

Alternating Current (AC): A current whose polarity alternates from positive to negative over time. The rate of such "alternations" is measured in cycles per second - more commonly known as Hertz (Hz)

Amp / Ampere: The basic unit of current flow

Ampere Hour (Amp hour, Ah): a measurement of the capacity of a storage medium (a single cell or a battery). A cell which can supply 1 Amp for 1 hour before it is discharged to a specified minimum level is said to have a capacity of 1 Amp hour

Amplification: a method for increasing the amplitude (or current) of electrical signals

Amplifier: An electronic device which generates a high power signal based on the information supplied by a lower powered signal. A perfect amplifier would add or subtract nothing from the original except additional power - these have not been invented yet

Amplitude: the loudness of sound waves and electrical signals. Amplitude is measured in decibels (dB) or volts

Analog to Digital Converter (ADC): A device that converts the infinite range of an analog signal into discrete "steps". Normally, a good audio ADC will use sufficient "steps" to resolve the smallest musical detail. For CD, this is a 16 bit converter, having 65,536 discrete levels covering the most negative signal level to the most positive

Aspect Ratio: Horizontal by Vertical units displayed on a TV or Computer screen. Example: 16 X 9, 4 X 3

Attenuation: the decrease of a signal's amplitude level over any distance during transmission or through purpose designed attenuators. Attenuation measures signal loss in decibels (dB)

Bandwidth: the measure of a range of frequencies containing an upper and lower limit. Amplitude modulated signals usually have a bandwidth that is equal to twice the highest modulating frequency.

Band Pass Filter (BPF): A filter which allows a band of frequencies to pass while blocking frequencies above and below its pass band.

Battery: a bank of individual cells connected together to provide the required voltage

Binary: the basic counting system used in computer logic. Two values are available - 0 and 1. A zero is normally represented by a 0 Volt signal, and a one by a voltage of approximately 5 Volts - these levels are dependent upon the type of logic used

Binary Code: a coding scheme that communicates information by using a series of "1s" and "0s" that are represented, respectively, by the digital "ON" and "OFF" states

Bit Stream: the bit rate, or flow of information, between a sender and receiver in digital communication. Also called Digital Bit Stream.

Bit: a unit of the binary code that consists of either a single "1" or "0." (Commonly 5V or 0V respectively.)

Bleeder resistor: A resistor that discharges filter capacitors in a power supply. It places a minimum load on the supply to reduce ripple and provides some safety by discharging caps when the power supply is turned off.

Bus: a pathway that connects devices, enabling them to communicate. May be digital or analogue, including power and earth (ground).

Byte: a unit of the binary code that consists of eight bits. One byte is required to code an alphabetic or numeric character, using an eight-bit character set code.

Cable: a type of linear transmission medium. Some of the common types of cables include: hook up wire, coaxial (shielded) cables, lamp and mains cable, figure-8 (zip) cable and fibre optics

Capacitor: A pair of parallel "plates" separated by an insulator (the dielectric). Stores an electric charge, and tends to pass higher frequencies more readily than low frequencies. Does not pass direct current, and acts as an insulator. Electrically it is the opposite to an inductor. Basic unit of measurement is the Farad, but is typically measured in micro-farads ($\mu\text{F} = 1 \times 10^{-6}\text{F}$) or nano-farads ($\text{nF} = 1 \times 10^{-9}\text{F}$).

Cell: one section of a battery. The common carbon or alkaline cells used in battery operated equipment, for example.

CMOS: (Complementary Metal Oxide Semiconductor) - one family of digital logic devices. Some CMOS devices can operate with power supplies from 3 Volts to 15 Volts - others are limited to the traditional logic 5 Volt power supply.

Coaxial Cable: a metallic cable constructed in such a way that the inner conductor is shielded from EMR (electromagnetic radiation) interference by the outer conductor. Coaxial cable is less susceptible to more transmission impairments than twisted pair cable, and it has a much greater bandwidth; thus coaxial cable is used by most analogue and digital systems for the transmission of low level signals.

CODEC: COder / DECoder - the component of any digital subsystem which performs analogue to digital and digital to analogue conversions.

Component Video: Red, Blue, and Green (Y, Pb, Pr) connection for TV and video monitors. Highest quality analog connections. Supports H.D.

Composite Video: Analog NTSC video signal that includes sync, luminance, and chrominance. The yellow, standard resolution, analog connection on TV and video monitors.

