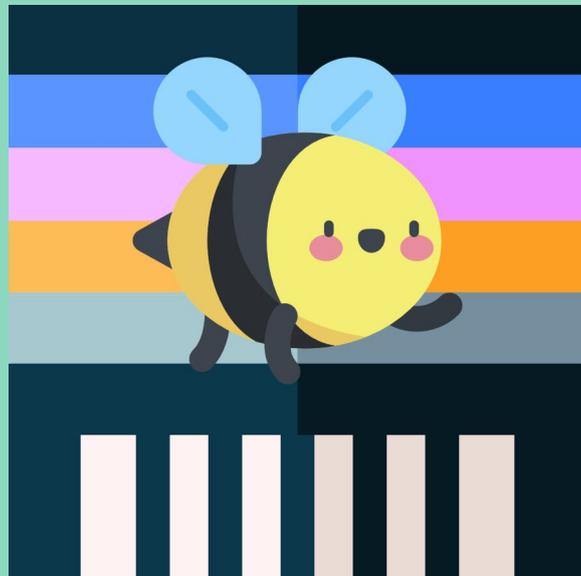


# BUMBLY

## WINGBEAT SYNTHESIZER AND SEQUENCER



## USER MANUAL

Version 1.0

Copyright 2019 by POGPALE Labs

<https://pogpalelabs.com>



## Table of Contents

1. Overview.....	3
1.1 Play Mode.....	4
1.2 Synthesizer Mode.....	4
1.3 Sequencer Mode .....	5
1.4 Information Window.....	6
2. Play Mode.....	7
2.1 Enable / Disable Sound Panel.....	7
2.2 Configuration Mode  / Play Mode  Toggle.....	7
2.3 Align Panels Horizontally / Vertically .....	9
2.4 Layout Presets (Piano, Trombone, Guitar) .....	10
3. Synthesizer Mode .....	11
3.1 Sound Selector .....	11
3.2 Waveform Window .....	11
3.3 Wingbeat Simulator .....	12
3.4 Room Simulator .....	13
3.5 Wing Size Filter.....	13
3.6 Amplitude Envelope.....	13
3.7 Volume.....	14
3.8 Touch Keyboard.....	14
4. Sequencer Mode .....	15
4.1 Track Selector.....	15
4.2 Show/Hide and Mute/Unmute Tracks.....	15
4.3 Sequencer LCD .....	16
4.4 Tool Bar .....	16
4.5 Edit Window .....	17
4.6 Touch Keyboard.....	17
4.7 Previous / Next Bar Buttons.....	17
4.8 Position Handle.....	18

# 1. Overview

BUMBLY is a synthesizer that makes sound by simulating the movements of the wings of insects.



Bees, mosquitos, flies beat their wings to fly. These wingbeats produce airflow around them and make buzzing sound.



Single-Cycle Waveform

BUMBLY synthesizes sounds that can be heard when an insect moves its wings in a certain way.

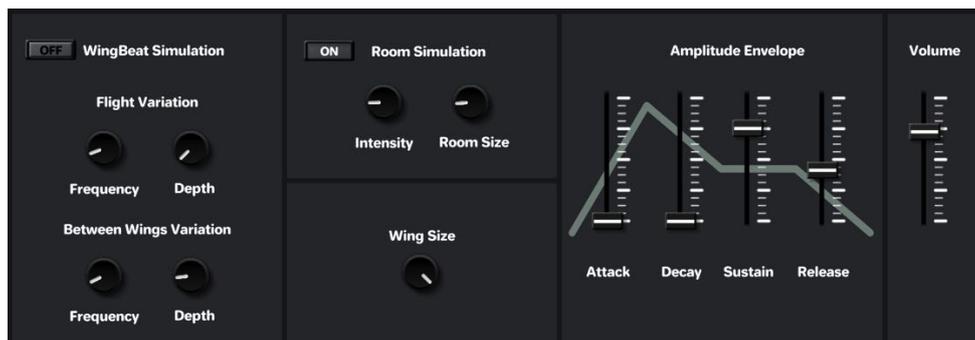
BUMBLY periodically reproduces single-cycle waveform to create a sound (Wavetable Synthesis).

