the spin axis [15].

**Z-AXIS**—In a gyro, an axis through the center of gravity and mutually perpendicular to both the X (spin) and Y axes [15].

**ZENER DIODE**—A PN-junction diode designed to operate in the reverse-bias breakdown region [7].

**ZENER EFFECT**—A reverse breakdown effect in diodes in which breakdown occurs at reverse voltages below 5 volts. The presence of a high energy field at the junction of a semiconductor produces the breakdown [7].

**ZEROING**—The process of adjusting a synchro to its electrical zero position [15].

**ZONE OF MUTUAL VISIBILITY**—The area where the satellite can be seen by both the up- and down-link earth terminals [17].