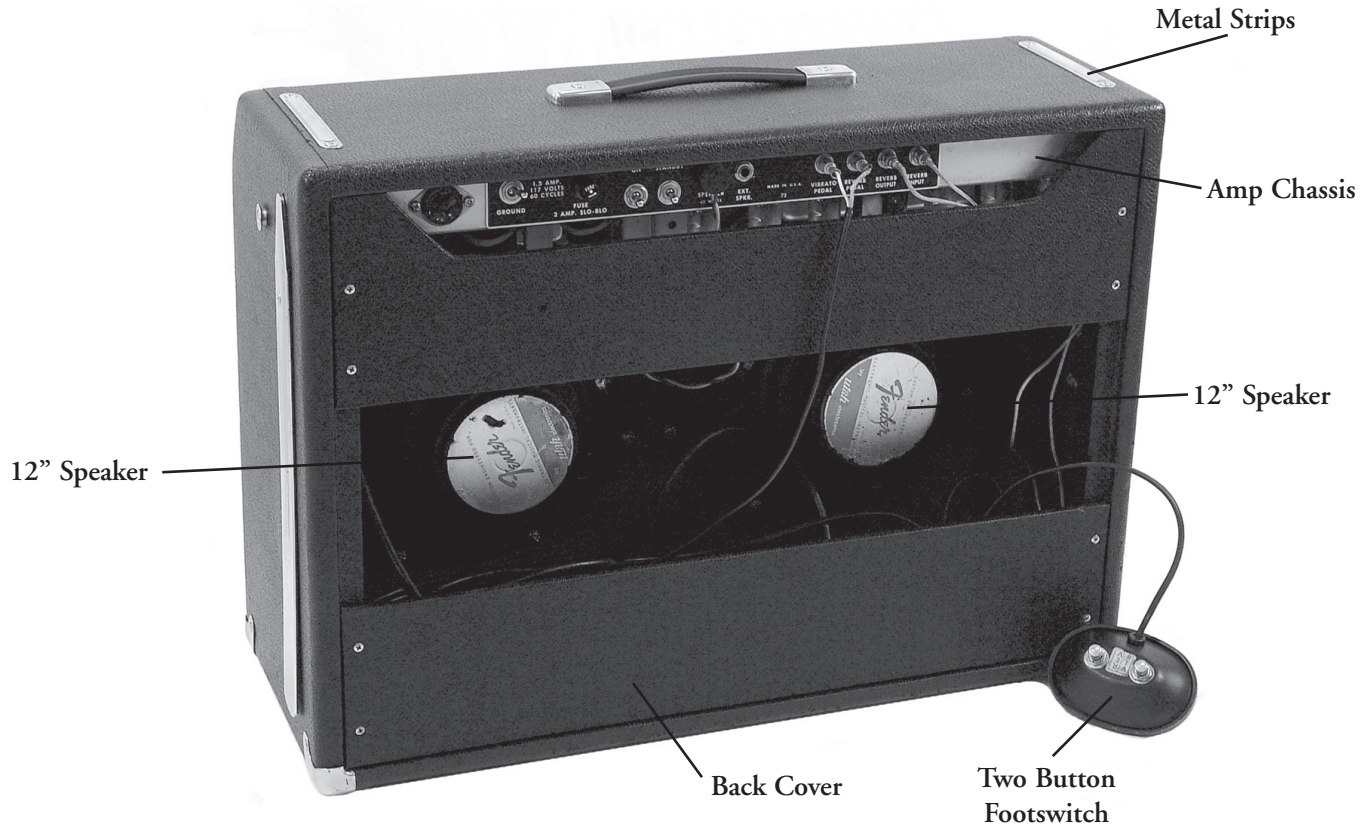
ANATOMY OF A GUITAR AMPLIFIER