This single-cycle waveform can be thought of as the way insects flap their wings.

You can draw this waveform on BUMBLY.

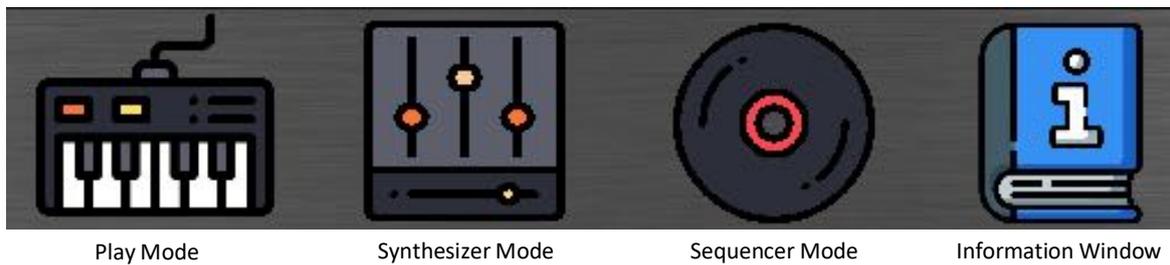
You know that the pitch of insect sounds keeps changing depending on how they beat their wings. Frequency difference between two wings also make difference in sound. You can add these sound effects with BUMBLY wingbeat simulator. BUMBLY modifies sound using pitch modulation of wings, pitch variation between two wings, wing size filter, room simulation and amplitude envelope.

Experiment with the synthesizer parameters and enjoy sound variations. This make sounds more realistic and interesting.



Synthesizer Parameters

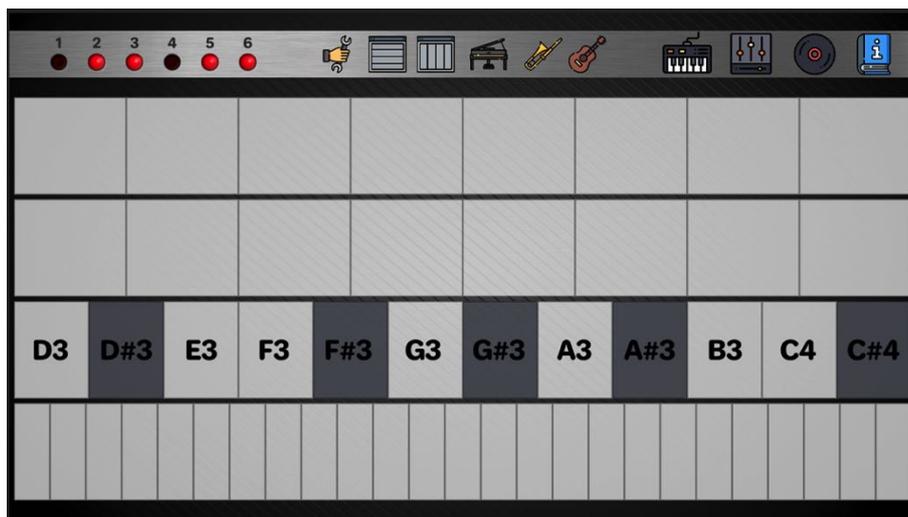
BUMBLY provides [Play Mode], [Synthesizer Mode], [Sequencer Mode] and [Information Window] buttons on the tool bar.



### 1.1 Play Mode

Use BUMBLY as a musical instrument.

You can use up to 6 sound panels. Each sound panel can have its own touch interface including size, appearance, sound and pitch ranges.