Compression (1): the act of compressing (making smaller) a digital data stream - e.g. converting from 16 bit signals to 8bit signals. Most compression schemes are "lossy", which is to say that some of the original data is discarded and cannot be reconstructed.

Compression (2): a circuit used to restrict the amplitude variations of a signal (often combined with a limiter to set an absolute limit). Unlike digital compression, analogue compression can be "undone" to restore the original signal with little degradation.

Crossover Network: A filter network which separates frequencies into "bands" (Highs, Lows, and Mids) which match the capabilities of the loudspeaker drivers within an enclosure.

Crosstalk: a noise impairment when a signal from one pair of wires affects adjacent wires or one channel affects the adjacent channel.

Cutoff Frequency: Normally defined as the frequency where the output from a filter has fallen by 3dB from the maximum level obtainable through the filter.

dB - Decibel - (0.1 Bel): defined (more or less) as the smallest variation of volume detectable by ear (under laboratory conditions). This is measured on a logarithmic scale, so a change of 3dB from 1 Watt is equivalent to 0.5 Watt or 2 Watts. A change of 10dB from 1 Watt is equivalent to 100mW or 10 Watts. In electronics, 0dBm is a reference value corresponding to 1mW at 600 Ohms - this equates to approximately 775mV. The threshold of sound is 0dB SPL, and typical sounds can reach 140dB SPL or more. Any prolonged sound above 90dB SPL may will cause hearing damage.

Detector: A circuit found in a RF receiver that removes the carrier wave and allows the modulation to remain. Sometimes also called a demodulator. Usually used in the reception of AM signals.

Digital/Analog Conversion: a method used to recreate an analog signal that has been coded into binary data and transmitted as a digital signal.

Digital/Analog Converter (DAC): a device used to generate a replica of the original analog signal that has been coded into binary data and transmitted as a digital signal.

Dipole: An RF antenna that consists of two elements that both equal a half wavelength in length. It has a bi-directional radiation pattern. It's length is $468/f\text{MHz}$.

Direct Current (DC): A current flow which is steady with time, and flows in one direction only.

Distortion (1): Any change to a signal which results in the generation of frequencies which were not present in the original.

Distortion (2): Of phase, any modification of the phase relationship between two or more signals which causes the observed waveform to differ from the original.

DSP: Digital Signal Processor - a dedicated computer circuit which performs complex changes or analysis on a digital signal, generally encoded from an analogue source.

DVI: Digital Video Interface – Type of connector for TV's or computer monitors. Does not transport audio.

DVR: Digital Video Recorder – A device used to digitally record audio/video to a hard drive or other digital recording media

Electronic: The use of active electronic components (integrated circuits, transistors, tubes, etc) which require a power supply to function. Such "active" components will always be used in conjunction with passive components.

F-Connector: A threaded RF type coaxial cable connector usually found on the back of TV's for the reception of over the air, RF analog or digital TV signals.

Faroudja: Video processing, line doubling and quadrupling technology used to improve picture quality on monitors.

Earth or Negative (1): also known as ground - commonly used to describe the chassis and other materials that provide a return path for power supplies and signals within any electronic device.

Earth Ground (2): also known as ground - a protective connection from wall outlet to equipment chassis to conduct fault currents away from human contact.

Electromagnetic Interference (EMI): an unwanted (possibly interfering) signal emitted by any electronic apparatus. The emission of EMI is heavily regulated in most countries.

Electromagnetic Radiation (EMR): a transmission medium that includes radio waves and light waves.

Farad: the base unit of capacitance - equal to the capacitance of a capacitor having an equal and opposite charge of 1 coulomb on each plate and a potential difference of 1 volt between the plates (Abbreviation - F). The Farad is a very large value, and is more commonly referred to as the pico-Farad (pF, 1×10^{-12} Farad), nano-Farad (nF, 1×10^{-9} Farad), micro-Farad (μ F, 1×10^{-6} Farad), and (less common) milli-Farad (mF, 1×10^{-3} Farad).

Filter: a circuit which is frequency dependent. The "pass band" is the range of frequencies allowed through, and the "stop band" is that range of frequencies which are blocked.

Filtering: (1) a process used to remove or accentuate specific frequencies or frequency ranges of a signal.

(2) To smooth ripple in a power supply, usually after the rectifier.

(3) To remove unwanted noise or interference.

Frequency: The rate at which an alternating current changes in a cyclic manner from positive to negative and back again (one cycle). The basic unit of measurement is the Hertz (Hz), which equates to one cycle per second.

