Car Amplifiers Glossary

Ampere
The unit of measure for current or electrical "flow" through a circuit. It is commonly abbreviated as "amp" and should not be confused with the word "amplifier," which is also commonly abbreviated as "amp."

Bridged Power
When you bridge an amplifier, you combine the power output of two channels into one channel. Bridging allows you to drive one speaker with more power than the amp could produce for two speakers. Because of this high power output, bridging is an ideal way to drive a single subwoofer.

If your amp is bridgeable, the owner's manual will have directions that tell you how. Usually, an amp is bridged by connecting the speaker leads to the positive (+) terminal from one channel and the negative (-) terminal from the other channel. However, you should be sure to consult your owner's manual before attempting to bridge your amp.

Also, keep in mind that most amplifiers need to see a 4-ohm load when bridged to mono operation. If you want to bridge your amp, you should use one 4-ohm speaker or, if you prefer multiple woofers, wire two 8-ohm speakers in parallel. (Again, consult your manual before operating your amp in bridged mode.)

Bass Boost Circuitry
Increases the output of low frequencies. Usually centered somewhere between 40 and 90 Hz, many amps have variably controlled circuits that allow you to increase the bass level in dB increments (ie. 0-12 dB at 45Hz). Variable bass boosts allow you to adjust the center frequency, changing the character of the bass.

Built-in Crossovers
Crossovers consist of both a high-pass and low-pass filter. Often used to keep high-frequencies from reaching a subwoofer, a **low-pass** filter allows only frequencies below the crossover point to be amplified. A **high-pass** filter allows only frequencies above the crossover point to be amplified — useful for keeping low bass away from small speakers, so they can play more efficiently. Crossovers are usually listed as variable or selectable. **Continuously Variable** means the crossover can be freely adjusted to any frequency between the listed end points. **Selectable** means that you can choose from several preset crossover points.

Capacitor
Heavy-duty capacitors act as a buffer zone between your amp and your car's electrical system. They store up a reservoir of power, which can supply the amplifier's peak demands (like a kick drum beat) without having to get additional current from the battery. All amplifiers have built-in capacitors, though high-performance amps use larger, more effective ones. External capacitors connect to the power cable just before it reaches your amplifier.

CEA-2006 Compliant
On May 28, 2003, the Consumer Electronics Association published standard CEA-2006, "Testing & Measurement Methods for Mobile Audio Amplifiers." This "voluntary" standard advocates a uniform method for determining an amplifier's RMS power and signal-to-noise ratio. Using 14.4 volts, RMS watts are measured into a 4-ohm impedance load at 1 percent Total Harmonic Distortion (THD) plus noise, at a frequency range (for general purpose amplifiers) of 20 Hz to 20,000 Hz. Signal-to-Noise ratio is measured in weighted absolute decibels (dBA) at a reference of 1 watt into 4 ohms. This applies to both external amplifiers and the amplifiers within in-dash receivers.

CEA-2006 allows consumers to be able to compare car amplifiers and receivers on an equal basis. Manufacturers who choose to abide by the new standard are able to stamp their products with the CEA-2006 logo that reads: "Amp Power Standard CEA-2006 Compliant."

Classes of Amplifiers
People sometimes assume that for every portion of the input signal there is corresponding 100% output from the amplifier. However, power dissipation (in the form of heat) and distortion of the audio signal are two key factors in determining the efficiency of an amp. The design of an amp's circuitry determines the class of operation of an amplifier, and each class has its own performance characteristics.

- **Class A amplifiers** are desirable for the high quality of their sound, but, because of the configuration of its transistors, a pure class A amplifier is inefficient and runs very hot. This is because even when there is no audio signal, the output transistor(s) always have current running through them. The current flowing through the output transistor(s) (with no audio signal) causes the amp to heat up unnecessarily, and "waste" input energy. Most car amplifiers that boast "Class A" circuitry are really Class A/Class AB hybrids.
- By far the most common car amp design, **Class AB amplifiers** also allow current to run through the output transistors when there is no audio signal, but at a much lower level. A class AB amplifier runs cooler, and therefore, more efficiently than a class A, with low distortion and high reliability.
- **Class D amplifiers** use output transistors as switches to control power distribution — the transistors "turn off" when there is too much voltage across them. Class D amps boast higher efficiency, produce less heat, and draw less current than traditional Class AB designs. Class D amplifiers produce higher distortion than AB designs due to the high-speed switching on and off of the transistors, but this distortion occurs at high frequencies that are typically removed by a low-pass filter.
- **Class T amplifiers** provide the sort of sonic advantages of conventional Class AB designs, combined with the high power efficiency and low heat production of a Class D design. Class T amps are able to generate 2-4 times more power than a comparably-sized Class AB amp.