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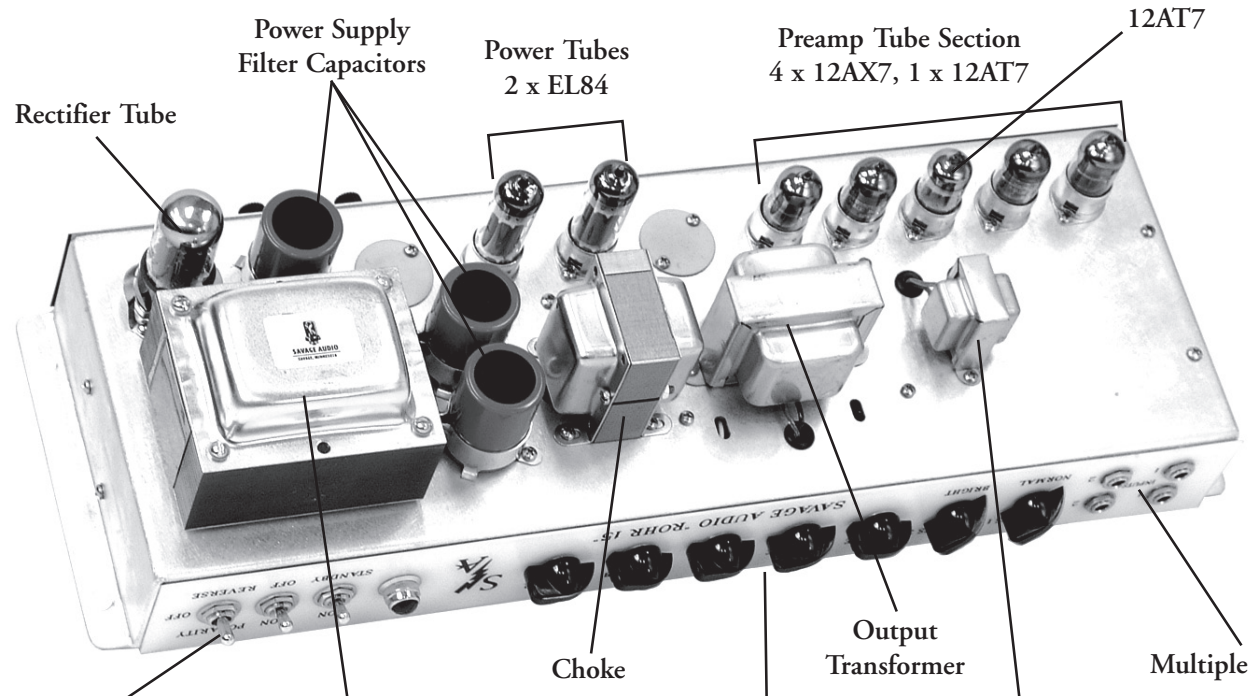

