

## Overview

Just provides a means of exploring arbitrary tuning systems using standard representations (pitch, musical interval, cents, frequency, and ratio), as well as exploiting theoretical systems such as Just Intonation and N-tone equal temperament. The application organizes these features into two main window styles and a few auxiliary panels. The two window styles: Keyboard and Matrix, contain Keys that may be tuned and played with the mouse or MIDI keyboard. A **Tuning Panel** provides controls that are used to tune, play, compare, or change the representation of selected keys.

The user may also play standard NeXT and MIDI score files. These scores may be retuned from tuning information in Keyboard or Matrix Windows.

## **Keyboard Windows**

Keyboard windows contain an arbitrary number of marimba style keys. Keys are sounded by clicking with the mouse. Multiple keys may be selected at one time. This is useful for listening to chords, or examining relationships within a subset of a tuning.

Keys are moved within or between Keyboards with the standard *cut, copy, and*

paste mechanisms. Each Key may be tuned and presented in a variety of representation styles:

*Pitch*

*Cents Relative to a Reference\* Key*

*Cents Relative to the Previous Key*

*Hertz*

*Ratio Relative to a Reference\* Key*

*Ratio Relative to the Previous Key*

*Interval from Reference\* Key*

*Interval from Previous Key*

*MIDI Key Number*

*User Label (arbitrary names, i.e Do, Re, Mi)*

\* The *Reference Key* is no different than other keys except that it acts as base in relative tuning representations. Any key can be made the *Reference* by using the *Tuning Panel*.

## **Matrix Windows**

There are two types of Matrices available: **Transposition** and **Just**. Each presents a palette of ratios to be used in the formation of new Keyboards,

although representation is not restricted to ratios. Any of the above tuning representations may be used.

A **Transposition** matrix is formed by selecting two keyboards as axes, and creating a matrix consisting of each keyboard transposed by each step of the other.

A **Just** Matrix also provides a system of ratios. Each axis represents powers of a specified ratio, reduced and brought to within an octave of the origin (1/1), which is centered in the matrix.

## **Tuning a Keyboard or Matrix**

The **Tuning Panel** is the mechanism used to tune a key or change its representation. Controls in the Tuning Panel are applied to the last key played. The desired representation or tuning style for individual Keys or an entire Keyboard/Matrix are chosen with the Tuning Panel.

## **Tuning a Score**

Once a tuning is described, it may be used to affect the performance of a score. Re-tuning a score is accomplished by installing a Keyboard's tuning as the

*default tuning system* for Musickit performance. A score may be heard with a variety of tunings by installing those from different Keyboards.