Homework 13: User Manual

Team Code Name: BeatSquare   **Group No. 01**

User Manual Outline:
- **Brief (marketing-style) product description**
- **Product illustration annotated with callouts for each control/display**
- **Product setup instructions**
- **Product use instructions**
- **Product troubleshooting instructions**

Evaluation:

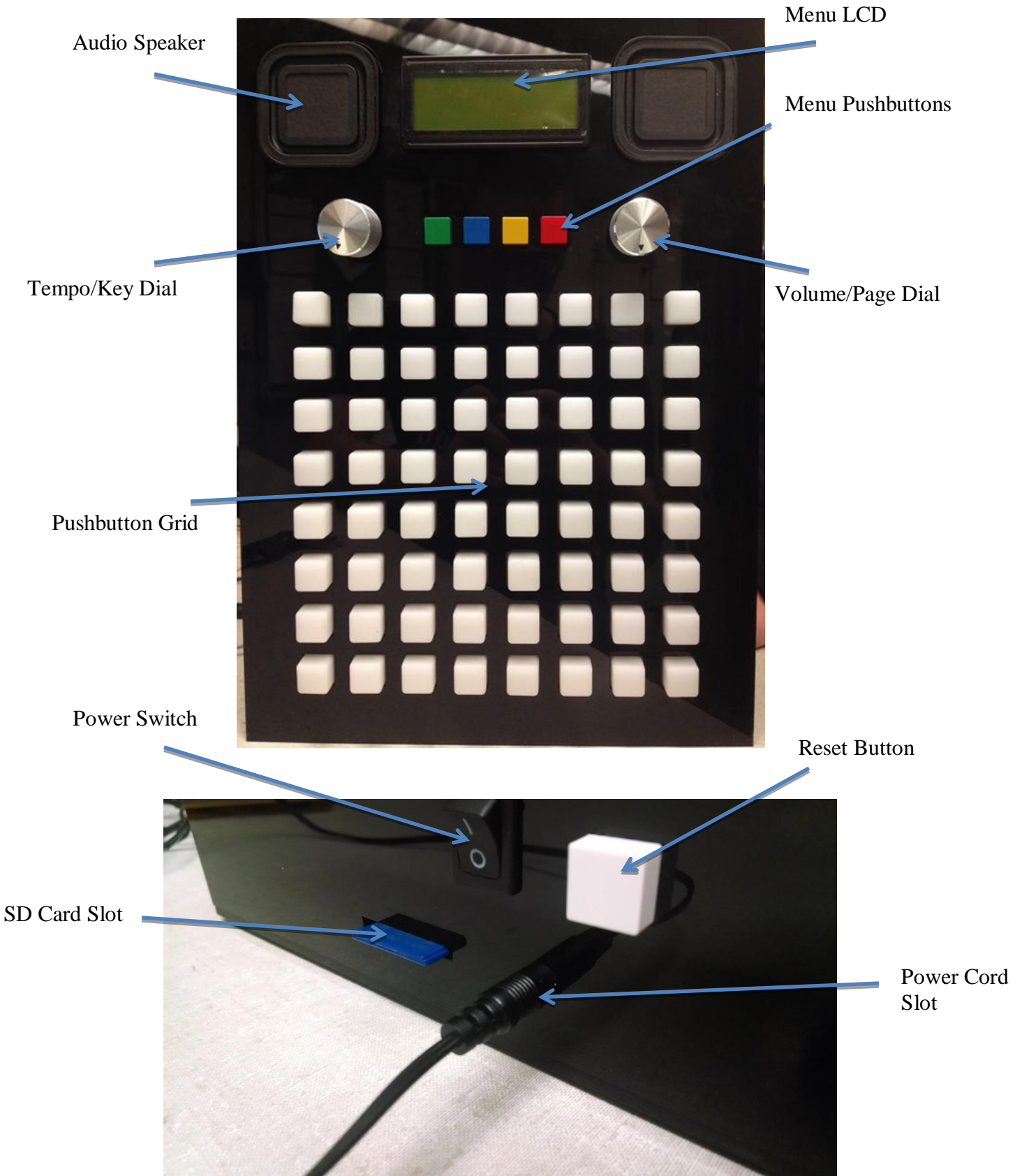| SEC	DESCRIPTION	MAX	SCORE
1.0	Product description	20	
2.0	Product illustration	20	
3.0	Product setup instructions	20	
4.0	Product use instructions	20	
5.0	Product troubleshooting instructions	20	
	TOTAL	100	

