

**Homework 10: Patent Liability Analysis****Team Code Name: BeatSquare****Group No. 01****Team Member Completing This Homework: Kevin Meyer****E-mail Address of Team Member: meyer25 @ purdue.edu****Evaluation:**

SEC	DESCRIPTION	MAX	SCORE
1.0	Introduction	5	
2.0	Results of Patent and Product Search	40	
3.0	Analysis of Patent Liability	30	
4.0	Action Recommended	10	
5.0	Summary	5	
6.0	List of References	10	
	<b>TOTAL</b>	<b>100</b>	

**Comments:**

## 1.0 Introduction

The BeatSquare is a simple approachable audio sequencer based off of popular flash applications such as the Tonematrix Audiotool. At a high level, the BeatSquare will consist of an 8x8 illuminable grid with a configuration section above containing an LCD and controls. A TI Tiva TM4C123GH6PM microcontroller will be utilized to interface with the system.

The primary functions of the BeatSquare include use of an interactive pushbutton-LED matrix interface to produce sound, and a method of saving these sound configurations to internal or external memory. Several patents were found to claim ownership of several similar ideas, and one in particular that seems to perform substantially the same functions in substantially the same way as the BeatSquare.

## 2.0 Results of Patent and Product Search

### 2.1 Graphical User Interface for Music Sequence Programming

Patent Number: US 8330033 B2 (Grant)

Patent Holder: Apple Inc.

Patent Filing Date: September 13th, 2010

This patent describes a grid matrix interface to create and manipulate audio and music. This particular interface pertains to the ability of the device to output a sound or tone based upon an object icon placed in a cell of an accompanying grid. Each icon is movable and represents a predefined sound type, which is output accordingly when placed on the grid. The grid itself is defined by two axes, representing intensity and complexity, such that, when an object is placed on the grid, the associated sound file is played with the respective intensity and complexity. [1]

Claims made by this patent include the following:

- 1) A graphical programming interface comprising a grid matrix where each position represents a different sound characteristic, object icons with predefined sounds associated with them, and a processor to interpret the sounds produced by placing the objects on the grid in a rhythmic or looping pattern.
- 2) A method for programming a MIDI-based drum kit via computer using the above interface.
- 3) A computer program providing the above interface in software on a computer.

## 2.2 Performance Apparatus and Tone Generation Method

Patent Number: US 8008565 B2 (Grant)

Patent Holder: Yamaha Corporation

Patent Filing Date: October 21, 2009

This patent pertains to a music board where each button contained in a grid emits a tone when operated by the user. This grid is defined by two axes representing tone and time, or tone and pitch, such that each button corresponds to a different tone at a different time or a different tone-pitch combination. There are additional functionalities and adjustments located around the perimeter of the grid, permitting users to change the sounds output by the button grid. The board has the ability to loop the specified key set and repeatedly play the corresponding music piece.

[2]

Claims made by this patent include the following:

- 1) A grid of key switches arranged in two axes, with the ability to store information related to the specified key set and play it back.
- 2) The above interface using the axes to represent tone and pitch, with the ability to adjust the range of tones and pitches on the board.
- 3) The above interface using the axes to represent tone and time, with the ability to play the specified set of notes in a repeating loop.
- 4) The above interface with the ability to control the device from a computer.

## 2.3 Dynamic Diatonic Instrument

Patent Number: US 20140076126 A1 (Application)

Patent Holder: Ableton Ag

Patent Filing Date: September 11th, 2013

This patent details a musical instrument featuring a grid layout of rows and columns, representing different keys and scales. The instrument has the ability to switch between diatonic and chromatic layouts, and different scales. The keys may be backlit and may be sensitive to velocity and pressure. [3]

Claims made by this patent include the following:

- 1) A musical instrument comprising a grid of buttons that play musical notes, which can be changed between a diatonic and a chromatic layout and is able to change between keys and scales.
- 2) The above instrument where the buttons are sensitive to velocity and/or pressure, and where the buttons are backlit.

### **3.0 Analysis of Patent Liability**

#### **3.1 Graphical User Interface for Music Sequence Programming (Apple)**

The design outlined in this patent uses a grid layout to produce music, but the axes represent intensity and complexity of a sound specified by a movable object icon. While functionality specified in this patent is somewhat comparable to that of the BeatSquare, the key claim of an interface using “a plurality of object data files, each data object file associated with a particular matrix position on said grid matrix, such that different positions along a coordinate axis correspond to different characteristics of each object data file” [1] differs from the BeatSquare’s sound board implementation, where no object icons are used at all; the sound produced is preconfigured and stored in the device’s memory, rather than being a configurable setting with multiple options using icons. Thus, there is no patent liability relating to these claims.

#### **3.2 Performance Apparatus and Tone Generation Method (Yamaha)**

This patent claims a grid-like user interface for creating sound. One of the main claims of this device relevant to the BeatSquare is a grid layout along two axes representing tone generation timing, and tone pitch. Other relevant claims include the ability to loop parts of the input sound configuration, the ability to configure the tones produced by the buttons, and the ability to save and load music data to and from the device [2]. Unfortunately, these are the primary functions of the BeatSquare, and so would constitute infringement under the Doctrine of Equivalents upon this intellectual property.

#### **3.3 Dynamic Diatonic Instrument (Ableton)**

This patent application calls for a musical instrument with a grid interface for making music. One of the key claims of this application is the “means for choosing between a diatonic and chromatic layout of the buttons and by means for choosing between different keys and

scales” [3]. The key difference between this device and the BeatSquare is the ability to choose between diatonic and chromatic layouts. Since the BeatSquare does not have this functionality, there will not be any patent liability related to these claims if this patent is granted.

#### **4.0 Action Recommended**

Because the device patented by Yamaha performs many of the same functions as the BeatSquare, the BeatSquare could potentially be infringing upon the intellectual property. Because it would be very difficult for the BeatSquare to perform its basic functions in a different manner without compromising its *raison d'être*, the necessary course of action for commercializing this product would be to seek licensing for, or acquisition of, the patented claims owned by Yamaha. Because the patents found in this search are certainly not the only patents pertaining to audio looping devices similar to the BeatSquare, more research will be needed to determine if the aforementioned patent is in fact the only patent that may lay claim to the functionalities of the BeatSquare, thus constituting infringement.

#### **5.0 Summary**

The BeatSquare is not a novel idea, thus there are several patents covering the primary functions of using backlit button matrices to represent sound patterns, outputting these sound patterns repetitively, and saving these configurations to and loading them from the device. Since these functions are covered by one of Yamaha's patents, rights will need to be obtained from Yamaha in order to legally manufacture and sell this product.

**6.0 List of References**

- [1] Gerhard Lengeling, Jan-Hinnerk Helms. “Graphical user interface for music sequence programming,” U.S. Patent 8,330,033 B2, December 11, 2012.
- [2] Yu Nishibori, Toshio Iwai. “Performance apparatus and tone generation method,” U.S. Patent 8,008,565 A1, January 31, 2007.
- [3] Jesse Terry. “Dynamic diatonic instrument,” U.S. Patent Application 2014-0076126 A1, March 20, 2014.