Clipping
Clipping occurs when an amplifier is asked to deliver more current to a speaker than the amp is capable of doing. When an amplifier clips, it literally cuts off the tops

and bottoms of the musical waveforms that it's trying to reproduce, thus the term. This introduces a huge amount of distortion into the output signal. Clipping can be heard as a crunching sound on musical peaks.

Crossover Point
In high-pass filters, low-pass filters, and crossovers, the crossover point is the frequency at which the level of the output signal has been reduced by 3 dB.

Crossover Slope
The rate at which the crossover attenuates the blocked frequencies. Slope is expressed as decibels per octave. A 6dB per octave crossover reduces signal level by 6dB in every octave starting at the crossover point. This means that every time the frequency of the audio signal is changed by a factor of 2 (one octave), the level of the audio signal will change by 6dB. For example, if your low-pass filter is set at 80Hz with a 6dB slope, you'll see a drop in level of 6dB at 160Hz. With slopes of 12dB and higher, you'll hear little output beyond the crossover point.

Damping Factor
The ability of an amplifier to control the movement of a speaker — the higher the damping factor, the greater the accuracy. Damping factor is calculated by dividing the speaker impedance by the output impedance of the amplifier. An amplifier's damping factor will decrease as the speaker's impedance decreases — that's why an amp running at 4 ohms will provide tighter bass than at 2 ohms.

Discrete Output Devices
There are three basic types of output devices found on car audio amplifiers — integrated circuits, bipolar transistors, and Metal Oxide Semiconductor Field Effect Transistors (MOSFETs). An integrated circuit (or IC) is found only on relatively low-wattage (20 watts RMS per channel or less) amplifiers called "bridged transformerless" amps. An IC can not pass enough current to work on a more powerful amp and is not considered a discrete output device.

Bipolar transistors and MOSFETs are found on the output stages of high-powered amplifiers. They are fast enough and can handle enough current to send wattage greater than 20 watts per channel to your speakers. Both of these types of transistors are considered discrete output devices. Usually there are two per channel, but some amps feature as many as four per channel.

Impedance
The total opposition to the flow of alternating current in an electrical circuit at a given frequency. Impedance is measured in Ohms. Although car audio manufacturers label the impedance of most car speakers and subs at 4-ohms, the impedance of a speaker is actually not a constant. It's actual impedance changes with frequency and can vary greatly. Therefore, though 4-ohms is the standard impedance in car audio, this standard is more of an average impedance for speakers and amplifiers when driven within the part of the audio spectrum for which they are designed.

Mono Amplifier
Mono (or monaural) amplifiers are single channel amps, well suited for low-frequency applications since the human ear cannot distinguish stereo in the extreme bass range. Also, since mono amplifiers are stable to 2-ohms, you can connect them safely to two 4-ohm woofers (wired in parallel).

MOSFET
Metal Oxide Semiconductor Field Effect Transistors have a higher switching speed than bipolar transistors and generate very little heat. MOSFETs offer fast response and high efficiency.

Ohm
The unit of measurement for impedance or resistance. It tells you how much a device will resist the flow of current. If you take two signals of exactly the same strength and send one to a 4-ohm speaker and the other to an 8-ohm speaker, twice as much current will flow through the 4-ohm speaker. In other words, the 8-ohm speaker will require twice as much power (wattage) to play at the same volume.

