Bond Institute Music Corporation

USER GUIDE

“Tiny differences matter most”

iotaTONE

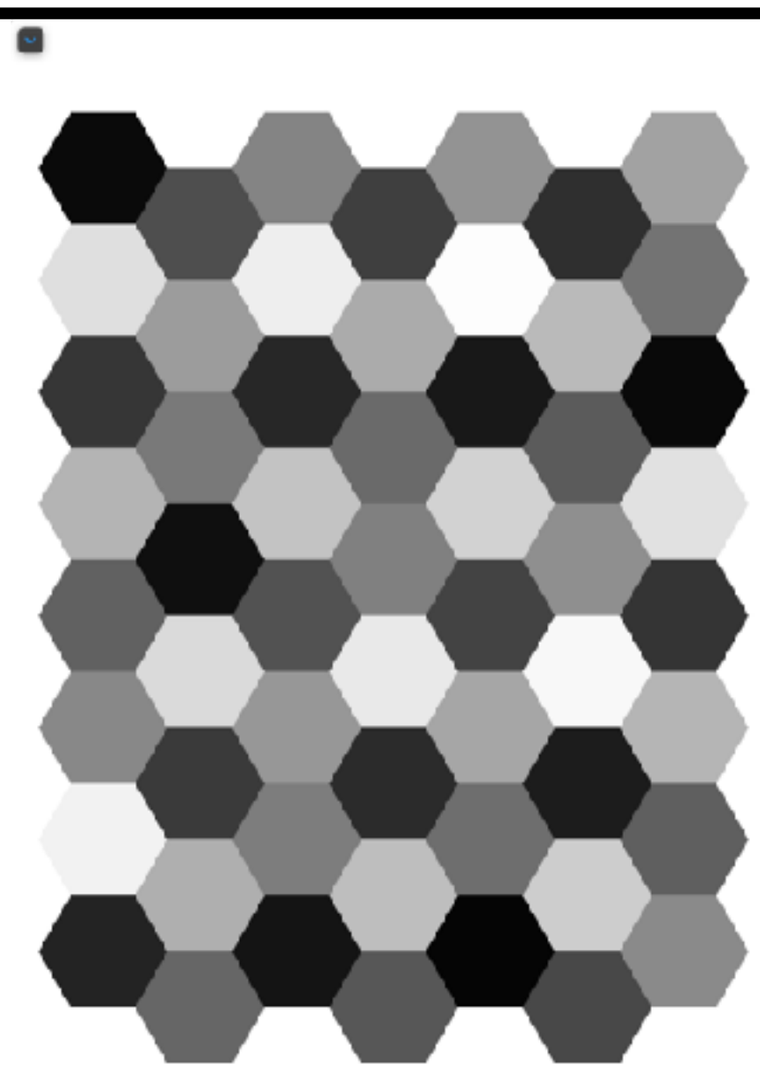
Isomorphic, Polyphonic, Microtonal, Just Intonation

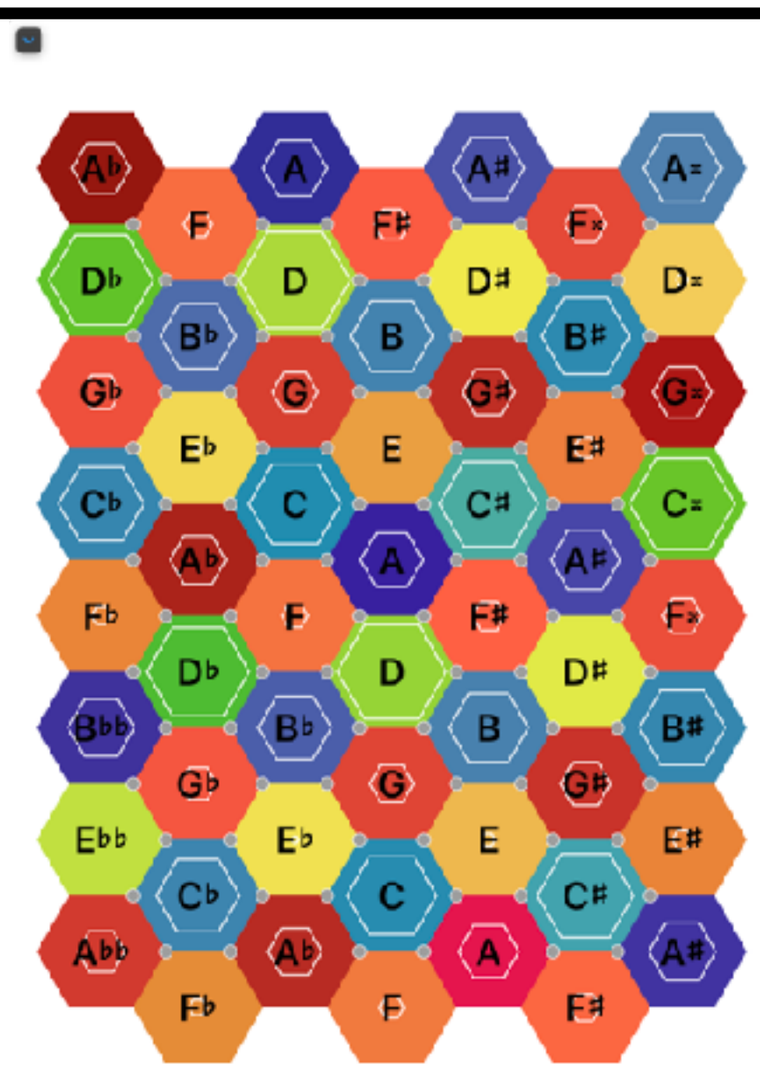
Musical Instrument & MIDI Controller for tablets & mobile phones

- **Touch & Tilt** - Intuitive playing mechanism
- NEW! - **Motion Detector** - Camera input controls pitch & volume.
- **Isomorphic Keyboard** - precision numeric & graphic display
- Play melodies, chords, scales, instant inversions, effortless Arpeggios
- **4 Distinct Playing Modes** - Polyphonic / Monophonic x Touch / Hold
- Expressive - realtime **FX Box** controls. User configurable **Volume** settings.
- NEW! Basic **Drum Machine** - 50+ practice patterns
- **Quantized** Output for Rhythmic Effects

- Microtonal Capabilities - explore Just Intonation & Pythagorean Tunings
  Includes Harmonic Table, Tonnetz, Wicki-Hayden + more
  Create your own microtonal mappings

iotaTONE combines touchscreen technology with mobile hardware device orientation & continuous controls to define a distinct new paradigm in music instrument design.