Play Mode

### 1.2 Synthesizer Mode

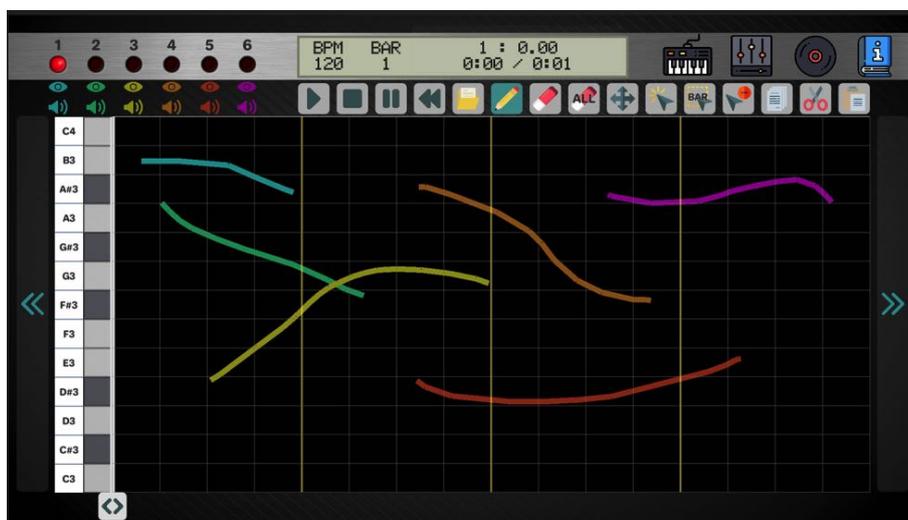
You can make and change sounds in this mode. Draw your own waveform or load the saved sound. Modify your sound with synthesizer knobs and buttons.



Synthesizer Mode

### 1.3 Sequencer Mode

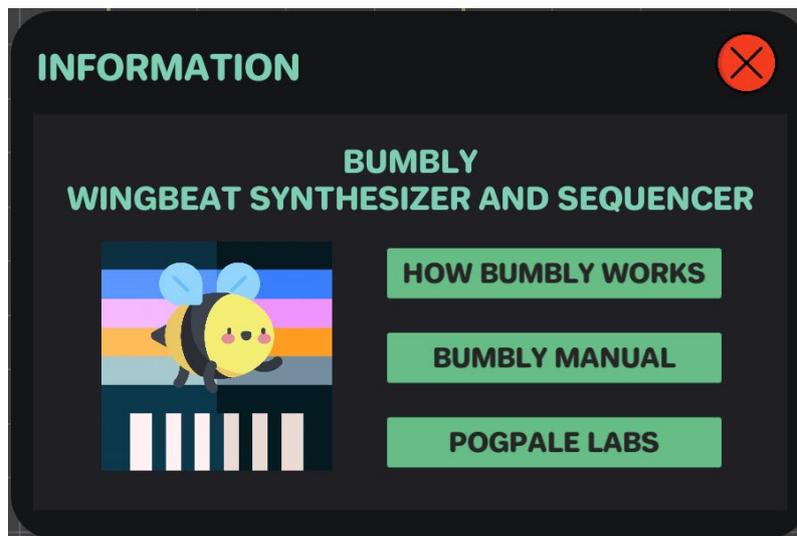
In this mode, you can draw notes on the sequencer grid. BUMBLY will play what you draw. You can also load and save your songs.



Sequencer Mode

## 1.4 Information Window

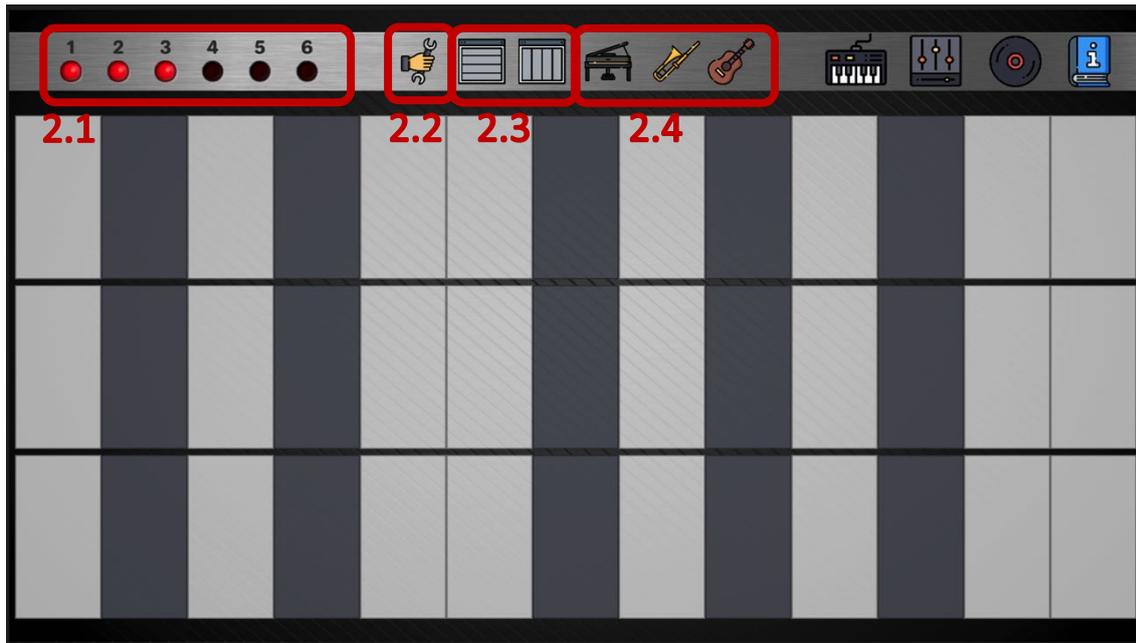
This window provides information about BUMBLBY.



