Stompboxes:

chains of operation for

sonic production

Justin Gagen

jmg@phasechange.co.uk

April 2012

An introduction to the stompbox

Guitar effects pedals, or stompboxes, are discrete devices of varying size designed to produce one specific effect, and are operated with the feet (thus the term stompbox). They are, quite literally, laid out in the form of a chain between the guitar output and the amplifier input, and the order of connection can have a profound influence on the sound produced. This report examines the sequence of connection of a number of such pedals. and describes the various processing stages that the instrument signal is subject to as it passes along this chain.

Fig. 1 A chain of stompboxes – note that the signal path runs from right to left, as the input on most pedals is on the right hand side and the output is on the left.

Stompboxes utilised

Listed in no particular order, this exercise was carried out using the following stompboxes:

1) **Redzone Gain-Green** (see Fig. 2) – This is a basic gain booster pedal which enables a quiet, passive guitar (i.e. one that does not feature high output active pickups) to overdrive a valve amp or (as in this case) a valve amp simulator. It also adds a certain 'thickness' to the tone.
2) **Jim Dunlop Cry baby Wah-Wah** (see Fig. 2) – The wah-wah effect, which consists of a frequency shift from bass-heavy to treble-boost, is activated by rocking the large pedal backwards and forwards.
3) **Boss FB-2 Feedbacker / Booster** (see Fig. 3) – This pedal boosts the signal level and adds a touch of distortion. When the foot switch is held down it also generates a very convincing simulation of speaker feedback.
4) **Boss PH-1r Phaser** (see Fig. 3) – The phaser, or phase shifter, 'moves' the signal phase around and creates a sci-fi sweeping effect. It is of a type know as a modulation effect; this class of processing also includes chorus and flanger pedals.
5) **Blackstar HT Drive** (see Fig. 4) – This pedal features a high voltage valve overdrive circuit and a speaker emulated output (to enable direct connection to a recorder or mixer). It does a very good impression of a valve amplifier.
6) **Boss DD-20 GigaDelay** (see Fig. 4) – Billed as the most powerful delay (echo) pedal that money can buy, the DD-20 also features some nice emulations of older, analogue and tape-based delay systems.