Include this sheet as a cover page for your report

Product Description

The BeatSquare is a musical device that lets the user create a melody using an 8x8 grid of buttons and save these melodies internally or to an SD card. The main component of the BeatSquare is the pushbutton grid. Each button on the grid corresponds to an individual beat and note, where the beat is determined by the column the button is in and the note is determined by the row the button is in. Each button has an LED under it that will light up to show if the button is on or off. The device will loop through the columns of beats repeatedly, playing all the notes activated during the current beat. This allows the user to create a unique melody by pressing different combinations of buttons. The notes played by the different buttons are based on a pentatonic scale so no matter what combination is played, the end result will sound amazing.

The BeatSquare also features several controls in order to get the melody exactly how the user wants it. Four menu pushbuttons, two dials that also act as pushbuttons and an LCD allow the user to control many aspects of the BeatSquare such as tempo, volume, major key, and which page the LED is on. The tempo can be varied from 120-240 beats per minute (bpm) with each column being one beat. The key can be changed to be any of the 7 major keys and the pentatonic scale will change to the major pentatonic scale based on the current major key. Changing the page allows the user to add more than 8 notes to their repeated melody and will refresh the grid to show the new page.

If the user would like to save a particular configuration for future use they have a couple options to choose from. The first is saving to the device itself. The user can choose from the main menu to save the current setup internally to one of 4 save files. These 4 files will remain on the device and can be loaded at any time from the main menu. The user also has a choice to save the current setup as a MIDI file to an SD card located on the top face of the device. This allows the user to create a basic melody using the BeatSquare to then import into music producing software and add more musical depth to their new creation.

Product Illustration

Audio Speaker

Menu LCD

Menu Pushbuttons

Tempo/Key Dial

Volume/Page Dial

Pushbutton Grid

Power Switch

Reset Button

SD Card Slot

Power Cord Slot

Setup Instructions

The BeatSquare is an extremely easy product to setup because it is designed as a plug and play device. Make sure to setup the device in an appropriate environment. Look for a spot:

- o   That has a flat surface to rest the device on
- o   With access to a wall outlet
- o   That won't bother others if music is played

Once a good spot has been found, plug the power cord into the wall and into the device. The device has been designed for US wall outlets and should only be used with such. Do not try to force the power plug into a wall outlet it is not designed for. Also do not try to force the barrel jack of the power cord into the device. The jack should fit cleanly into the power slot without force.

When power has been connected to the device, flip the power switch to the on position and the device will be ready to play.



              Power Off   Power On

In order to save to a MIDI file, an SD card needs to be inserted into the SD card slot located on the top of the device. The card slot is a push-in push-out design. When inserting an SD card, push the card in far enough where the card clicks and no longer is pushing back out. When trying to remove the card, push the card in until it clicks and pull the card out as the slot pushes it.
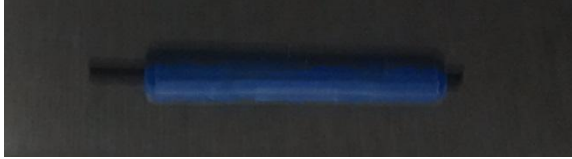

