

ZOA 1.0.x User Manual

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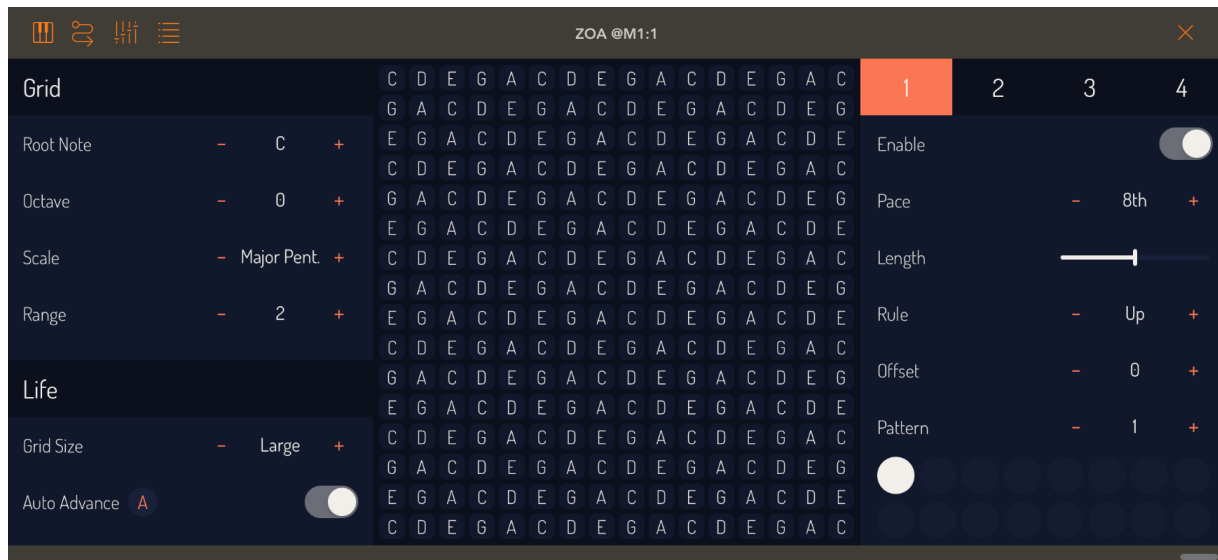
Introduction

ZOA is a MIDI sequencer for iOS and macOS that generates melodies based on a creative implementation of John Conway's Game of Life. ZOA can run as a standalone app or as an AUv3 plugin.

Note: ZOA does not produce sound. Instead, it generates MIDI notes that can be used to “play” other instruments, devices, or apps that can receive MIDI.

For best results, please check out the tutorials on [YouTube](#). Otherwise, read on.

ZOA has three main views, the global panel (left), the grid (center), and the playhead panel (right).

