Guitar & Amp Tone
Video Manual

Version 1.. 1994`.

ALIGNING REFERENCES IN THIS MANUAL TO THE VIDEO CASSETTE

On your video recorder (or with the remote), set the counter to zero (0:00:00) exactly at the beginning of the video, exactly where the title screen shown below first appears. It must be a REAL TIME COUNTER.

GUITAR and AMP TONE

By Jim Gleason

You can then cue sections of the video by refering to the column on the far right of the Contents pages.

CONTENTS

All entries in *italics* below are guitar and amp tone setups.

INTRODUCTION

A. The Procedure Suggested By This Video and Book

The *signal chain* (or *signal path*) includes every wire, cable, plug, switch, and other device that passes the signal from your guitar pickup to the speaker (or microphone). As an electric guitarist, it is your job to be aware of the effect of every component in your signal chain. Concentrate on basics first. Get a good sound with just a guitar and amp, *before* adding effects and other devices. Here is a general order of procedures:

- check your microphone placement, if recording or sending to a PA or monitor (Chapter 6)
- choose a guitar, pickup, amp and speaker combination (Chapters 2 and 3)
- find the *power amp distortion reference setting* (Chapter 3) and listen to the *envelope* (Chapter 1)
- adjust the input gain and tone on the amp (Chapter 4)
- if desired, add an equalization device to the signal chain and adjust it (Chapter 5)
- recheck your microphone placement and setup the mike preamp and noise reduction (Chap. 6)
- play through the system, make necessary adjustments to components or to your technique

B. Volume Control

Passive and Active Volume Controls.

A *passive volume control* does not increase amplification of the signal when it is turned up. Instead, it allows all of the signal to pass through when it is turned all the way up. It grounds out increasingly more of the signal as you turn it down. When a signal is connected to ground, it loses power.

An *active volume control* employs a transistor pre-amplifying circuit so that when you turn the knob to increase the volume, it is amplified. With the passive volume control, turning the volume knob to increase the volume doesn't amplify the signal, but makes it louder by reducing the amount of the signal that is connected to ground.

Volume Control On the Guitar.

It is preferable to turn passive volume controls fully clockwise so the full volume of the pickup is allowed to pass through to the amplifier. The more a passive volume control on a guitar is turned counterclockwise, the more of the harmonic content of the guitar is not heard. Some of my electric guitars have no volume controls. They are wired "direct" to minimize hum and bring out the full tone of the pickups.

Crescendo with no-attack. A useful effect common to pedal steel guitar playing is produced on the guitar by playing a note with the volume off and "swelling" the volume up gradually by turning the volume knob with your little finger. There is no audible attack with this effect (you can't hear the note being picked). Instead, the note seems to "sneak in from nowhere."

Volume Control On the Amplifier.

Adjust your volume as much as you can on the amplifier instead of on the guitar so harmonic content is preserved (as discussed above).

Volume pedal.

Volume pedals with potentiometers are noisy and bothersome to maintain. The best volume pedals use a light-sensitive resistor (you might specify that when you buy one). Volume pedals seem to detract from the harmonic content of the notes on a guitar less than the volume control on the guitar. A crescendo with no attack can be performed with the volume pedal with more ease than with the volume knob on the guitar (see above).

C. DISTORTION.

In this context it is more correctly called harmonic distortion. This type of distortion produces a grating, raspy sound by adding greatly to the harmonic content of the guitar tone.

Pickups.

The most common mistake Rock guitarists make is to use a pickup with too high an output (too *hot)*. It is cool that distortion increases sustain, but you don't have to get all of the distortion from the pickup. Most of the distortion should happen in the preamp section of the amplifier (or distortion box), not the pickup. When a pickup is too hot, it lacks tone character.

Some pickups have so high an output that they distort without any distortion devices. Stock pickups usually don't distort much. Most pickup manufacturers now include many high-output, distortion-producing pickups in their product line. When selecting a new pickup for your guitar, play a guitar similar (or identical) to yours with the new pickup installed on it.

Humbucking pickups are always double-coiled. They produce much less hum than single coil pickups, especially with distortion.

Distortion boxes.

Overdrives, fuzz boxes, sustainers, and distortion boxes are basically the same thing. They imitate the harmonic distortion that occurs in tube amplifiers, usually in a more exaggerated manner and with more control. Sustainers usually have compression and distortion (see Chapter).

Don't always use maximum distortion. Create the appropriate tone for the song you are playing.

Tube Versus Solid-State Guitar Amplifiers.

Tube amplifiers produce a warmer sound, more like that of acoustic instruments. They have more "bite" or "crunch" and are generally much-preferred for electric guitar.

Solid-state ("transistor" or "transistorized") amplifiers have more of a dry "punch." They sound somewhat synthetic. Usually solid-state amplifiers are preferred for bass, keyboard or PA applications.

Overdrive preamps.

Tube amplifiers equipped with overdrive channels usually produce the best sounding distortion. They usually involve a master volume control and a "lead drive," "gain" or "tube voice" control which adjusts output in the preamp stage. To produce distortion, the preamp stage is turned up to where the signal is distorted; then the main output stage (controlled by the master volume knob) is turned down so the volume coming out of the speaker is not too great.

D. TONE CONTROL

Passive Tone Control

Passive tone control diminishes the treble as the knob is turned counterclockwise (or as the slider is pulled toward you on a mixer) by "grounding out" the treble. The further you turn the control counterclockwise, the more of the treble part of the signal is cancelled out by running part of the signal (1) through a capacitor, (2) through the tone control, and finally (3), to "common ground." All ground connections are connected and usually contact the chassis or massive metal parts of the instrument.

A higher value capacitor cuts less treble and produces a more bassy tone. Capacitors are rated in "microfarads." Single coil pickups usually use a .02 microfarad capacitor in their tone circuit (Fender uses .05 through .1). Double coil ("humbucking") pickups commonly use a .05 microfad capacitor (Gibson often uses .02). Electric basses use .05 through .08.

Another name for a volume control is a potentiometer (or "pot"). A passive tone control is a potentiometer with a capacitor as described above. The weak point of passive tone controls is that as they relatively increase bass, they cut the treble. An active tone control can leave the treble part of the signal unaltered and boost the bass.

Active Tone Control

Active tone control is superior, but more expensive. It employs amplifying circuits to boost the treble, bass or selected frequency bands (a selected "band" or range of tone anywhere between treble and bass). Some guitars are equipped with active tone controls, but it is generally better to rely on rack mount equalization. For studio use, an electric guitar can be wired without any tone or volume controls, to assure the purest signal to the amplifier.

Active treble tone controls are called *high pass filters*. Active bass controls are called *low pass filters* and active selective frequency band tone controls are called *band pass filters*. *Band-reject filters* (or "notch" filters) allow all frequencies to pass except those within a given frequency band.

Treble is high frequency. Bass is low frequency. Bandwidth is the range of frequency: it defines how high and low the frequency band to be affected is.

Boosts and Cuts (attenuators).

Boost and cut switches are tone controls with stationary ratings (adding or diminishing a set amount of treble or bass). Cut switches on a mixer are usually called "pads."

Tone Control On the Guitar and Amplifier.

First, turn the tone controls on the guitar fully clockwise, so the full tone of the pickup is allowed to pass through to the amplifier. Then adjust your tone as much as you can on the amplifier, before adjusting the tone on the guitar. Start with a "flat" tone on the amp: with all of the tone controls turned half way up. As you add tone, you add thickness also. If you want to add treble without adding thickness, turn the bass down and the volume up slightly. If you want to add bass without adding thickness, turn the treble down and the volume up slightly.

Presence Control.

The presence control adjusts the *bite* (or *edge*). Increasing the presence adds bite. Decreasing the presence smooths out the tone and mutes it. An alternative to the above method of adding tone without adding thickness is to add treble or bass and turn the presence control down.

Wah-wah pedal.

A wah-wah pedal is a band pass filter (see "Active Tone Control" on the previous page). It can be used as a tone control by leaving it in one position or as an effect by moving it from one position to another.

Pressing the wah-wah pedal down with your toes increases the treble. Pressing the wah-wah pedal down with your heel (allowing the "toe end" of the pedal to rise) increases the bass. When using the wah-wah as an effect, you usually would keep the beat with your foot. Press the toe end of the pedal down on the beat and press the heel end of the pedal down between the beats. Occasionally the pedal is used for every note instead of every beat when special emphasis is desired.

E. REVERB, ECHO, DIGITAL DELAY AND MODULATION

Reverb

Reverb is a multitude of echoes in an enclosed space which cause a sound to continue for some time after the source has been cut off. Reverb occurs naturally in any confined area.

Artificial reverb units are commonly used to give music a "live" sound. The least expensive reverb units are spring reverb. Spring reverb units delay part of the signal by running it through long springs so the signal takes longer to pass through. The rest of the signal is run directly to the output.

Reverb units almost always have a depth control to adjust the volume of the delayed signal in relation to the original signal. Natural reverberation is greater where sound bounces off hard, sound-reflective surfaces and lesser where sound is absorbed by soft dense materials (such as rugs, drapes and bodies). The better reverb units also have a control for delay time. Adjusting the unit for greater delay time simulates natural reverberation occurring at a greater distance from the sound-reflective surface.

Echo and Digital Delay

Acoustic echo is occasionally produced in an acoustic echo chamber in which the echo effect is produced by the acoustical design of the chamber which allows sound to bounce around. The sound is pumped into the chamber through a speaker and a microphone picks it up with the added echo.

Tape loop echo produces an echo by recording the signal at one point on the moving recording tape and playing it back from another point on the tape. This delays the signal. The delayed signal is then mixed with the original signal for the desired intensity of echo. The duration of the echo can be adjusted with a control that changes the distance between the recording and playback heads. Tape loop echo is now all but extinct, since innovations in analog and digital delay have so greatly improved on the capabilities of artificial echo.

Analog delay units produce echo. They are commonly noisier than digital delay units (which also produce echo) but can usually produce higher frequencies and are less expensive.

Digital delay is "state-of-the-art" for artificial echo. Digital delay units can produce delay times from 1 millisecond up to one second or more (1 ms = 1/1000 of a second). Most digital delay units are capable of doubling, chorusing, flanging and phasing in addition to echo. Doubling produces the effect of two instruments playing the same part that one instrument played. See chorus, flange, and phasing below.

Modulation.

Modulation causes a swirling or swishing effect. It is produced by altering a signal in a continuous, pulsing way.

Phasing is produced by slightly but continuously decreasing and increasing the delay time of a signal. The result is a "swishing" tonal sweep. It generally sounds best on notes or chords of long duration.

Flanging is the same as phasing, but with a wider variation in delay time. Phasing is a more subtle effect, not as easy to recognize as flanging. Flanging sounds like you're "stuck in a space warp" or experiencing some kind of altered state. Delay time for flanging is usually about 1 to 20 milliseconds (1/1000 to 20/1000 seconds).

Chorusing, like doubling, produces the effect of more than one sound from a single source by combining the original sound source with a delayed signal of about 20 to 80 milliseconds (20/1000 to 80/1000 seconds). The delayed signal is modulated to produce a swirling effect. This swirling effect makes the two signal sources (the original and delayed signals) sound slightly out of tune as they would if there were two instruments.

CHAPTER 1:
THE GROWTH AND DECAY ENVELOPE

A. Envelope Defined

The volume of a note or chord always changes during its sustain. It usually increases (or grows) to its loudest level, then decreases (decay) to silence. The increase at the beginning of a note or chord is called *growth.* The decrease of volume toward the end is called *decay.* The combined growth and decay is called an *envelope.*

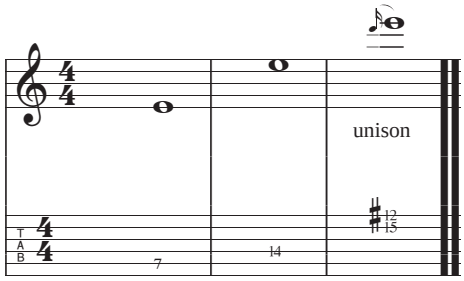
To graphically represent the envelope, time proceeds from left to right. A horizontal line represents zero volume (silence). Increase in volume is indicated by lines of equal length drawn above and below the horizontal line. Viewing the graphic representation below from left to right, you can see the envelope fatten, sustain (hopefully), then thin out, as the sound grows and decays.

The Growth and Decay Envelope of a Note

The envelope mainly shows you changes in volume. The growth and decay envelope shows you changes in volume. I'll discuss all the characteristics of tone later.

B. Illustrations of 10 Basic Envelopes By Amplifier

Here is a demonstration of the different envelopes created by ten different amplifiers. You can see and listen to all of these amplifiers in the audio/video library at the end of the video cassette. Each amplifier was set to a reference setting as described in Chapter 3, then decreased in volume to a moderately clean level. The same guitar and pickup was used in each example. Three notes were played for each example: fifth string, seventh fret "E"; fourth string, fourteenth fret "E"; and first string twelfth fret "E" played with second string, fifteenth fret "D" bent to "E."



Amplifier

1. 1953 *Fender Deluxe*

2. 1964 *Vox AC30, 2X12"* Blue "Bulldog" speakers (15 watt), open-back

3. 1968 Fender Super Reverb, 4X10" speakers, open back

4. 1970 Fender Twin Reverb, 2X12" Greenback speakers, open back

5. 1969 *Marshall Model 1987* 50 watt, 2x12" Greenback speakers, open-back

6. *1991 Marshall JCM900* 100 watt. 2x12" Greenback speakers, open back

7. *Marshall JMP-1* preamp, Overdrive 2, all tone set to zero, Marshall 100 watt tube power amp, 2x12" Greenback speakers, open back

8. *ADA MP-2* preamp, Warm Hi-Gain, all tone set to zero, Marshall 100 watt tube power amp, 2x12" Greenback speakers, open back

9. *ADA MP-2* preamp, Warm Hi-Gain, all tone set to zero, Ampulator (in place of power amp *and* speakers)

10. *ADA MP-2* preamp, Warm Hi-Gain, all tone set to zero, 60% to Marshall 100 watt tube power amp, 2x12" Greenback speakers; 40% to Ampulator

Preferred Characteristics Of An Envelope

A Good Envelope Swells Up To Full Volume, It Doesn't Explode. The preferred tones usually begin with a gradual volume increase during the first tenth of a second or so. This is very similar to the beginning of notes produced on mouthpiece instruments like trumpet and on the blues harmonica. The note *swells* up to full volume, instead of exploding.

A Gradual Decay. It is usually preferred that notes decay gradually (sustain), so long notes can be played when desired. Most amps will do this at higher volume levels, but the most favored amps will produce sustained notes a moderate volumes, as well.

Vintage Marshall and Vox amps produce some of the roundest growth sections in their envelopes, especially at higher volumes. At lower volumes, Fender amps typically produce envelopes with a fairly abrupt beginning and a quick decay (decrease in volume).

The ADA *Ampulator* produces an envelope with a somewhat abrupt beginning, but follows with an excellent sustain. I particularly like sending about 60% of a preamps output to a tube power amp, and 40% to the *Ampulator*. The *Ampulator* adds sweetness and sustain to the mid-range and really fills out the tone. I'm spoiled. I find it hard to use a tube power amp without accompanying it with the *Ampulator*.

C. GETTING THE ENVELOPE YOU WANT

You may want to copy an envelope from what you heard on a recording, in a live concert or even on another instrument (blues harmonica makes a good model for blues guitar). Follow this general procedure, as elaborated in the following chapters and on the videotape:

1. Make your best guess at a good *guitar, amp and speaker combination* (if you have choices).
2. Get a good sound from the *power amp section* of your amplifier with moderate preamp levels, no effects and little or no equalization. After working on it for a while, try changing the guitar and speakers to make sure you have the combination you want.
3. Adjust the preamp section to further define the envelope.
4. If more sustain is desired, add a compression device between the guitar and the amp.
5. Add equalization (if available) between the guitar and the amp (after the compressor, if any).
6. Mike the speakers and monitor the sound from another room or on tape.

