Glossary of Terms

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A/C (Alternating Current): Energy that alternates back and forth at a certain frequency. The frequency is measured in Hertz (Hz).

Acoustical Energy: Energy consisting of fluctuating waves of pressure called sound waves.

Acoustic-Suspension Enclosure: An enclosure type where the box is completely sealed. The air trapped inside is compressed and rarefied by the speakers motion and assists the speakers' suspension. See also Air-Suspension Enclosure and Sealed Enclosure.

Air-Suspension Enclosure: A sealed enclosure where the volume of air inside of the box helps assist the speakers' suspensions (as well as the motor) restore the speaker to its center position. See also Acoustic-Suspension Enclosure and Sealed Enclosure.

Amperes (I): Measurement in units for Current. One ampere of current flowing is 6,240,000,000,000,000,000 free electrons passing one particular point each second. Also known as "amps".

Amplification: An increase in signal level, amplitude, or magnitude.

Amplitude: The measure of how much signal is contained in an alternating signal. Amplitude is typically expressed in units of Volts or decibels (dB).

Analog: An electrical signal in which the frequency and level vary continuously in direct relationship to the original acoustical sound waves. Analog may also refer to a control or circuit which continuously changes the level of a signal in a direct relationship to the control setting.

Aperiodic: Describes waves that do not repeat at a fixed time interval and do not produce a fundamental tone. Random noise is an example of an aperiodic signal.

Attenuate: To lessen the amount of force, magnitude or value of something.

Audio Signal: An electrical representation of a sound wave in the form of alternating current (A/C) or voltage.

Bandpass Enclosure: An enclosure type where all of the output comes from a port or ports. See also Dual-Reflex Bandpass, Series-Tuned Bandpass, and Single-Reflex Bandpass.

Bandpass Filter: A device which incorporates both high-pass and low-pass filters in order to limit and attenuate both ends of the frequency range.

Bandwidth: Refers to the "space" in the frequency response of a device through which audio and/or data signals can pass.

Bass: The low audio frequency range, normally considered to be below 125 Hz.

Bass-Reflex Enclosure: A term used to describe an enclosure that has a port or vent that assists the output of the speaker. See also Ported Enclosure.

Bridging: Bridging combines left and right channels of an amplifier into a single, more powerful L & R mono channel. Bridging is common when using an amplifier for a subwoofer application.

Capacitor: A passive two-terminal electrical component used to store electrical energy temporarily in an electric field. Capacitors are widely used in electronic circuits for blocking direct current (DC) while allowing alternating current (AC) to pass.

Circuit: A closed circular path through which current flows from a power source, though various components, and back to the power source.

Circuit Breaker: An electromechanical device designed to quickly break the electrical connection should a short circuit or overload occur. A circuit breaker is similar to a fuse, except it will reset itself or can be manually reset, and will again conduct electricity.

Clipping: A form of waveform distortion that occurs when an amplifier is overdriven and attempts to deliver an output voltage or current beyond its maximum capability.

Compliance: The reciprocal of stiffness. The greater the compliance, the less the stiffness.

Crest Factor: A measure of a waveform, such as alternating current or sound, showing the ratio of peak values to the effective value. Crest factor is the peak amplitude of the waveform divided by the RMS value of the waveform.

Crossover: Splits the audio signal into separate frequency bands that can be separately routed to loudspeakers optimized for those bands. Crossovers are often in a Passive or Active configuration.

Current (I): The movement or "flow" of free electrons through a conductor and measure in units called amperes or "amps"

DC (Direct Current): A flow of electrons that travels only in one direction.

Decibel (dB): A logarithmic unit used to express the ratio of two values of a physical quantity, often power or intensity.

Distortion: Sound that is modified or changed in some way. In a speaker, distortion is produced by several factors, many of which are related to poor construction. Voice coil rubbing (cause by being overdriven) is the most common cause of distortion.

Dual-Reflex Bandpass: A type of Bandpass Enclosure that has ported front and rear chambers.

Dynamic Range: The range difference between the quietest and the loudest passages of the musical selection or program signal being played.

Electromagnet: A large coil of wire that becomes a magnet when current flows through it.

Electromagnetism: The use of electricity to create a controlled magnetic field with north and south determined by the current flow.