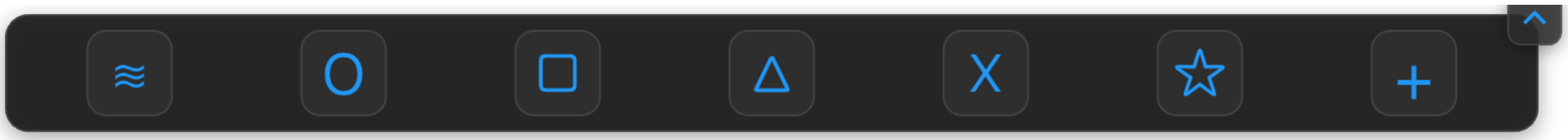




⚠ Bluetooth audio is not recommended due to latency.

Main Menu

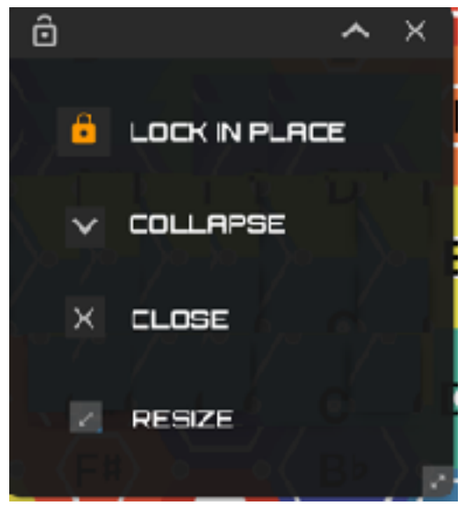
Show/Hide



Settings **Controls** **Ratio Matrix** **Transpose** **FX Box** **Drum Machine** **Extras**

All Panels

Icons toggle panels open & closed. Use panel top bar to move panels. Panels can be collapsed, resized & locked in place. iotaTONE stores & recalls the most recent panel settings.



Settings

B/W or COLOR
- Select **SHAPE**: Hexagon, Square, Circle

Instrument Range Type
- Select **uString** = Universal String ∞
- or **Linear** = Piano style
  then set Linear **Octave Range**

Labels Enable/Disable
- Select Note Names (approximate), precision MIDI values, or Ratios (expressed as decimal).

Resize TouchPad
- (see directions below)

Fine Tune Dial
- Adjust ±¼ tone.
- **LongPress** to Reset to 440.0

Corner Chords
- Enable one touch Major & Minor chords.

Swipe Chords
- Enable 2 finger swipe shortcut for 3 note diminished, augmented & sus chords. *Now extend to 4 note chords!*

Octave Frames
- Enable/ disable octave guide frames.

Reset
- **Tap** - All notes off. **DoubleTap** - Clear Regions.
- **LongPress** - Reset display.

TILT - CAMERA
- Choose instrument Input Type - Show selected settings panel.

Settings

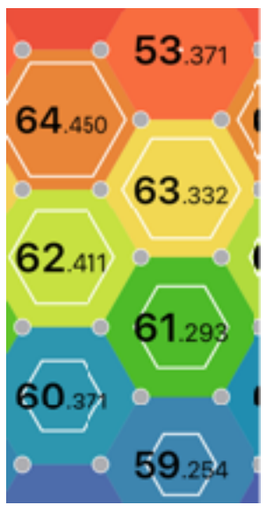
Settings are user configurable options intended to be set up in advance of performance.

Enable / Disable
Coloring & **Labels**

Select **Shape** &
Label Type

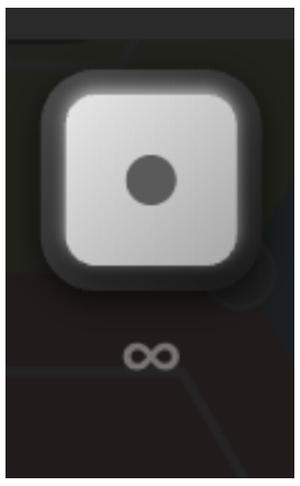
- Choose **Notes** to apply traditional note names* to TouchPad cells.
- Choose **MIDI** note for precision pitch values. UI displays 3 decimal places (the app is more accurate than indicated).
- Choose **Ratio** to see the pitch as a ratio in relation to A = 1.0

* Please note: 'Note names' are approximations only. The prime number values > 5 (eg. 7, 11, 23) are not exact matches to ET note names. Error grows exponentially as calculated outwards from the center. Note names are for convenience. The naming system is *consistent*, but not necessarily *accurate*.



Impeccable precision

Range Type & Size



Controls how TILT & CAMERA input affects instrument range.

uString - the 'universal string' stretches from 0 to ∞.
The mathematical union of the physical string & its inversion. Covers the entire audible range.

Linear mode equidistant octaves – set the Tilt range from 2 to 5 octaves.

Set Linear Range

Resize screen

To change the size of the touch pad,
- tap 'Resize' Icon.
  'Settings' panel will close.
  Touch pad resizing is now unlocked.
  Background, if visible, turns purple.
- Pinch to zoom in & out.
- Touch & drag to move left & right.

IMPORTANT:
Once positioned,
DOUBLE TAP
anywhere to re-lock
screen in place.

