

## Czar of Guitars Pedal Clinic

### Intro:

We'll be looking at and listening to four major categories of pedals:

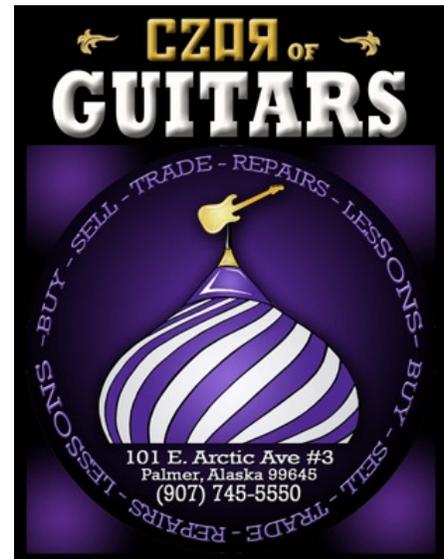
1. *Modulation* – phasers, flangers, etc.
2. *Overdrive/distortion*
3. *Delay*
4. *Miscellaneous*: Compressor, EQ, tuner, etc

### 1. Basic tone (amp)

- a. You must have good tone to start with; over-use of pedals is rampant.
  - i. Everything affects your tone. *Control what you can.*
  - ii. Good tone keeps people engaged, and equally important it serves to inspire your playing.
- b. When to use pedals, when not to use pedals - ultimately, to serve the song.

### 2. True bypass/buffers

- a. A "true bypass" pedal completely switches itself out of the circuit when turned off – non true-bypass pedals can affect your tone even when off.
  - b. Too many true bypass pedals in a row can kill your tone –use a buffer if so.
  - c. *Buffers* change the signal of your guitar from high to low impedance, and drive the signal through your effects chain and to the amp better.
    - i. Some pedals have a decent buffer built in – Boss, Ibanez, etc. - some do not! Use your ears...
    - ii. A standalone buffer in your chain is a great idea if you use a lot of pedals – Axess Electronics BS-2, Radial Dragster or VHT Valvulator are good choices.
    - iii. Buffers should usually go at the beginning of your chain, or the end, depending. Or both. ☺
  - d. **\*\*It is critical to understand how EACH pedal you use affects your tone when switched off. Play your rig with the pedal in the chain, then plug straight into the amp – compare the difference. Do this with each pedal, then add them back into your chain one at a time until you know your tone is (relatively) unaffected by the pedals you are using – whether they are switched on or off.**
3. **Order of pedals:** see (Keeley) handout – remember, the "rules" are not hard and fast – you must use your ears, listening to your own rig.
  4. Types of pedals, what they do and their uses:



- a. Modulation** – designed to add depth, dimension and movement; there is a gray area between phasers, chorus, flangers and vibes...
- i. Phaser - A phaser splits the guitar signal and shifts one path out of phase by from 0 to 360 degrees through the entire range of the frequency spectrum, and blends it back with the dry path so the moving in-phase/out-of-phase relationship can be heard
    1. A good phaser pedal can fake a Leslie!
    2. Example – early Van Halen
  - ii. Flanger –Typically a cloned signal, detuned and delayed, mixed with dry signal. Can be heavy, bombastic and annoying.
    1. Example – Heart’s “Barracuda” intro
  - iii. Chorus – a slightly detuned and delayed “clone” of a guitar signal is played back with the original, it produces a doubling effect, which produces a thicker, more lush tone.
    1. A good chorus pedal can fake a Leslie!
    2. Example – The Police, and a million other bands
  - iv. Vibe – sort of a phaser, sort of a chorus, depending on the pedal. Think Hendrix, Trower, Pink Floyd, Van Halen
  - v. Vibrato – basically a chorus pedal without the cloned signal being mixed back in with the dry signal.
    1. Another depth/movement pedal. Sounds like an organ.
  - vi. Tremolo - The tremolo effect is a fluctuation in the guitar signal’s *volume*. “Swampy” is the classic description.
- b. Dirt Pedals – Overdrive/distortion:** listed below in order of dirt succession. These pedals literally “clip” the sound wave in order to produce a rougher sound. These pedals are the sound of rock and roll.
- i. Clean boosts – should be “your tone, only louder.”
  - ii. Overdrive – not as much gain as distortion and fuzz; typically used to push a tube amp into overdrive or to emulate an overdriven tube amp.
    1. TUBE SCREAMERS and their many derivatives
      - a. Mid-hump, symmetrical clipping
    2. Examples – TS9 (silver), Bad Monkey, Danelectro, Jimmy Stomp
  - iii. Distortion – the Rat!!! Jetter Gain Stage Blue, Danelectro, etc.
  - iv. Metal/High-gain
  - v. Fuzz – can usually go from overdrive to distortion and way beyond;
    1. They clean up with the guitar’s volume knob
    2. Many are positive grounded, so need isolated power or battery
    3. If they are a traditional fuzz circuit (ala Fuzz Face) they must be first in chain due to their relatively low input impedance
- c. Delays** – delays can be used for a variety of purposes – from a simple slapback that adds depth, to a bit more delay that expands your sound, to a great many spacier applications.
- i. Analog delay vs. Digital Delay