CHAPTER 2: GUITAR AND PICKUPS

A. Gibson and Fender Electric Guitars

Most electric guitars used in Rock, Blues and Metal can be traced in their design and sound to a Gibson or Fender guitar (usually a solid body model). Fenders have much more rounded edges, due to the wood tooling capabilities in their early production years. Modern derivations have added new pickup designs, active tone control, floating tremolo systems, sustain systems and drastic changes in body design.

The most popular Gibson for Rock, Blues and Metal has been the Les Paul. Patented in 1953, it had a heavy solid body and low profile frets, nicknamed the *Fretless Wonder*.

The Gibson 335, a thin hollow body with a solid block of wood running from the neck through the body, is another very useful guitar. B.B. King plays a Gibson 345, a stereo version of the 335. Clapton often used a 335 in the studio with Cream, illustrating its similarity in sound to the Les Paul. The Seymour Duncan Custom and Pearly Gates models of pickups are great versions of the Les Paul type humbucking pickups.

The Stratocaster is the most popular Fender model used in Rock, Blues, Metal, Surf Music. See more information on the Stratocaster below. Jimmy Page used Fender Telecasters on many early Led Zeppelin recordings, and occasionally used Danelectros. The Telecaster is usually associated with country music, but Jimmy redefined it a bit for us. Steve Cropper, who played on many of the classic songs on the Stax label (Wilson Pickett, Otis Redding, Booker T. & the MG's) defined yet another great tone with a Telecaster (he was the white guitar player in the *Blues Brothers* movie).

B. Single Coil Pickups

Vintage Fender Type Pickups.

Leo Fender was first to use pickups with an individual magnet or *polepiece* for each string. He started using the design in the 1930's. Original Stratocaster alnico staggered-pole pickups have a beautiful vintage tone, which can be heard in the less distorted guitar parts by Jimi Hendrix and Stevie Ray Vaughan. Alnico is an alloy made from aluminum, nickel and cobalt.

Larry Van Zandt makes great hand-wound vintage Strat-type pickups. He wound pickups at the Fender factory in the old days. My favorite is his Blues model. It is a good idea to get the middle of the three pickups on a Strat-type guitar reverse-wound, reverse-polarity, so when used with the neck or bridge pickups, you get hum cancellation.

Staggered-pole pickups are somewhat of a hassle when it comes to getting an equal volume from each string. The first and second strings are usually not loud enough unless you use the larger gauge strings the pickup was designed for. Also, there is some decrease in volume when bending a string between the pole pieces. However, it's worth the disadvantages to hear that great vintage tone!

Other Single Coil Pickups.

Danelectro "Lipstick Tube" Pickups. In addition to Strat pickups, Stevie Ray used Danelectro "lip stick tube" pickups, which sound similar to the vintage Strat pickups, but have a gutsier sound with a wider tonal range (more lows and highs).

So-Called "Vintage" Single Coil Pickups. Many manufacturers sell single-coil, Strat type pickups

labeled "vintage." They often don't have the authentic sound. If you've ever heard an authentic vintage Stratocaster alnico pickup or a Van Zandt Stratocaster alnico pickup, you'll know the difference.

"Hot" Single Coil Pickups. In most cases, when I want a hot pickup, I use a humbucking pickup. Hot single-coil pickups do have a unique tone, however. Try a Duncan "Hot - Model STL-2T" with Alnico magnets for a fat, full vintage tone. It is tapped (see the last section of this chapter), so you have two choices of power level. Another tapped pickup is the Duncan "Quarter Pound - Model SSL4T," with huge, quarter-inch wide magnets.

C. HUMBUCKING PICKUPS

One of the coils in a humbucking pickup is reverse wound, reverse polarity to cancel hum. The coils are usually wired in series, but can be wired in parallel, as described in the last section of this chapter.

Vintage Gibson Pickups.

The original humbucking PAF pickups used in the Les Paul still have some of the finest tonal characteristics available. The name comes from Patent Applied For, which was used to label the pickups when Gibson applied for their patent in 1957. They were used on Gibsons from 1957 through 1959. Many Gibson humbuckers made since 1959 can sound as good as the PAF's, but the PAF's have a special reputation.

Some successful pickups based on the vintage Gibson humbucker are the Duncan Custom, Duncan Pearly Gates (my current favorite), DiMarzio PAF Pro, and DiMarzio "Fred."

"Hot" Humbucking Pickups.

Metal and Hard Rock styles often require the use of a high output humbucking pickup. These are easy to find, since so many have been developed since the mid-'70's. Vintage pickups will often work as well or better for a Metal or Hard Rock sound by adding distortion in the preamp and preserving more of the guitar tone.

Stacked Humbucking Pickups (fit in single coil cutout).

These humbucking pickups have one single coil on top of another, so they will fit into a single coil cutout. The Duncan "Vintage Rails" pickup has a nice "kind-of-vintage" tone, is humbucking, and uses blades instead of polepieces. The blades allow you to bend strings without volume dropouts between the pickup polepieces.

D. PICKUP ADJUSTMENTS

Listen to the output of each string played at the same fret and adjust the tilt of each pickup individually so each string has approximately the same volume. Be careful to pick each string with the same force, at the same angle, and at the same place on the length of the string. Generally keep the polepieces (or blades, on some models) at least 1/16" away from the strings. 1/8" is a safer minimum, to avoid touching the pickup with the pick.

It is useful to mike the guitar and look at the comparative volumes on a meter, such as on a mixer or tape recorder. Many brands of pickups, such and DiMarzio and Gibson have individually adjustable pole pieces so you can adjust the volume separately for each string.

E. ACTIVE PICKUPS

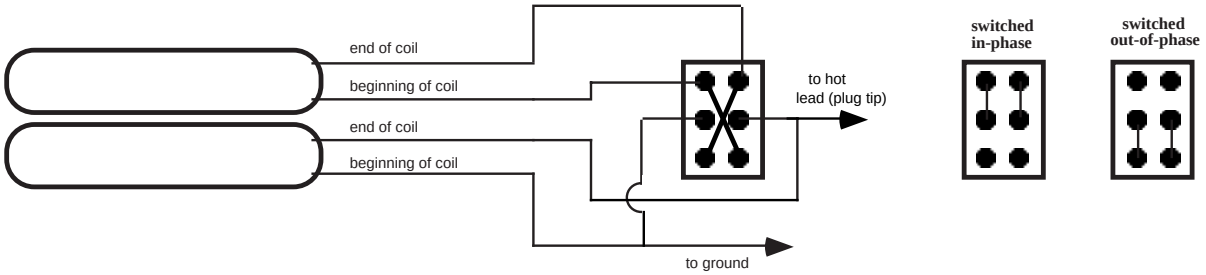
I'm sorry, but I just don't like active pickups. I've tried many of them, but they usually sound lifeless and sterile. Duncan Livewires were the least offensive.

F. PICKUP WIRING AND POLARITY

Phase and Hum Cancelling.

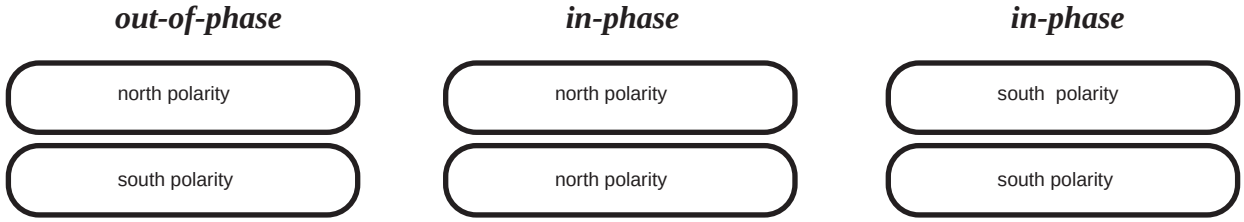
Coil Polarity. Normally, the positive (hot) wire from each pickup is attached to the positive wire going to the amplifier (the tip connection on your guitar plug) And normally, the negative pickup wire is attached to the ground wire going to the amplifier (the shield connection on your guitar plug).

When two or more pickups are used together where one of them has its positive and negative leads reversed (positive to negative and negative to positive), the pickups are *out-of-phase*. The lower frequencies are cancelled with out-of-phase pickups, resulting in less output and more treble. A double pole, double throw switch (DPDT) can be installed as shown below to allow choice of phase.



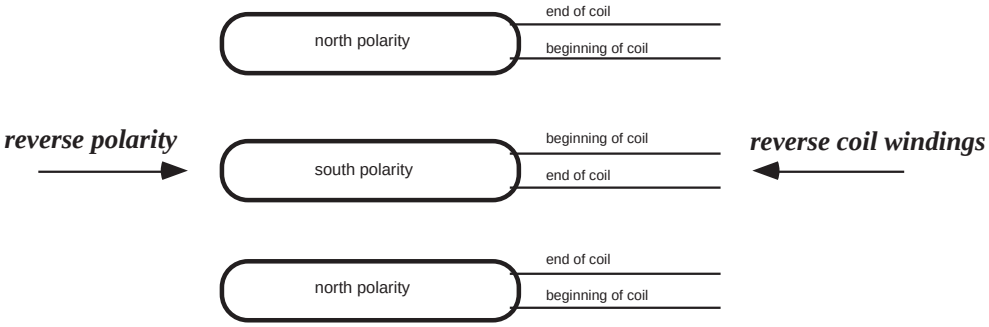
Magnetic Polarity. When both pickups have the north magnetic polarity or both have south magnetic polarity, they are said to be in-phase. Phase can be changed with magnetic polarity, as well as with coil polarity. When two or more pickups are used together with opposite magnetic polarity, they are said to be out-of-phase.

Changing Phase By Magnetic Polarity



Hum Cancelling. If coil polarity and magnetic polarity are opposite on a pair of pickups they will operate in phase (normal) *with hum cancelling.* ***HIP TIP:*** To get this situation on a guitar which has a single coil pickups in the middle position, buy the middle pickup in a "reverse wound/reverse polarity" configuration.

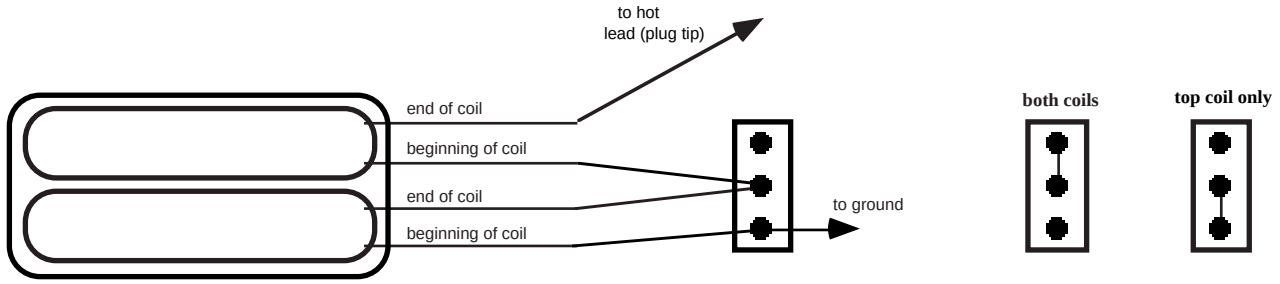
Reverse Coil Windings, Reverse Magnetic Polarity on Center Pickup To Cancel Hum



Coil Splitting and Coil Tapping.

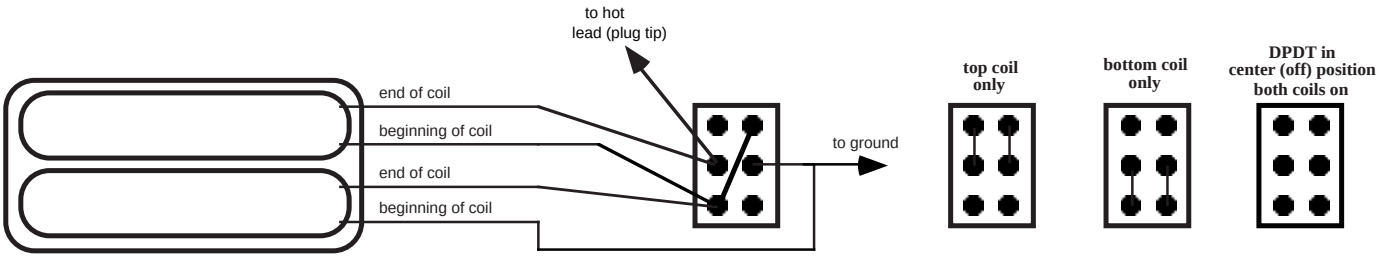
Coil Splitting. To get a single coil sound with a humbucking pickup, it can be wired to a switch providing the option of one coil or both. The pickup must have 4 wires, one for the beginning and end of each coil. With a single pole, double throw switch, you can choose single or double coils, but cannot choose which single coil.

Coil Splitting a Humbucking Pickup to Choose One or Both Coils With a Single Pole, Double Throw Switch



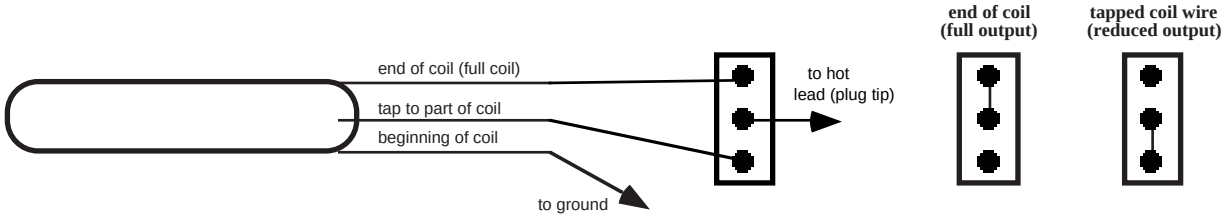
Using a double pole, double throw switch (DPDT) which has a center-off position, you can choose *either* single coil or choose both coils. This gives you three possible sounds, however the single coils will sound almost identical.

Coil Splitting a Humbucking Pickup to Choose One or Both Coils With a Double Pole, Double Throw Switch



Coil Tapping. To get two sounds out of a single coil pickup, it can be purchased with a "tap" wire, connecting near the middle of the coil wire. This provides a lower output sound with the wire tapped to part of the coil and full output with the end-of-coil wire. A single pole, double throw switch is employed to allow choice between full output or tapped (reduced) output.

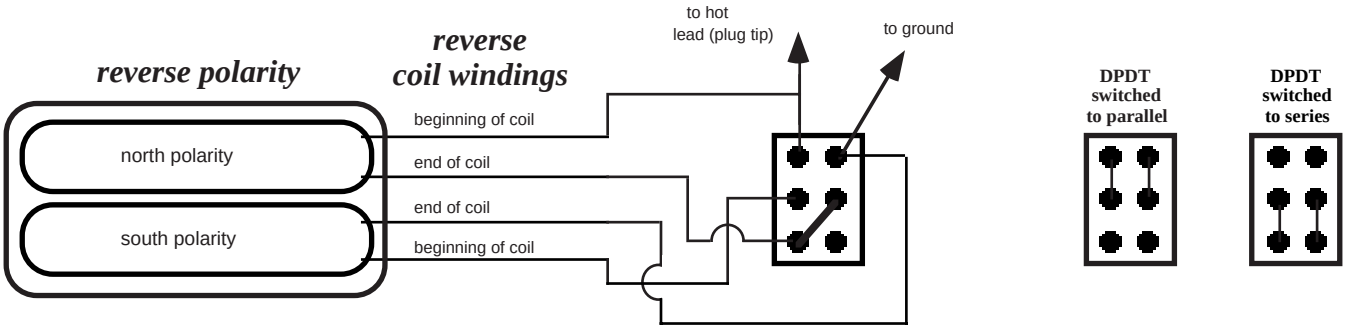
Wiring a Coil-Tapped Pickup to Allow Reduced or Full Output



Series and Parallel Wiring of Humbucking Pickups.

Traditionally, humbucking pickups are wired in series. The series-wired humbucking pickups you are already familiar with are full-bodied in tone, but often lack highs.

Wiring a humbucking pickup in parallel decreases the lows and increases the highs. This is a good alternative when you want more of a single coil pickup characteristic, while retaining the humbucking characteristic. Any humbucking pickup with separate leads for each coil can be wired to a double pole, double throw switch (DPDT) to allow choice between series and parallel.



