Multi-Effect Guitar Pedal

There are many different kinds of guitar pedals for artists to choose from. However, one problem that guitarists run into is that a song may require many different types of effects. In order to accomplish this, many different guitar pedals need to be connected which can become a huge hassle and also become very expensive. This project would help to alleviate this problem, by combining a multitude of different effects into a single guitar pedal.

The Multi-Effect Guitar Pedal is a digital guitar pedal that is capable of producing multiple effects. The brain of the pedal is the Linkit Smart 7688 SoC. The Linkit Smart 7688 runs OpenWRT which is an open source Linux distribution meant for embedded devices. The Linkit Smart 7688 is capable of hosting a wireless AP or connecting to an existing wireless AP. Connected to the Linkit is the HC-06 serial Bluetooth module. The Linkit is able to communicate and send commands to the Bluetooth module via UART. A USB soundcard is connected to the Linkit so that it is able to read in an input signal and output the resulting signal with effects layered on top of it. A couple of Op-Amps are needed in order to convert an instrument level signal into a line level signal which the USB soundcard needs and then to convert the line level signal to an instrument level signal for the output. A 9V battery will power the device with a 5V regulator being used to feed into the Op-Amp’s VCC and –VCC pins and a 3.3V regulator to power the Linkit SoC.

For the software, the Linkit Smart 7688 will use Node.js to apply the audio effects and to host a webserver for the user to change advanced settings of the guitar pedal when connected to Wi-Fi. Timbre.js is an audio processing library that will help apply the effects on incoming audio signals and output the resulting signals. In order to communicate with the Bluetooth module libMRAA will be used. The user is able to control which effect is active and settings of those effects with an Android or iOS application. These applications will be native using Java for Android and Objective-C/Swift for iOS. The mobile application will only be responsible with providing an interface for the user to utilize the pedal and to send those settings to the guitar pedal.

Bibliography

Timbere.js

<http://mohayonao.github.io/timbre.js/>

libMRAA

<http://iotdk.intel.com/docs/master/mraa/>

Linkit Smart 7688

<http://labs.mediatek.com/fileMedia/download/87c801b5-d1e6-4227-9a29-b5421f2955ac>

Android

<https://developer.android.com/guide/index.html>

iOS

<https://developer.apple.com/reference/>

OpenWrt

<https://wiki.openwrt.org/doc/techref/start>

HC-06

<http://silabs.org.ua/bc4/hc06.pdf>