Legal Analysis

Year: 2020   Semester: Spring   Team: 8   Project: AudioBeamer

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Assignment Evaluation:

Item	Score (0-5)	Weight	Points	Notes
Assignment-Specific Items				
Regulatory Analysis		x3		
Analysis of Patent 1		x3		
Analysis of Patent 2		x3		
Analysis of Patent 3		x3		
Writing-Specific Items				
Spelling and Grammar		x2		
Formatting and Citations		x1		
Figures and Graphs		x2		
Technical Writing Style		x3		
Total Score				

5: Excellent   4: Good   3: Acceptable   2: Poor   1: Very Poor   0: Not attempted

Comments:

1.0 Regulatory Analysis

FCC

Our project is a class B device according to the FCC because it is intended for personal use and therefore may be relatively close to other devices, such as televisions, radios, personal computers, etc. As such, our device needs to not interfere with any other electronics that are in a relatively close proximity.

In order to comply with the FCC's regulations, our project must go through a verification process as a class B device. This includes testing the computer for radio frequency emissions, designing a compliance label to stick to the device, producing a report to show test results and creating a description for the manufacturer. Our project can only be marketed under the FCC after all the previous steps have been completed for the verification. Necessary testing for radio frequency emissions would need to be done on our device if necessary but given that our project uses an external device for radio transmission, it may not be necessary. Still, any abnormal noise generation will need to be mitigated in order to comply with FCC class B standards.

European Commission

For electronic devices to be approved under the European Commission, they must not interfere between other electronics, such as television sets, headsets, radios, power lines, etc. This is done by checking our project's electromagnet compatibility, which is essentially the ability to reduce all the potential negative side effects one electronic device can have on another electronic device. Our project/device cannot create any sort of disturbance in any other electronic device, which can be accomplished by limited its radio communication and electromagnetic noise generation. Complying with the European Commission and the FCC seem to be practically identical, so optimally both can be satisfied by doing the same thing.

2.0 Legal Liability Analysis

2.1 Analysis of Patent 1

Adjustable distortion guitar amplifier [3]

Patent Number: US4495640A

Filing Date: June 28, 1982

Abstract:

A programmable adjustable distortion amplifier circuit with an adjustable gain, filters for high and low frequency components, an adjustable parametric equalizer, and a summing device to combine outputs of signals.

Key Patent Claims:

- A programmable adjustable distortion amplifier, especially for amplifying music

- A programmable adjustable parametric equalizer

- A programmable adjustable bandwidth adjustable frequency filter

- A circuit for introducing a selectable amount of varying distortion into an electrical signal input thereto

Analysis:

The claims listed above appear to be very similar to what our project is doing in regard to audio distortion and equalization, however, this patent has a specific means in which it achieves these two things. This patent uses a potentiometer (hardware) to adjust for certain values where we plan to use code (software). The patent states, "a potentiometer means receiving output from said filter means, providing two output signals, the sum thereof [equaling] output from said filter means, first output from said potentiometer means being provided to said first amplifier". Our project differs because we intend to alter distortion and equalization values through an Android app, not a potentiometer.

Our project is, however, similar because we both intend on distorting audio to a varying degree. The patent states in a claim that in contains, "A circuit for introducing a [selectable] variable amount of distortion into an electrical signal input thereto". However, where our project differs is that we are using software to implement distortion, not hardware.

This patent also appears to be for a device strictly contained within one physically connected circuit. Where this differs from our project is that our project has functionalities separated through Bluetooth.

2.2 Analysis of Patent 2

Cordless electrical guitar and amplifier system [4]

Patent Number: US3901118A

Filing Date: June 21, 1974

Abstract:

A cordless electrical guitar and amplifier system which eliminates the use of connecting electrical wiring between the guitar and amplifier unit. An output transducer linked to an internal radio transmitter which is powered by batteries is contained within the guitar. A radio receiver in a remote amplifier unit receives the radio signal from the transmitter in the guitar and converts it through an attached loudspeaker to the audio signal.

Key Patent Claim:

- An electrical guitar equipped with a radio transmitter system which transmits the sounds of the guitar to a remote radio and amplifier unit comprising of a guitar fitted with a transducer connected to an amplifier of a radio transmitter located within the guitar, with the output of the radio transmitter led to an antenna mounted to the face of the guitar and oriented to extend parallel to said guitar face in a direction away from and generally perpendicular to the strings of the guitar.