As far as I know, any 4-conductor or 5-conductor humbucker provides series/parallel capability, with the use of a double pole, double throw switch.

G. SHIELDING AND POTTING

Shielding reduces hum and other unwanted noise by sending it to the ground in your amplifier. By using metals that *conduct electricity but do not have magnetic properties*, you can direct the signal from the pickups to the amplifier without adding any unwanted hum. Heavy duty aluminum foil can be applied to the underside of pickups and the inside surfaces of pickup and control cavities in a guitar (not touching the hot or positive leads), then connecting to the ground wire going to the amplifier.

The common technique of grounding the guitar circuits to the bridge is very effective in reducing hum, but in certain cases (such as ungrounded two-prong AC cords), can put you in danger of electrocution! Whenever you can obtain sufficient noise reduction with shielding, it is preferable.

Shielded Cable. Always use shielded cables for your guitar. Use cables less than 20 feet long (unless you have a low impedance guitar, which is rare). Braided shielding wire is preferable to spiral-wrapped (unscrew the jack cover to look at the shielding). Additional foil shielding is even better.

To test cable shielding, turn your guitar volume off, connect it to an amplifier with the cable in question. Turn the amplifier up fairly loud. If you have reverb, turn the reverb up high. Tap briskly on the chord. If you hear the taps in the amplifier, the shielding is poor. Even the best cables may produce the tapping sound faintly, so compare with other cables.

Potting. Most good pickups are encased in a resin or waxlike substance to prevent unwanted feedback (microphonic squeal).

CHAPTER 3:
AMP AND SPEAKERS

A. Fender, Marshall and Vox Tube Amplifiers

Most electric guitarists use tube amplifiers for a warmer tone. The classic Rock, Blues, Metal and Country amplifiers are Fender, Marshall and Vox.

Three Important Rules for Tube Guitar Amps.

1. Use only *matched* power tubes. These are sold in pairs or quads (sets of four), where the bias reading for each in the set varies no more than around 5 millivolts.
2. Change your power tubes after every 100 hours of loud playing, 150 or so hours of moderate volume playing. Every time you change power tubes, the bias *must* be set by a qualified technician. Failing to have the bias set can cause damage to the amplifier circuit and undesirable tone.

   You can request that your technician bias your amp on the low end of tolerance for a warmer, smoother sound; or on the high end of tolerance for more edge.
3. The remaining tubes in your amp should usually be changed about every 200-250 hours of use. Coordinate their change with one of your power tube changes and have the technician check out the general performance of the amp at the same time.

Fender. In the 1940's, Leo Fender began building guitar amplifiers with circuit designs based on RCA and Western Electric circuits. Leo sold the company to CBS in 1965. The pre-CBS Fender amps are generally preferred, but some CBS Fenders are fine, too.

Small tweed and blackface (control panel) Fender amps are great for a sweet lead sound, but are not real loud, they must be miked in a concert. They include the Champ, Princeton, Harvard and Yale.

Midsize Fender amps can be good for lead and rhythm; particularly good for R&B, Blues and Soul. They include the Bandmaster, Bassman (yeah, its a bass amp, but Jim Marshall did OK with its circuit design when he based his 50 watt Marshall on it!), Super, Concert, Vibrolux, Tremelolux, Pro Reverb, Super Reverb.

Larger Fender amps are best for clean sounds like Country or Surf music. They include the Twin Reverb and Dual Showman.

Marshall. Jim Marshall and Kenneth Bran (the service manager of Jim's music shop) began building guitar amplifiers based on the Fender Bassman circuit and selling them with closed-backed cabinets with four 12 inch Celestion speakers.

My favorite Marshall is a Model JTM45 - 50 watt head (made before July 1969), a 50 watt JCM made July 1969 through 1970, a vintage reissue JTM45 or a Model 1962 "Bluesbreaker" (so-called because it was used by Clapton on the famed recording with John Mayall and the Bluesbreakers). 50 watt Marshalls are sweeter for lead guitar, particularly for Blues Rock or Classic Rock. Before buying a 50 watt Marshall, listen to the ones I mentioned above.

Marshall's JMP-1 preamp does a fine job of reproducing classic Marshall preamp sounds. Though it can be used with a Marshall tube power amp, I output it into the main output stage of a JTM45. This routing must be properly implemented by a qualified technician.

The finest-sounding 100 watt Marshalls are the Model 1959 with Plexiglass control panel, made from 1965 to July, 1969. In 1993, they were reissued as Model 1959S, 1959X and 1959SLP. 100 watt Marshalls tend to be better for Hard Rock or Metal.

Vox. Electrical engineer Dick Denny and Tom Jennings began selling Vox amplifiers in 1957. Unlike the Fenders and Marshall, the Vox amplifiers used Class A circuit design, which is technically less efficient but produces a very sweet and warm distortion. The Beatles and Rolling Stones used Vox model AC30 in the early and mid-sixties.

A Boogie *Caliber .22* uses the same EL84 power tubes as an AC30, and can sound similar. *Matchless* makes amplifiers very close to the Vox design, similar in sound with the proper EQ. Vox has reissued the AC30. It's well-made at the Marshall factory, but quite expensive.

B. HOW AMPS AND SPEAKERS WORK

Tube guitar amplifiers are based on radio amplifier circuits designed in the 1930's. They were mainly refined in the 1950's and early 1960's, and are basically the same today. Here are the four sections of the amp/speaker unit in the order in which the signal passes through them:

- The *power supply* transforms AC current from the wall outlet into high voltage DC current to run the amplifier circuits.
- The *preamp* and *signal processing stages* initially establish the tone and level of distortion. This gives you control over the gain, bass, middle (usually), treble, and sometimes presence. *Gain* is the amplifying power sent from the preamp to the main output stage. *Presence* adjusts the "bite" or "crunch" versus smooth sound in the upper mid-range (lower presence is smoother).

  A good preamp has a high signal-to-noise ratio: at high volume levels, there is low noise (hum or high-pitched squeal).
- The *power amp* stage amplifies the preamp signal to a much higher level. The *output tubes* (the largest tubes) work together to greatly increase the electrical current going to the p*ower transformer,* which "puts the brakes" on the signal so it can pass on to the speakers.

  As you turn the amplifier volume up, a good power amp produces a warm, smooth, round distortion. Without matched output tubes and a good power transformer, your amp is useless.
- The *speakers* receive the signal from the power amp. A speaker has a round magnet with a round hole in the middle. The *voice coil* (a coil of wire is wrapped around a cylinder) is inserted in the hole.

  Pulsing electric current from the power amp is applied to the magnet/coil assembly. This creates a magnetic field which causes the paper speaker cone attached to it to pulsate in and out. The pulsing speaker cone moves columns of air which vibrate bones and membranes in our ears, and voila, we hear!

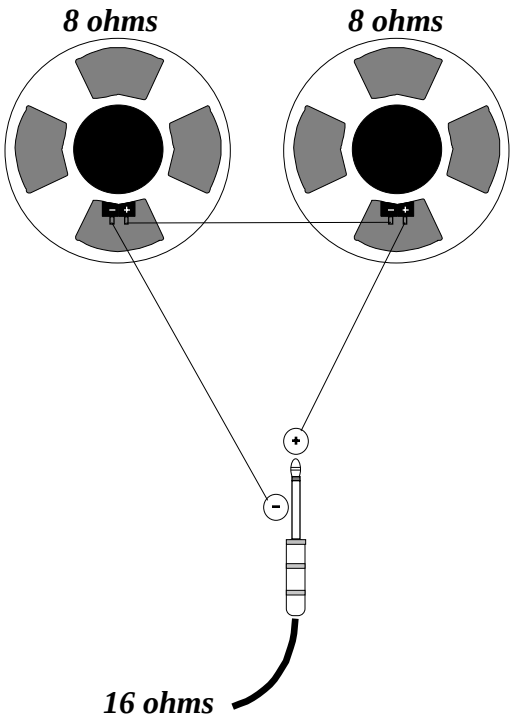
I feel safer having twice the wattage rating in speakers as an amplifier output rating. Without higher speaker wattage than amp wattage, you <u>can</u> blow a speaker . Also be aware that speakers in an open-backed cabinet are easier to blow than those in a closed-back cab.

The proper *resistance rating* of a speaker or (speaker cabinet) is critically important. Common ratings are 4 ohms, 8 ohms and 16 ohms. Find out what impedance your amplifier puts out and attach it to a cabinet that has the same resistance.

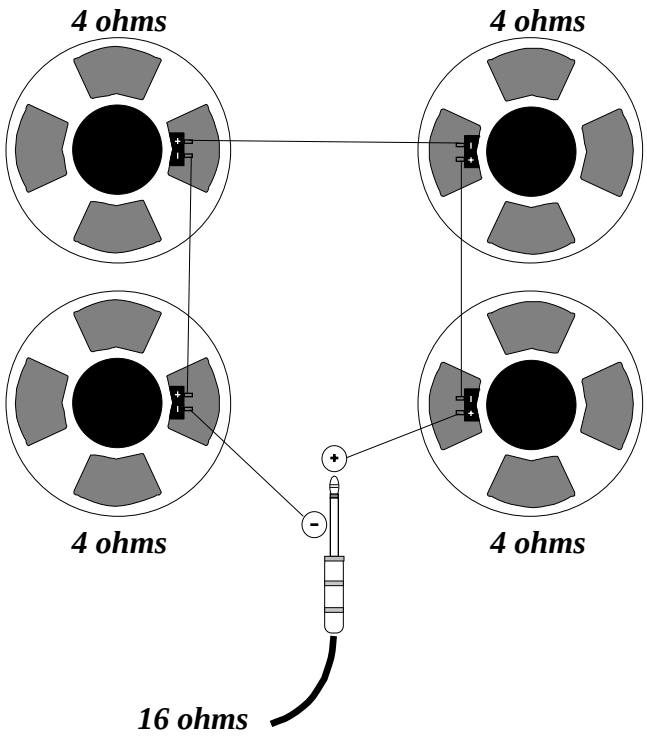
When two or four speakers are used in a cabinet, the resistance is determined by the way they are wired. The three common wiring schemes are *parallel, series, and series-parallel*. All speakers in each cabinet must have the same resistance rating. It sounds best if multiple cabinets are all open-back or all closed-back and that all speakers not only have the same resistance rating, but are the same brand and model.

With *series speaker wiring*, the ohm rating of all speakers in the cabinet are combined in calculating the resistance rating of the entire cabinet. Two 8 ohm speakers wired in series constitute a 16 ohm cabinet. Four 4 ohm speakers wired in series make a 16 ohm cabinet. Here is an illustration:

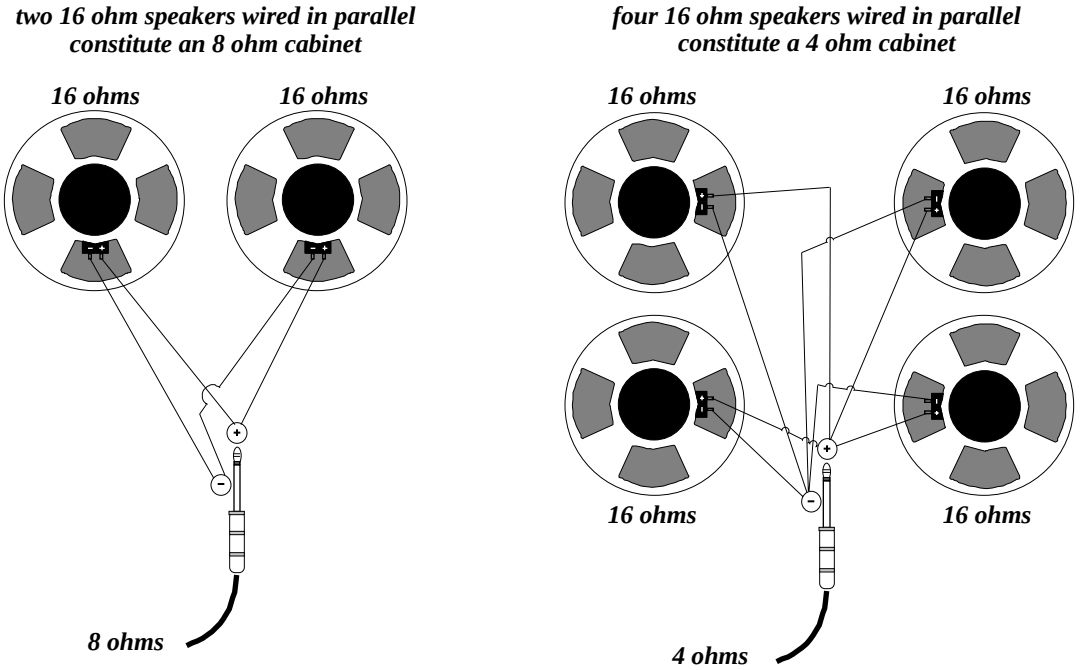
two 8 ohm speakers wired in series constitute a 16 ohm cabinet



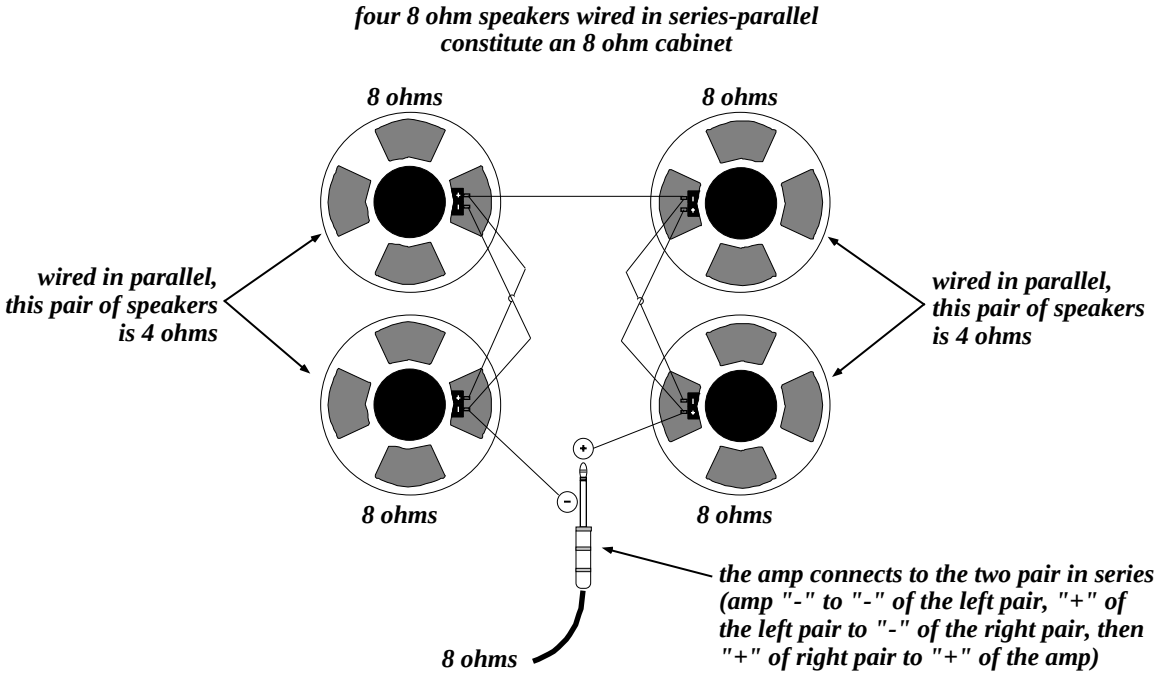
four 4 ohm speakers wired in series constitute a 16 ohm cabinet



To calculate the resistance of a cabinet with *parallel speaker wiring*, the ohm rating of one speaker in the cabinet is divided by the number of speakers in the cabinet. Two 16 ohm speakers wired in parallel constitute an 8 ohm cabinet (16 divided by the number of speakers). Here is an illustration:



Cabinets with four speakers are often wired *series-parallel* to achieve a desired resistance rating not available with *series* or *parallel* alone. This wiring scheme divides the speakers into two groups (with two speakers in each group). Each pair of speakers is wired parallel, making the pair half the resistance rating of a single speaker. Then, thinking of each pair of speakers as a unit, the two pairs of speakers are wired in series. The series wiring of the pairs doubles the resistance rating, making it equal to that of a single speaker. Cool, eh?. Here is an illustration:



C. OPEN-BACK VERSUS CLOSED-BACK SPEAKER CABINETS

Open-back speaker cabinets have a sweeter and clearer mid range and upper mid-range. They theoretically have a better bass response (are better are reproducing low range frequencies). Since the air is not enclosed in a box, the speaker cone (the cone-shaped paper part of the speaker) is free to move in and out enough to represent the low frequencies.