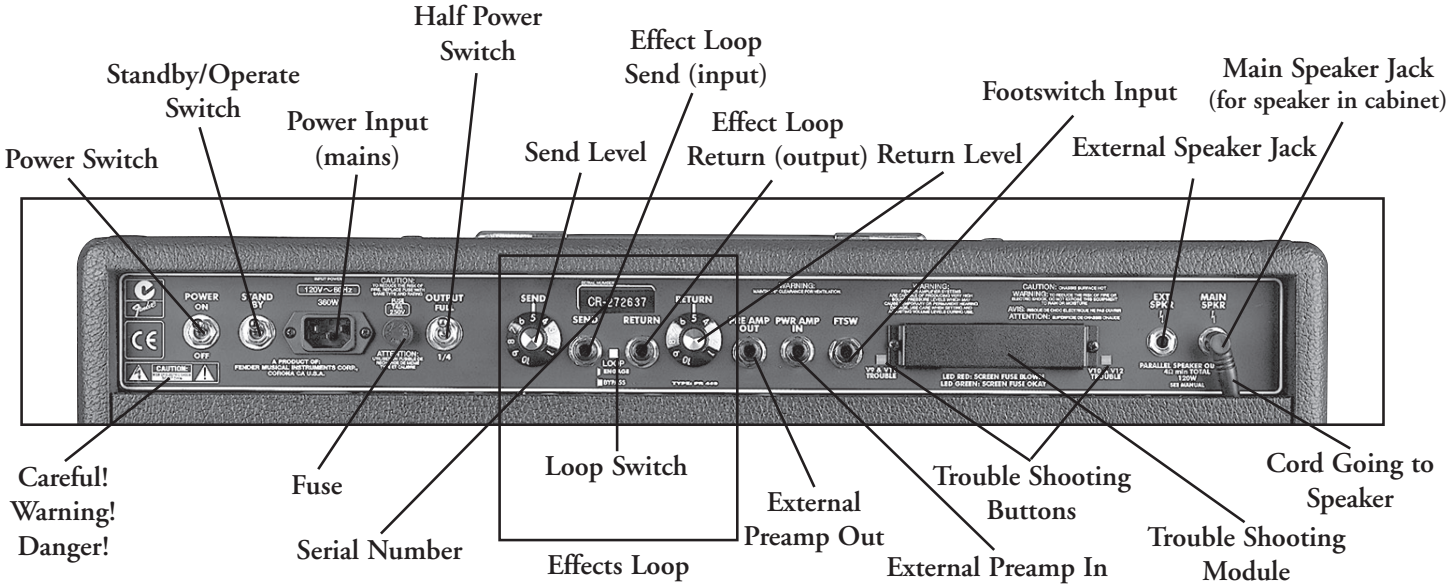

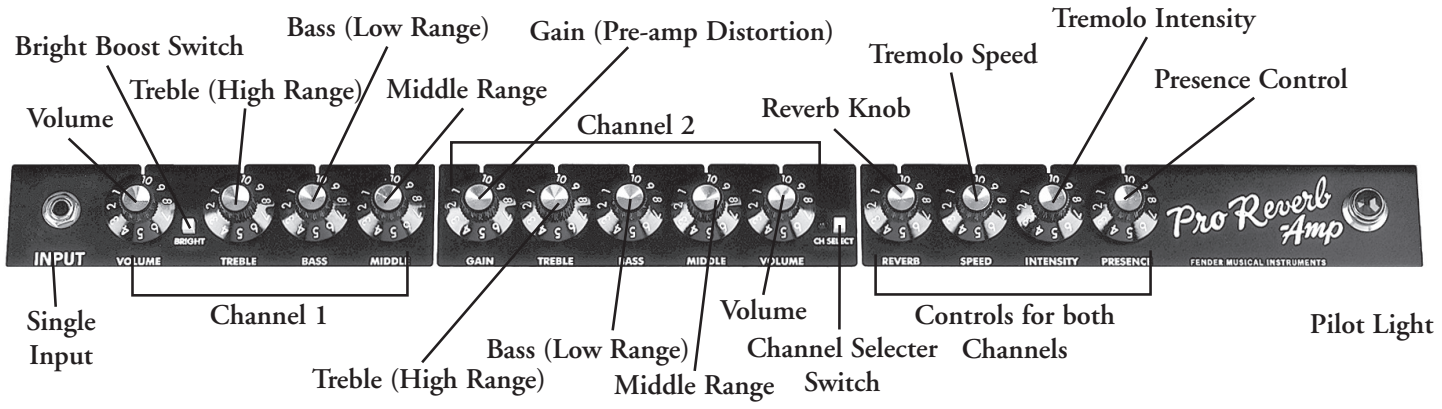

AMP GLOSSARY

This glossary is divided into five sections: General Amplifier Glossary, Different Types of Amplifiers, Amplifier Components, On the Control Panel of an Amplifier, and Coverings and Grille Cloths. If you are looking for something and can't find it in one section, please check the others. You may also want to refer to Anatomy of a Guitar Amplifier on pages 14-15 for visual identification on many of the terms listed below.

GENERAL AMPLIFIER GLOSSARY

AC (ALTERNATING CURRENT) - This is a type of electricity that comes out of a wall outlet. It flows in a back and forth motion, switching from negative to positive several times in a second. Most guitar amplifiers initially utilize this type of current but convert it to DC.

BIAS - The proper level that tubes should be set at for optimal operation. Setting the bias is much like adjusting a carburetor in a car after you have worked on it. If you replace tubes or repair work in your guitar amplifier, you may have to adjust the bias to a proper level. Unless you are an experienced guitar amp repair person, you may want to have a professional perform this adjustment. Some amplifiers, such as Mesa Boogies, do not have bias adjustments and this is known as fixed bias.