Frequency Modulation (FM): a modulation technique that records changes in an information signal by modifying the frequency of the carrier signal according to changes in the amplitude of the information signal.

HDMI: High Definition Multimedia Interface. A digital connection for TV or computer monitors that carries HD video and multiple channels of audio down one wire.

Henry: The basic unit of inductance in which an induced electromotive force of one volt is produced when the current is varied at the rate of one ampere per second (Abbreviation - H).

Heterodyne: To beat or combine two (or more) signals together to create an intermediate frequency.

High-pass: A filter which allows high frequencies to pass while blocking low frequencies.

Hertz (Hz): the measurement of frequency. Hertz represents the number of cycles of an electrical signal measured in one second.

Impedance (Z): A load applied to an amplifier (or other source) which is not a pure resistance. This is to say that its loading characteristics are frequency dependent. Impedance consists of some value of resistance in conjunction with capacitance and/or inductance. The equivalent circuits can vary from two components to hundreds.

In-Phase: a condition of two waveforms when they cross the reference line at the same time and in the same direction.

Inductor: A coil of wire which exhibits a resistance to any change of amplitude or direction of current flow through itself. Inductance is inherent in any conductor, but is "concentrated" by winding into a coil. An inductor tends to pass low frequencies more readily than high frequencies. Electrically it is the opposite of a capacitor. Basic unit of measurement is the Henry (H), in crossover networks it will typically be measured in milli-henrys ($\text{mH} = 1 \times 10^{-3}\text{H}$) and for RF micro-henrys (μH) are common.

Insulator: A material that prevents the passage of electricity, heat or sound. The plastic coating on wires is an insulator, preventing the wires from coming into electrical contact with each other. Insulators are extensively used in electronics. Most good electrical insulators are also good thermal insulators.

Integrated Circuit (IC): A collection of active and passive devices (e.g. transistors and resistors) mounted on a single slice of silicon and packaged as a single component. Examples include operational amplifiers, Central Processing Units (CPUs), random access memory (RAM), etc.

Intermodulation Distortion (IMD): the intermixing of two frequencies. It is often caused by non-linear distortion within an amplifier or loudspeaker system.

Line Choke: A circuit used to minimize unwanted EMI on a power line. Usually a circuit with inductors and capacitors.

Laser: Light Amplification by Stimulated Emission of Radiation. Originally, lasers were either gas or precious stone (e.g. ruby), but are now made using semiconductors. Laser light is coherent, meaning that the emitted light waves are in phase, which gives the light a strange appearance since our eyes were never designed to observe coherent light.

Low-pass (LPF): A filter which allows low frequencies to pass while blocking high frequencies.

LPDA: Log Periodic Driven Array – A directional, good gain antenna that is an array of dipoles that covers a wide band of frequencies (unlike the Yagi). Many outdoor TV type antennas are LPDA designs.

Mixer (1) A device used to combine many audio inputs such as microphones, guitars, cd players, etc

(2) A circuit in the super-heterodyne receiver that combines the incoming RF signal with a local oscillator signal, creating the a new signal called the intermediate frequency. The output of the mixer usually consists of the sum, difference, and two original signals.

Octave: Musical terminology, meaning the doubling (or halving) of frequency. For example, one octave above "Concert pitch" A440 Hz is 880Hz, and one below is 220Hz. Musically, each of these

frequencies is "A". One octave consists of 8 notes (hence octave) from A440 to A880 for example. The remaining musical notes are semitones (see Tempered Scale).

Oscilloscope: An electronic measurement tool which allows one to view a waveform. The vertical axis shows amplitude and the horizontal axis shows time.

Parabolic Reflector: A high gain, wide bandwidth, very directional antenna- more commonly known as a satellite dish.

Passive: Containing no devices which require a power supply. Passive devices include resistors, capacitors and inductors.

Phase: Hmmm. Tricky..... Ah-ha! Think of a bunch of soldiers all marching happily (?) to the sergeant's cries of "Hep, rah, hep-rah-hep" - except for Pt. Johnny who is blissfully "Rah, hep, rah-hep-rah"-ing. He is 180 degrees out-of-phase with the rest (or vice-versa). So it is with musical signals, where some signals have a "phase angle" (phase is measured in degrees of rotation) which is different from other signals.

Power Amp: An amplifier that is designed to drive loudspeakers or other relatively low impedance loads. Usually combines voltage and current amplification. May be integrated with the preamp (see below).

Preamp: Multiple meanings, but in hi-fi generally refers to a separate section of circuitry that includes source switching, volume and balance controls (as well as tone controls in many cases). Used to raise the level from tape decks, turntables, CD players and other music sources to a level suited to the power amplifier.