However, an open-back enclosure allows the vibrations from the *back* of the speaker to mix in the room with vibrations from the *front* of the speaker. This mixture causes a phenomenon called *phase cancellation*, which cancels out part of the sound, thinning it out. This thinner sound has less detail, so it is easier to hear.

Closed-back speaker cabinets (also called *infinite baffle enclosures)* have a fuller sound, since they don't have the phase cancellation characteristic of open-back cabinets (see above). However, since the back of the speaker cannot send air vibrations into the room, air pressure restricts the movement of the speaker cone and limits the low frequencies. The smaller the speaker cabinet, the more the lows are limited. With larger cabinets like Marshall 4X12" cabinets, there is less limiting of the lows.

By cutting a hole in the baffle board (the board the speaker is mounted on), an effect is produced similar to blowing air over a bottle. This hole is called a *port.* Putting ports on a closed-back guitar cabinet can give it a "boomy" sound, which is sometimes useful.

Demonstrations of various speakers and cabinets are shown on the video.

D. GUITAR, AMP AND SPEAKER SETUP

During this procedure, do not push your ears and speakers beyond what they can handle. It is a good rule to use speakers with twice the wattage capability as your amplifier puts out, especially when you turn the volume over half way up. Your ears are in greatest danger in a small room or directly in front of a speaker.

Find the guitar, pickup, amplifier and speaker combination you want. You may decide to change guitars or speakers when you don't get the sound you are looking for, but stay with the same amplifier, so you can find a good combination for it. It's a good idea to read this chapter along with the previous chapter on guitars and pickups before following the procedures below.

Make sure your amp is in good working order. The output tubes should be matched. The amplifier should be properly biased by a technician, every time you change power tubes. If your amplifier has a speaker resistance setting (4 ohms, 8 ohms, etc.), it should be set correctly for the speakers you attach.

Turn all your effects (reverb, chorus, etc.) off, or better yet, disconnect them from your effects loop or other part of the signal chain. Set all tone and equalization to center points. If your bass, middle, treble and presence controls go up to "10," set them to "5." If you are using an equalization device, select "bypass" "EQ off," or set all controls to "0 db."

Tone can be greatly affected by the type of pick you use, the manner in which you contact the string and the point (on the length of the string) at which you pick.

E. DISTORTING THE POWER AMP

If you have a master volume control on your amplifier, turn the preamp all the way down, then turn the master volume all the way up. If you do not have a master volume, the control marked "volume" control increases the preamp level and the main output section is always on full.

Gradually increase the preamp level. As you increase the level of the preamp section (with the master up full), the tone will get fatter. Ranging from low to high volume settings, you will hear *clean tone*, then *compression*, then *soft clipping*, then *hard clipping*. When you reach the hard clipping volume level, the attack gets abrupt and thumpy. The tone may break up in a "chunky," undesirable manner. Vintage distortion uses soft clipping. Heavy metal uses the upper range of soft clipping through the beginning of hard clipping.

Now reduce the preamp level to where the tone is fat, warm and sweetly distorted. This is usually the highest level you will want to run your power amp. Think of this as your *power amp distortion reference setting.* Come back to this reference setting when you look for various distorted sounds.

F. USING POWER AMP DISTORTION

Distorted sounds with a master volume control. Find your *power amp distortion reference setting* (read above). If you have a master volume control, turn it down in small increments as you turn the preamp up in small increments. Stop when you have the desired amount of distortion. The further you increase the preamp and decrease the master volume, the more you lose the guitar string tone and add fuzz.

Distorted sounds with a distortion footpedal device. Find your *power amp distortion reference setting.* Distortion footpedal units usually have one control for distortion and another for volume. They are usually transistor amplifiers. More transistor distortion usually requires a softer attack to compensate for the abrubt envelope they cause.

Set the footpedal distortion very low (not so low that signal doesn't pass through it). Turn your amplifier volume down in small increments as you turn the footpedal distortion volume up in small increments. Stop when you have the desired amount of distortion. The further you increase the distortion footpedal volume and decrease the master volume, the more you lose the guitar string tone and add fuzz.

If you want even more fuzz with your distortion footpedal (after following the procedure in the paragraph above), incrementally increase the level of the *distortion control* on the footpedal , while incrementally decreasing the preamp volume on the amplifier. If your amplifier has no master volume, the "volume" control adjusts your preamp volume.

You may also combine the two previous procedures, by first setting up a mildly distorted tone with the master volume control procedure, then fine-tuning the distortion with the footpedal procedure.

CHAPTER 5: EQUALIZATION

SHAPING THE TONAL CHARACTER

"Hey, its no big deal. Equalization is just tone control!" Guitar amp tone controls usually divide the sound into three sections or *frequency bands.* The bands are called bass, middle and treble. On a graphic EQ (equalization device), the bands are named after the area of sound they adjust, in vibrations per second. If a band is labeled "100" "100 cps" (cycles per second) or "100 Hz." (100 Hertz), it adjusts the area of sound with around 100 vibrations per second. If a band is labeled "1.3 k" or "1.3 k Hz.", the "k" multiplies by 1,000, so the band adjusts the area around 1,300 vibrations per second.

A. THE HARMONIC CONTENT OF A NOTE

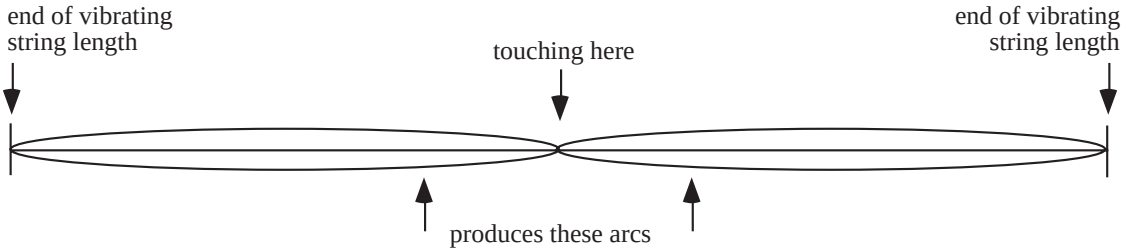
As a string vibrates, it causes columns of air to vibrate, which in turn cause the resonating bones and membranes in our ear to vibrate. Every musical note is tuned to a specific *frequency*, or number of vibrations per second. The *fundamental* frequency is the loudest and most apparent part of a note, except with extreme distortion. Distortion is the fuzzy tone produced by soft clipping (see Chapter 3, Section E). It is technically called *harmonic distortion.* since it ads other notes to the sound, called *harmonics.*

We tune to the fundamental when using an electronic tuning device. The first string, fifth fret "A," for example, is tuned to 440 vibrations per second. Vibrations per second are referred to as *cycles per second,* abbreviated *cps.* A note one octave lower vibrates half as fast, so down an octave from "A," 440 cps, is "A," 220 cps. Conversely, a note up an octave vibrates twice as fast, so up an octave from "A," 440 cps, is "A," 880 cps.

For simplicity, we refer to the vibrating frequency of notes according to their fundamental. However, each note is not one speed of vibration, but many different speeds of vibration occurring during the notes sustain. Tonal detail is determined by the harmonics contained in the note. A note with more harmonics is not necessarily good. We must hear the particular combination of frequencies and their relative volume levels to judge the tone.

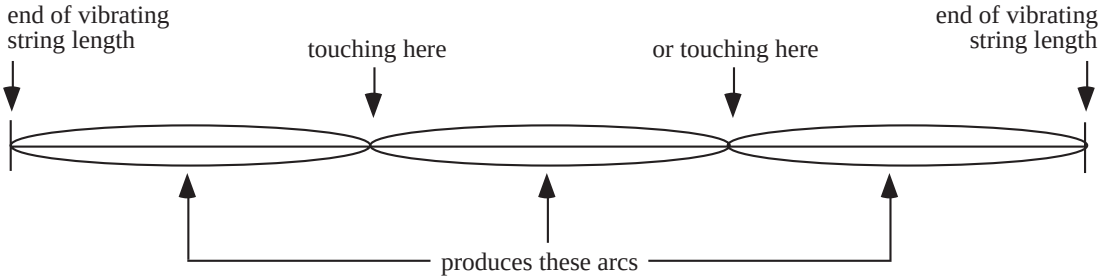
As a string vibrates, the fundamental vibrates at a certain number of vibrations per second, say 110, for example. Periodically, it vibrates in two arcs at half its length, *twice as fast as the fundamental.* These two arcs sound the first harmonic, and vibrate at 220 vibrations per second (or 220 cycles per second, abbreviated *cps).* You can hear this harmonic by playing an open string while touching very gently over the twelfth fret.

The First Harmonic



A string with its entire length vibrating 110 times per second vibrates periodically in three arcs as well, dividing in thirds, at 330 cps (cycles per second, or vibrations per second). To hear the second harmonic divide the string into thirds, touch an open string very gently directly over the seventh fret, while playing it. Other arcs occur periodically at 1/4 the string length (440 cps), 1/5 the string length (550 cps), and so on.

The Second Harmonic



In musical terms, these harmonics have the following relationship to the fundamental:

harmonic	*speed of vibration*	*musical interval above harmonic*
first harmonic	2X the fundamental	one octave
second harmonic	3X the fundamental	one octave and a perfect fifth*
third harmonic	4X the fundamental	two octaves
fourth harmonic	5X the fundamental	two octaves and a major third†
fifth harmonic	6X the fundamental	two octaves and a perfect fifth*

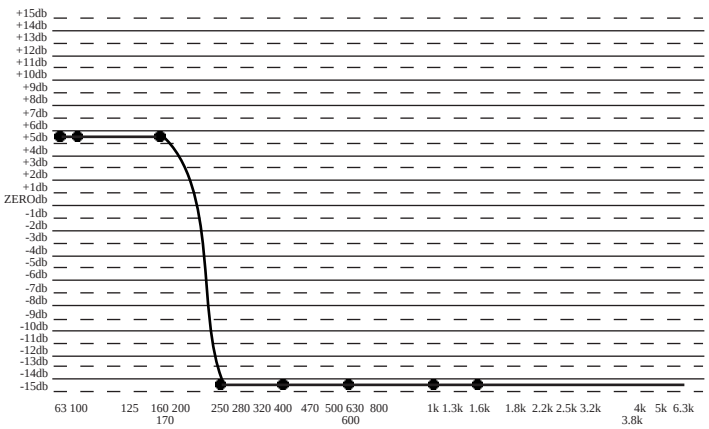
* slightly flat
† slightly sharp

B. EQUALIZATION AND FREQUENCY BANDS

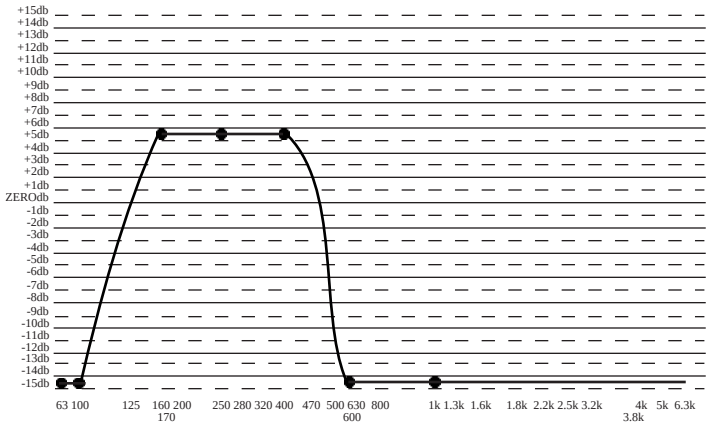
Tone is determined by the relative volume levels of the various harmonics which occur with notes. If you isolate a note and omit its harmonics, it loses all its character (or tone color). Tone controls don't give control over the relative volume levels of specific harmonics for each note. They can, however, set up a general scheme for notes within a certain range (say that of a guitar, for example).

The frequency range of a guitar is 82.407 cps (sixth string, open "E") through 1174.7 cps (first string, twenty-second fret "D"). The following demonstration is on the video:

"Here is the fifth string, open "A", which vibrates at 110 cps. The equalization device is adjusted to amplify the frequencies around 110 cps and silence all other frequencies."



"Here is the first harmonic of fifth string, open "A," which vibrates at 220 cps (2 X 110cps). The equalization device is adjusted to amplify the frequencies around 220 cps, where it occurs, and silence all other frequencies."



Equalization is the selective adjustment of various ranges of pitch. When working on a guitar and amp tone setup, I usually play examples in low, middle and high ranges. A tone setup may sound fine in one range of pitch and not in another. Each range of pitch is called a *frequency band*. Bass, middle and treble controls on an amp might be enough with certain guitar and amp combinations. However, you may often want more tonal definition than the three basic amp tone controls provide.

C. EQUALIZATION DEVICES

Rack-mount and Foot Pedal Type Equalization (EQ).

Equalization (tone control) devices are available in rack-mount and foot pedal type units. They split the full range of sound into five or more *frequency bands* and can add or subtract volume for each band.

The rack-mount units are usually higher quality. Before committing to an EQ unit in your signal chain, set all the band controls to zero decibels (0 db) and compare the tone of your guitar with and without the unit. Listen for hiss and hum. This should show you if the unit is going to degrade your guitar sound.

Graphic equalization is the most common type of active tone control. Graphic EQ usually has fixed bandwidth, where each control adjusts a specific range of the tone. They usually divide the audible range of tone into from five to fifteen bands.

Each band is controlled with a vertical slider. The sliders have a center point at zero decibels (0 db, or zero change in air pressure). At this center point, the tone for that band should be unchanged. Moving a slider up will increase the volume for that bandwidth, and moving it down will decrease the volume for that bandwidth. The slider on the far left controls the lowest bandwidth (range of tone) and each slider to the right controls a higher bandwidth.

Parametric equalization is another type of active tone control. It can select a bandwidth center, the range of tone (bandwidth), then increase or decrease the volume level for the band you've defined. Parametric EQ's usually have three to five bands, much fewer than graphic EQ's. Once the band centers and band widths are defined, it is easier to adjust, since you are dealing with fewer bands.

In choosing graphic versus parametric EQ's, remember: *graphic EQ's* give you more bands, with the ability to adjust *only* the volume of each band; *parametric EQ's* give you fewer bands, but with the ability to define the center, width and volume for each band.

View the demonstration of equalization devices on the videotape.

D. GUITAR & AMP SOUNDS WITH EQ

Your EQ will not necessarily have the same frequency bands as mine. Copy the frequency curve, so that if you drew a chart of your EQ setup and connected the dots (as I've done below), the curve would look much the same.

The column at the far left of my EQ chart shows overall level. Most EQ units have such a control. If yours does not, you will have to keep the shape of the frequency curve and move all frequency bands up or down the prescribed amount. For example, if my "LVL" control shows +3 db, you would have to add 3 db to all your frequency bands.

1. Compensating For the Use of a Substitute Guitar Pickup.

The Hendrix "Watchtower Intro." tone setup below used a vintage style Van Zandt Blue pickup in Chapter 4, Section B. What if you didn't have a vintage pickup? The setup below shows compensations made with an EQ device. Copy the frequency curve with your EQ.

The compensation could have involved changes on the amplifier *and* the use of EQ, but I wanted to let you see all the changes on the EQ setup.

Hendrix's "Watchtower Intro." Tone, Substituting A Duncan Quarter Pound Neck Pickup.

If your amps have a master volume, set it to 8 or 10.