CHORUS - An effect that is similar to vibrato, but combined with reverb. When engaged it sounds like a watery effect. Controls on the amp for chorus are typically depth and rate. Many acoustic amplifiers feature chorus, and when included on guitar amplifiers, they are designed specifically for chorus. Chorus amps commonly feature two speakers with a twin power amp that produces stereo sound.

DC (DIRECT CURRENT) - This is a type of electricity that comes from a battery, for example. The current is consistently flowing in one direction. The internal circuitry of most guitar amplifiers utilize DC current, and a rectifier is the component that converts AC power into DC power.

DISTORTION - A natural or created effect that sounds dirty or distorted. In tube amps, distortion is created when a tube starts to clip and is commonly known as a natural effect. In solid-state amps, diodes and transistors do not naturally clip, so they are programmed to sound like distortion. This is probably the most common effect found on guitar amplifiers.

IMPEDANCE - The amount of resistance (typically listed in ohms) that a component is rated at. Amplifiers put out a certain impedance and speakers receive a certain impedance. Amplifiers and speakers (speaker cabinets also) need to run on corresponding impedances.

PEAK POWER - An amplifier wattage rating that indicates the peak power of an amp. In today's amplifier world, companies don't typically list this rating, but many vintage models (especially early solid-state models) may list peak power.

OHMS - A measure of electrical resistance. Impedance is listed in ohms, and this symbol is represented by the Greek letter Omega.

OVERDRIVE - A control or second channel that increases gain on a guitar amplifier. Many amps may have a clean channel and an overdrive channel that are switchable, or on basic amps, it may be a switch or a control that increases gain.

REVERB - An echo effect that is typically created by springs. Besides distortion, this is the most common guitar effect. Most guitar amplifiers feature a single reverb control, but more advanced units may have up to three reverb controls.

RMS (ROOT MEAN SQUARE) - An amplifier wattage rating that indicates the average maximum power. Amplifier companies typically use RMS to rate the output power of their amps. Although this isn't always true, RMS power is typically about half of the peak power. If the peak power is listed at 100W in a catalog, the RMS should be around 50W.

TONE - The different pitch of a sound that an amplifier produces.

TREMOLO - A pulsating effect created by altering the volume from loud to soft. Tremolo is very similar and is often confused with vibrato (see definition). In vintage amplifiers, tremolo is more common as it is much easier to produce than vibrato. Tremolo is most often controlled by a rate or speed and intensity or depth.

VIBRATO - A pulsating effect created by altering the pitch of the tone. Vibrato is very similar and is often confused with tremolo (see definition). In vintage amplifiers, vibrato is less common as it is much harder to produce than tremolo. Vibrato did not appear until the late 1950s as tremolo, and many manufacturers would advertise vibrato when in reality the amp really featured tremolo. Vibrato is most often controlled by a rate or speed and intensity or depth.

WATTAGE - In guitar amplifiers, power is measured by watts. In traditional electricity terms wattage is determined by voltage and amperage. Amplifiers put out a certain amount of watts and speakers can handle a certain amount of watts.

DIFFERENT TYPES OF AMPLIFIERS

ACOUSTIC AMPLIFIERS - An amplifier that is designed specifically for acoustic guitar and microphone use. 99.9% of the time, these amps are covered in a brown finish. Unique features for acoustic amplifiers often include separate guitar and microphone channels, XLR inputs, twin power amps, two speakers, tweeters, and feedback controls.

ANALOG AMPLIFIERS - Any amplifier that does not have digital components. Usually, amplifiers are not referred to as having an analog chassis, but in today's analog vs. digital world a guitar amp has to be classified as something. Naturally, all vintage tube and solid-state amps are analog as digital processing did not come around until the 1980s.

BASS AMPS - An amplifier that is designed specifically for bass guitars. There are certain controls on a bass amp such as limiter and compression that are unique to the instrument. Can be either tube or solid-state in design and are generally bigger and more powerful than guitar amps.

CLASS "A" CHASSIS - This refers to a tube amp where the tubes are always on. This is the least efficient way of producing sound from amplifiers, but is typically considered to sound the best. Class A amps typically produce low wattages.