Fig. 2 Redzone Gain-Green and Jim Dunlop Cry Baby Wah-Wah

Fig. 3 Boss PH-1r Phaser and Boss FB-2 Feedbacker / Booster

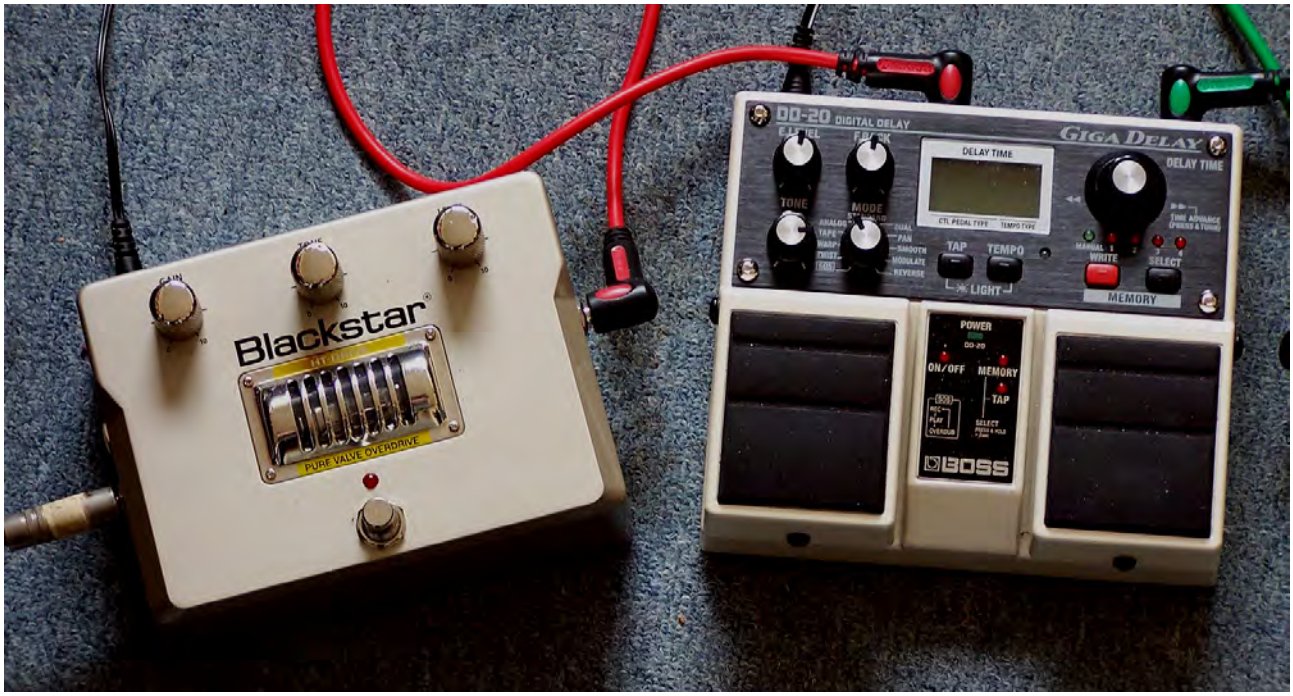

Fig. 4 Blackstar HT Drive and Boss DD-20 Giga Delay

Effects chain 1

Order of pedal connection:

1) Guitar
2) Cry-Baby Wah-Wah
3) Redzone Gain-Green
4) Boss FB-2 Feedbacker / Booster
5) Boss PH-1r Phaser
6) Boss DD-20 Giga Delay
7) Blackstar HT Drive
8) Mixer or recorder

This order of connection is quite conventional. First comes the guitar, then the wah. This signal, manipulable by the guitarist via the Cry-Baby foot pedal, is then boosted by the Gain Green into mild overdrive. The FB-2 booster adds flexibility in that the musician can add volume and gain when required. This is followed by the modulation effects (in this case a phaser) and delay. Lastly the HT Drive acts as a stand-in for an amplifier, as it adds valve overdrive and speaker cabinet emulation, before being plugged into a mixer or recorder. This connection order means that the sounds behave and interact in a limited number of ways; for example, the phaser can be delayed after the fact but the output from the delay cannot be phased.

Audio samples can be found at http://www.phasechange.info/stompboxes

Effects chain 2

Order of pedal connection:

1) Guitar
2) Boss PH-1r Phaser
3) Boss DD-20 Giga Delay
4) Boss FB-2 Feedbacker / Booster
5) Redzone Gain-Green
6) Cry-Baby Wah-Wah
7) Blackstar HT Drive
8) Mixer or recorder

This order of connection is unusual, and follows no standard convention. Then phaser acts on the basic instrument signal, which is then delayed (repeated multiple times, potentially into infinity). The output from the delay (including all of the repeats) can then be boosted by the FB-2, and then further boosted by the Gain Green, facilitating interesting possibilities for over-driving the repeats, before then manipulating them with the Cry-Baby. Lastly the entire, strange melange can be driven further driven using the Blackstar.

Audio samples can be found at http://www.phasechange.info/stompboxes

In summary

These two combinations offer only a fraction of the possibilities utilising this number of effects pedals (with six pedals, this should be six factorial or 6!; this equates to 6 x 5 x 4 x 3 x 2 x 1 = 720 combinations), and many more effects could be used, but they illustrate the differences that can be achieved by connecting the devices in different orders and, as such, illustrate an interesting point about operational sequences in general; the order of operations is paramount.

The production of a guitar sound occupies many guitarists to the point of obsession with thousands often being spent on the instrument. The author has found that the effects and amplifier utilised have a far more profound effect on the sound than the guitar; the processing operations are more important than the source, in much the same way that the stages that a raw material goes through during production of an artefact can be more important to the finished product than the raw material itself. The starting point is obviously important as it must be appropriate - in the case of a guitar it must stay in tune and the musician must find it playable; in the case of a raw material it must be suitable for purpose and workable by the artisan.

Effects pedals are interesting from several perspectives, including those of material culture, and visual and acoustic design and, when one considers that a musical instrument is a machine for turning human gestures and physical actions into sound, the humble stompbox can be a powerful component within this process.