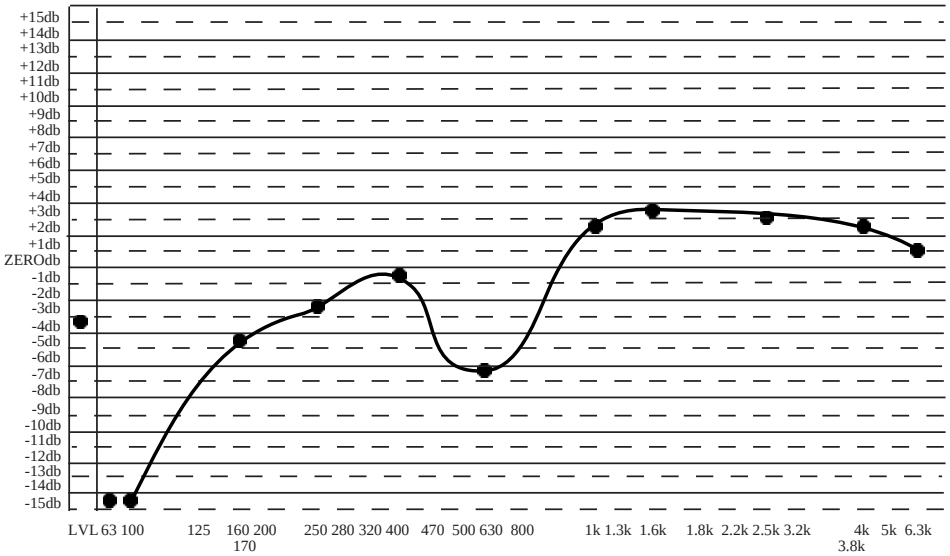
Guitar	*body type*	*bridge pickup*	*middle pickup*	*neck pickup*
Stratocaster	solid	vintage alnico	vintage alnico	vintage alnico

I used a Duncan Quarter Pound neck pickup (actually *next-to-neck*, on my guitar).

Amp	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Marshall	100	Celestion Greenback	4	25	closed-back

growth & decay envelope

volume bass middle treble presence



2. Compensating For the Use of Substitute Speakers.

In Chapter 4, Section B, the Clapton "Bluesbreaker" tone setup below used two Celestion Greenback speakers in an open-back cabinet. What if all you had was a 4X12" cabinet with Celestion Vintage 30 speakers? The setup below shows compensations made with an EQ device. Copy the frequency curve with your EQ.

The compensation could have involved changes on the amplifier *and* the use of EQ, but I wanted to let you see all the changes on the EQ setup.

Clapton's Bluesbreaker Tone, Substituting A 4X12" Cabinet With Vintage 30 Celestion Speakers.

Clapton's solo tone with John Mayall's Bluesbreakers and with Cream is very similar. His Bluesbreaker tone was mildly distorted, but full-bodied.

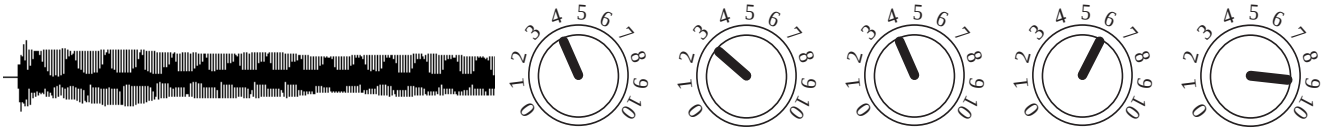
Guitar	*body type*	*bridge pickup*	*middle pickup*	*neck pickup*
Gibson Les Paul	solid	stock PAF type (knob tone 2.5)		stock PAF type (knob tone 2.5)

I used the neck and bridge pickups on a 335. I had to boost the input 4 db to match Clapton's pickups.

Most solid body guitars with moderate output humbucking pickups will do.

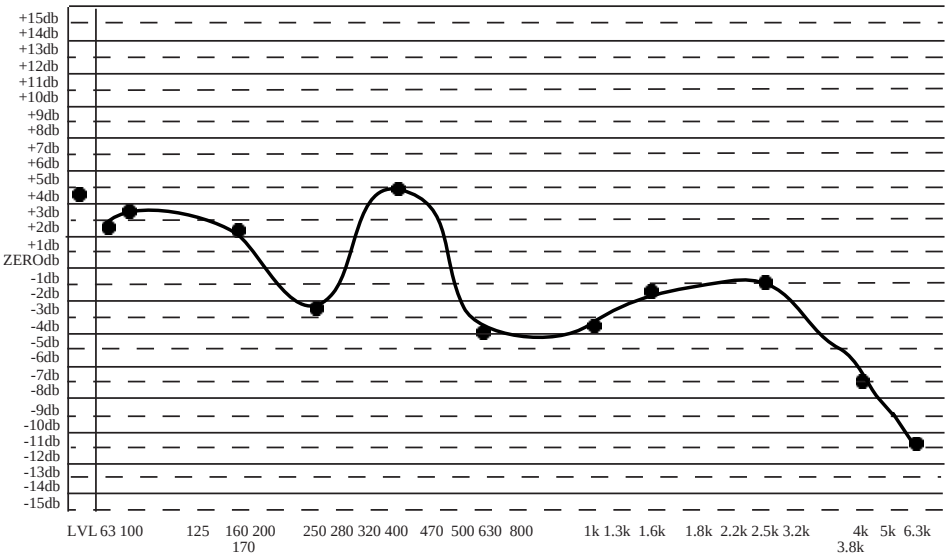
Amp	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Marshall 1962 "Bluesbreaker"	50	Celestion Greenback	2	25	open-back

I used a '69 Marshall 50 watt head,
but substituted Vintage 30 speakers for the 25 watt Greenback speakers.



growth & decay envelope | presence | bass | middle | treble | volume

I compensated for changing the speakers with the EQ shown below.



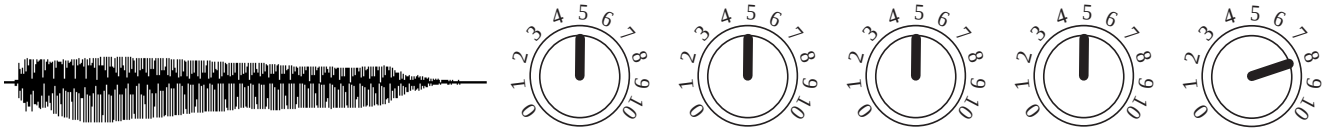
3. Compensating For the Use of a Substitute Amplifier.

Tough One: Substituting a Fender for a Marshall (note the similar envelopes).

Guitar	*body type*	*bridge pickup*	*middle pickup*	*neck pickup*
Charvel Strat	solid	Pearly Gates		

Here's the Marshall setup:

Original Amp	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Marshall	50	Celestion Greenback	2	25	open-back



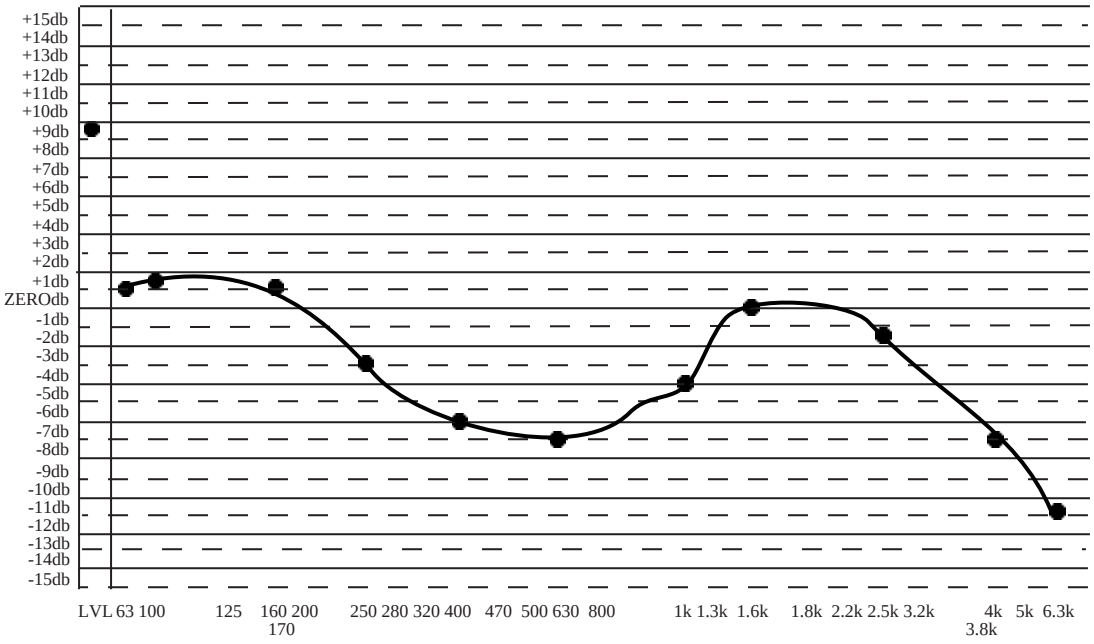
growth & decay envelope | presence | bass | middle | treble | volume

To approximate the tone with a Fender Twin Reverb, I set the amplifier and EQ as shown below.

Substitute Amp	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Fender Twin	80	JBL	2	45??	open-back

I used two 12" Black Shadow 90 watt speakers, each in an open-backed cabinet.

growth & decay envelope | bright | treble | middle | bass | volume



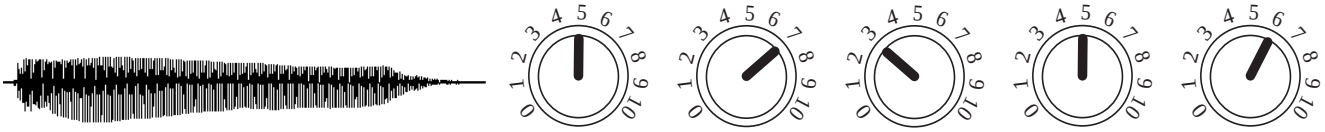
The Vox AC30 Amp Tone.

The Beatles "Revolver" Sound. For the exact, authentic sound heard on the Beatles *Revolver* LP, use a Gretch Model 6120 or Country Gentleman guitar into a mid-sixties British *V*ox AC30 top boost combo amp. If you don't want to spend over $4,000 for this guitar and amp combination, here's a reasonable alternative: Use a thin hollow body electric like a 335 on the bridge pickup or bridge and neck pickups with the volume set to 7 on the guitar. Play through a 50 watt Marshall, as shown below.

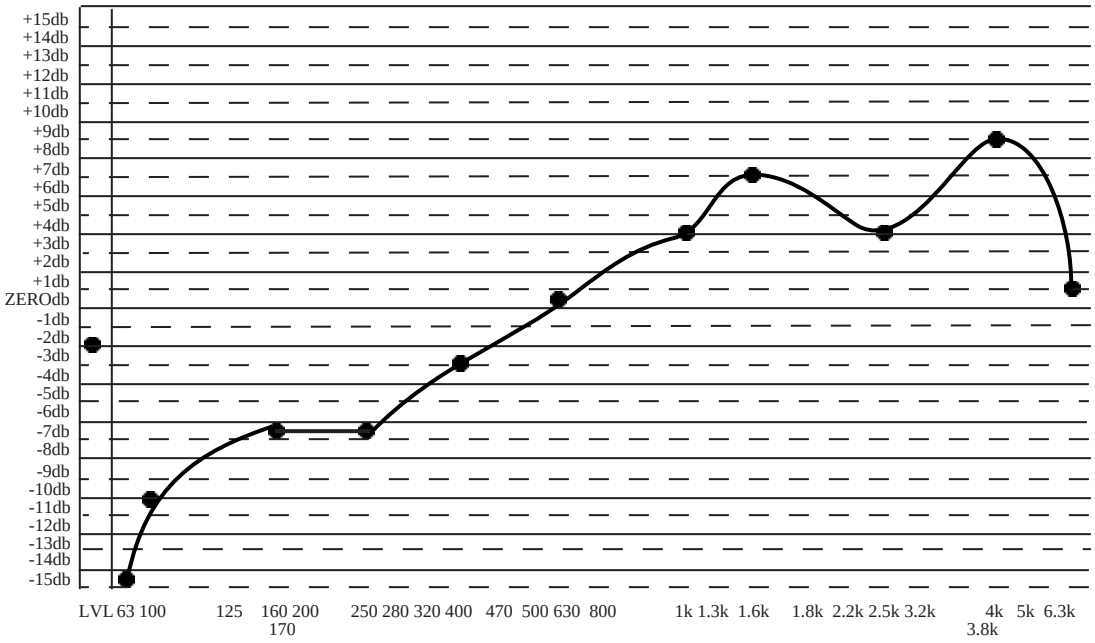
Guitar	*body type*	*bridge pickup*	*middle pickup*	*neck pickup*
Gibson 335	thin hollow	stock PAF type		stock PAF type

(pickups could be Duncan Alnico II Humbucker, Duncan Pearly Gates, Duncan '59, Duncan Custom, or DiMarzio PAF,)

Amp	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Marshall	50	Celestion Greenback	2	25	open-back



growth & decay envelope | presence | bass | middle | treble | volume



4. Compensating For the Inability of Your Equipment to Produce A Sound You Imagine.

"General Jeff Beck Tone" Setup I Used for Tut (Book 2 CD).

On *Tut*, I was going to play a Jeff Beck style solo, and wanted an appropriate tone. I decided to use a combination of Fender and Marshall. The Fender amp would help bring out the fret noise characteristic of the Strat sound. The tone controls on the Fender Twin Reverb and Marshall JMP-1 were not sufficient to get the tone I wanted, so I used the EQ setup shown below (on the frequency curve drawing).

Guitar	*body type*	*bridge pickup*	*middle pickup*	*neck pickup*
Stratocaster	solid	vintage alnico	vintage alnico	vintage alnico

I used a Duncan Pearly Gates bridge pickup split to one coil and a Van Zandt Blue middle pickup.

Pickups could be Van Zandt Blue, Duncan Vintage Staggered, Fender Lace Gold or Blue, DiMarzio Class of '55.

First Amp of Two	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Fender Twin	80	JBL	2	45??	open-back

I used two 12" Black Shadow 90 watt speakers, each in an open-backed cabinet.

growth & decay envelope

bright

treble

middle

bass

volume

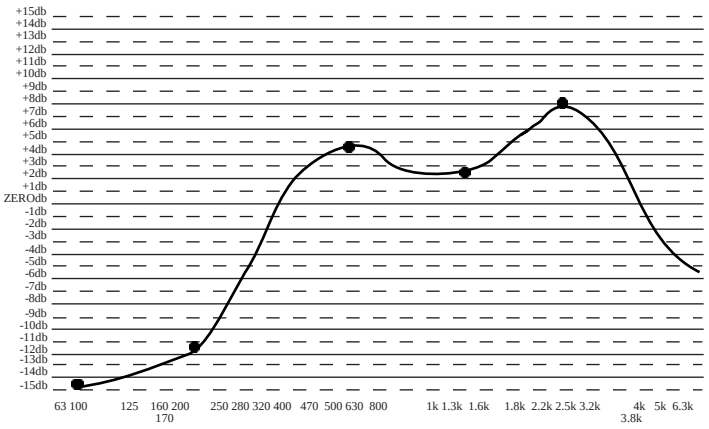
Second Amp: JMP-1. Preset Name: MORE GARY (FACTORY PRESET 16)

MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ				
				BASS	MID	TREB.	PRES.	LO (100 CPS)	LOMID (220 CPS)	MID (600 CPS)	MIDHI (1.5K)	HI (2.5K)
OD2	ON	15	10	1	6	-6	3	-18	-12	+4	+2	+7.5

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 6, speakers in open-backed cabinet and 40-50 watt Fender, volume on 5; speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



Albert King Tone Setup I Used for *Albert* (Book 2 CD).

I don't know what Albert King used on *I'll Play The Blues For You*, but here's what I used to get the tone. The amp sounded like a Fender. The guitar sounded thin, but gutsy. The Danelectro pickup provided the gutsy tone. To thin out the tone, I used the middle pickup out-of-phase. You can also get this sort of guitar tone with neck and bridge vintage humbucking pickups out-of-phase (PAF Gibson type).

