FMScreen v1.0
User's Guide

SUMMARY

FMScreen is a software program that transforms the iPhone and iPod touch into a versatile musical instrument. Sounds are produced using classic frequency modulation synthesis techniques. The character of the sound can be easily manipulated using touch gestures on the device's screen.

Figure 1. *FMScreen displaying the Octave grid.*

OVERVIEW

FMScreen is an FM Synthesizer designed with live performance in mind. All gestures used to modify the sound are selected to allow for dynamic and seamless changes in the characteristics of the sound.

Simply touch the screen to produce a sound. Slide the finger across the screen to change the frequency and timber of the sound. The sound is produced using a well known synthesis technique called Frequency Modulation.

FM Synthesis

FMScreen implements the simplest form of FM Synthesis. In this application, the FM Synthesis creates complex sounds by manipulating the interaction between two sine waves, where one of them (*modulator*) is in charge of modifying the frequency of the other (*carrier*). By altering the sine waves' properties, different effects are produced, as follows:

Index of Modulation

The index of modulation (i.e. "amount of modulation") determines to what extent the modulator will affect the carrier, by controlling which partials are present (added to the carrier sine wave.) The result consists of changing the timber, and therefore controlling the richness of the sound.

C/M Ratio

The C/M ratio (carrier/modulator ratio) sets the relation between the carrier and modulator frequencies, dictating the partials' frequencies. The ratio is used to keep a constant timber as the carrier frequency changes.

How to Use FMScreen

The following gestures are used to play the FMScreen instrument:

Trigger Sound

Tap on the screen to trigger a sound. Stop the sound by releasing the finger from the screen.

Volume

Tilt the phone sideways to dynamically change the volume. When the device is horizontal, it will play at full amplitude. As the iPhone / iPod Touch turns on its side, the volume will decrease until it goes silent when it is on its side.

Carrier Frequency

Slide the finger along the length of the screen to control the carrier's frequency.

Index of Modulation

Slide the finger along the width of the screen to change the index of modulation (timber/richness of the sound).

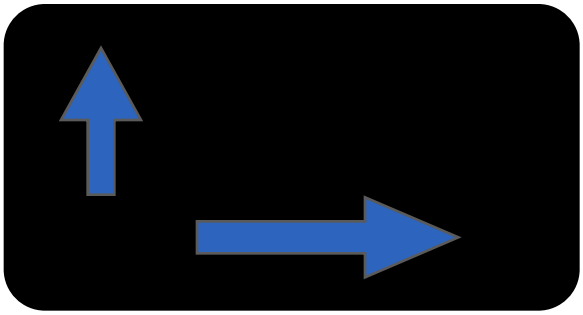

Figure 2. *The frequency increases from left to right. The index of modulation increases from bottom to top..*

C/M Ratio

While playing a sound, a second finger can be used to modify the C/M ratio by sliding it along the width of the screen.

Active Frequency Range

Pinch along the device's length to set the active frequency range (4 to 6 octaves).

Note Grid

Tap three fingers to display an octave grid and snap frequencies to an equal tempered chromatic scale. While the sounds snap chromatically to an invisible grid, the grid displayed on the screen marks the note A in each available octave.

Tips & Tricks

This section will grow as we get feedback from our users. Feel free to send us different ways of using FMScreen so that we include it here!

Vibrato

Move the iPhone / iPod touch sideways rapidly to produce a vibrato effect,