

David Wallace's Brief Guide to the Most Common Electronic Effects

I. Gain / Amplitude-based effects: Effects that alter the signal by modulating the volume level

A) Distortion

In the early days of electric blues, guitarists would crank their amplifier pre-amps to levels that were so high, the overdriven amplifier would "clip" the signal. The resulting tone was quite different than the pure sounds Les Paul sought when he helped to develop the electric guitar; however, it was perfect for blues, rock, and other genres. Since then, electronics specialists have designed various effects pedals and processors to create many varieties of distorted tone. The most generic designations are overdrive (mild and fairly clean- good for blues), distortion (more distorted), and fuzz (most distorted). Pedal names (e.g. "Death Metal" or "Mystic Blues") give hints to nature of the distortion. Use your ear to determine what's the right effect and amount. Be aware that the more distortion you have, the less distinct the pitch becomes; double-stops may become unintelligible. (Which might not be a bad thing for certain songs. . .) In general, bowed instruments require less gain because hair adds a certain amount of noise.

Common Distortion Parameters:

- **GAIN:** more gain = more distortion
- **PRE-GAIN:** adjusts the basic distortion amount. More pre-gain allows more undistorted signal to pass through before gain is added. More pre-gain= more pitch
- **TONE:** higher values = more treble / more high harmonics
- **LEVEL:** Controls volume of final signal. On some units, this is the same as gain.

Classic distortion pedals: Ibanez Tube Screamer TS-808, Foxy-tone fuzz box; Fuzz face; Big muff

B) Compressors / Sustainers and Limiters

Compressors level out the signal by boosting the softest signals and reducing the loudest signals. In practice, this can make for a "punchy" sound, and also increased sustain as the note dies out (hence, the designation of many compressors as "sustainers.") Compressors are most useful for rhythm parts and certain pizzicato effects. For basic tone and soloing, it's not so desirable for bowed passages, since bows give us infinite sustain and a very different attack than a guitar pick. Limiters reduce the louds, but unlike compressors, true limiters do not boost softer signals. (Some people use the term "limiter" for really high ratio compression).

Common Compression Parameters:

- **SENSITIVITY / THRESHOLD / KNEE:** Determines the level at which the effect kicks in.
- **RATIO:** The amount that the signal gets compressed. The higher the ratio, the less dynamic range, and the more the signal is dropped / boosted.
- **ATTACK:** Adjusts the amount of time before the compressor kicks in. More attack means a quicker response.

Classic compressors: Electro-Harmonix Black Finger, Maestro Sustainer, Boss CS 1

C) Volume Pedals

Volume pedals adjust your volume- pedal down; maximum volume, pedal up, no volume. Guitarists will use volume pedals to boost their signal (e.g. when soloing) or to cut it. Guitarists also use volume pedals to make cool effects like picking chords in silence then swelling them in with the pedal. Although the bow offers the ultimate in volume control, you may still find a volume pedal useful for macro-adjustments to your level and for silencing your signal when you're not playing for a while.

David Wallace's Brief Guide to the Most Common Electronic Effects

D) Gates

Noise gates turn the signal output off when it falls below a certain level. This is especially useful when recording or using distortion pedal, since your instrument usually generates a certain amount of hum or sound even when you're not playing. Do listen to make sure that the gate is not affecting your tone. Gates can also be used creatively to trigger additional effects, but that's another story.

Common gate parameters:

- **SENSITIVITY / THRESHOLD / KNEE:** Determines the level at which the gate closes.
- **ATTACK:** Adjusts the rate at which the gate shuts. More attack means a quicker response.
- **SUSTAIN / HOLD:** Determines how long the gate remains closed after the signal falls below the threshold.

E) Tremolo & Auto Pan

Not to be confused with bow tremolo, this effect oscillates the volume at regular intervals. It's a little like rapidly turning a volume knob up and down over and over. A number of classic amps introduced this effect, and you can hear it in surf music. For auto pan, it's basically the same idea, only your [stereo] signal is also oscillating from left to right. Auto pan tends to be a slower oscillating effect than Tremolo. NOTE: Some effects marked "vibrato" are really tremolo.

Common tremolo parameters:

- **DEPTH:** Determines the degree to which the volume oscillates. More depth=more difference in the volume change.
- **RATE:** Controls the speed of the volume fluctuation.

II. Filter / Frequency Modulation Effects: Effects that affect the frequency content of the sound.

A) Equalization (EQ)

Just as most colors are composites of different light waves, every sound contains sound waves of different frequencies. EQ lets you adjust which frequencies are emphasized. Most amps and effect boards have knobs for adjusting EQ; graphic equalizers have faders for boosting or cutting different frequency bands. The controls may either use descriptors such (Bass / treble; high / low / mid) or wavelength values (100 Hz, 500 Hz, 2 khz, etc.).