Quasi: to some degree or in some manner, resembling. For example, a quasi complementary-symmetry output stage in an amplifier is *not* in fact complementary-symmetry, but appears to be, and acts in a similar manner.

Quiescent: being still or at rest, in an inactive state. The *quiescent* current in an amplifier is that current drawn when the amplifier is "at rest" - i.e. not amplifying a signal, but supplied with power.

Rectify: To change or convert A.C. in to D.C.

Regulate: To control or hold a voltage to a very steady state. Usually found in power supplies.

Resistor: An electrical device which impedes (resists) current flow regardless of frequency. Basic unit of measurement is the Ohm.

Resolution: The amount of pixels displayed on a screen- usually width by height. Example:1024 by 768

Resonance: The natural frequency at which a physical body will oscillate. An example is when you blow gently across the top of a bottle, the enclosed air resonates at a frequency determined by the internal volume. Also refers to the natural resonance of loudspeaker drivers, cabinets and ports, or the frequency where an inductance and capacitance have the same impedance (this causes maximum impedance with a parallel circuit, and minimum impedance for series circuits).

RMS: Root Mean Squared (Volts Effective) Applies to voltage, current, or power. Defined as an alternating voltage (or current) which has exactly the same energy content (power) as the same value of direct current.

Semiconductor: Silicon (or various other materials) that are specially treated so as to form diodes, transistors, MOSFETs, light emitting diodes (LEDs) etc. The basis of all modern electronics.

SPL: Sound Pressure Level, measured in decibels (dB). 74dB SPL is considered to be the level of normal speech at a distance of 1 metre. The threshold of hearing is 0dB SPL. It is also a loudspeaker specification designating how much volume a speaker generates at a given power level, usually 1 watt.

Tank Circuit: A circuit that tunes a band of frequencies in a RF transmitter or receiver.

Thermal Coefficient (1): Of expansion, describes the amount by which a material expands when heated. Commonly expressed as a percentage per degree Celcius so the exact size at various temperatures may be calculated. Knowledge of the expansion characteristics of different materials is important in high power semiconductor manufacture, since differing expansion rates may cause device failure due to temperature cycling fractures.

Thermal Coefficient (2): Of resistance, describes the change in resistance at various temperatures. Most metals have a positive temperature coefficient of resistance, which means that the resistance increases with increasing temperature. Carbon and some alloys have a negative temperature coefficient of resistance, so as temperature is increased, resistance decreases.

Thermal Resistance: The resistance of various materials to the passage of heat energy. Most electrical conductors are also thermal conductors, with the higher electrical conductivity materials usually having higher thermal conductivity. Important in the design of high power electronics, heatsinks, semiconductor casings, etc.

Total Harmonic Distortion (THD): the sum of all amplifier distortion components, plus system noise. THD measurements are sometimes quoted as THD+noise. Usually measured at specified frequencies and power levels.

Velocity: speed of motion or rapidity. In audio and electronics, we are concerned with the speed of a signal in air and a conductor. Speed (velocity) of sound in air is approximately 345 metres per second at sea level, but it varies with temperature and humidity. Speed of an electrical signal in a wire is approximately 3×10^8 metres per second, but may be influenced by ...

Velocity Factor: a situation that occurs in conductors that are close to another conducting material. For example, a coaxial cable has an inner and outer conductor, with insulation between the two. The velocity factor of such cables varies from 0.7 to 0.9 (i.e. the signal travels slower than in free space).

Vertical or Marconi antenna: A single, vertical antenna element that is one quarter wavelength ($234/f\text{Mhz}$) at its operating frequency. It's radiation pattern is omni-directional.

Volt: The basic unit of "electromotive force". One Volt applied to a resistance of one Ohm will force a current of one Ampere to flow (Abbreviation - V).

Watt: The basic unit of power. 1 Volt across 1 Ohm (giving 1 Amp) dissipates 1 Watt (all as heat with a resistive load).

Wavelength: the length of one cycle of an AC signal. Determined by $Wavelength = c / f$ where "c" is velocity and "f" is frequency. The wavelength of a 345Hz audio signal in air is one metre. The symbol for wavelength is the greek alphabet symbol Lambda.

Yagi or Yagi-Uda antenna: A multi element antenna that has a directional radiation pattern and good forward gain. It consists of multiple elements, usually a Reflector, driven element, and director/s. It covers a relatively narrow range of frequencies.