Guitar	*body type*	*bridge pickup*	*middle pickup*	*neck pickup*
Telecaster	solid	Duncan Classic Strat Stack, split to one coil	Duncan Alnico II Tele, out-of-phase	Danelectro

Amp	*amp watts*	*Speakers*	*number of*	*watts each*	*cabinet*
Fender Twin	80	Celestion	2	25	open-back

growth & decay envelope

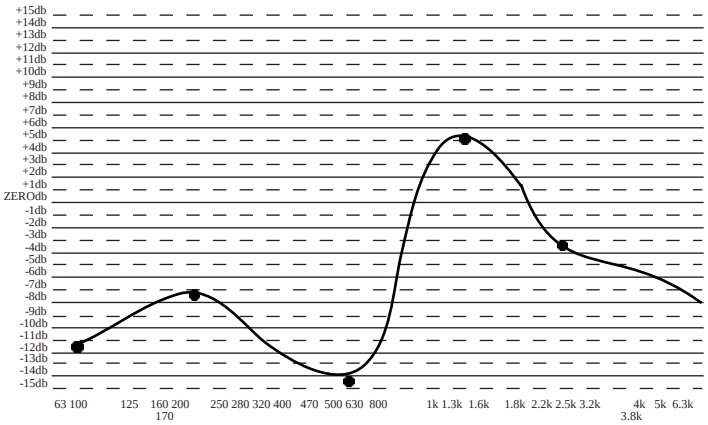
bright

treble

middle

bass

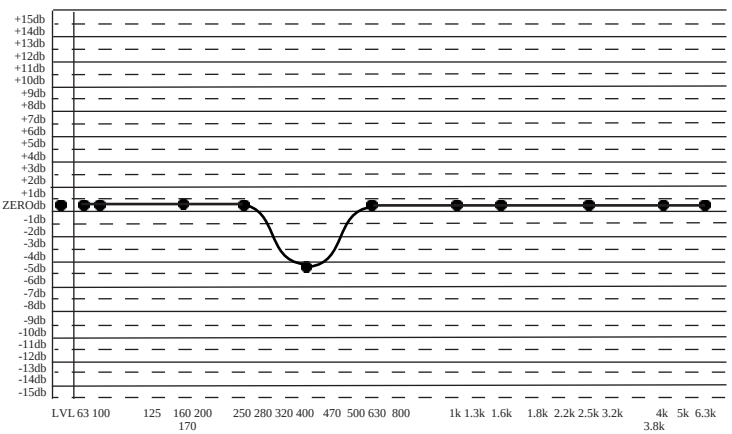
volume



5. Using EQ to Limit Unwanted Sounds.

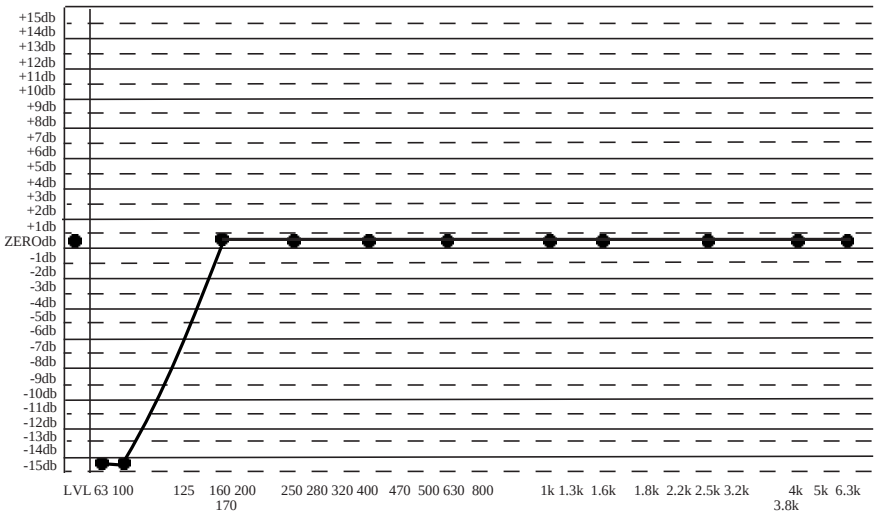
Reducing "Pick Slap."

Pick noise during the attack can be reduced by attenuating a frequency band around 500 Hz., but don't reduce the frequencies below 400 Hz. too much, since they help to mask the pick slap. Of course, you will be changing your guitar tone, but a drop in level around 500-600 Hz. is one characteristic of the classic Stratocaster tone.



Reducing 60 Cycle Hum.

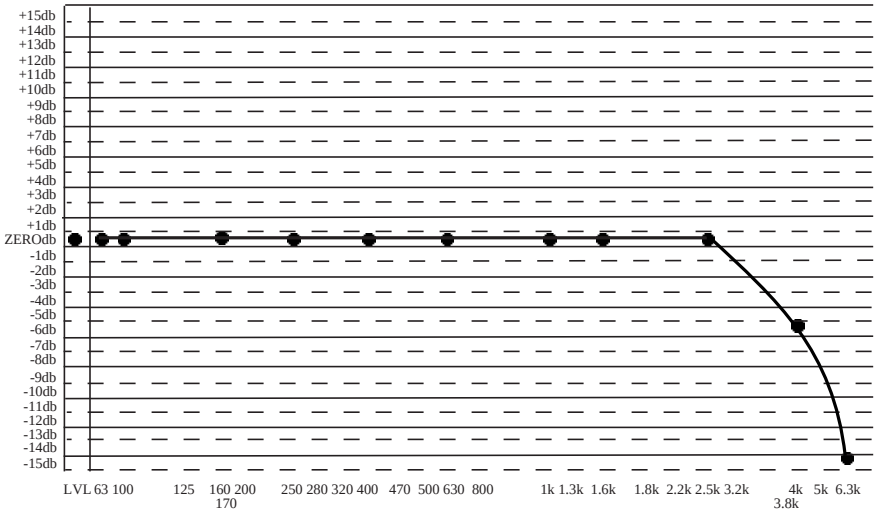
The low hum you hear coming from your amplifier when you are not playing is mostly the 60 Hz. hum produced by the power supply in your amplifier. It becomes louder when your amp is set for greater distortion. It is often necessary to turn the lowest frequency bands down to reduce the hum, at the risk of compromising your tone.



Compensating For Increased Hiss or High Frequencies When Using Time Delay or Reverb.

Lower quality time delay or reverb units often add a slight hiss to the upper range, which can be compensated by decreasing the level of the highest frequency bands.

Natural echo and reverb typically has a different tone than that of the original sound. Lower frequencies travel farther without fading out, so echo and reverb often need to have the high frequencies reduced to sound natural.



Compensating For Room Acoustics.

Your guitar is never going to sound the same in the back of the performance space as it does in front of the amp, so get out there and listen to it while someone else plays your guitar. You usually need to add highs to account for the fact that lows carry farther and since highs are absorbed by materials like clothing, rugs, etc.

CHAPTER 6:
MIKING AND NOISE REDUCTION

A. Microphone Placement

The most common microphone placement is one foot in front of the speaker, around one foot above the floor, pointing somewhere between the voice coil (center) and outside of one speaker. For more treble, point the mike closer to the center of the speaker and/or toward the top of the cabinet. For more bass, point the mike closer to the outer edge of the speaker and/or toward the bottom of the cabinet.

I usually point the mike a little closer to the outside of the speaker cone, toward a 4 o'clock or 8 o'clock position on the cone, for a smoother sound. Moving closer to the speaker gives more presence ("bite" or "edge"), especially near the center. Moving further from the speaker gives less presence and more reverberance.

If you use more than one mike, listen carefully. Two or more mikes can produce a thin sound or muffled lows. The microphones pick up a different part of the air wave emitting from your speakers which causes phase cancellation and phase shifting. Keeping multiple microphones over three feet apart usually avoids these problems.

B. The Microphone Preamp

The microphone preamps in most mixers and audio recorders are not sufficient for high quality reproduction. The microphone preamp should reproduce the sound heard in the speaker room so it sounds nearly identical when transferred to tape or to a PA (public address system). Studio quality microphone preamps start at around $500 for *each* channel. A good mike preamp has parametric EQ, compression and expansion, so it can compensate the tone and reduce noise.

In my favorite mike placement for recording, I use two mikes. One mike is one foot in front of the speaker and a foot above the floor, and a second mike is eight or ten feet away, in front of the speaker at five or six feet above the floor. The mikes go into a studio quality microphone preamp with parametric EQ.

The close mike is EQ'd with the low range attenuated to about -10db, with the mid and high range flat (no change). The far mike is EQ'd with the low range boosted to about +5db, with the mid and high range flat. I sometimes make a slight adjustment in the EQ of the high band for both mikes. I then adjust the level of one mike against the other to get the particular tone I want.

C. Noise Reduction, Expansion and Compression

Noise reduction units turn the signal down or off when it is below a desired level. They can do it immediately when a specified level is reached (gating), or they can gradually fade the signal off (fading). This eliminates any hiss, hum or other noise present when the instrument is not being played.

When using noise reduction with gating, make careful adjustment of the threshold. The threshold should be high enough that notes can still sustain, yet low enough that the signal is gated when noise like amp hum is present.

Expansion. *Expanders* function as noise reduction units when they are set so incoming signals below a prescribed level are decreased and signals above the prescribed level are increased. Unwanted hum and noise is usually below the level of guitar sound you want to preserve.

Recording with Dolby™ or DBX™. When hiss is present in a multitrack recording, noise reduction is useful. Noise reduction does, however, reduce some of the very high frequencies and take away some of the "live" qualities of the recording. Avoid using noise reduction on lead vocal tracks and guitar tracks whenever you can to preserve the presence and brilliance critical to those tracks. If a tape has been recorded with a particular type of noise reduction, it must be played back with the same type.

Compression makes soft notes and loud notes more equal in volume. It prevents you from playing too loud or too soft. *Compressors* have special amplifying circuits which increase the gain (volume level) when you play softer and decrease the gain when you play louder. By making the volume more consistent, compression can increase sustain.

CHAPTER 7: NEW TECHNOLOGY

A. RACK-MOUNT GUITAR PREAMPS

Beginning with the ADA MP-1 preamp, many rack mount guitar preamps have appeared on the market during the last decade. Most of them use the same 12AX7 tubes found in Marshall and Fender amplifier preamp sections. Here is a chart of the common rack-mount preamps and their basic features:

manufacturer	model	12 AX7's	channels or voices	EQ bands	other features	July 1994 price
ADA	MP-1	2	3	4	stereo chorus, programmable FX loop	$799.95
ADA	MP-2	2	10	9	stereo chorus, compressor, wah, tremolo, noise reduction, speaker emulation, real time MIDI, programmable FX loop	$999.95
ART	SGX2000 Express	2	3	5	reverb, chorus, flange, phasing, sampling, harmonic exciter, dual pitch transposer, space phaser, digital tuner, wah	$849
Digitech	GSP-2101	2	3	15	reverb, wah, tremolo, phase-shift, pitch shift, detuner, arpeggiator, chorus, flange, whammy effects, speaker emulator, stereo FX loop	$1099.95
Gallien-Krueger	100MPL	?	1	7	compression, chorus, noise reduction	$799
Groove Tubes	STP-G	3	1	0	5-position mid-boost selector, speaker emulator, treble-middle-bass boost switches,	$1000
Groove Tubes	Trio	5	3	0		$1200
Hughes & Kettner	Attax	1	3	3	stereo FX loops, recording out	$599
Mesa/Boogie	Studio	4	2	5	reverb, stereo FX loop	
Mesa/Boogie	Triaxis	5	8	0		
Rocktron	Chameleon	0	12	4+2	pentode/triode function, compression, tremolo, phaser, delay, reverb, chorus, flanger, pitch shift, speaker emulation	$1099
VHT	Pittbulll	?	3	7	FX loop, power amp simulator	$1595

My choices for rack-mount preamps are the ADA MP-2 and Marshall JMP-1. On the next few pages, I show the presets I've made up for those two units. The presets are basic sounds which I start with and usually modify to get a specific sound for a song.

The EQ settings and frequency curve shown for the MP-2 presets represent its built-in EQ. The JMP-1 does not have a built-in EQ. The EQ shown for the JMP-1 is a separate EQ device which I have used for all of the JMP-1 presets.

ADA MP-2: VINTAGE SOUNDS FOR GIBSON GUITARS

MP-2 Preset Name: ALTERNATIVE CLEAN

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE LO	TONE MID	TONE HI	TONE PRES.
SPANKY CLEAN	42		100	+2	0	+2	0

WAH IN/OUT	WAH MODE	WAH PEDAL FREQ.	NOISE REDUCTION IN/OUT	NOISE REDUCTION MODE	NOISE REDUCTION THRESHOLD	CHORUS IN/OUT	CHORUS DEPTH	CHORUS RATE
OUT			OUT			OUT		

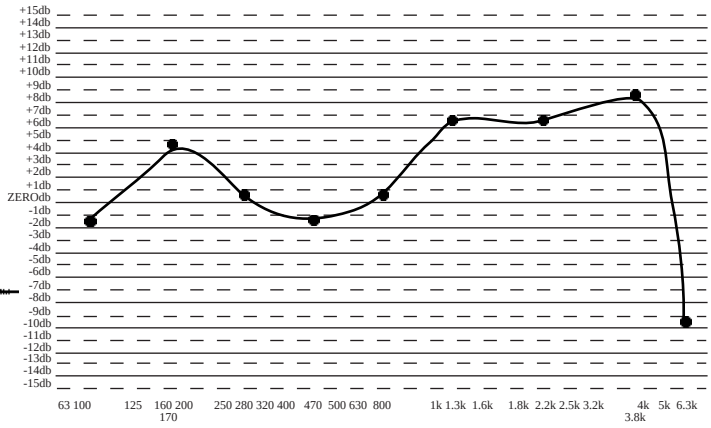
Suggested Guitars: Most guitars with low to moderate output pickups. Adjust the volume on the guitar to match the distortion.

Simulated Amp/Speakers: Vox AC/30 with 15 watt Blue Bulldog speakers.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

EQ 100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
-2	+4	0	-2	0	+6	+6	+8	-10



MP-2 Preset Name: BLUESBREAKER 1 (Clapton's rhythm guitar on "Hideaway," from John Mayall's Bluesbreaker's")

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE LO	TONE MID	TONE HI	TONE PRES.
FAT CLEAN	96		47	-2	0	+6	+4

WAH IN/OUT	WAH MODE	WAH PEDAL FREQ.	NOISE REDUCTION IN/OUT	NOISE REDUCTION MODE	NOISE REDUCTION THRESHOLD	CHORUS IN/OUT	CHORUS DEPTH	CHORUS RATE
OUT			IN	FADER	50	OUT		

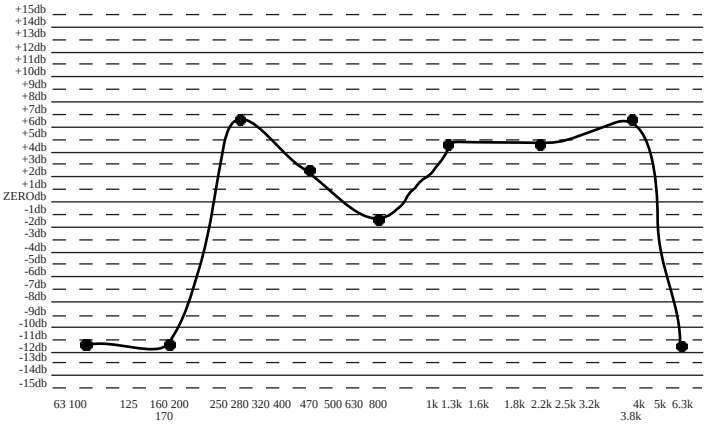
Suggested Guitars: Gibson Les Paul or 335. If your pickups are hot, turn the volume down on the guitar to match the distortion.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 5; 2 x 25 watt Celestion Greenback speakers in open-back cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

EQ 100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
-12	-12	+6	+2	-2	+4	+4	+6	-12



MP-2 Preset Name: BLUESBREAKER 2 (Clapton's solo guitar on "Hideaway," from John Mayall's Bluesbreaker's")