EQ adjustments are useful for getting your tone just right, but EQ can also be used to get special effects. Some heavy metal guitarists go for a "scooped" sound by cranking the highs & lows while cutting the mids. For bowed electric stringed instruments, often it's best to attenuate (cut) the high and mid frequencies slightly while giving the bass a bit of a boost. Be aware that EQ adjustments apply to every note you play- the perfect EQ for your stratospheric solo may make your low power chords sound less than ideal.

B) Flangers & Phase Shifters:

When different sound waves overlap, one of two things will happen to their shared frequencies: if the sound waves line up, the waves will combine, and the shared frequencies will be louder (constructive interference). If they are out of sync, they'll cancel each other out and the shared frequency will decrease or disappear (destructive interference).

Flangers and phase shifters use this wave interference phenomenon to create a "comb filter" effect that makes a "whooshing" or "airplane" sound. This sound shows up in a number of psychedelic

David Wallace's Brief Guide to the Most Common Electronic Effects

rock songs, as well as the sounds of 80s rock guitarists like Eddie Van Halen and Joe Satriani. Flangers and Phasers are essentially the same thing, although phasers tend to be a little more subtle. Stereo flangers pan the flange effect left and right, making for a spacious effect.

Common Flanger / Phase Shifter parameters:

- **DEPTH / INTENSITY:** Determines the degree to which the frequencies are altered. More depth makes for a more pronounced effect.
- **RATE:** Determines the rate. Faster rates create a tremolo or a vibrato sound.
- **PRE-DELAY:** Determines the amount of time before the effect kicks in. More pre-delay increases the degree of "normal" unprocessed sound.
- **FEEDBACK:** After being processed, part of the signal is fed back to be processed again. This makes for a deeper, weirder effect.
- **MIX / RATIO:** Determines how much of your sound is the original signal and how much is the affected signal.

C) Vibrato & Leslie:

True vibrato oscillates the pitch just as tremolo alters the volume. Many amps offer vibrato. The leslie effect is a combination of tremolo and vibrato, which emulates the "leslie" or rotating speakers found on electric organs. In the Beatles' "While My Guitar Gently Weeps," Eric Clapton plays a solo through a real organ leslie.

Common Parameters: see flanger

D) Chorus:

Chorus takes your original signal, detunes and delays it slightly, then feeds it back through. The result is a "fuller" or "doubled" sound; a chorused 6-string guitar sounds like a 12-string. Chorus is great for a full tone (especially stereo chorus, which pans the effect back & forth), but be aware of the "de-tuning" aspect: it can make double-stops sound really out of tune. Many amps offer chorus; I like the Roland JC-120, which offers a really nice, swirling stereo chorus effect.

Common Chorus Parameters:

- **DEPTH / INTENSITY:** Determines how evident the effect is, and this generally means how "de-tuned" the signal is when it is sent back. If you're suffering from "chorused intonation syndrome," try decreasing the depth.
- **RATE / SPEED:** Determines the rate of oscillation.
- **PRE-DELAY:** More pre-delay= more time before the effect kicks in (more "normal sound").
- **MIX:** Determines how much of your sound is the original signal and how much is the "chorused" signal.

Classic chorus pedals: Univibe, Boss CE (1-3)

E) Pitch Shifters / Harmonizers / Octave-Splitters:

These synonymous effects take your signal and add in a copy of the signal that has been adjusted to be a lower or higher pitch. Smart "harmonizers" can be set to a specific key so that the added note will be adjusted to stay in the same key. The most common intervals used for pitch shifting are the octave and the fifth.

Common Pitch Shifting Parameters:

- **PITCH:** determines how many steps away the added pitch is.
- **BALANCE:** determines the balance between the added pitch and the original pitch.

David Wallace's Brief Guide to the Most Common Electronic Effects

Classic Pitch Shifters: Octavia, Eventide Harmonizer

F) Wah-Wah Pedal / Auto-Wah

The original 1967 Vox wah-wah pedal was designed so that jazz guitarists could emulate the sound of trumpet players playing with wah-wah mutes. Jimi Hendrix and others put the wah to quite different uses, including the rhythmic "wock-a-chicka" sounds that show up in funk music and 70s police chase scenes.

Basically, a wah pedal is a foot-controlled EQ modulation switch that allows you to sweep through or emphasize different frequencies of your tone. "Auto-wah" is a non-foot-controlled effect that gives the same kind of sound, only the degree of it is based on your attack, not your foot. Some wah pedals like the Morley "Bad Horsie II Contour Wah" allow you to adjust the bandwidth of the frequency sweep so that the wah can be wild or mild.