Efficiency: The measurement of a loudspeaker or amplifier's ability to convert input power to output power (work). Formula: Efficiency = (power out/power in) x 100. Efficiency is always expressed as a percentage.

Fast Fourier Transform (FFT): Displays voltage or energy that is present over each frequency resulting in a more detailed look at a signal than a typical RTA provides .

Flat Response: An output signal in which the fundamental frequencies and harmonics are in the same proportion as those of the input signal being amplified. A flat frequency response would exhibit relatively equal response to all fixed-point frequencies within a given spectrum.

Frequency: The term in physics that refers to a number of vibrations or cycles that occur within a given time.

Frequency Response: A term that describes the relationship between a component's input and output with regard to signal frequency and amplitude.

Gauge: The size (thickness) of wire. Commonly seen for power wire and speaker/signal wire in car audio.

Graphic Equalizer: Equalizer with predefined frequencies that the user can make changes in amplitude at (boost or cut).

Ground: The term given to anything that has an electrical potential of zero. Most modern vehicles are designed around a negative ground system, with the metal frame being the vehicle's ground (electrically also called the "chassis" or "chassis ground").

Harmonic: The overtones and undertones that define the acoustic difference between two sounds with the same fundamental frequency.

Headroom: The difference between the highest level present in an audio signal and the maximum level an audio device can handle without noticeable distortion. A greater amount of headroom reduces the chances for unwanted distortion in an audio system.

Hertz (Hz): The unit for frequency in cycles per second.

High Frequency: Refers to radio frequencies in the 3-30 MHz band. In audio it usually refers to frequencies in the 5-20 kHz band.

High Pass Filter: A network of components which attenuate all frequencies below a predetermined frequency determined by the designer. Frequencies above the cut-off are passed without any effect.

Imaging: The width and definition of a sound stage. Instruments should appear to be coming from their correct positions, relative to recording.

Impedance (Audio): A measurement of the resistance to the audio current by the voice coil of the speaker. Also see, Nominal Impedance.

Impedance (Electrical): The dynamic resistive opposition offered by a device or circuit to the flow of alternating current (AC).

Inductor: An electrical component in which impedance increases as the frequency of the AC increases; also known as "coils" that are used in passive crossovers.

Infinite Baffle: An enclosure that is large enough that the air behind a speaker does not affect its performance. Theoretically the enclosure would have to be infinitely large, but in practice, a volume three time the Vas of the speaker works well.

Infrasonic: Refers to sounds or signals whose frequencies are below the normal human hearing range, generally considered to be 20 Hz.

Isobaric / Isobarik: "Constant pressure". A mounting technique where two woofers are used together as a single unit. The result is a enclosure recommendation that is half what a single speaker would need.

Joule: A unit of electrical energy equal to the work done when a current of one ampere passes through a resistance of one ohm for one second.

Line Output Converter (LOC): Device used to convert a high (speaker) level signal to a low (line) level signal by decreasing the voltage. Often needed for integrating an aftermarket amplifier to a factory head unit with RCA cables.

Load: Any electrical component that is connected to a circuit that consumes electricity.

Loudness: The subjective perception of sound pressure (SPL).

Low Frequency: Refers to radio frequencies within the 30-300 kHz band. In audio it usually refers to frequencies in the 40- 160 Hz band.

Low Pass Filter: A network of components which attenuate all frequencies above a predetermined frequency selected by the designer. Frequencies below cut-off are passed without any effect.

Magnet: A device that can attract or repel pieces of iron or other magnetic material. Speaker magnets provide a stationary magnetic field so that when the coil produces magnetic energy, it's either repealed or attracted by the stationary magnet.

Mechanical Power Handling: The amount of power a speaker can handle before reaching it's mechanical limitations while moving.

Midrange Driver: A loudspeaker specifically designed to reproduce the frequencies in the middle of the audible bandwidth. Most musical energy lies in the midrange band.

Noise Floor: The noise power generated by an audio device in the absence of any input signal. It is generally measured in decibels.

Nominal Impedance: The minimum impedance a loudspeaker presents to an amplifier, directly related to the power the speaker applied to the speaker. Actual impedance varies with the frequency applied.

Oscilloscope: A type of electronic test instrument that allows observation of constantly varying signal voltages, usually as a two-dimensional plot of one or more signals as a function of time.