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE LO	TONE MID	TONE HI	TONE PRES.
VINTAGE BROWN	48		74	-6	0	+2	+2

WAH IN/OUT	WAH MODE	WAH PEDAL FREQ.	NOISE REDUCTION IN/OUT	NOISE REDUCTION MODE	NOISE REDUCTION THRESHOLD	CHORUS IN/OUT	CHORUS DEPTH	CHORUS RATE
OUT			IN	FADER	70	OUT		

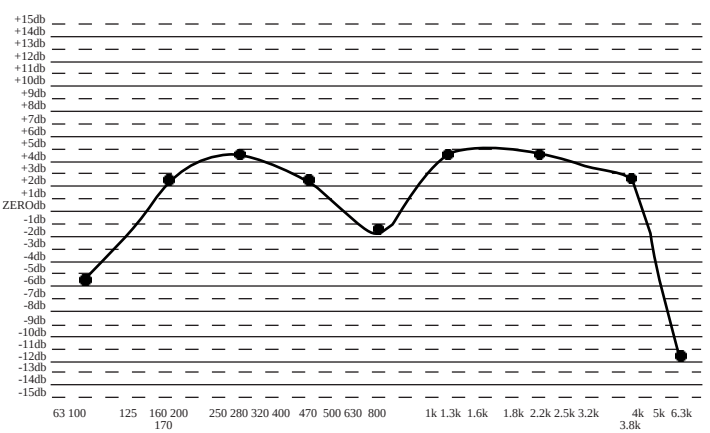
Suggested Guitars: Gibson Les Paul or 335. If your pickups are hot, turn the volume down on the guitar to match the distortion.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 6; 2 x 25 watt Celestion Greenback speakers in open-back cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

EQ 100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
-6	+2	+4	+2	-2	+4	+4	+2	-12

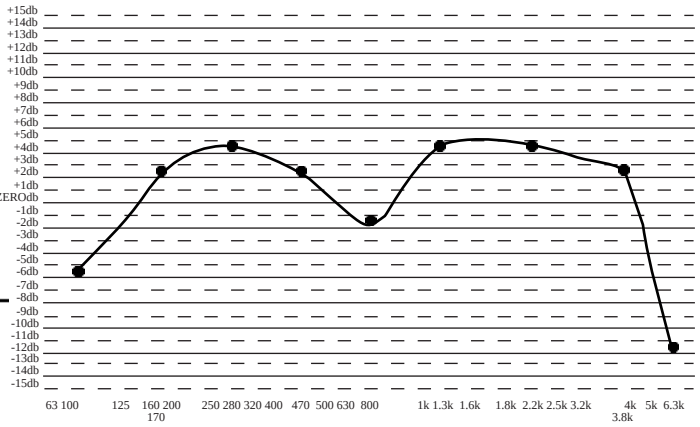


MP-2 Preset Name: BLUESBREAKER 3 (a more distorted version of Bluesbreaker 2)

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
WARM VINTAGE	48		71	-6	0	+2	+2

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			IN	FADER	70	OUT		

EQ								
100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
-6	+2	+4	+2	-2	+4	+4	+2	-12



Suggested Guitars: Gibson Les Paul or 335. If your pickups are hot, turn the volume down on the guitar to match the distortion.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 7; 2 x 25 watt Celestion Greenback speakers in open-back cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

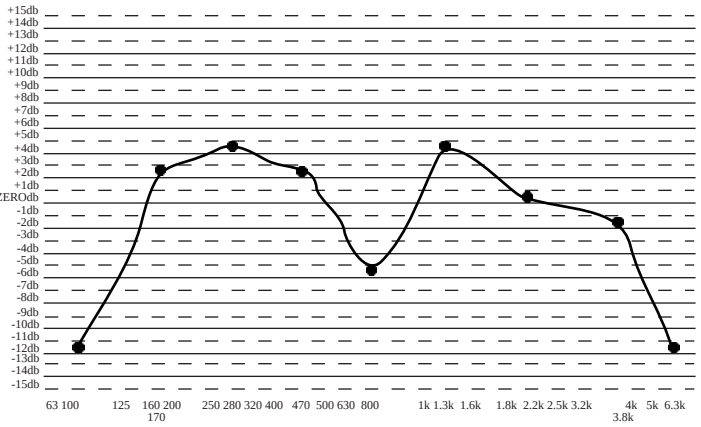
ADA MP-2: VINTAGE SOUNDS FOR FENDER GUITARS

MP-2 Preset Name: CLEAN FENDER

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
SPANKY CLEAN	49		86	-2	0	-2	+4

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			OUT			OUT		

EQ								
100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
-12	+2	+4	+2	-6	+4	0	-2	-12



Suggested Guitars: Fender Stratocaster with vintage staggered alnico pickups. If the distortion is to great, turn the volume down on the guitar.

Simulated Amp/Speakers: 1969 Marshall 50 watt or 40-50 watt Fender, volume on 4; speakers in open-back cabinet.

ENVELOPE

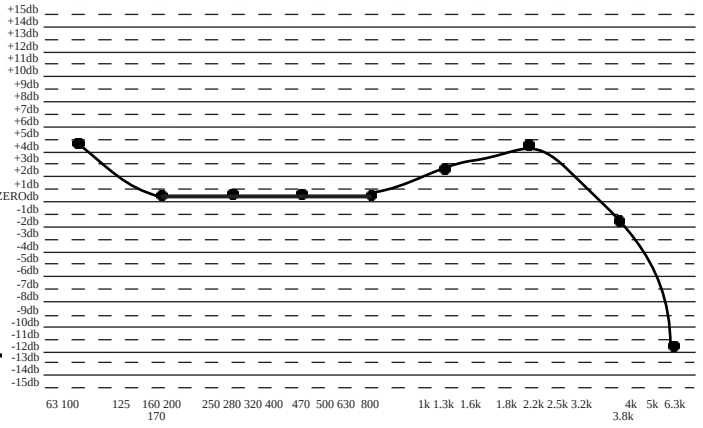
(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

MP-2 Preset Name: AXIS CLEAN STRAT (Hendrix: "Little Wing" from "Axis Bold As Love")

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
SPANKY CLEAN	46		100	-4	-4	+8	+6

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			OUT			IN	46	.3

EQ								
100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
+4	0	0	0	0	+2	+4	-2	-12



Suggested Guitars: Fender Stratocaster with vintage staggered alnico pickups. If the distortion is to great, turn the volume down on the guitar.

Simulated Amp/Speakers: 1969 Marshall 50 watt, vol. 4 and 40-50 watt Fender, vol. 5; 2 12" low wattage speakers in open-back cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

MP-2 Preset Name: HOT TEXAS STRAT (Stevie Ray Vaughan: "Pride and Joy" on "Texas Flood")

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
VINTAGE BROWN	46		82	+2	-2	+4	0

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			OUT			OUT		

Suggested Guitars: Fender Stratocaster with vintage staggered alnico pickups. Neck and middle pickups. If the distortion is to great on your guitar, turn the volume down on the guitar.

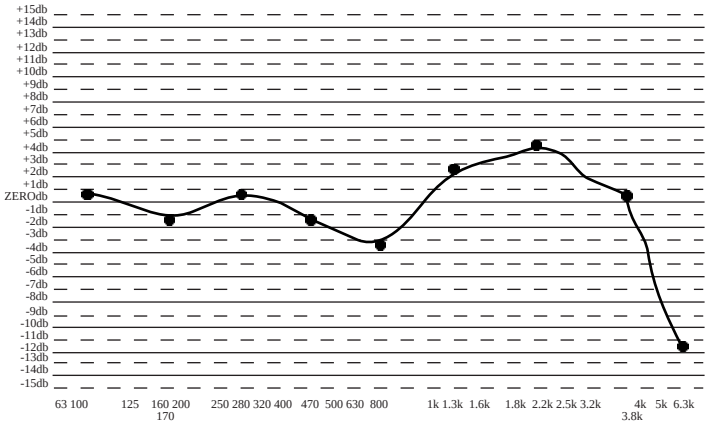
Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 6, speakers in open-backed cabinet and 40-50 watt Fender, volume on 5; speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

EQ

100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
0	-2	0	-2	-4	+2	+4	0	-12



MP-2 Preset Name: HOT NECK ALNICO (neck pickup selection with a vintage staggered alnico pickup)

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
WARM HI GAIN	46	88	72	-4	-4	+8	+6

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			IN	FADER	70	OUT		

Suggested Guitars: Fender Stratocaster with vintage staggered alnico pickups. Neck pickup. If the distortion is to great on your guitar, turn the volume down on the guitar.

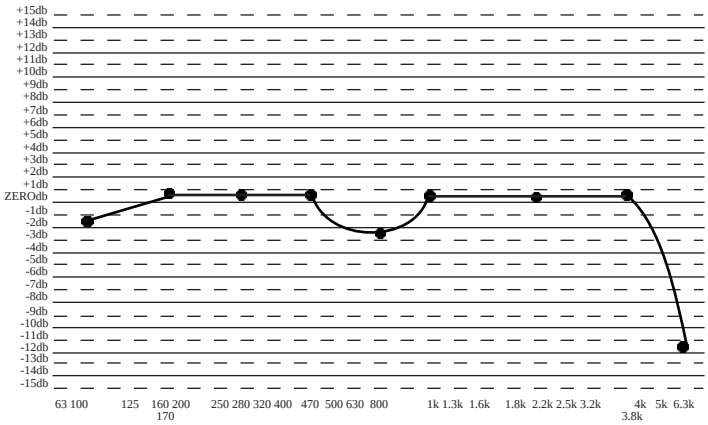
Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 6, speakers in open-backed cabinet and 40-50 watt Fender, volume on 5; speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

EQ

100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
-2	0	0	0	-4	0	0	0	-12



ADA MP-2: HARD ROCK GUITAR SOUNDS

MP-2 Preset Name: HAZE STRAT NECK (Hendrix: "Purple Haze" from "Are You Experienced?")

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
DYNAMIC VINTAGE	66		54	-4	-4	+8	+6

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			IN	FADER	88	OUT		

Suggested Guitars: Fender Stratocaster with vintage staggered alnico pickups. Neck pickup. If the distortion is to great on your guitar, turn the volume down on the guitar.

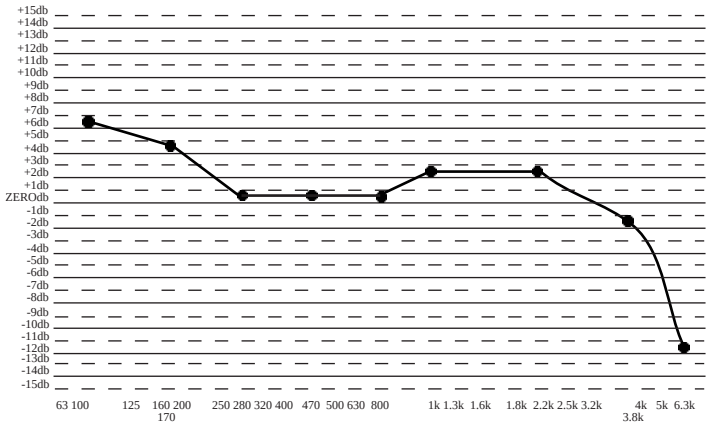
Simulated Amp/Speakers: Transistor distortion footpedal into 1969 Marshall 50 watt, volume on 6, open-backed speakers.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

EQ

100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
+6	+4	0	0	0	+2	+2	-2	-12



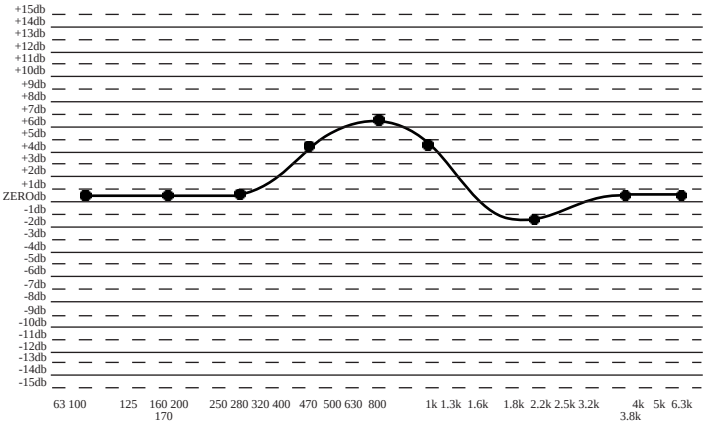
MP-2 Preset Name: HOT TO HANDLE (Michael Schenker: solo on "Too Hot To Handle" from UFO's "Light's Out")

TUBE VOICING	DRIVE LEVEL	OVERDRIVE	MASTER	TONE			
				LO	MID	HI	PRES.
DYNAMIC HI GAIN	72	80	57	-2	+8	0	+4

WAH			NOISE REDUCTION			CHORUS		
IN/OUT	MODE	PEDAL FREQ.	IN/OUT	MODE	THRESHOLD	IN/OUT	DEPTH	RATE
OUT			IN	FADER	64	OUT		

EQ

100	170	280	470	800	1.3K	2.2K	3.8K	6.3K
0	0	0	+4	+6	+4	-2	0	0



Suggested Guitars: Gibson Flying V, Les Paul, or 335. If the distortion is to great, turn the volume down on the guitar.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 7; 2 x 25 watt Celestion Greenback speakers in open-back cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of thebridge pickup)

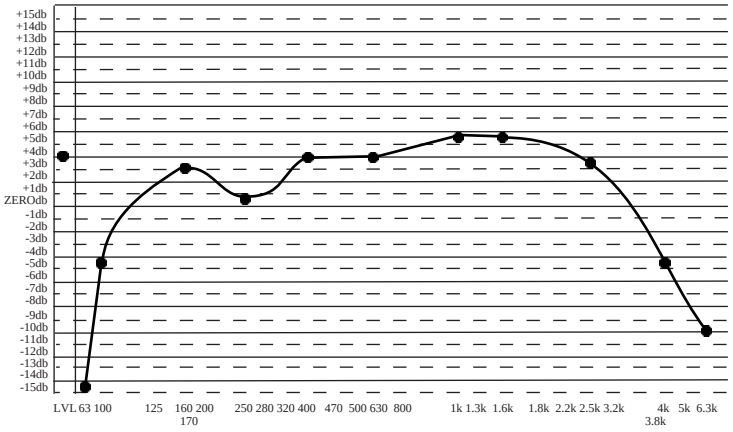
MARSHALL JMP-1 - VINTAGE GIBSON GUITAR SOUNDS

JMP-1. Preset Name: HUMBUCKER DISTORTION

MODE	BASS SHIFT	VOLUME	GAIN	TONE			
				BASS	MID	TREB.	PRES.
OD2	ON	14	3	0	-1	2	2

EQ

LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
0	-15	-5	+2.5	+0	+3.5	+3.5	+5	+5	+3	-5	-10.5



Suggested Guitars: Solid body electric with PAF type humbucking pickup.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 8, 4 vintage 25 watt speakers in close-backed cabinet.