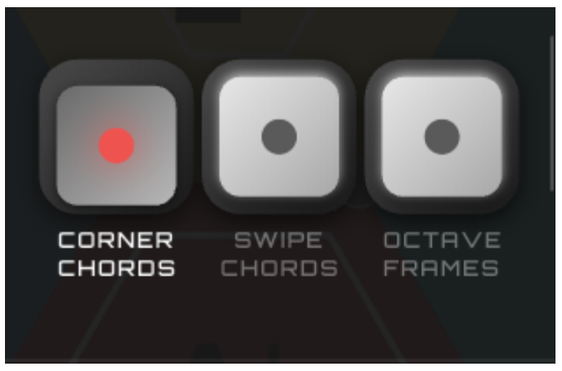
Fine Tuning

For precision tuning.
- Range is ±¼ tone.
- **LongPress** on the dial to reset to 440.0

All Off / Reset

- **Tap** once to turn 'All Notes Off'
- **DoubleTap** to turn 'All Notes Off' & 'Clear All' held regions.
- **LongPress** 5 seconds to RESET the User Interface to default (grayscale, no labels.)

Corner Chords | Swipe Chords | Octave Frames



- **Corner Chords** - one touch Major & Minor chords
- **Swipe Chords** - 2 finger Diminished, Augmented & Sus chords.
- **Octave Frames** - provide visual indication of device orientation & current sounding & potential octave.

Corner Chords

Enabling Corner Chords adds small target circles at every intersection point (where 3 shapes touch). Corner chords work best with Harmonic Table & Tonnetz.

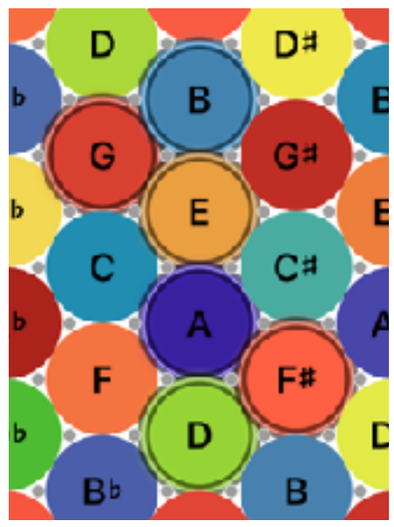
This button allows for Major & Minor chords to be played with one touch.

Then other notes can be added, for example, 7th for a dominant chord. Multiple corners can be played at the same time, allowing for easy input of Pentatonic scales, six note configurations, etc.

Combine Corner Chords with custom Ratio Matrix settings to design microtonal clusters of arbitrary complexity.

Try using this feature on "Touch" mode "Monophonic"

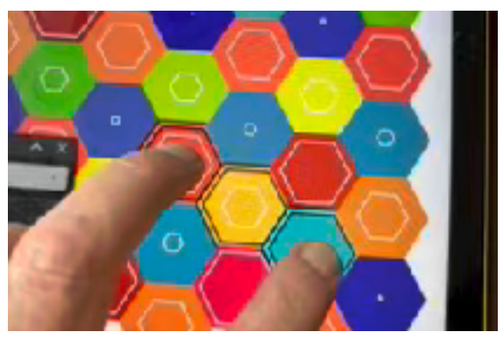
One touch chord



Partial Scales

Swipe Chords

Swipe start



Extend to 3 notes

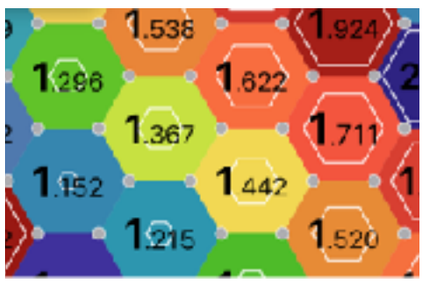
Extend to 4 notes!

* *Experimental Feature* - When enabled, you can 'stretch out', extending 2 fingers into a 3 note linear chord. On Harmonic Table, this allows for 2 finger diminished, augmented. & sus chords. ****NEW** - Extend to 4 notes!

Octave Frames

Frames indicate the relative position of the pitch class to the current X tilt position.

The most common 'mistake' on the iotaTONE is playing a note in the wrong octave. Frames allow the user to see in advance which octave any given pitch will be in before it is played.



Dynamic Guide Display

TILT | CAMERA

iotaTONE has 2 continuous input modes - TILT & CAMERA.

When TILT is selected, the **Accelerometer** controls pitch & volume.

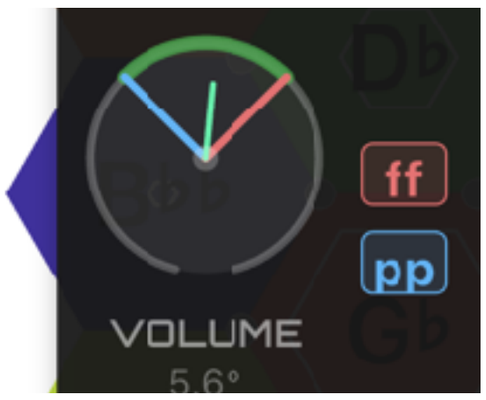
When Camera is selected, the **Motion Detector** controls pitch & volume.

TILT - along the X-axis (left to right) controls pitch. Up & down controls volume (velocity).

CAMERA "Léon-ized"
the field of view along the X or Y axis controls pitch. Motion detection can be toggled horizontal or vertical. Volume is orthogonal to pitch.

Léon Theremin (1896-1993) [AI]. "The Léonization of iotaTONE"

TILT VOLUME



Away <—> Close

Upon initialization, by default, when flat on a table your device will play at medium volume, ***mf***. Tilt the device upwards (towards you) & the volume will increase. Tilt down (& away) to decrease.

This is arbitrary. You can set the Volume gradient to any range along the Y-axis. **VOLUME** parameters ***ff*** & ***pp*** can be set to any location in space between -180° to 180°.

- Tilt the device to position its loudest point. Tap ***ff***
- Tilt to location where you want the sound off. Tap ***pp***

*Any TILT beyond the **ff** set point will be MAX volume. Any TILT below the set **pp** point will be silent.*

Whether standing, sitting, or lying down, you can adjust the accelerometer to your preferred playing style. Try using:

- **Volume Gradient** for smooth crescendos & diminuendos.
- **Volume Shelf** to quickly mute & unmute the instrument with minimal tilt.

eg. Wide Gradient

eg. Tight Shelf

Technical note: Volume is a real-time continuous control.
Velocity of notes (initial attack) is similarly scaled, but to a lesser degree.