Octave:A halving or doubling of frequency. For example, 40 Hertz is one octave higher than 20 Hertz. 5,000 Hertz is one octave lower than 10,000 Hertz.

Ohm: The unit of measurement for electrical resistance.

Ohm's Law: The statement of the relationship between current, voltage and resistance. Where I = Current, E = Voltage and R= Resistance. I=E / R, E=I *x* R and R=E / I

Parallel Circuit: A circuit with multiple paths for current to travel through. Parallel circuits have the same potential difference (voltage) across their ends.

Parametric Equalizer: An equalizer that allows the user to choose the frequency to make changes in amplitude (boost or cut), as well as the bandwidth ("Q") of the change in amplitude.

Passive Crossover: An electrical circuit consisting of capacitors, inductors and resistors designed to separate an audio signal into specific speaker groups.

Peak: An emphasis over a frequency range not greater than one octave.

Peak Amplitude: Also can be called Peak Voltage, is the highest point of a measured wave.

Peak-to-Peak Voltage: The difference in amplitude between the highest peak voltage and the highest negative voltage. It is equal to twice the peak voltage.

Period: The amount of time required for a single cycle of a sound wave.

Periodic: Describes waves that repeat the same waveform over and over again and produce a fundamental tone. Sine waves and square waves are periodic signals.

Phase: A measure of time in degrees where 360 degrees is equal to one cycle. Phase is related to frequency.

Phase Shift: Frequency interaction in the crossover region of passive crossovers that can cause some frequencies to be delayed with respect to other frequencies.

Pink Noise: Random noise with equal energy per octave covering 20Hz-20kHz that is often used as a test signal.

Polarity: In electricity, refers to the condition of being either positive or negative.

Ported Enclosure: An enclosure type that uses a port to couple the energy from the rear of a speaker with the energy from the front. See also Bass-Reflex Enclosure .

Potential: The electrical charge that allows work to be done in a circuit. Potential is commonly called Voltage. A circuit must have an electrical potential for electrons to flow.

Potentiometer: A variable resistor made with either carbon or wire wound material that attenuates (adds resistance) to a signal. Often used to set the input sensitivity of an amplifier.

Power (P): The amount of energy (in joules) that a device delivers or consumes divided by the time (in seconds) that the device is operating.

Pre-amp: A circuit unit that takes a small signal and amplifies it sufficiently to be fed into the power amplifier for further amplification. A pre-amp includes all of the controls for regulating tone, volume and channel balance.

Qtc: Measurement of a speaker and enclosure working together as one. When applied to enclosure design, in particular sealed boxes, it is a gauge to the frequency response shape.

Qts: Measurement of the speaker as a motor, taking into consideration all mechanical and electrical losses.

Range: Usually described as frequency range, this is a system's frequency response, beyond which the frequency is attenuated below a specific tolerance. Also, the frequency bands or bands with which a receiver or component is designed to operate.

Resistance (R): The opposition to current flow. Greater amounts of resistance result in smaller amounts of current flow when a given amount of voltage is applied.

Resistor: A passive two-terminal electrical component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the same time, act to lower voltage levels within circuits. In electronic circuits, resistors are used to limit current flow, to adjust signal levels, bias active elements, and terminate transmission lines among other uses.

Resonant Characteristic: The frequency at which something resonates at. All things have resonance, and in the case of a Ported Enclosure, this resonance is used to assist the speakers output.

Roll-Off: Relates to the attenuation of frequencies, above or below a given point at a specific state.

RTA (Real Time Analyzer): A professional audio device that measures and displays the frequency spectrum of an audio signal. Often used to view an audio system's equalization for tuning.

Sealed Enclosure: An enclosure type that uses the air trapped inside of a completely sealed enclosure to affect the motion and therefore the performance of the speaker. See also Air-Suspension Enclosure and Acoustic-Suspension Enclosure.

Sensitivity: The rating of a loudspeaker that indicates the level of sound intensity the speaker produces (in dB) at a distance of one meter when it receives one watt of input power.

Series Circuit: A circuit where resistances are connected in a straight line (like a chain) and allow only one current path. The current in a series circuit goes through every component in the circuit. Therefore, all of the components in a series connection carry the same current.

Series-Parallel Circuit: A circuit where resistance occurs when both series and

parallel resistances are present.