CLASS "B" CHASSIS - This refers to an amp where the tubes switch on and off. This chassis usually uses a push/pull design, which means the tubes turn on and off. When one tube is working the other is off. Tubes are usually placed in pairs. These amps put out much more wattage than Class A. This is a more efficient way to operate a guitar amplifier because it creates less heat.

CLASS "A/B" CHASSIS - A combination of both Class A and Class B amps. When the volume is low the tubes will remain on in Class A. When the volume is higher it switches to Class B to create more power. Most guitar amplifiers are like this today.

CLASS "C" - This refers to an amp where the tubes are off most of the time. This creates a lot of power and is used for radio and other amplification where the sound isn't as important. Class C amps are not very common in guitar amplifiers.

DIGITAL AMPS - Any amplifier that has digital components that typically appear in the effects section, modeling section, or any programmable applications the amp may have. A digital amp will have at least some kind of computer chip to function.

GUITAR AMPS - Amplifiers that are designed specifically for electric guitars. Most amplifiers produced on the market today are usually aimed solely for guitars. Early amplifiers were often designed for multiple applications such as guitars, microphones, and accordions.

HYBRID AMPS - An amplifier that employs both tube and solid-state circuitry. Typically in a hybrid amp, the preamp stage is run by tubes and the power section is solid-state. The advantage of a hybrid chassis is sound is created with tubes, but money is saved by amplifying it with solid-state. Most companies advertise tube sound at a solid-state price.

KEYBOARD AMPLIFIERS - An amplifier that is designed specifically for keyboards. Unique features for keyboard amplifiers often include separate multiple channels and limited distortion, tremolo, and other effects.

MODELING AMPS - A design where several different amp sounds are programmed into one amplifier to produce literally hundreds of sounds available at your fingertips. This design is extremely popular as many popular amp sounds can be included in just one amp. Most of these amps use digital technology, but the first modeling amps were analog. Amps, speaker cabinets, and even effects are all modeled today. Some modeling amps even have digital read outs and motorized knobs to be set to a pre-programmed desired sound.

PUBLIC ADDRESS AMPLIFIERS (PA) - An amplifier that is designed specifically for multiple applications. Typically, they feature at least four channels and eight channels are common. They usually have high wattages and several speaker outputs. Many early European tube manufacturers such as Marshall, HiWatt, and Sound City featured a PA model. PA systems are typically a separate division of amplifier companies today as they serve a different purpose than they did in the 1960s and 1970s.

SOLID-STATE (ALSO KNOWN AS TRANSISTOR) - An amplifier that uses diodes and semiconductors instead of vacuum tubes to create and produce sound. These amps feature several more components than a tube amp. Traditionally, solid-state amps are viewed as budget models that aren't as sonically pleasing, or have the response of a tube.

TUBE AMPLIFIERS (ALSO KNOWN AS VALVE AMPLIFIERS IN EUROPE) - A glass "tube" that is sealed containing electrodes and cathodes (among other components) that generates sound by passing electrons back and forth. Tubes were used in all amps until solid-state came around in the '60s. Today, tubes are considered superior and are used in higher priced amps as they generally produce a warmer sound.

AMPLIFIER COMPONENTS

CABINET - A box (or other enclosure) that houses the amplifier, speakers, or both, and it is usually constructed out of wood. Cheap, but stable, woods are often used for construction such as plywood, particleboard, or birch since most cabinets are covered in a fabric. Some boutique amplifier companies offer cabinets built out of fancier-grade woods.

CHANNEL - A circuit in an amplifier that is in some way separate from one set of controls to another. A channel is used for creating different sounds from one amp without having to change the settings on the dials. The *Blue Book of Guitar Amplifiers* only considers an individual channel for each volume or gain knob. If an amplifier only has one volume knob, but separate inputs, it is not a multi-channel amp. If an amplifier has two volume knobs but a boost switch, it has two channels - not three.

CHASSIS - The chassis is where all the electronic components, tubes, and controls for the amp is housed. Typically, the chassis consists of one piece of metal folded into a box. Some amps have split designs where the reverb unit is separate or the preamp and power amp sections are separate. Refer to Anatomy of an Amp for pictures of a chassis.