If you find the instrument has suddenly fallen silent, check these VOLUME settings first.

Make sure a range is set & the device is oriented correctly.

CAMERA VOLUME

Similarly the Camera Motion Detector will track movement along its field of view. ***pp*** & ***ff*** can be placed anywhere. Recommended: place ***pp*** near either edge. position ***ff*** nearby for a shelf, or more distant for a gradient.

TILT MODE

- **VOLUME** display - set ***ff*** & ***pp***
- **FOCUS** stabilizes edge cases where notes change octaves.
- **SMOOTH** cleans away jitter & noise from the input signal.

N.B. TILT does not support Orientation. By convention Tilt X-axis controls pitch, Y Volume.

CAMERA MODE

"Zebra Display" Horizontal (above), Vertical (right)

Calibrate the **LIGHT LEVEL** so that the Camera's "Zebra Display" is noise-free & responds to movement. Conditions vary. Find a sweet spot.

- **FOCUS** stabilizes the input signal.
- **LIGHT LEVEL** adjusts the sensitivity of the Motion Detector.
- **ORIENT** switches the camera input between horizontal & vertical. 'Zebra Display' will change position to match the orientation.
- invert **PITCH**
- invert **VELOCITY**

Touch & drag the Zebra Display to reposition it on screen

Play Hands-Free (but it is Not A Theremin!)

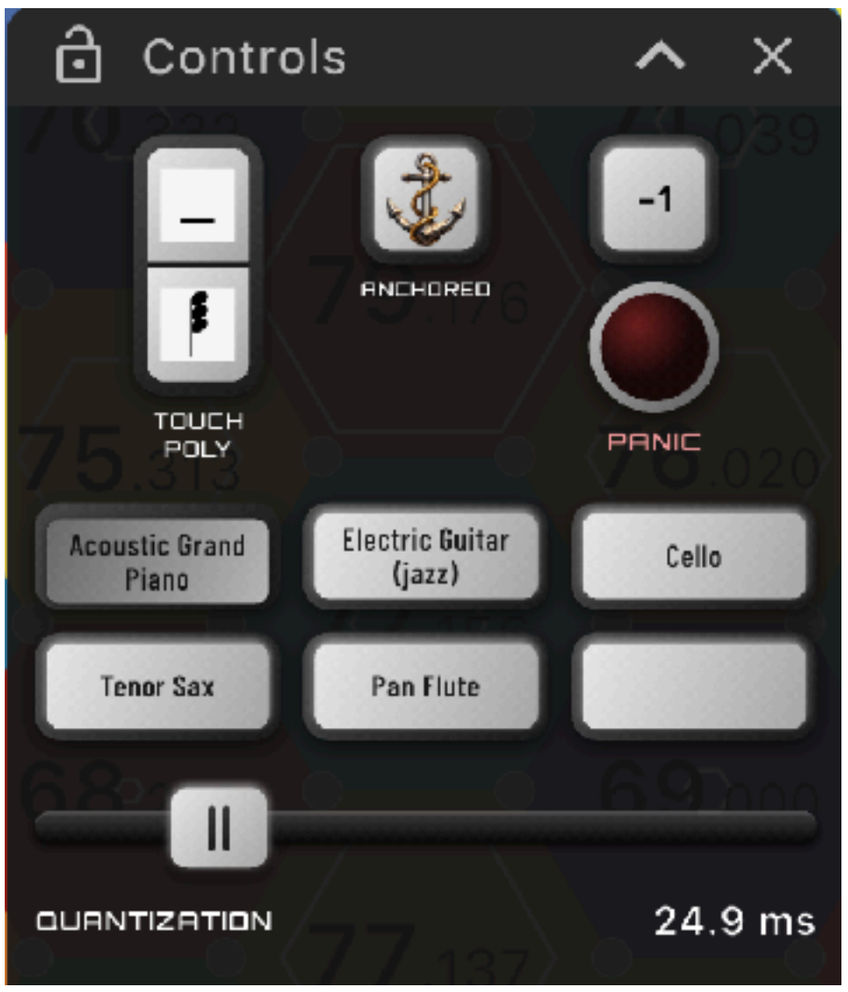
iotaTONE uses the **Léon Light Module,** named after Léon Theremin. A Theremin responds to movement within electromagnetic fields. **Léon Light Module** responds to motion detected within a visual field.

Inventor's note:
Early demos of the prototype camera instruments always elicited the response: "Oh, it's like a Theremin!". I would protest & begin to explain the differences — to no avail. Today, I embrace the comparison.
"Yes, it is like a Theremin — but way easier to play in tune."

Léon Theremin *(born Lev Sergeyevich Termen, 1896–1993) was a Russian inventor, physicist, & musician best known for creating the Theremin in 1920, one of the first fully electronic musical instruments. The theremin is played without physical contact, using the performer's hands to control pitch & volume generated by two antennas. Its ethereal, voice-like sound became iconic in early electronic music, film & science-fiction soundtracks.*

Controls

'Controls' are options that the user may wish to vary during performance.



The 4 Play Modes

- Touch | Hold & Polyphonic | Monophonic

Transpose Mode

- Reset | Iterative

Octave Shift:

- Adjust base octave ± 2 octaves

Panic / Reset

- Tap "All Notes Off" - DoubleTap "Clear all regions."