Information Window

## 2. Play Mode

Use BUMBLY as a musical instrument. BUMBLY provides 6 sound panel. Each panel can have own sound, shape and interface setting. Touch the sound panel to make BUMBLY sing.



### 2.1 Enable / Disable Sound Panel

Switch on/off sound panels by touching numbered LEDs. Disabled panel will be invisible.

2.2 Configuration Mode  / Play Mode  Toggle

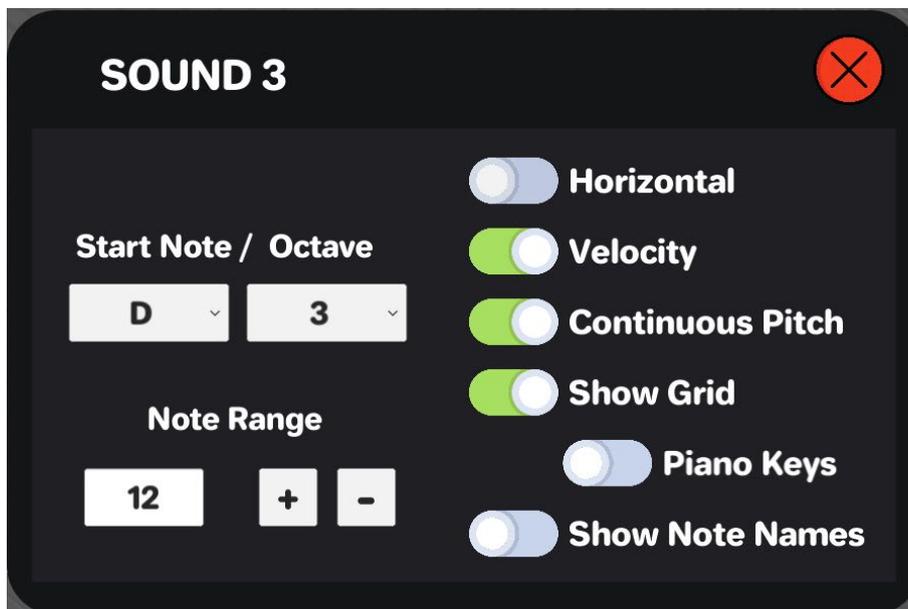
Touch  to enter configuration mode.



Configuration Mode

Each sound panel will show the number of sound panel (1 to 6) and configuration instructions.

- Drag the panel to move the sound panel.
- Drag the lower right triangle to change the size of panel.
- Double tap the panel to show configuration options.



Configuration Options

The configuration options for the sound panel are as follows:

- Start Note / Octave

Set the lowest pitch on the sound panel.

- Note Range

Set the pitch range of sound panel (in semitones). There are 12 semitones in an octave.

- Horizontal

ON : The pitch rises from left to right on the sound panel.

OFF : The pitch rises from down to up on the sound panel.

- Velocity

ON : Note velocity can be controlled by the touch position.

OFF : Note velocity is fixed.