ENVELOPE

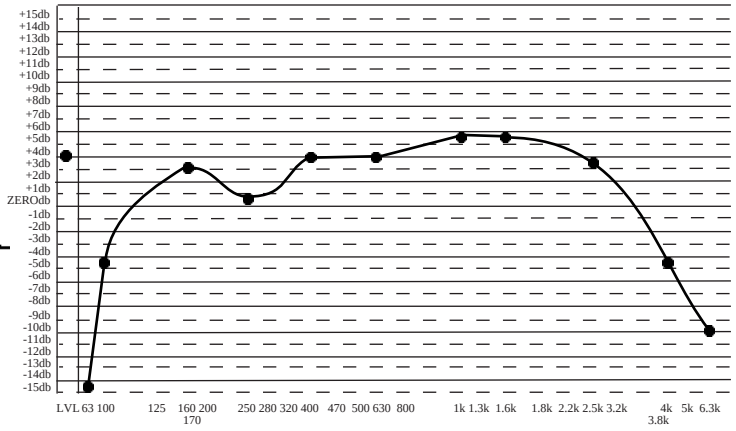
(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)

JMP-1. Preset Name: BLUESBREAKER

MODE	BASS SHIFT	VOLUME	GAIN	TONE			
				BASS	MID	TREB.	PRES.
OD2	ON	12	1	-1	2	1	4

EQ

LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
0	-15	-5	+2.5	+0	+3.5	+3.5	+5	+5	+3	-5	-10.5



Suggested Guitars: Solid body electric with PAF type humbucking pickup.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 8, 2 vintage 25 watt speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)

JMP-1. Preset Name: RED NECK

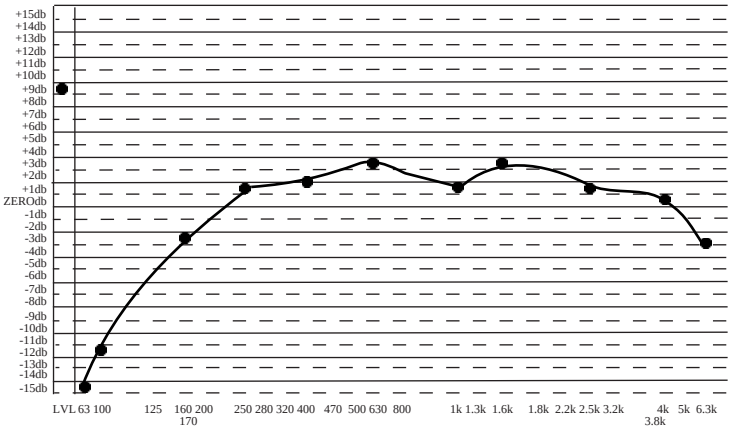
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ									
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
OD2	ON	16	3	-3	-2	1	2	+9	-15	-12	-3	+1	+1.5	+3	+1	+3	+1	0	-3.5

Suggested Guitars: Thin hollow body electric with PAF type humbucking neck pickup.

Simulated Amp/Speakers: Fender Twin Reverb, volume on 8, 2 - 90 watt speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



JMP-1. Preset Name: BURNING BRIDGE

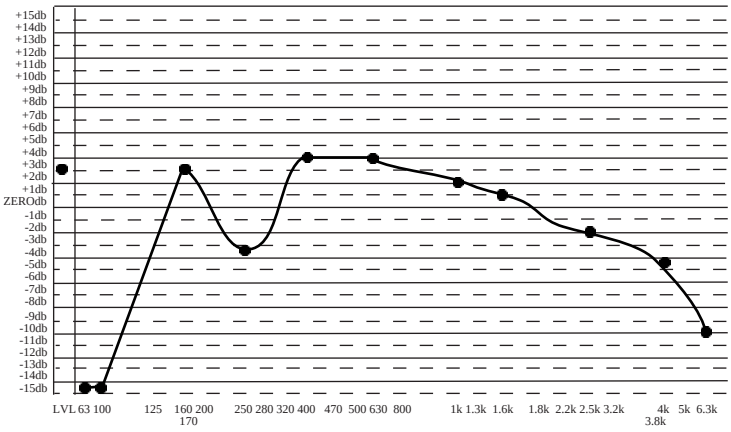
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ									
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
OD2	ON	16	3	-4	-1	0	2	+2.5	-15	-15	+2.5	-4	+3.5	+3.5	+1.5	+.05	-2.5	-5	-10.5

Suggested Guitars: Thin hollow body electric with PAF type humbucking neck pickup.

Simulated Amp/Speakers: Fender Twin Reverb, volume on 8, 2 - 90 watt speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



MP-1. Preset Name: AC30/GRETCH

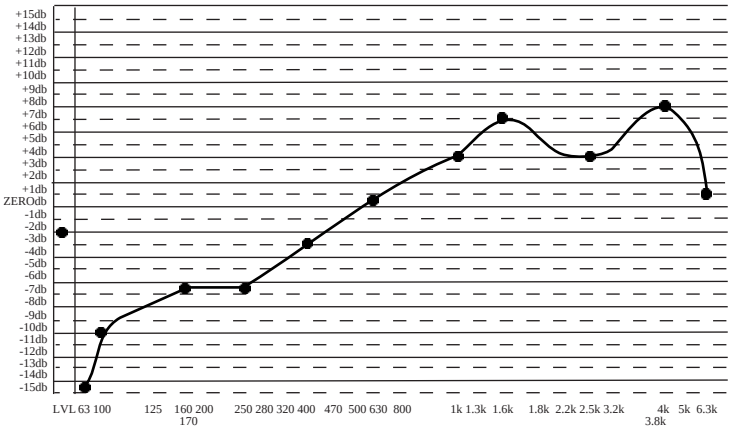
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ									
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
CL2	OFF	18	20	3	1	4	6	-2.5	-15	-10.5	-7	-7	-3.5	0	+3.5	+6.5	+3.5	+7.5	0.5

Suggested Guitars: Thin hollow body electric with PAF type humbucking pickup.

Simulated Amp/Speakers: Mid-60's Vox AC30, volume on 4, 2 vintage 25 watt speakers in open-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



MARSHALL JMP-1 - VINTAGE FENDER GUITAR SOUNDS

JMP-1. Preset Name: ALNICO DISTORTION

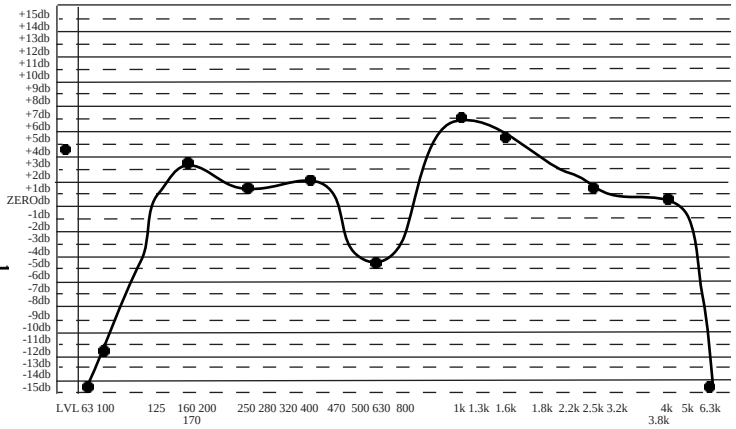
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ										
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
OD2	ON	17	1	2	-2	-6	2	0	-15	-12	-3	+1	+1.5	-5	+6.5	+5	+1	0	-15

Suggested Guitars: Solid body electric with vintage staggered Stratocaster type pickups.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 8, 4 vintage 25 watt speakers in a close-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



JMP-1. Preset Name: HOT FENDER

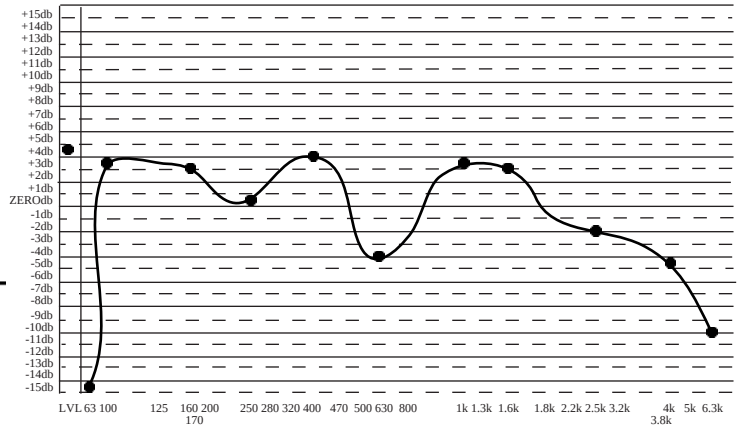
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ										
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
OD1	ON	17	1	2	-2	-6	2	0	-15	+3	+2.5	0	+3.5	-4.5	+3	+2.5	-2.5	-5	-10.5

Suggested Guitars: Solid body electric with vintage staggered Stratocaster type pickups.

Simulated Amp/Speakers: Fender Twin Reverb, volume on 8, 2 - 90 watt speakers in an open -backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



JMP-1. Preset Name: CLEAN FENDER

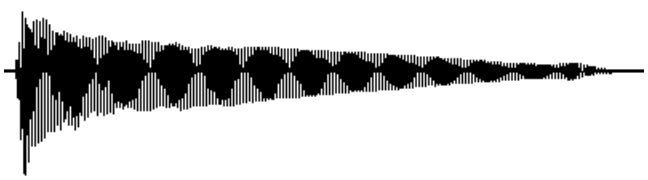
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ										
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
CL1	ON	17	1	2	-2	-6	2	+2	-15	-12	-3	+1	+1.5	-5	+6.5	+5	+1	0	-15

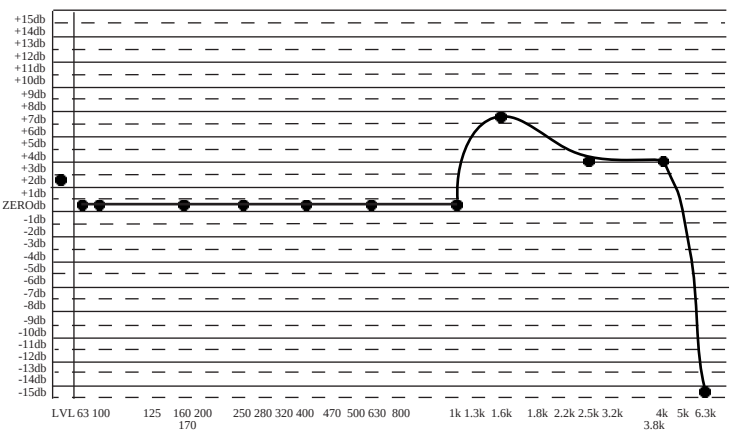
Suggested Guitars: Solid body electric with vintage staggered Stratocaster type pickups.

Simulated Amp/Speakers: 1969 Marshall 50 watt, volume on 8, 4 vintage 25 watt speakers in close-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)





JMP-1. Preset Name: L.A. '80 (VAN HALEN RHYTHM TONE)

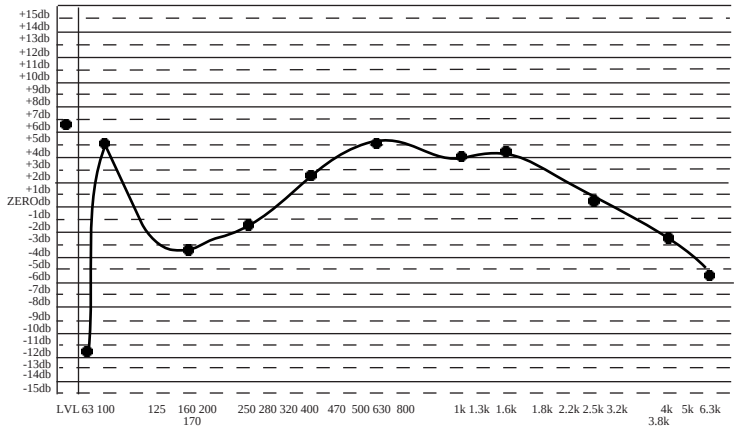
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ										
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
OD1	ON	16	17	6	1	3	2	+6	-12	+4.5	-4	-2	+2	+4.5	+3.5	+3	0	-3	-6

Suggested Guitars: Solid body electric with moderately hot PAF type pickups, guitar volume on 8.

Simulated Amp/Speakers: Marshall 100 watt JCM 800, volume on 8, 4 vintage 30 watt speakers in close-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup



JMP-1. Preset Name: L.A. '80 (VAN HALEN SOLO TONE)

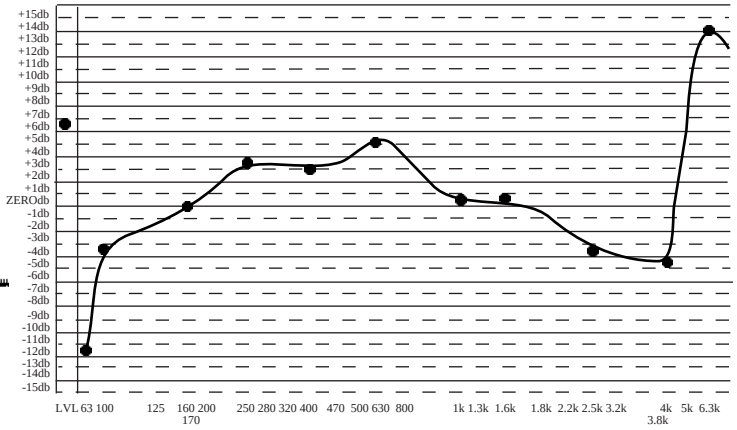
MODE	BASS SHIFT	VOLUME	GAIN	TONE				EQ										
				BASS	MID	TREB.	PRES.	LVL	63	100	160	250	400	600	1K	1.6K	2.5K	4K	6.3K
OD1	ON	16	17	6	1	3	2	+6	-12	-4	-0.5	+3	+1.5	+3.5	0	0	-4	-5	+13.5

Suggested Guitars: Solid body electric with moderately hot PAF type pickups, guitar volume up full.

Simulated Amp/Speakers: Marshall 100 watt JCM 800, volume on 9, 4 vintage 30 watt speakers in close-backed cabinet.

ENVELOPE

(5th string, 7th fret, "E", picked moderately on the left end of the bridge pickup)



B. SPEAKER EMULATORS

My first experience with a sepeaker emulator was the *Silent Speaker* built by Harry Kolbe in the mid-eighties. It allowed me to record direct from my amp without going to speakers, or to send the signal to a power amp, allowing lower volume in the room. I did alot of experimenting, but always ended up using speakers, anyway. Around the same time, Groove Tubes came out with a speaker emulator circuitry that they patented.

Since then, many companies have included speaker emulation in their amps and preamps (see the preamp list at the beginning of this chapter). Speaker emulation has come a long way in ten years, but I usually still prefer real speakers.

The ADA *MicroCab* goes further by emulating the speaker cabinet *and the microphone.* Then ADA out-did itself by releasing the *Ampulator,* discussed below.

C. THE ADA *AMPULATOR:* *ACCURATELY SIMULATING POWER AMP AND SPEAKERS*

The *Ampulator* simulates the power amp with control over the front and back end via drive and output level controls. It allows adjustment of the presence, tube matching, bias, power level and pentode/triode characteristics of a power amp.

I use an MP-2 or JMP-1 to drive the ampulator. I find it excellent for clean Fender, Marshall and Vox sounds. I often use it *in place of* a Fender amp. For Marshall and Vox sounds, I blend it with a Marshall and the necessary EQ.

Setting the power level control set very low and the drive reasonably high, you simulate a low wattage power amp screaming at high volume. By setting the power level very high, and the drive low, you simulate a powerful amp running very clean. Decreasing the power level increases distortion and softens the attack.

The tube matching control allows you to keep its 12AX7 tube matched to keep the sound musical and reduce hum....unless you want hum. Authentic rock guitar sounds include amp hum, which can be inserted on the Ampulator with the *hum injection* control. When the hum injection control is turned off, the tube matching control allows you to minimize hum.

As the *bias control* is turned clockwise, the circuit will simulate Class A (like Vox), then class AB (most modern guitar amps), then class B (usually undesirable). Increasing the bias control to the high end of the class AB range and into the class B range mutes the tone.

The miked cabinet portion of the controls allow you to set the number of speakers, closed/open back, size of speaker, dark/bright speaker driver and provide an EQ. I usually bypass the miked array configurations (number, size and driver of speakers) for Marshall sounds and use it for Fender and Vox sounds. Bypassing the miked array still allows use of the close/open back and EQ controls of the speaker sound.

There are some very hip Alternative Music tones in there for Vox sounds, especially with fast, layered chorusing. Try fattening Fender/Vox type setups with the *dark* Driver setting before increasing the low resonance. It can really sweeten the midrange in a Marshall sound, blending it with a Marshall amp.

Here are a few settings I use on the Ampulator (many settings are given in “o’clock” form):

use for	Drive	Presence	Hum	Bias	Pwr Lvl	Tri/Pent	#Spkrs	10”/12”	Driver	Cab	LoQ	HiQ	Output
hi gain Strat/humbucking	1:30	11:00	1:00	10:45	2:00	pent	1	12”	dark	open	off	2:00	11:45
med. gain vintage Strat	1:30	11:00	off	11:00	11:30	pent	2	12”	dark	open	off	1:30	12:30
hot Gibson/Marshall stack	1:00	10:30	12:00	10:45	10:00	pent	out	out	out	closd	1:00	full	10:30