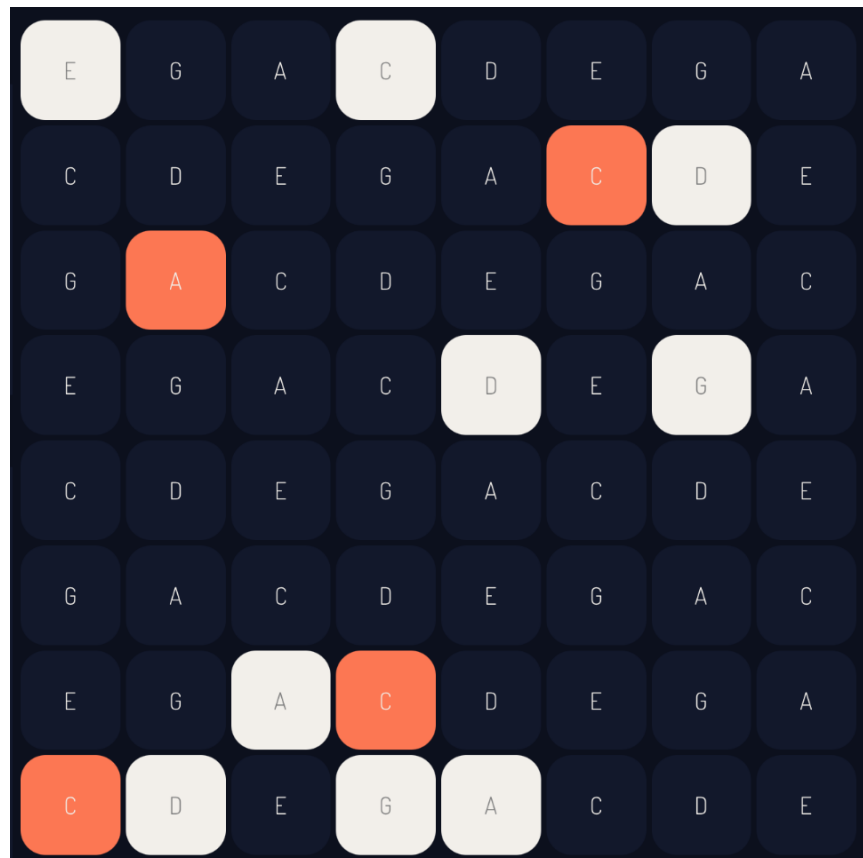


Grid

In the center of ZOA's window is a two-dimensional grid of cells. Each cell has the ability to play a note, which is displayed in the center of the cell. The bottom left cell is the lowest note. In general, as you move up and to the right, the notes get higher. (See Global Panel for details.)

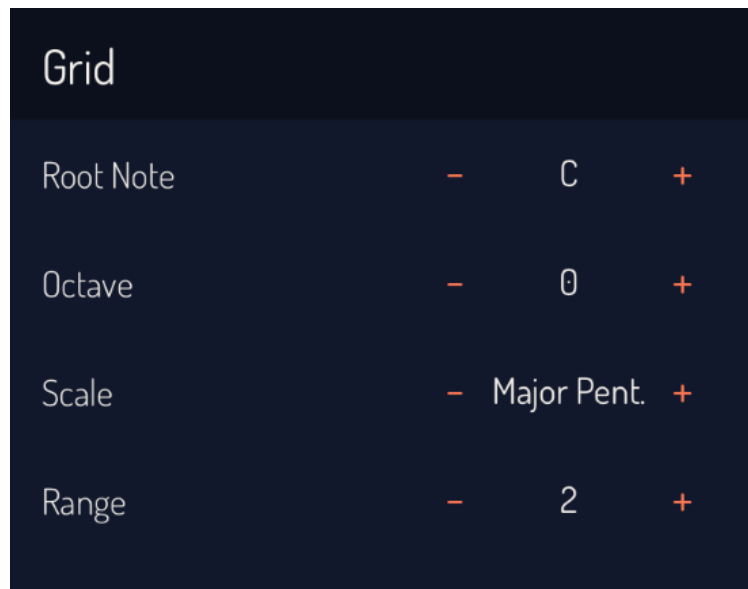
Cells can be either alive or dead. Dead cells are blue, and alive cells are white. You can toggle a cell's state by touching it.

ZOA has four “playheads” that can move through the living cells based on various rules and play their notes. Notes that are being played are orange.



Global Panel

The Global panel contains two banks of settings: the “Grid” settings, which control how the grid behaves musically; and the “Life” settings, which control how ZOA’s Game of Life simulation works.



Grid Settings

Root Note: Sets the identity of the bottom left note. This will be the root note used by the scale setting. *Range: C to B*

Octave: Sets the octave shift of the root note. *Range: -4 to +4*

Scale: Sets the scale used to fill the grid with notes. *Range: Major Pent., Minor Pent., Major, Dorian, Phrygian, Lydian, Mixolydian, Minor, Locrian, Blues, Whole Tone, Harm. Minor, Mel. Minor, Chromatic.*

Range: Sets the range of the grid in octaves. As you move up and to the right, notes get higher, but once the end of the range is reached, if there are still notes in the grid, then the range wraps back around to the beginning. *Range: 1 to 8.*



Life Settings

Grid Size: Sets the size of the grid. *Range: Small (8x8) to Large (16x16).*

Auto Advance: Sets whether the Game of Life simulation advances according to the pace setting.