Analysis:

This patent is similar to our project because they both involve the wireless transmission of audio signals from an electrical guitar to an amp. The two differ, however, because the only effect that this patent does is amplification whereas our project does audio equalization, distortion, and reverb. This patent also is for an actual electrical guitar with a transmission device attached to it that communicates via radio. Our project is similar because we plan to use radio transmission from the guitar to our device, however we are using a third-party transmitter to plug into our device and will therefore not infringe on this patent. This patent also affects audio through the radio transmitting device that acts as an "amplifier unit". Our project has separated this role into the Android app for selecting parameter values and the MSP430 for audio effect calculations. Therefore, our project would not infringe on this patent.

2.3 Analysis of Patent 3

Multi-sound effect system including dynamic controller for an amplified guitar [5]

Patent Number: US7541536B2

Filing Date: June 3, 2004

Abstract:

The proposed invention is a portable multi-sound effect system providing a novel and unique solution for processing the electrical audio signals created by a guitar. The innovation

according to the present invention is by attaching a signal processing unit along with a touch-sensitive dynamic control unit upon the front panel of the guitar's body for controlling and processing electrical signals produced by an amplified guitar, e.g. electric, bass, acoustic or classic guitar.

Key Patent Claims:

- A multi-sound effects system for controlling guitar sound-effects comprising:
    - The Dynamic Control Unit is located beneath the guitar strings at a lower front panel of the guitar.
    - The amplified guitar is a bass guitar, wherein the Dynamic Control Unit is attached above the guitar strings at an upper front panel of the bass guitar.
    - The Dynamic Control Unit is touch sensitive to at least one finger's contact, position and pressure, providing at least one [three-dimensional] vector that represent the absolute or relative position and the amount of absolute or relative pressure of the finger on the Dynamic Control Unit.
    - The Dynamic Control Unit is one of the following: a trackball, potentiometer, encoder, at least one push button, joystick, lever, touch pad, touch screen, dynamic ribbon.
    - The Dynamic Control Unit is removably mounted upon the body of the guitar.
    - The Dynamic Control Unit is built-in to the body of the guitar.
    - The connection between the Dynamic Control Unit and at least one of the other system's components is a wireless connection.
    - Further enabling at least one effect manipulation operation from the list of: activating/deactivating specific effect, changing the effect type, activating/deactivating or changing an effect patch, controlling parameters of effect algorithm which determine the activation pattern of an effect, bypassing or muting an effect, freezing the values of effect parameters according to last user action or according to predefined settings.
    - Wherein effect patch is a combination of several effect types and parameters setting, in which the effect types are combined in a certain order or structure and are played together.

Analysis:

Our project is fairly similar to this patent because they both involve signal processing on a guitar. However, our project differs because this patent involves the use a touch-sensitive

control unit, whereas our project controls audio effects through an android app. This patent also covers products where the control unit is "a trackball, potentiometer, encoder, at least one push button, joystick, lever, touch pad, touch screen, [or] dynamic ribbon". Our project does not infringe on this patent in this regard because the equivalent of our "control unit" is an Android app and a not an external device. However, it is fairly similar to the patent's claims because it covers control units that are connected wirelessly.

Furthermore, our project differs from the patent because our project is not meant to be mounted on a guitar in any way, shape, or manner. This patent appears to be for devices that can be physically attached to a guitar whereas our project is strictly wireless.

Lastly, our project and this patent are similar in their approach to audio signal processing. Both this patent and our project involve altering parameter values to affect the output audio signal of an electric guitar. They also both "freeze" values of specific parameters "according to the last user action"; in our project's case, this would be setting values for audio distortion, equalization, and reverb in the Android app. Additionally, both our project and the patent allow for several effect types to be active at once, thus combining multiple audio processing effects to be combined to create a "summed" signal to output.

3.0 Sources Cited:

1. Federal Communications Commission. "Understanding the FCC Regulations for Computers and Other Digital Devices," 2020. [Online]. Available: http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet62/oet62rev.pdf [Accessed April 3, 2020].
2. "Electromagnetic Compatibility (EMC) Directive," 2014. [Online]. Available: https://ec.europa.eu/growth/sectors/electrical-engineering/emc-directive_en [Accessed April 3, 2020].
3. Douglas R. Frey. "Adjustable distortion guitar amplifier," 1982. [Online]. Available: https://patents.google.com/patent/US4495640?oq=wireless+guitar+equalizer [Accessed April 3, 2020].
4. Alexander T Ford. "Cordless electrical guitar and amplifier system," 1974. [Online]. Available: https://patents.google.com/patent/US3901118?oq=wireless+guitar+equalizer [Accessed April 3, 2020].
5. Shavit Daniel. "Multi-sound effect system including dynamic controller for an amplified guitar," 2005. [Online]. Available: https://patents.google.com/patent/US7541536?oq=wireless+guitar+equalizer [Accessed April 3, 2020].