Quick Select Instrument

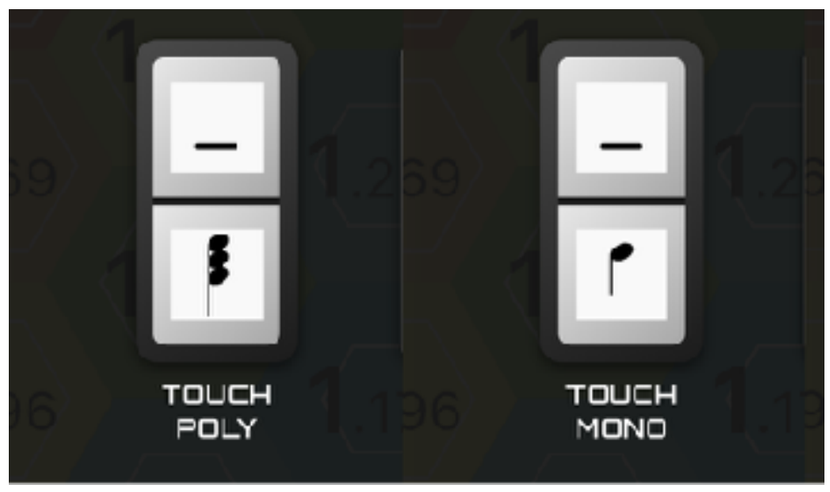
- 6 instrument slots - tap to recall. long press to select new voice.

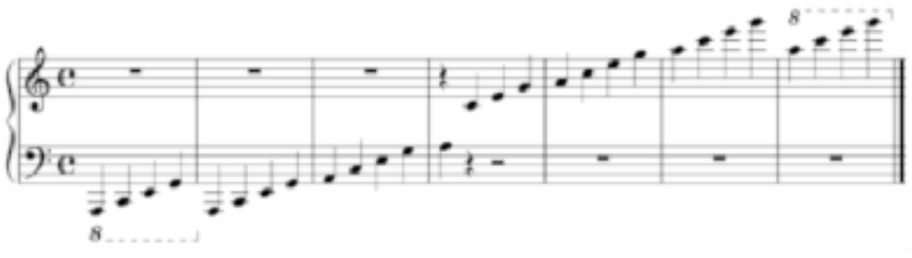
Quantization Value

- Set time interval in milliseconds.

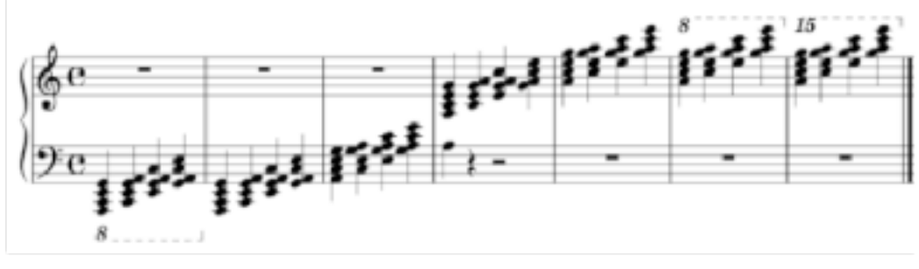
4 Play Modes

- **Touch Mode** piano style keyboard – touch & lift, trigger & release notes.
- **Hold Mode**: a.k.a. "latch mode". Screen touches toggle regions active & inactive.
- **Polyphonic** - any & all notes that are touched or activated are played & updated.
- **Monophonic** - only one note sounded at a time. While many regions may be active, only the one nearest to Tilt value is played. (Please note, in this mode the Octave Frames visuals do not exactly line up).





Monophonic Mode



Polyphonic Mode

Transpose Mode - Anchored | Iterative

The Transpose function has 2 modes.

- **Anchored -** tapping the floating △ Transpose button will visually reset the board to the 'Reset Key'. Modulation is always within range of 'Home'. The very next tap sets the MainKey.
- **Iterative** - transposition begins from the current Main Key. Roam & travel freely.

For complete info about Transpose, see p.11 "△ Transpose "

Octave Shift

Change the base octave of the instrument ± 2 octave

Most General MIDI instruments on iotaTONE sound best at -1 octaves.

Panic

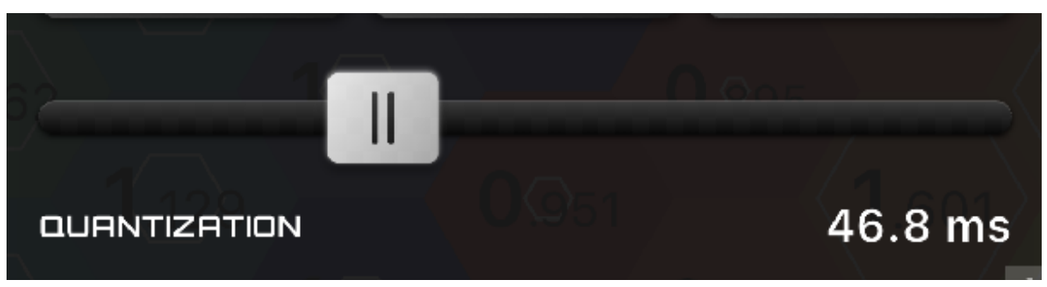
- Tapping **Panic** shuts "All Notes Off". *N.B. Stuck notes are rare, usually caused by playing the board while changing settings & controls. (Don't panic!)*
- **DoubleTap** to turn 'All notes Off' & 'Clear All' held regions.
  (**LongPress** on Controls screen has no effect. Use Settings > Reset to restore defaults.)

Instrument Quick Select Menu

- Store & recall your favourite instruments.
- **LongPress** on a slot to open the Instrument list & select a new instrument.

Quantization Value

Sets a limit on how often notes can be triggered. At default 10 ms, the instrument responds instantly. At higher values, rhythm appears, steady tempo, melodies, regular "Note Streams", & a new playing technique "Haptic Counterpoint" emerges. Experiment with different values. Shake it up!