- Continuous Pitch

ON : The pitch of an instrument changes continuously. (like a violin)

OFF : The pitch of an instrument changes at discrete intervals (semitones).  
(like a piano)

- Show Grid

ON : Show grid on the sound panel.

OFF : hide grid.

Piano Keys : On/off black and white key colors.

- Show Note Names

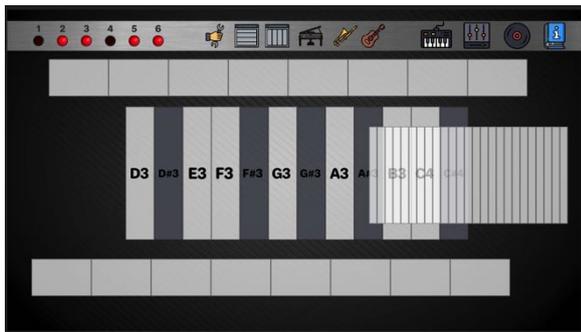
ON : Show note names on the sound panel.

OFF : Hide note names.

When the configuration is complete, touch  to return to play mode.

## 2.3 Align Panels Horizontally / Vertically

Touch the Align button to automatically align and resize the enabled sound panels.



horizontally

align panels

vertically



## 2.4 Layout Presets (Piano, Trombone, Guitar)

Touch these buttons to change layout to the preset layouts.

These layouts can be used as starting points for your custom layouts.

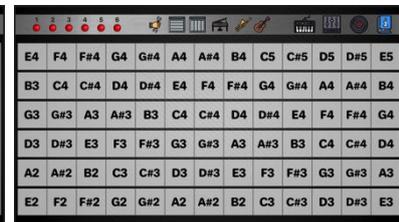
Double tap these buttons to change the sound of panels to the preset sound.



Piano Layout



Trombone Layout



Guitar Layout

### - Piano Layout

Three sound panels for three octaves.

Discrete Pitch like piano.

Grid with piano color.

### - Trombone Layout

One big panel.

Continuous pitch like trombone.

### - Guitar Layout

Six sound panels for six strings of guitar.

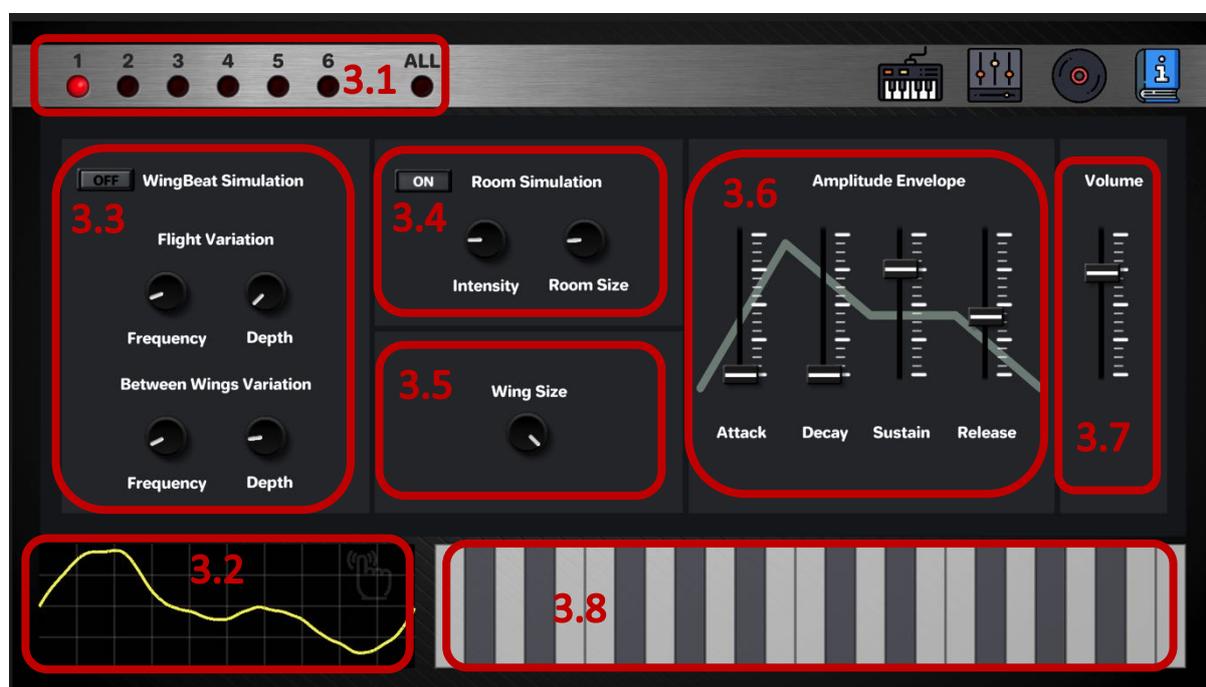
Discrete Pitch like guitar frets.