COMBO - An amplifier that houses both the chassis and the speaker in one enclosure.

COVERING - The material that wraps the cabinet on an amplifier.

FOOTSWITCH - A remote box or control connected by a cord that has buttons to turn certain effects on or change channels on the amp. Footswitches can range from a single button to a digital processing board that can select channels, effects, and amp models.

GRILLE - The covering on the front of the amp that is usually made of cloth or metal. This covers the speaker and protects it from damage and dust.

HEAD UNIT - An amplifier where the chassis is housed in its own enclosure. There are no speakers within the cabinet. Head units were originally designed to keep the heat and frequencies of the tube chassis from interfering with the speakers, but they caught on for several reasons. As guitar amplifiers became more powerful and larger, combo units with 4-12 in. speakers were not very practical. Head units are also easier to service on their own. Separate head units and speaker cabinets also allow the player to use different combinations. This is especially evident with Marshall.

MODE - A specific sound that can be switched within a single channel. Many amplifiers are advertised with four unique channels, when in reality, there are only two channels with a mode switch on each one. For example a two channel amp will have a clean channel and an overdrive channel; the clean channel has two modes: clean and crunch, and the overdrive channel has two modes: overdrive and hi-gain.

NEODYMIUM - A specific type of magnet used in speakers designed to make them more lightweight. Many bass speaker cabinets now have speakers with Neodymium magnets to reduce weight.

POWER-AMP TUBE - A specific type of vacuum tube that turns the audio wave into physical sound. In this stage of the amplifier, the low power audio signal is amplified many times to produce several watts. These tubes actually produce the amplified sound in the guitar amplifier. In small Class A guitar amplifiers, a single tube may be used, but most often they are mounted in pairs. Examples: 6L6, EL34, KT88, 6550, EL84, 6V6, etc.

PRE-AMP TUBE - A specific type of vacuum tube that shapes and tones the audio wave. In this stage of the amplifier the signal from the guitar is shaped into the amplifier's unique style depending upon how many pre-amp tubes it has. All of a guitar amplifier's natural effects are shaped by preamp tubes: tremolo, vibrato, reverb, etc. A tube guitar amplifier has at least one pre-amp tube, but they typically have many more. Many pre-amp tubes can be split in half to serve as dual purpose. Examples: 12AX7, 12AT7, ECC81, 7025, 12AY7, etc.

RECTIFIER - A solid-state or tube unit that converts AC power into DC power, which an amplifier can use. On old and small-wattage amps the rectifier is usually a tube. On newer designs and high-watt amps the rectifier is usually solid-state. The rectifier has no direct contact with the sound, therefore a reliable solid-state rectifier can be used and no sound difference is noticed, although tubes produce an effect referred to as sag when the signal is attacked hard. In tube applications, a single tube is typically used (with the exception of Mesa/Boogie's double and triple rectifier amps). Examples (tubes): 5AR4, GZ34, 5U4.

SPEAKER - The component that the sound is projected from. Most of the time it is a round unit with an 8-,10-,12- or 15-inch speaker (excluding models such as the Fender Bantam Bass, the Ampeg Echo unit, and various early Harmony, Kay, and Supro models).

SPEAKER ENCLOSURE - A cabinet that consists of speakers only or speakers and a power amp. Although Marshall is mainly credited with inventing the 4-12 in. speaker cabinet, Fender was experimenting with piggyback units consisting of 1-12, 1-15, and 2-15 in. speaker cabinets. Some companies in the 1970s installed power amps in the speaker cabinets, and in these types of designs, only the preamp is separate. Several speaker cabinet configurations exist and some of the most popular include, 1-10 in., 1-12 in., 1-15 in., 1-18 in., 2-10 in., 2-12 in., 2-15 in., 4-10 in., 4-12 in., 6-10 in., and 8-10 in.

TILT-BACK DESIGN - An amplifier design that features tilt-back legs or a cabinet designed to sit at an angle facing upward. Many guitar players desire their sound to be projected upward as well as outward and this beats finding blocks to position your amp the way you want it. This design is usually found on smaller combo amps and acoustic amps.