Classic Wah pedals: Vox Wah-Wah, Dunlop Crybaby

III. Time-Based Effects:

A) Reverb

Anybody who has sung in the shower has experienced the sound-enhancing joy of reverb. Whether yodeling on a mountainside or jamming in a garage the obvious reality is: sound reflects. Reflected sound adds space, warmth, and ambience to the original sound. In the early days of recording, engineers would use speakers to pipe the recorded sound into an echo chamber where another microphone would record the reverberations. Makers of amplifiers began installing tanks of springs-which would add reverb by scattering the sound waves- into amplifier cabinets. Electronics specialists developed artificial ways of adding reverb to tape, and now digital reverb units can simulate a wide variety of spaces ranging from a small room to a cathedral or arena.

Most amps will just have one reverb knob, but when you get into digital effects, here are some of the parameters that you may encounter:

- **ALGORITHM / TYPE:** Determines the ambience; e.g. "large room," "club," "amphitheater"
- **TIME / DECAY:** Determines how long the reverb affects the sound. This may be adjustable in terms of seconds and milliseconds, or it may just be a fixed range (e.g. 1-30 or a knob).
- **PRE-DELAY:** Determines how long the signal is allowed to pass without being processed. More pre-delay will make the sound more "up-front" and present. Less pre-delay will make the sound seem farther away.
- **TONE:** Affects the EQ. More tone= more trebles, usually makes for a "sweeter" sound.
- **DIFFUSION:** Determines how "scattered" the effect makes the reflected sound. Higher diffusion makes the echoes wash together more. Less diffusion makes it clearer.
- **HI-FREQ CUT / LOW-PASS FILTER:** Some reverbs allow you to let high or low frequencies pass unprocessed. This can help adjust the brightness or darkness of the tone, and it can also let you adjust the clarity or muddiness of the sound.

B) Delay

In his early days of inventing multi-track recording, Les Paul discovered that by placing an extra recording head slightly out of sync with the original one that came with his machine, he could record an echo onto tape. In contrast to the diffused echo of reverb, "tape delay" produced a clean, exact duplicate of the original signal. With the advent of digital delay, new possibilities opened. Digital delay devices like the Boomerang allow you to record loops so you can have several layers of sound going at once. Or, you can tap in a tempo with your foot so that you can

David Wallace's Brief Guide to the Most Common Electronic Effects

play a canonic duet with yourself. Ping-pong delay (one of my favorites) pans the delayed stereo signal from speaker to speaker. Some of the parameters you'll find when using delays:

Common Delay Parameters:

- **TIME:** sets the amount of time between the original signal and delayed signals. Often this time is measured in seconds or milliseconds.
- **FEEDBACK:** Returns the processed signal to be delayed yet again. On some units, feedback will determine the number of repetitions. On others it will control the degree to which the signal is fed back, in conjunction with volume and decay.
- **DECAY:** Determines the rate at which the sound fades.
- **WET/DRY MIX; BALANCE:** Determines how loud the delayed signal is in proportion to the original "undelayed" signal.
- **DEPTH / RATE:** Some delays allow pitch to be oscillated, too. See flanging.

IV. Multi-effects Units, Stomp Boxes, Effects Chains, etc.

So those are the basic effects. There are many others (e.g. ring modulation, talk boxes / vocoders, rectifiers, amp and cabinet simulators . . .), and one of the most economic ways to get an effects smorgasbord is to buy a multi-effect unit that has a good variety of effects and many pre-set sounds.

Multi-effects units may be floor-mounted (so you can put it on stage and step on it) or rack mounted (which means you put it on your amp or recording rack and operate it remotely with pedals). Rack-mounted effects tend to be considerably more expensive and generally higher quality, but try things in person, use your ears, and consider your budget. Common brands include Boss, Digitech, Lexicon, Line 6, and Zoom. Look for programmability because most presets will need tweaking, especially for bowed instruments.

Single effects can also be purchased in individual units known as "stompboxes" or "effects pedals." Many purists criticize multi-effects units for being "jacks of all trades and masters of none," so they simply chain their favorite stomp boxes together to get their sound. Less expensive boxes currently run from \$40-\$70; higher end stomp boxes can run around \$170. Vintage effects can fetch exorbitant sums (Original Ibanez Tube Screamer TS-808's are now fetching \$600 per box- a good \$430 more than the reissue), but vintage diehards insist that there's something special about the original. One solution is to get a good basic multi-effects processor and supplement it with a few of your favorite single effects pedals.

Most musicians will use effects in combination ("effect chains"). While there are no hard-fast rules for the order of effects, most musicians put gain / amplitude effects first, frequency modulation effects next, and time-based effects last. As always, use your ear and experiment. There's something to be said for putting compression before distortion, and there's something to be said for putting it afterwards.

Guitar magazine publishes monthly columns on how to get certain sounds, and DOD and various other companies have published books to help as well. I recommend Eric Mangum's *DOD*

Presents 100 Superstar Guitar Sounds on a Stompbox Budget.

player should be without Joe Denimzen's fabulous new resource, Plugging In!
Happy processing!

Doc Wallace