Grid with note names.

### 3. Synthesizer Mode

There are 6 sound generators in BUMBLY. You can think there are six bees in the BUMBLY box. Each bee can have a different wing-beating pattern that makes a different sound. That is, each sound can have a different waveform and synthesizer setting. Each sound is connected to the corresponding sound panel (Play Mode) and track (Sequencer Mode).

Note that each sound in BUMBLY is monophonic (only one note at a time like bee noise). You can make harmony (polyphonic sound) using 6 sound generators of BUMBLY.

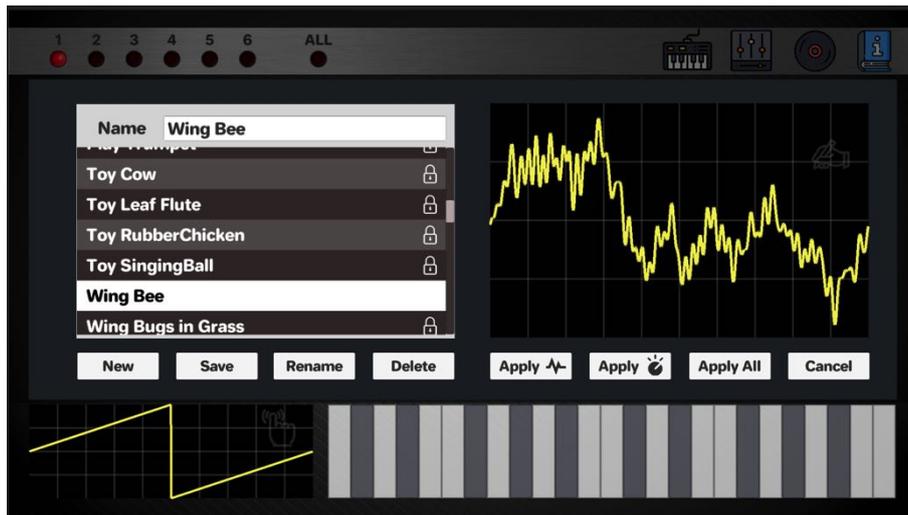


#### 3.1 Sound Selector

Touch the numbered LED to select the sound you want to change. Touching 'ALL' LED allows you to change six sounds at the same time.

#### 3.2 Waveform Window

This window displays the currently loaded waveform in the selected sound. Touching this window shows the waveform editor. You can draw your own waveform in the editor. You can also save / load / delete / rename waveforms. Touch the name of waveform in the list to preview the sound.



Waveform Editor



apply waveform only.



apply synthesizer parameters only.



apply both waveform and synthesizer parameters.



cancel and close the editor.

Locked waveforms  in the list are factory presets. You can't modify or delete factory presets.

### 3.3 Wingbeat Simulator

- ON / OFF toggle (  ,  )

ON : Apply wingbeat effects.

OFF : Bypass wingbeat effects.

- Flight Variation

Pitch of insect sounds keeps changing depending on how they beat their wings. This parameter adds randomness to pitch to simulate wingbeats.

Frequency : control the speed of pitch variation.

Depth : control the range of pitch variation.

#### - Between Wings Variation

If an insect has two wings, the left wing and the right wing can have different beating frequencies. Or you might think there are many bees with different beating frequencies. This frequency difference makes a difference in sound. This variation makes the sound thicker.

Frequency : control the speed of variation.