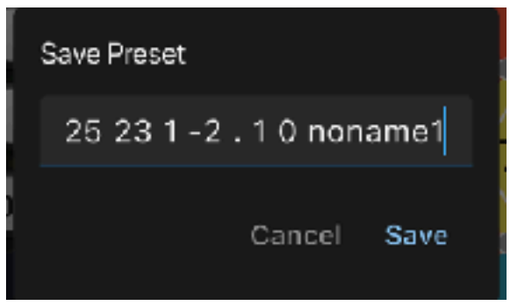


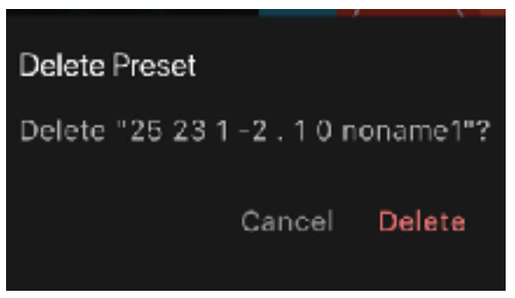
- 10 - 80ms Normal (As Fast As Possible, Fast)
- 60 - 160ms Note Streams
- 120 - 300ms Haptic Counterpoint

Ratio Matrix

Advanced Custom Board Settings

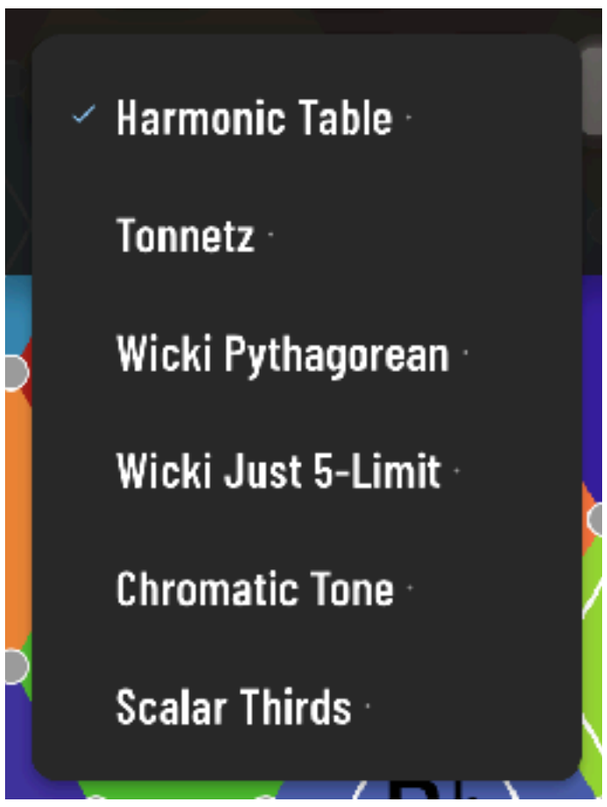
- Enter **Power Series Base** ratios for **X** & **Y** Choose any odd number from 3 to 31.
- **Skew Rows** - Inc., Dec., Invert
- **Skew Columns** - Inc., Dec., Invert
- Select **Preset** or a **Saved Tuning Board**
- **Save & Delete**





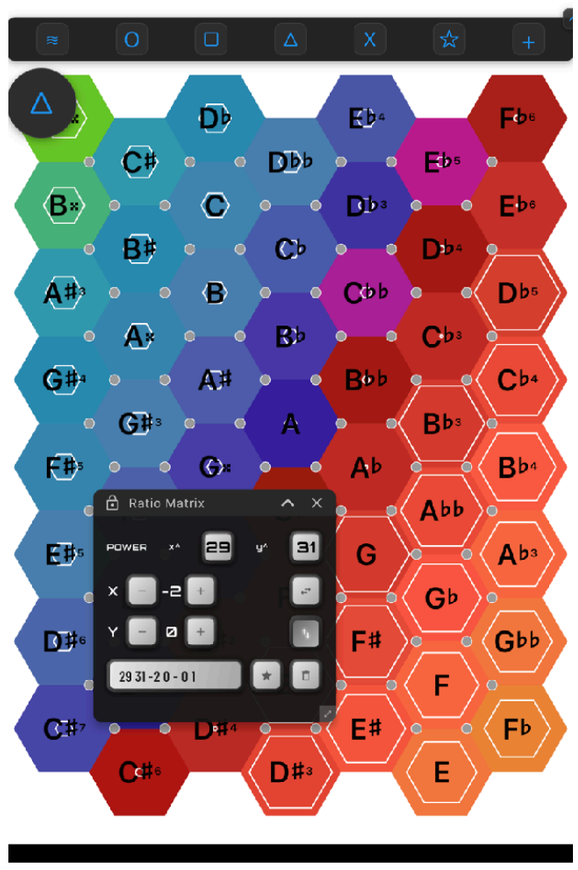
Naming convention: "X Y ±ShearX ±ShearY. invertRow invertColumn" (1=True, 0=False)]

Standard **Isomorphic Board Layouts**

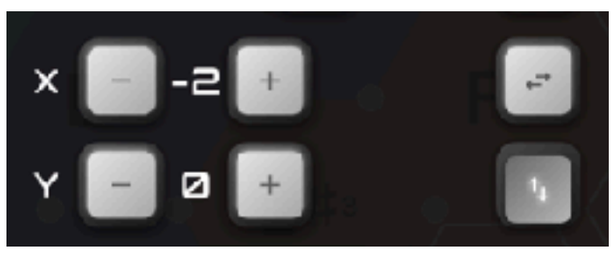


Built-in presets:

- Harmonic Table & Tonnetz are morphologically identical.
- Wicki Pythagorean & Wicki-Just 5-Limit are variants of Wicki-Hayden, an Equal Temperament configuration used in concertinas & bandoneons.
- "Chromatic Tone" [15 9 . 1 0] is an intuitive board & "Scalar Thirds" is compact & useful for playing melodies.



29 31 -2 0 . 0 1
Many exotic boards to discover!



