Overview

In the world of music production, the variety of sound in the sound library is important. For an electric guitarist, they need to have different guitar effects to perform a song. Most of the people built discrete circuits and connect different circuits together to modify the signal output. The circuits can create different effects like delay, booster, overdrive. These circuits are mount inside a little metal box and called effect pedals. However, these kind of effectors have disadvantages, such as signal loss, noise and the limitation on creating new sounds. This project discovered a way to use digital signal processing to create the effects.

Objectives

- To create 3 different fundamental effects for performance which are the Booster, Delay and Overdrive
- Minimize the size of the system to make it portable and be able to carry on stage.
- Create sound effect which are not yet existed on the market

Methodology

Block Diagram

- Digitizing the raw signal from the electric guitar
- Boosting the signal by adjusting its gain
- Overdriving the guitar tone by clipping the signal
- Added a delayed sound by saving the signal into an array and read it
- Output to the speakers

Figure 1 Block diagram of the guitar effect processor

There are 3 parts of the program, which are the booster part, the overdrive part and the delay part. The 3 part acts as 3 separate pedals. They can be activated separately or together to create different tones.

Result

The booster and delay part can work as a pedal effecter. The booster gain can be adjust in the interface and the delay time, feedback and playback level can be adjusted. The overdrive part was not finished on time. The setup create less noise than connecting multiple effect pedals together.

Conclusion

DSP is a new way of modifying guitar tone. It is portable and more user friendly comparing to a bunch of effect pedals. It also enables the professional guitarist to explore new possibilities with newly create effects.