Depth : control the range of variation.

### 3.4 Room Simulator

Room Simulator adds reverb effect on sound.

Control the reverb effect with intensity and room size knobs.

- ON / OFF toggle (  ,  )

ON : Apply reverb effect

OFF : Bypass reverb effect

### 3.5 Wing Size Filter

Small wing makes thin sound and Big wing makes thick sound.

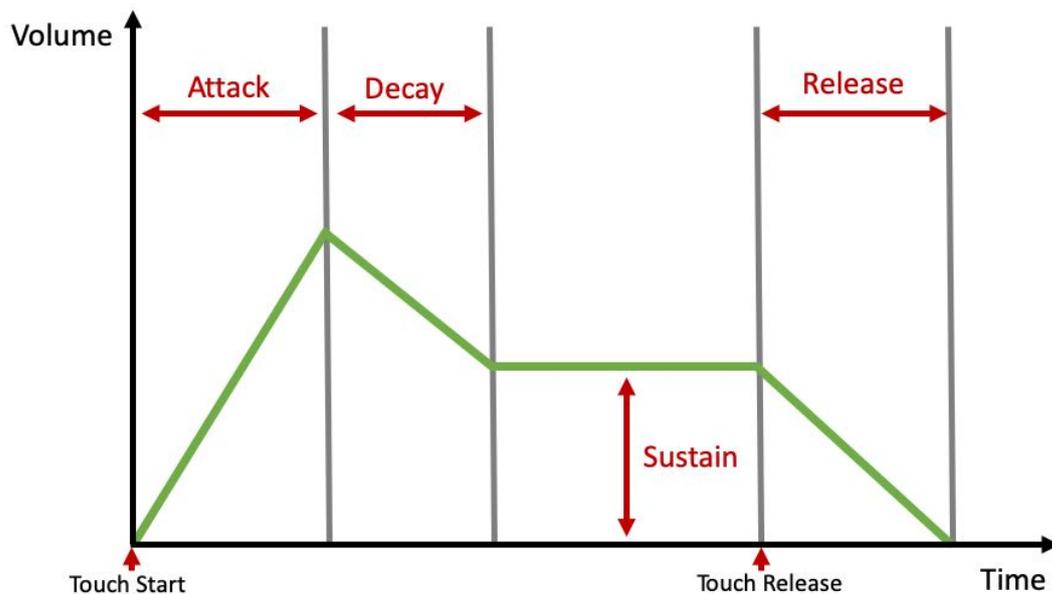
This parameter controls sound with the high pass filter.

### 3.6 Amplitude Envelope

This parameters control how the volume of sound changes over time.

Amplitude Envelope consists of four parameters: Attack, Decay, Sustain and Release (ADSR). Change parameters with ADSR sliders.

- Attack : **time** taken for the volume to run up from zero to peak. (after touch input)
- Decay : **time** taken for the volume to run down from peak to the sustain level. (after attack)
- Sustain : **level** of sustain volume.
- Release : **time** taken for the volume to decay from the sustain level to zero (after touch release).