1. Analog tend to be warmer, more natural, and darker.
2. Digital is cleaner and clearer.
- ii. Check out this page for a range of what delays can do:  
<http://www.buildyourownclone.com/analogdelay.html>
- d. Miscellaneous tone-shapers and utility pedals**
  - i. Compressors – “squash” your signal by smoothing the attack and sustaining the tail. Can also boost, and create a tactile, touch sensitivity.
    1. Players usually turn to compressors for more for sustain, for punch, for thickening up thin sounds and to increase the “touch” and dynamic feel of their set-up. But - compressors can also kill dynamics and overuse is rampant.
  - ii. Envelope filter/follower – Auto Wah. Anything from Jerry Garcia on Shakedown Street to a wah type sound.
  - iii. Buffers (related to true bypass – see above)
  - iv. Tuners – Boss TU2, Peterson, Planet Waves – accuracy, strobe, etc.
5. What to look for in a great pedal (Don't *look* – listen!)
  - a. Metal jacks
  - b. Durable case, knobs, switches
  - c. True bypass or a good buffer
  - d. Sounds good with YOUR amp
  - e. Stacks well with other pedals
  - f. Cool cheap pedals
    - i. Danelectro Cool Cat line
    - ii. Bad Monkey (Digitech)
    - iii. Timmy
    - iv. Rat
    - v. Line 6
    - vi. Build Your Own Clone, if you prefer to roll your own.
  - g. Tone! If it doesn't sound good to you, with your rig – forget it.
  - h. Boutique vs. mass-produced
6. Pedal boards
  - a. Handy, but not critical
  - b. Power supplies
    - i. Industry standard Voodoo Labs Pedal Power Plus II
      1. isolated inputs – can use fuzz pedals, etc. sag feature
    - ii. One Spot and other “daisy-chain” type – simple, cheap, easy, great
7. Simplify your rig: 3 must-have pedals
  - a. Overdrive
  - b. Boost
  - c. Chorus

## ADDITIONAL RESOURCES

Also visit [www.jimbeck.com/pedalclinic](http://www.jimbeck.com/pedalclinic)

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### Gain-staging with a clean boost

Here is a tone recipe that works well with most tube amps, this will help improve both clean and overdriven tones and is just in time for the season...your family and friends will love it!

You will need a Barber Launch Pad or other extremely high headroom and uncolored clean boost and a tube amp that has a preamp tube right after the input (nearly all tube amps work this way).

In this case we are going to use the LP as a input trim (ala mixing desk) or as a "tube cooker" to get the most out of your guitars output and maximize gain staging at the input. Plug in your effects chain as normal, with the exception of placing the LP last in the chain. Set the LP Vol + on maximum, set your amp to a fairly low volume clean sound (as in "dead clean") , now footswitch your LP to "on" and start playing clean rhythm on your guitar, use your ear to set the sensitivity of your LP as you play, the idea here is to listen for the amp starting to break up as you are playing your standard rhythm style, when you find the "break up point" back off slightly on the sensitivity until you have the desired clean sound.

Congratulations, you have just set your guitars output for maximized gain staging with your amplifier. After you have the first preamp tube better matched to your guitar, you will need to set your amps volume control a bit lower in most cases and simply set any other effects that come before your LP to their unity gain output position. If your amp has a bright cap permanently attached (deluxe reverb), you could experience some extra top end because of your relatively lower volume settings, the best option here is to "clip out" that offensive bright cap, and most amps will have a bright switch which means you can simply turn that cap off.

Dave Barber, amp and pedal maker:  
<http://tpngear.com/forum/index.php?showtopic=169>

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### What are buffers and how are they used?

Buffers are extremely important in a multi-component system. They are often misunderstood and often get a bad rap by those who are uninformed. In a CAE system, a buffer is a unity gain (input level equals output level) impedance converting circuit. It essentially protects your high impedance guitar output (or any other high impedance source, such as an amps' effects loop send) from being loaded down by the input it is connected to. In effect, it converts high impedance to low, which means subsequent stages are then driven by a low impedance source (the buffer's output). High impedance sources such as your guitar's output (assuming you have passive pickups) has very little current drive capability and it's signal is subject to a harsh environment once it leaves the guitar. You already know the adverse affect a long cable has on your tone. Same thing happens if you pass your signal through a bunch of effects pedals. Even if they have "true bypass" (an ugly, over-used term), each one will suck a little more of your signal along with the cables and connectors, mainly due to capacitive loading of your high impedance guitar signal. The

end result is a muffled weak signal that lacks clarity. But once your high impedance guitar signal hits a properly designed buffer with a high input impedance, the buffer takes over, and uses its higher current capability (remember, its an active circuit that requires a power supply) to drive all subsequent stages, thus preserving your instrument's tone. This brings us to buffer quality. Buffers come in all types of designs, from discrete transistor, op-amp, to esoteric tube designs. All have their own unique sonic stamp. At CAE we use the op-amp approach. It has served us well for years, is low noise, and is extremely transparent to our ears. Buffers often get blamed for causing an overly bright sound, but we feel if its designed properly, any perceived "brightness" is because now the guitar is not being loaded down by subsequent stages!