SD Card inserted

Ready to remove

Use Instructions

- Pushbutton/LED grid

The 8x8 grid of pushbutton LEDs is very intuitive to control. Pressing a button while it is off will light up the LED underneath that button and turn on that note. Pressing the same button while it is on will then turn the LED and note off. Any buttons can be on at the same time which means it is possible to turn on every note at once but it is not recommended!
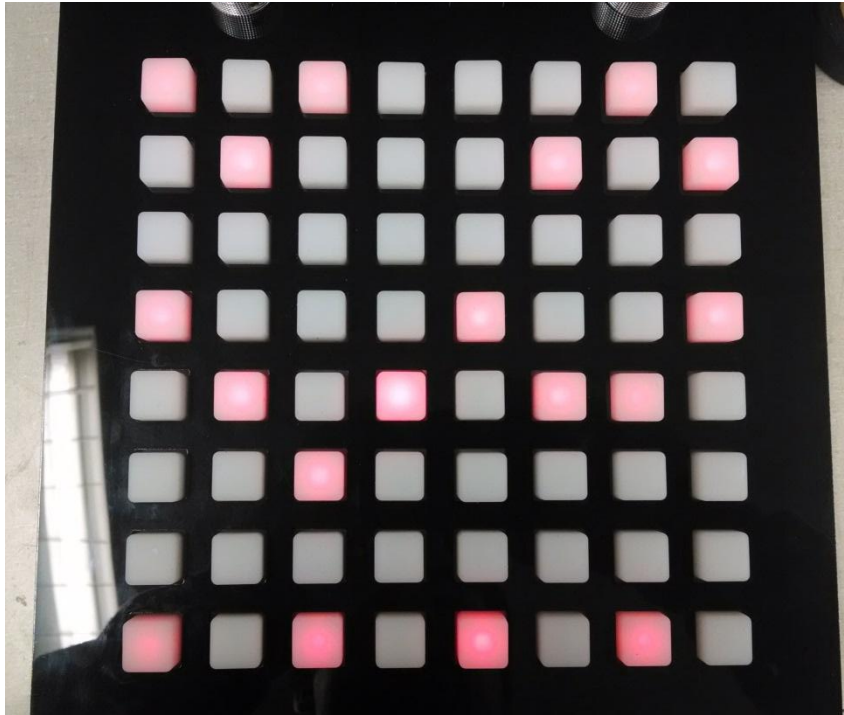
- Main Menu System

The main menu shows all of the options available to the user. These include saving and loading from internal flash memory, saving the melody to a MIDI file on the SD card, and clearing the current configuration on the pushbuttons.

- o Loading a file from flash begins by choosing the button for "Load" on the main menu. From there choose one of the four files presented and press "Ok" on the following screen. The layout that was saved to that file should now be present on the grid.

- o Saving a file to flash begins by choosing the button for "Save" from the main menu. Then choose one of the four files to save to. Confirm the choice by pressing "Yes" to overwrite the current file or "No" to return to the main menu. If "Yes" was pressed, press "Ok" on the following screen to return to the main menu. The file should now be saved in the devices memory.

  o Exporting the melody as a MIDI file is a similar process as saving to flash. From the main menu press the button for "MIDI." Then choose the file that you would like to save the melody as and confirm that you would like to overwrite the current MIDI file. The melody will be saved on the SD card under the name BT_SQR_X where X is the letter chosen.

- Tempo/Volume/Key/Page Dials

Aspects of the audio can be controlled by the two dials found to the sides of the menu pushbuttons. The left dial controls the tempo and key of the music while the right key controls the volume and page of the music. In order to switch between the two controls a dial can change, push the dial down until it clicks. This toggles between one control and the other.

- o The tempo adjusts how fast the notes are played and can be varied from 120 bpm to 240 bpm. The default tempo is 120 bpm.

  o The volume adjusts how loudly the music plays from the audio speakers. It can be varied from no audio playing (0%) to full audio (100%). The default volume is 75%.

  o The key changes the major pentatonic key that the music is played in. The choice for the key is taken from any of the 7 natural note keys (A,B,C,D,E,F,G). The notes will adjust to make the bottom note the natural note and the increasing pentatonic scale from there. The default key is C major.

  o The page adjustment changes which page of music is currently being altered by the pushbutton grid. There are 4 pages to choose from and the default page is page 1.

Troubleshooting

- Device does not power on

If the device does not seem to have power, check the power cord and power switch. Make sure the power cord is connected to the wall outlet as well as inserted into the power slot of the device. It should be inserted so the black plastic of the power cord is touching the black acrylic of the device.

- SD card not writing

If the musical configuration is not being written to the SD card properly or the LCD is showing that there was an error writing to the SD card, check if the SD card is inserted fully into the card slot. The card should be inserted with any label facing down and the side with the gold pads inserted first. Make sure to also push the card in fully.

- Audio does not play

If no audio is being played from the speakers, check the volume of the device. Adjust the volume higher if it is at 0 or being drowned out by background noise.

- Other issues

If there are any unexpected issues with the device but the power is still functioning, try resetting the device by either pressing the reset button on the top of the device or flipping the power switch off and on. If this does not fix the problem or the solutions above did not fix the problem, contact technical support for help.