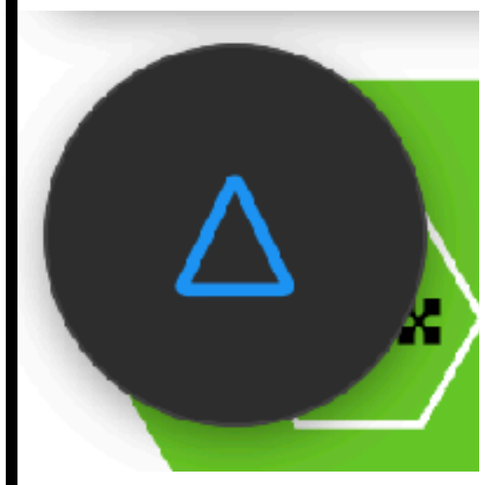
"Horizontal & Vertical Shear Transformation"

Skew Rows & Columns

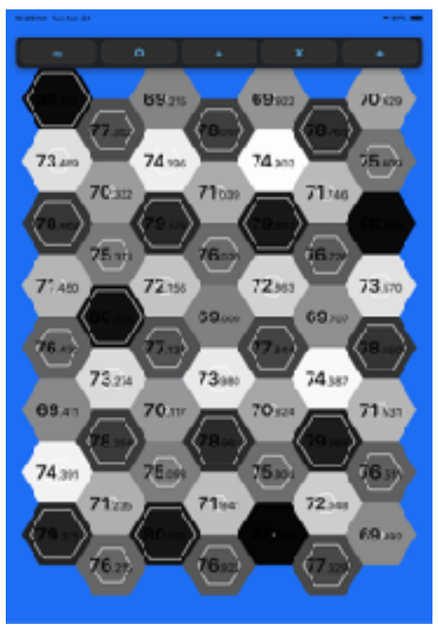
- by default rows skew upwards to the right
- **-** or **+** to Increase | decrease skew
- Invert - flip across line of symmetry

Transpose

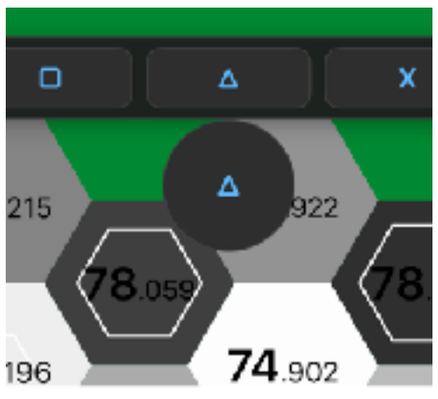
Navigate the Harmonic Fractal



Floating Transpose position anywhere



Transpose enabled, awaiting next touch…



Select a new 'HOME' key

Tap the top menu bar △ icon to open & close (hide/show) the **Floating Transpose Button**.
Position this button anywhere on screen.

- There are 2 Transpose Modes (Reset & Iterative). See Control panel to select the mode.

To change the Main Key:

- **Tap** the floating button. The background, If visible, turns blue to indicate touch pad is waiting for input.
- The **next touch** will transpose the playing surface to the value of the cell tapped.
- The graphical interface will be updated. Once a new key has been selected keypad resumes normal operations.

Home Key:

- **DoubleTap** the **Floating Transpose** button to reset the Touch Pad to user selected 'Home Key'.

To change the Home Key:
By default, the Home Key of the instrument is 'A'. However, any cell can be set as the 'Home Key'.

LongPress on the top **Main Menu** bar **Transpose/Triangle** button. If visible, the background turns green indicating the instrument waits for the next touch to set a new Home Key.

If anything goes awry, ***LongPress*** *the Panic Button in the Settings Panel to Reset the device to factory.*

Transpose function complexity is essential for precision & completeness in Just Microtonal tuning systems.

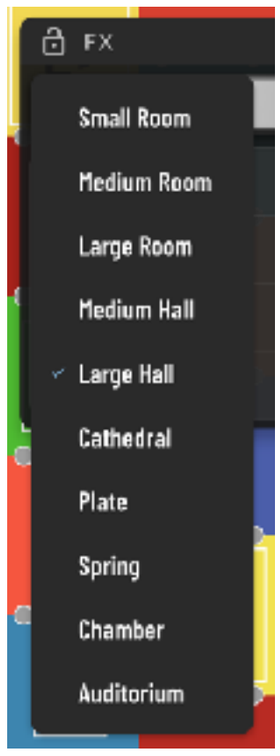
FX Box

Room - select size

X-Y TouchPad

- **Tone** - brightness / color
- **Space** - room size / depth

FX Box can be positioned anywhere & used as a real-time controller in performance.

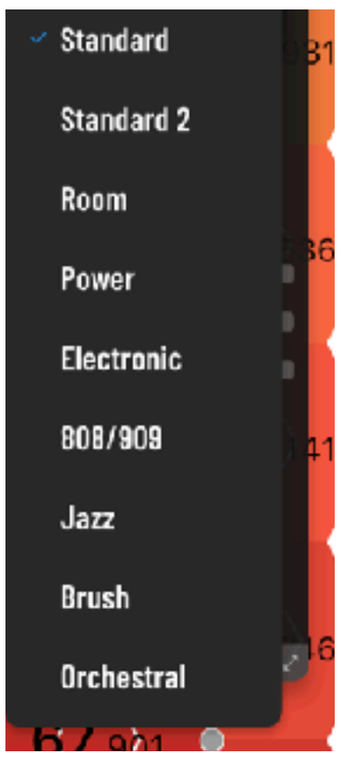


Drum Machine

NEW FEATURE - **BASIC DRUM MACHINE**

A collection of 50+ common drum patterns to support practice.
(Not intended as a polished performance feature.)

- **TEMPO** - from 40 - 300 beats per minute
- **VOLUME** - set relative dynamic level.
- **HUMANIZE** - adds a random amount of delay or anticipation to drum beats.

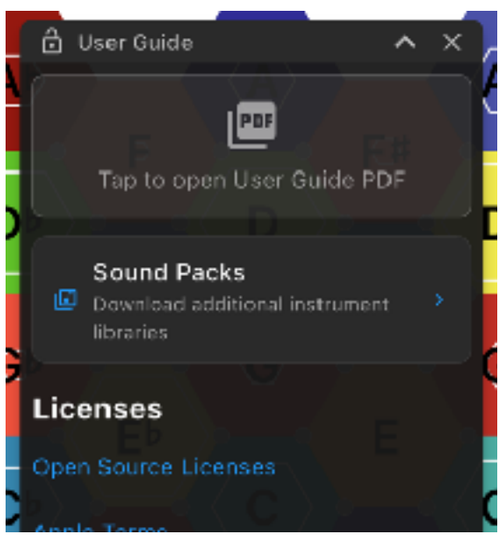


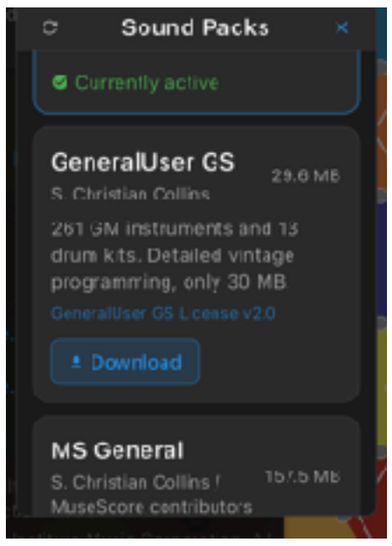
GM Drum Kits

Currently the Drum Grid is not editable. Future development plans include allowing user edits, change instruments, create new patterns, save, delete, add fills, form builder, etc.
For now, consider the Drum Machine a glorified practice Metronome.