Buffers can cause problems, too. There are some effects devices that don't like to see the low output impedance of a buffer. These are typically discrete transistor designed fuzz circuits (such as the Dallas Arbiter Fuzz Face). They react better to the high impedance output of the guitar. In fact, the guitar output, cable and input stage of the Fuzz Face complete a circuit that is highly dependent of those 3 components to work correctly. Fuzz Faces clean up nicely when you roll back the guitar volume control... not so if a buffer is between the guitar and Fuzz Face input. So if you have a pedal board with a Fuzz Face on it , put it first! Other pedals may react the same way. Experiment to see what works best for you. Keep in mind all active pedals (such as Boss, Ibanez, etc...) act as buffers and will impart their own sonic stamp even when bypassed. This is what started the whole "true bypass" (ugh! that term again) craze. See? Too much of a good thing can be "bad". Which brings us to how we utilize buffers in CAE custom switchers. We only use buffers where absolutely necessary. Typically, in a pedal based system we will not buffer until after the first 4-5 loops, which is usually just prior to sending the signal down to the pedal board (via a long cable run, hence the need to buffer) to hit the wah/volume pedals. Any more than 4 or 5 loops, and the guitar signal may be affected by capacitive loading. So the first few loops is where you would put any impedance sensitive effects. This also means your guitar will go through fuzz, overdrive or distortion pedals BEFORE the wah. We prefer this order because the wah then has a more harmonically rich signal to filter. Try it yourself. Of course, if a specific order is required, we will do everything we can to make it happen. Buffers are also necessary to drive isolation transformers, since the relatively low primary impedance of the transformers may be detrimental to whatever circuit is feeding it. This is also why amp splitter circuits must be buffered. You can't drive multiple amps with a relatively high impedance source. So there usually is a buffer somewhere in the output stage of your custom switcher. That's usually it. 2 places minimum. There may be more active stages depending on your system requirements.

(Custom Audio Electronics:

[http://www.customaudioelectronics.com/frequently\\_asked\\_questions.htm](http://www.customaudioelectronics.com/frequently_asked_questions.htm))

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## Order of pedals – Robert Keeley

### **Which Chain Of Effect Pedals Makes Life Easy?**

- **Wah** -> Which,
- **Compressor** -> Chain,
- **Overdrive** -> Of,
- **EQ** -> Effect,
- **Pitch** -> Pedals,
- **Modulation** -> Make,

- **Level** -> Life,
- **Echo** -> Easy.
- I like to see **wah** pedals and sometimes even **phasers** as the first effect after the guitar. We'll call these Wah effects (yes even the phaser). **Wah** pedals boost a frequency you sweep to with your foot and **phasers** cut or notch a frequency that is swept to electronically. Distortion pedals make interesting response changes to the boost or cut from these sweep pedals.
- **Compressors** typically go next although I like them after distortion pedals in many cases if the compressor is clean and transparent enough. Compression after distortion has two effects that I really like. First, the noise floor is lower because the noise from a compressor isn't being amplified and distorted by the overdrive pedal. Second, there appears to be more sustain. There is one draw back that some people notice and that is a darker, warmer tone. Some folks might prefer a more conventional, brighter tone.
- Next comes **Overdrive** or **distortion**.
- **Equalizer** pedals can go next. They are commonly used for a boost pedal if they can be turned on and off, or used to shape the tone of the distortion pedal.
- **Pitch changing pedals, Vibrato** for example; go next for the simple reason that many distortion pedals can't handle the many pitches at one time. Try strumming a complex chord with your distortion pedal on, say a C7#9#11.
- **Modulation** effects such as chorus and flanging go next.
- **Level** pedals that control the volume go next in many cases. This would include **tremolo, volume** pedals (great at this point in the effects chain because it cuts all the hiss going to your amp), noise gates and limiters. Since compression is a limiter in many cases and this is why it works post-distortion by the way.
- **Echo** effects go last. These include **delay** and **reverb**.
- A sample effects board might contain these effects: Guitar -> Wah, Compressor, Overdrive, EQ, Vibrato, Chorus, Tremolo, Volume Pedal, and Delay-> Amp.

Note – these “rules” are meant to be broken. Use what sounds best in YOUR rig.