Series-Tuned Bandpass: A type of Bandpass Enclosure that has a rear section with a speaker and a port that fire into a second ported chamber. The output from the enclosure comes from the second ported chamber.

Short Circuit: The condition that occurs when a circuit path is created between the positive and negative poles of a battery, power supply, or circuit. A short circuit will bypass any resistance in a circuit and cause it to not operate.

Signal-to-Noise Ratio: The s/n ratio indicates how much audio signal there is in relation to noise, or a specified noise floor.

Sine Wave: Short for sinusoidal wave, is a mathematical curve that describes a smooth repetitive oscillation.

Single-Reflex Bandpass: A type of Bandpass Enclosure that has a sealed section and a ported section. All of the energy from the system comes through the port or ports in the ported section.

Sound: A type of physical kinetic energy called acoustical energy.

Sound Waves: Fluctuating waves of pressure that travel through a physical medium such as air. An acoustic wave consists of a traveling vibration of alternate compressions and rarefactions, whereby sound is transmitted through the air or other media.

SPL: Sound pressure or acoustic pressure is the local pressure deviation from the ambient (average, or equilibrium) atmospheric pressure, caused by a sound wave. In air, sound pressure can be measured using a microphone. Changes in SPL are measures in decibels.

Square Wave: A non-sinusoidal periodic waveform in which the amplitude alternates at a steady frequency between fixed minimum and maximum values, with the same duration at minimum and maximum.

Staging: The accuracy with which an audio system converts audible information about the size, shape and acoustical characteristics of the original recording space and the placement of the artists within it.

Subwoofer: A loudspeaker made specifically to reproduce frequencies below 125 Hz.

Symmetric Tuning: A term used to describe the recommended tuning frequency of a Ported Enclosure or Bandpass Enclosure. This frequency will usually ensure a smooth, even response.

Thermal Power Handling: How much heat a loudspeaker can dissipate without significantly compromising performance and/or failing completely.

TosLink: A proprietary connector style developed by Toshiba used in optical connections on digital audio products.

Transducer: Any device that converts energy from one form to another, e.g., electrical to acoustical or vice versa. Loud speakers and microphones are two types of transducers.

Transfer Function: The change in the low end of a low frequency system brought on by by loading the device into the cabin of a vehicle.

Transient Response: The ability of a speaker to follow the signal that it is sent.

Tuning Frequency: The frequency at which a port resonates.

Tweeter: A small loudspeaker or driver meant to reproduce high frequencies.

Uni-Body Chassis: A vehicle chassis design where the frame and main body cavity are integrated into a single structure. For more see, Ground.

Vas: Mechanical compliance. A measurement in liters or cubic feet of the volume of air that is equal to the compliance of a speakers total suspension.

Vented Enclosures: A type of enclosure that uses a vent (port) to couple the energy from the rear of a speaker with the energy from the front. See also Bass-Reflex Enclosure.

Voice Coil: A coil of wire that takes in the electrical energy comping from the amplifier and converts it into acoustical energy or mechanical motion.

Volt: The term used to refer to the property of electrical pressure through a circuit.

Voltage (E): The difference in electric potential energy between two points per unit electric charge.

Voltage Drop: The amount of energy consumed when a device has resistance in its circuit. The voltage (E) measured across a resistance (R) carrying a current (I). $E = I \times R$. See also, Volt.

Watt: The basic practical unit of measure for electrical or acoustical power.

Wattage: Electrical power.

Watt's Law: Similar to Ohm's Law, it demonstrates the relationships between Voltage (E) and Current (I) to represent a quantity of Power (P). With the Watt's Law formula, knowing two elements can mathematically compute the third element. $P=E \times I$, $P=I^2 \times R$ and $P=E^2 / R$

Wave: A single oscillation in matter (e.g. a sound wave). Waves move outward from a point of disturbance, propagate through a medium and grow weaker as they travel farther. Wave motion is associated with mechanical vibration, sound, heat, light, etc.

Waveform: The shape of a wave, typically viewed on an oscilloscope.

Wavelength: The length of distance a single cycle or sound wave travels.

Woofer: A large dynamic loudspeaker that is well suited for reproducing bass frequencies, typically 6-18 inches in diameter when used in car audio applications.

Xmax: The distance that a speaker can move while keeping a constant number of voice coil windings inside of the magnetic gap of the speaker. It is listed in either inches or millimeters in one direction.