Power Handling (RMS)
The maximum continuous sine wave power that can be dissipated by a speaker without failure, measured in watts RMS. Most speakers fail for one of two main reasons:

1. A speaker is driven with too much power, beyond its rating, and it overheats.
2. The amplifier is driven into clipping, producing square wave distortion that destroys the driver.

Preamp output
A preamp output lets you pass the preamp signal to additional amps, and in many cases the internal crossover from the first amp can send a filtered signal, eliminating the need for additional crossovers.

Resistance
The opposition to the flow of electrical current. Resistance is measured in Ohms.

RMS Power vs. Peak Power
The amount of continuous power, measured in watts, that an amplifier produces is called RMS power. The higher the RMS figure, the louder and cleaner your music sounds. When choosing an amplifier, the RMS rating is the power rating you should pay most attention to.

Also, keep in mind that some manufacturers calculate the RMS power ratings of their amplifiers at different input voltages. For example, an amplifier rated at 100 watts RMS at 12 volts can produce considerably more power than an amp rated at 100 watts RMS at the more typical 14.4 volts.

Stereo manufacturers often display peak power ratings on the face of their products. The peak power rating tells you the maximum wattage an amplifier can deliver as a brief burst during a musical peak, like a dramatic drum accent. The RMS figure is more significant.

RMS Power at 2 ohms
This spec tells you how much more power your amp delivers when presented with a 2-ohm stereo load. You can achieve a 2-ohm load by using parallel wiring or by using 2-ohm speakers.

Theoretically, amp output should exactly double as the impedance drops from the usual 4 ohms to 2 ohms. However, amp makers use different degrees of regulation on power supplies, which can restrict the actual increase in output.

Less regulated power supplies come closer to doubling their output into 2-ohm loads. An amp with little regulation can achieve higher wattage into lower impedances. An amp with stiffer regulation maintains rated output from your amp as other electrical accessories demand voltage from the battery.

Signal-to-Noise Ratio
Measured in decibels (dB), this spec compares the strength of the desired signal (music) to the level of background noise. A higher value indicates less background noise.

Sound Pressure Level (SPL)
SPL is measured in dB — an acoustic measurement of sound energy. One dB SPL is the smallest audible difference in sound level. 0dB SPL is the threshold of human hearing, while noise measuring 120dB can damage your hearing.

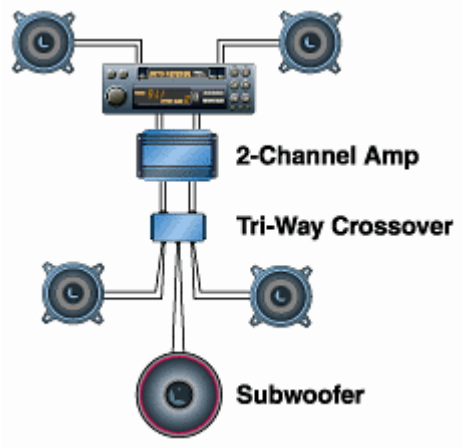
Speaker-level input
Also called high-level inputs, speaker-level inputs accept signal from a receiver's speaker outputs, letting you connect the amp to a receiver that lacks RCA preamp outputs.

Subsonic Filter
Also called an infrasonic filter, a subsonic filter cuts off extremely low bass (below the range of human hearing) that many speakers cannot effectively reproduce, thereby making the amp's power supply and output devices, and the speaker, more efficient.

Total Harmonic Distortion (THD)
Amount of change in harmonic content of the signal as it is amplified. A lower figure indicates less change and a more accurate amp. THD below 1% is inaudible.

Tripath
Tripath Technologies is the developer of the Class-T® amplifier design, which combines the low distortion and excellent sound quality of the Class AB design with the efficiency advantages of the Class D design. Tripath uses switching transistors to achieve very high power efficiency (around 90%), low heat production, and compact chassis-size.

Tri-Way Output
Sometimes called Dual Mode, this setup powers a pair of stereo speakers and one subwoofer simultaneously from the outputs of a single 2-channel amplifier. It's an affordable way to drive a subwoofer. It requires an external Tri-Way adapter that is connected in-line between your amplifier and your speakers.



A stereo amp with Tri-Way capability can power a pair of stereo speakers and a single subwoofer.