### 3.7 Volume

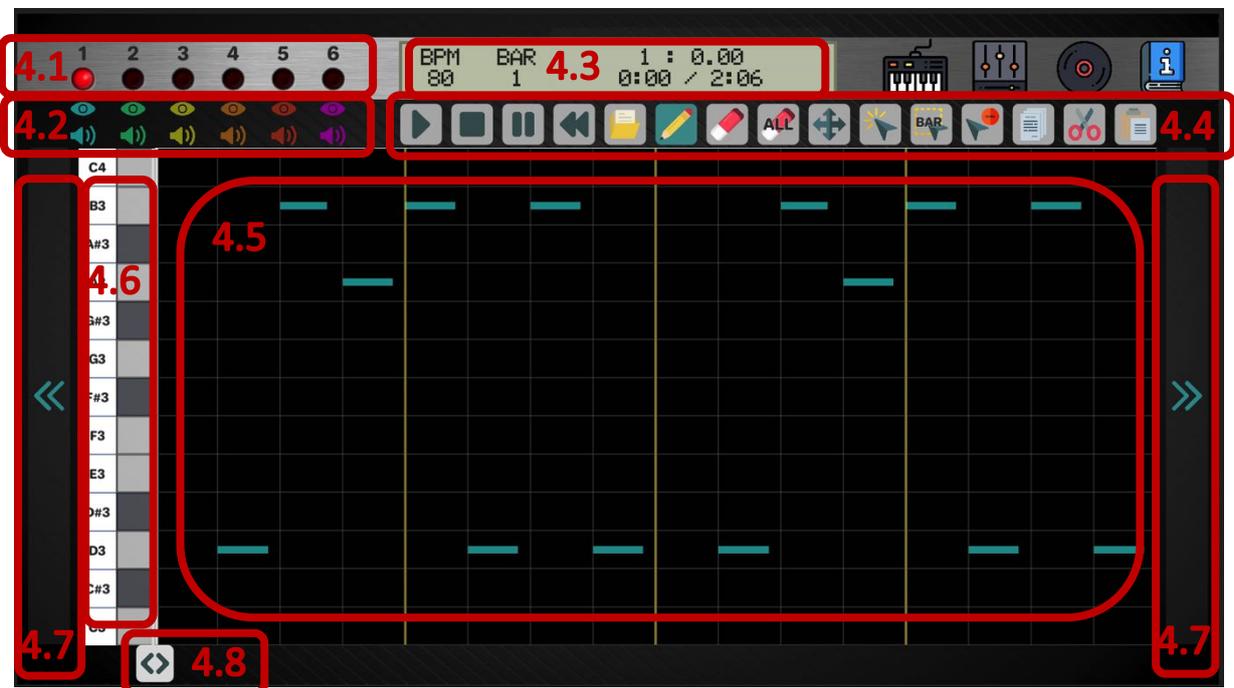
Control the volume of the selected sound.

### 3.8 Touch Keyboard

Preview and play the current sound with touch keyboard.

## 4. Sequencer Mode

Draw and play your song in BUMBLY. BUMBLY provides 6 tracks.



### 4.1 Track Selector

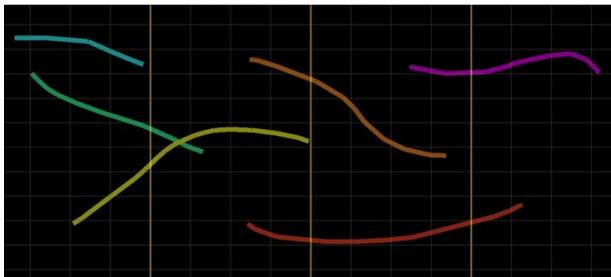
Touch the numbered LED to select the track you want to edit.

### 4.2 Show/Hide and Mute/Unmute Tracks

Toggle  icon to show or hide the corresponding track in the Edit window.

Toggle  icon to mute or unmute the corresponding track when playing a song.

Note that each track has a different color in the Edit window.



### 4.3 Sequencer LCD

This LCD shows the current bar number of the Edit window and the BPM of the current song. The current position and the total length of the song are also displayed (in both BAR and Time units).

Touch BPM to change the BPM of the song. You can change BPM from 20 to 300. Touch BAR to jump to the desired BAR. The maximum BAR is 256.

### 4.4 Tool Bar



Play



Stop



Pause



Go to the first bar



Open the Song Manager window

You can save, load, rename, delete songs.



Song Manager Window



Draw Mode

Draw pitch and length of a note in the Edit window.



Delete Mode

If there are selected lines, the selected lines will be deleted on touch.



Delete all lines



move lines.

If you drag on the selected lines, the selected groups will be moved.



Select Mode



Select all lines on the current bar



Unselect all lines



Copy the selected lines



Cut the selected lines



Paste the copied lines.

## 4.5 Edit Window

The editing of the sequence takes place in this window.

## 4.6 Touch Keyboard

Touch the keyboard to preview the sound.

Scroll up and down note names to change the note range in the Edit window.

## 4.7 Previous / Next Bar Buttons

Touch these buttons to go to previous or next bar.

## 4.8 Position Handle

This handle indicates the current position during playback.  
You can drag this handle to move the playback position.