Extras

- iotaTONE User Guide (YOU ARE HERE -> •)
- SOUND PACKS - 3 GM + 1 Synth .sf2 (FREE)
- Licenses & Accreditations
- Links to Website / Contact Support
- In-app purchases — currently N/A.





Troubleshooting

⚠️ **Bluetooth audio is not recommended due to latency**.

🔊 No Sound?

Check the Volume Settings in the TILT | CAMERA panels.
Is the device positioned to play at volume?

Double check by setting ***ff*** to the entire range.

If still no audio:

- Quit the app completely (Swipe up from the app switcher)
- Reopen the app
- Ensure Silent Mode is OFF
- If using Bluetooth speakers/headphones:

Turn Bluetooth off, relaunch the app, then try again.

🔊 Sound Stops After Switching Apps

If after returning from a game, social media, or another audio-heavy app, the sound does not resume immediately:

- Minimize the app and reopen it
- Or briefly switch to another system app (e.g., Music), then back

This refreshes the OS's audio routing.

🔊 Sine Tone as Instrument After Resuming

If the instrument defaults to a sine tone, the sampler got dropped.

- Quit the app completely (swipe up from the app switcher)
- Reopen iotaTONE

❗ Lag, Delay, or Response Feels Slow

If **iotaTONE** seems sluggish:
Set Quantization value to its lowest value for fastest response.
Increase Octave Range, or set to uString.
Ensure battery is sufficiently charged. Close unnecessary background apps.

Audio Initialization (resolved)

When first loading, the OS may place sampler instances in a dormant state until they are used.
This can result in:

- temporary slowdown
- audible pops as voices are activated

This behaviour is system-level & will resolve during use.
Recommendation: Before performance or recording, play some notes & briefly move (tilt) through the full range of the instrument to activate all voices.

When in Doubt

A restart of the app or the device solves almost all rare iOS audio/touch inconsistencies.

Fun things to try:

- Hear the difference between F♯ & G♭ (or any enharmonic pair). Notice there is more than one A (or any other note name).
- Swipe out a 4 note augmented chord. Hear the clash between C & B♯!
- In Hold mode, drag your finger to turn regions on & off. Move smoothly from chord to chord.
- Use monophonic mode for scales & melodies. Add & subtract notes in Hold mode. Anticipate your next move in Touch mode.

Hold Mode Mono Magic:

- Vibraphone, Major Scale, Q value = 200
- Clarinet, Gypsy scale, Q value = 120
- Saxophone, Blues scale, Q value = 60

⚠️ Data & Deletion Warning

- Deleting the app will permanently remove all of its save data from this device.
- Saves are stored locally unless otherwise backed up via device or iCloud backup.

ℹ️ First-Time UI Behaviour

When certain interface elements are loaded for the first time, you may notice a brief pause.
After initial use, performance should remain smooth and stable.

We have found no other issues when this app is used as directed.

Please report any unexpected behaviour so it can be addressed in future updates.

MIDI Connection

iotaTONE sends MIDI via Wi-Fi (macOS)

iOS

🎛️ How to connect to a Mac via wireless MIDI.

Both devices must be on the same Wi-Fi network.

1. On your Mac, open Audio MIDI Setup (found in Applications > Utilities).
2. In the menu, choose Window > Show MIDI Studio.
3. In the MIDI Studio window, double-click Network to open MIDI Network Setup.
4. Under My Sessions, select Session 1, then click Enable.
5. In the Directory, select your iOS device.
6. Click Connect to link your iOS device to the session.

Once connected, the device will appear as a MIDI source and can transmit wirelessly to any MIDI-enabled software on your Mac*.

iotaTONE sends MIDI via USB (Android)

🔌 How to connect to your Mac or PC

1. Connect your Android device to your computer using a standard USB cable.
2. On your Android device select MIDI from the USB connection options — swipe down the notification shade and tap the USB notification, or find it under Settings > Connected devices > USB (menu wording varies by manufacturer).
3. Open your DAW or MIDI software — iotaTONE will appear automatically as a connected MIDI input/output device. No additional drivers required.

Wireless MIDI for Android is in development.

* Rudimentary MIDI only. Advanced functions In development & at user request - contact Support.

iotaTONE — MIDI Specification Sheet

This document outlines the MIDI messages sent by iotaTONE for integration with external MIDI devices, DAWs, or recording software.

1. MIDI Messages Sent

MIDI Message	Purpose	Channel(s)	Trigger / Event
Note On (0x9x)	Plays note	Per voice / per internal channel (0–31)	Note start (touch input)
Note Off (0x8x)	Stops note	Per voice / per internal channel (0–31)	Note release / stop
Pitch Bend (0xEx)	Continuous pitch control / tuning	Per voice / per internal channel (0–31)	Continuous / tuning
Control Change – CC7	Main volume	Global (default ch. 0)	Volume control
Control Change – CC16	Tone	Global (default ch. 0)	Tone control

2. Technical Notes

- MIDI output only; incoming MIDI is not required.
- Supports Note and Pitch Bend messages across up to 32 MIDI channels (0–31).
- Pitch Bend is used for continuous pitch control.
- Internal pitch bend range: ±1 semitone.
- External devices should match pitch bend range for accurate tuning.
- Instrument selection is handled internally; no Program Change messages are sent.

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