ON THE CONTROL PANEL OF AN AMPLIFIER

BASS - Part of the equalization stage of the amp that represents the low end of the frequency spectrum. The frequency level varies depending upon the model. Traditionally, the bass control is one of two, three, or more sections of equalization in the guitar amp.

BOOST SWITCH - A switch that typically boosts the middle part of the tonal equalization range on the amp. Boost is a generic term and may be applied to other parts of the amp such as boost in the distortion circuit or boost for an entire channel.

BRIGHT SWITCH - A switch that boosts the high end of the tonal range on an amp. Early models sometimes had a push-pull feature on the volume or treble knob.

COMPRESSION - A control that compresses the range of sound to make the loud and soft sounds not so far apart. This control is almost always found on bass amplifiers.

CONTROL KNOBS - Knobs that control many of the features on a guitar amp. These are usually mounted on the control panel, but may also appear on the back of the amp or on footswitches and other satellite components. Common control knobs may include volume, gain, bass, mid, treble, reverb, rate, speed, intensity, and master volume.

CONTROL PANEL - The panel where the inputs, control knobs, switches and other buttons are located. On many amps there is a front and back control panel. The back control panel is for less used equipment such as the effects loop, footswitch jack, and fuses. The front control panel usually has volume and tone knobs along with input jacks. Control panels may be located in the front, back, top, or bottom of the amp depending on the location of the chassis. Most of the time that control panel is part of the chassis.

DEEP SWITCH - A switch that typically boosts the low or bass part of the tonal equalization range on the amp. Deep switches are most often found on bass amplifiers.

EFFECTS LOOP - A circuit that can be used for effects. Many effects feature in and out jacks that run directly between the guitar and the amp. The effects loop isolates the effect for use in different stages of the amp. This loop may have a level control to limit the amount of gain/volume.

FEEDBACK/NOTCH - A control that is typically used on acoustic amplifiers to limit the amount of unwanted feedback that can easily be generated by acoustic instruments. This control has been called several things by several manufacturers, but Feedback and Notch seem to be the most common.

GAIN - The technical definition of gain is the amount of distortion that goes into the preamp stage. Gain may either complement or replace the volume control depending on the complexity of the amp. Although gain appears to control the volume of the amp, it really only controls the amount of distortion or overdrive. If the gain is turned to "0" no sound will come from the amp, regardless of volume level, because nothing is being allowed into the pre-amp stage.

GRAPHIC EQUALIZER - A combination of slider switches, usually grouped in 5, 7, or 9 controls that provides ultimate tonal adjustment in the amplifier. A graphic equalizer (EQ) allows the user to precisely dial in their desired tone when simple bass, mid, and treble controls aren't enough. This is a common feature of bass amplifiers, and it is often accompanied by an on/off switch.

HALF POWER SWITCH - A switch that can take the power of an amplifier and reduce it to half or less power. This is usually accomplished by only utilizing two of four power tubes, or the amp may have a "Power Break" component built in to reduce power. Many guitar players run their amps wide open to maximize the sound, but sometimes full volume level is not required. A half-power switch lets the amp be run wide open but at a lower volume.

INPUT/INSTRUMENT JACKS - The place where the instrument or other object is plugged into the amplifier. Most input jacks are ¼ in. in diameter, but XLR jacks may be used in acoustic amplifiers for microphones. Every guitar amplifier has to have at least one input jack, but can have several depending on the number of channels and the function of the amp.

INTENSITY - A knob that controls the amount a certain effect is used. This is most often used on tremolo, vibrato, or any other pulsating effect. Speed may also be referred to as depth. This knob is optional for most pulsating effects while speed is standard.

JACKS - Besides input/instrument jacks, guitar amplifiers may have other jacks for separate purposes. Some examples of jacks include a pre-amp out, power amp in, footswitch, effects loop, external speaker(s), headphones, RCA inputs (for CD players, etc.), auxiliary input, XLR out, and MIDI connections.

LIMITER - A control that limits the sound of an amp from going too high. The limiter may have a level control or it may be a button with a built-in preset level. This feature saves the amp from getting too loud. Limiters are usually only found on bass amplifiers.

