# PEDALS

AoS 1: EFFECTS

Electric Guitar Effects

- Guitar effects are controlled using stomp boxes
  - The original guitar effects units before the introduction of **multi-effects units** in the 80s-90s

- Have retained popularity among guitarists due to their **greater flexibility** when it comes to **routing** and **editing**

- Stomp boxes are individual effects units that take the shape of floor-mounted boxes
- They are activated by stomping on a switch

Distortion

- Originally created by **overloading** the circuitry in the signal chain at some point

- Distortion effects were then integrated into guitar amps/stomp boxes

NORMAL

HARD CLIPPING

SOFT CLIPPING
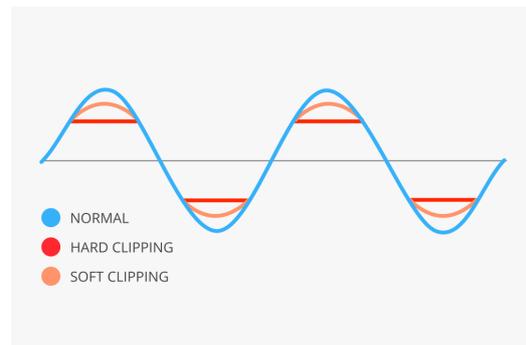
- When the gain is increased, the peaks and troughs of the waveform become clipped
  - This results in the distorted signal having more harmonics

- Most recently, distortion effects are used as DAW plug-ins, some of which are designed to emulate earlier hardware

Overdrive, Distortion and Fuzz

- The term '**overdrive**' is used to describe distortion that is '**smoother**' than **fuzz**
  - Often used on **blues rhythm guitar** and **lead guitar** when **higher** gain settings are used

- **Distortion** usually has a **higher** gain setting compared to **overdrive**
  - Used in heavy rock and metal music
  - More suited to **heavy power-chord riffs**

- **Fuzz** has more of a '**raw edge**' compared with the other types of distortion
  - Works better with **solo lines** than with chords

- Overdrive example: Chuck Berry – Johnny B. Goode
- Is often the 'crunch' setting on an amp
  - Gives more 'grit'

- Distortion example: Metallica – Enter Sandman
- Heavily associated with the 'scooped' EQ guitar sound of American metal bands
  - Bass and treble are boosted while mids are cut
- The term distortion is used as the generic umbrella term for all three of these effects as well as being an effect in its own right

- Fuzz example: Jimi Hendrix – Purple Haze
- This effect was popularised by Jimi Hendrix
  - Doesn't work well with chords due to the dissonance caused by multiple notes sounding simultaneously

Valve (Tube) vs Transistor (Solid-State) Amps

- Valve amplifiers were used almost exclusively up until the late 60s/early 70s
  - Solid-state amplifiers began to be used at this point

- Transistors began to replace valves due to their **reliability**, **smaller size** and **lower cost**

- Valve amps have had a resurgence in recent years due to their **warmer-toned overdrive**
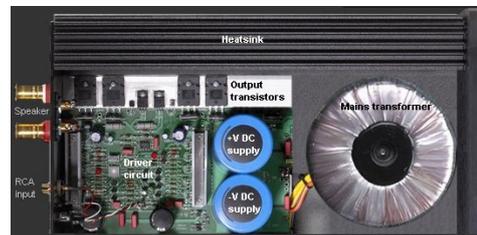

- Pictured: Tube amp (top) Solid-state amp (bottom)

- Valve amps are a type of electronic amplifier that use vacuum tubes to increase the power of a signal

- The switch to transistors made amplifiers more efficient, smaller and more affordable

- Valve amps soft clip the signal resulting in a warmer overdrive whereas solid-state amps demonstrate hard clipping, resulting in a harsher overdrive

Distortion Parameters

Term	Definition
Gain	The drive, determines the amount of distortion
Output	The volume of the output signal (after distortion has been applied) Compensates for the increase in gain necessary to achieve distortion Also allows for the balance between the distorted and clean signals to be adjusted
Tone	Controls the cut-off frequency of a low-pass filter

Wah Wah Pedals

- Wah pedals work by sweeping the centre frequency of a **band-pass filter**

- The effect is commonly used in funk music and is also used to make guitar solos more sonically interesting

---
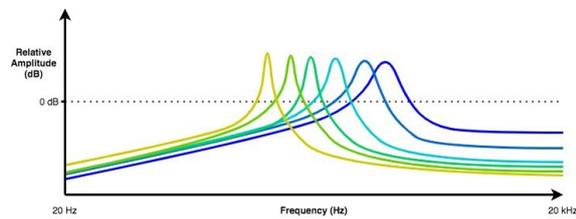
- The term 'wah wah' is onomatopoeic
    - The effect sounds like its name

- Example: Jimi Hendrix – Voodoo Child (Slight Return)

Vibrato and Tremolo

- Vibrato and tremolo are both modulation effects that are made up of only one signal

- Vibrato works by modulating the **pitch** of a signal using an LFO

- Tremolo works by modulating the **volume** of a signal using an LFO

- Other modulation effects work by combining both wet and dry signals

- Historically, modulation effects would be achieved using tape machines or rotary speakers

Guitar Amp Simulators

- Amp simulators are used to emulate various sounds and effects used by guitars
  - Examples include **spring reverbs** and **tremolo**

- Using **DI**, it is possible to simulate the sound of a guitar passing through an amplifier and speaker cabinet

The Leslie cabinet/Rotary Speaker

- The rotary speaker has a rotating horn that will turn at two speeds
  - Tremolo (fast)
  - Chorale (slow)

- The Leslie cabinet was most commonly used with Hammond organs and is often emulated in various 'rotary' plug-ins
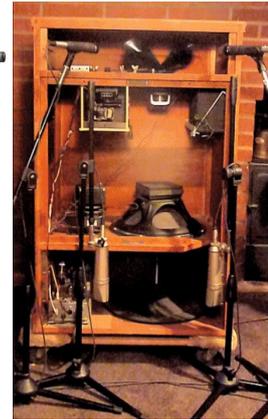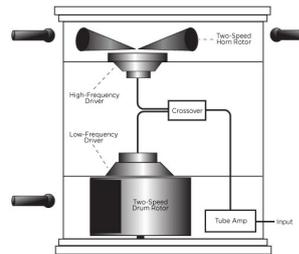
- As the horn rotates, it creates a slight change in pitch, volume and tone
  - This results in modulation
    - This phenomenon is referred to in physics as the Doppler Effect