MAINS - A voltage selector/power input on a guitar amplifier that is mainly used in Europe. Different countries use different voltages and many manufacturers provided a Mains selector to allow different voltages to be utilized. Many amps today are built for specific markets, and mains controls are not used as often anymore.

MASTER VOLUME - A volume knob that controls the overall volume of the amplifier. Master volume controls were added around the 1970s on most guitar amps as many people requested the ability to lessen the volume of an amp without losing any tonal characteristics gained by running the amp wide open. While there is some argument over how this control works, this is what it was designed for. The master volume control can also govern the volume over more than one channel.

MIDDLE - Part of the equalization stage that usually cuts or boosts the mid-range of the equalization. The middle control may not be present on basic amps or may appear on one channel but not another. The middle control may also be controlled by a switch. Traditionally, the middle control is one of two, three, or more sections of equalization in the guitar amp.

PILOT LIGHT (ALSO JEWEL LIGHT) - Indicates that the amplifier is turned "on." If the amp features a standby switch, the pilot light will light when the standby switch is in the operate or idle positions. Some amps may feature separate lights for the power and standby switches. The pilot light is typically found on the front control panel.

POWER SWITCH - Turns the amp on and off.

PRESENCE - A control that typically adjusts the upper frequencies on an amp equalization circuit. The Presence control may replace the bright switch.

SPEAKON/NEUTRIK - A specific type of speaker connector often used to connect amplifiers to speaker cabinets. Unlike standard 1/4 inch and XLR jacks, Speakon/Neutrik connectors can only be connected one way and users are completely shielded from human touch.

SPEED - A knob that controls the speed a certain effect is used. This is most often used on tremolo, vibrato, or any other pulsating effect. Speed may also be referred to as rate. This knob is standard for most pulsating effects while intensity is optional.

STANDBY SWITCH - A switch that enables a tube amp to be shut off from emitting sound, but the tubes are still on. A tube takes a long time to heat up and this switch allows the amp to be shut off from operation but is still running (like a car in neutral).

TONE - If the amplifier has simple features or is an early vintage model, it may only have a tone knob instead of separate bass and treble knobs. Typically, the tone knob will have a "0" at the 12 o'clock position with more bass sound to the left and more treble sound to the right. Tone knobs were phased out in the 1960s when more tonal varieties became desirable.

TREBLE - Part of the equalization stage that controls the high end of the equalization. The frequency level varies depending upon the model. Traditionally, the middle control is one of two, three, or more sections of equalization in the guitar amp.

VOLUME - The technical term is the amount of sound allowed into the preamp or power amp stage depending on the location of the control. When it gets down to it, all guitar amps have some kind of volume control. Many advanced amps will have several volume knobs for preamp volume, power amp volume, and master volume. All these volume knobs control the amount of volume.

COVERINGS AND GRILLE CLOTHS

REFER TO INDIVIDUAL MANUFACTURERS SECTION'S FOR MAKER - specific coverings and grille cloths.

CARPET - Many bass amplifiers, keyboard amplifiers, and speaker cabinets may have carpet coverings. A carpet covering has a fuzzy feel to it and wears well when used in large applications.

LEATHERETTE - A fake leather covering used by many manufacturers in the 1950s and 1960s. Gibson used a lot of leatherettes during the 1950s.

LEVANT - Marshall's first covering that has a unique pattern and texture to it. Many companies have used variations of this covering, but it is not usually referred to as Levant.

TOLEX - A covering used by Fender starting in the late 1950s that was developed by a rubber company. Many other companies have used a covering like Tolex or call their covering Tolex, but true Tolex is the rubber covering used by Fender.

TWEED - A brown/yellow diagonal woven fabric covering used on amps in the 1950s and 1960s. Fender is probably the first and most famous user of tweed, but many other companies have used variations of this covering. Tweed is not very durable and is subject to a lot of wear.

VINYL - Probably the most common and generic covering used on guitar amplifiers. Vinyl is a cheap covering that wears well and looks good. Since it is so economical, many manufacturers opt for vinyl.