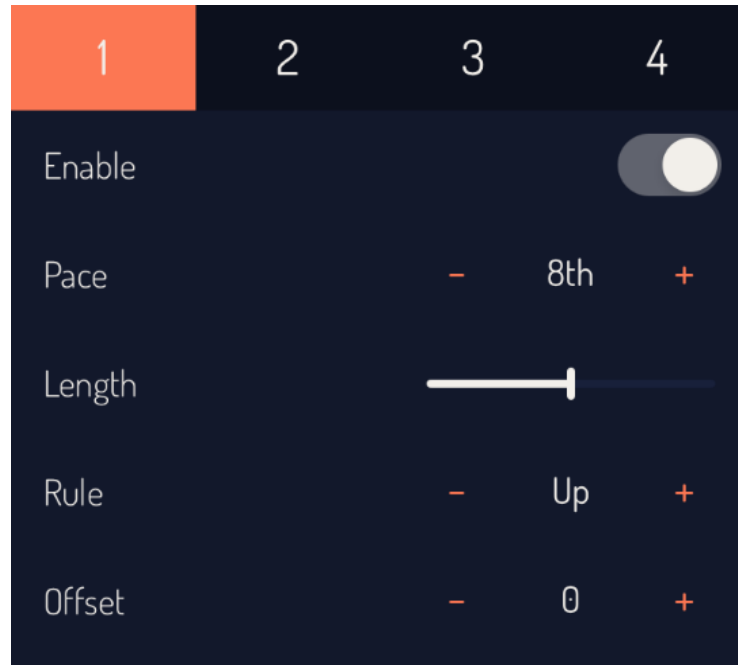
Pro Tip: You can disable auto advance and use the “A” button to manually advance the grid. This turns ZOA into something more like an arpeggiator than a sequencer.

Pace: Determines the speed at which the Game of Life advances to new generations. This happens in units of beat time based on the host clock. *Range: 16 bars to 32nd T.*

Auto Respawn: Sets whether Game of Life simulation automatically respawns. With this switch enabled, ZOA will respawn if 1) All cells are dead, or 2) the next generation of cells is the same as the current generation. Use the “R” button to manually respawn.

Playhead Panel

ZOA has four playheads that can independently move through and play the living notes in the grid. You can select and edit a playhead by tapping on it's number at the top of the panel.



Enable: Sets whether or not the playhead will produce notes.

Pace: Determines the speed at which the playhead will play notes. This happens in units of beat time based on the host clock. *Range: 16 bars to 32nd T.*

Length: Sets the gate length of played notes as a percentage of the pace. Gate length is how long between “note on” and “note off” events. Moving the slider to the left makes the notes sound shorter and more staccato, moving the slider to the right makes them sound longer and more legato. *Range: 10% to 100%.*

Rule: Sets the rule the playhead uses to choose new notes (from among living cells).

- Options:
 - **Up**, go right to the end of the row, then move up to the next row.
 - **Down**, go left to the beginning of the row, then move down to the next row.
 - **UpDown**, start at the bottom, do Up until the top, then do Down.
 - **DownUp**, start at the top, do Down until the bottom, then do Up.
 - **First**, always play the first (most bottom-left) living note.
 - **Last**, always play the last (most top-right) living note.
 - **Random**, randomly choose a note.
 - **Walk**, randomly play the same note, the next note right, or next note left.
 - **Rise**, start at bottom, follow pattern up 2, down 1.
 - **Fall**, start at top, follow pattern down 2, up 1.

Offset: Sets the pitch offset of the notes played by the playhead in semitones. *Range:* -12 to +12.



Pattern: Sets whether the playhead actually plays a note or waits as it moves according to its pace. Use the stepper to set the pattern length from 1 to 16 and then tap on the circles to set whether those notes play. White means play, dark blue means wait. Light blue means those circles are not in the pattern.

Pro Tip: Use patterns of different lengths for each playhead to create complex, evolving polymeters.

Velocity: Sets the velocity of the notes played by the playhead. *Range:* 1 to 127.

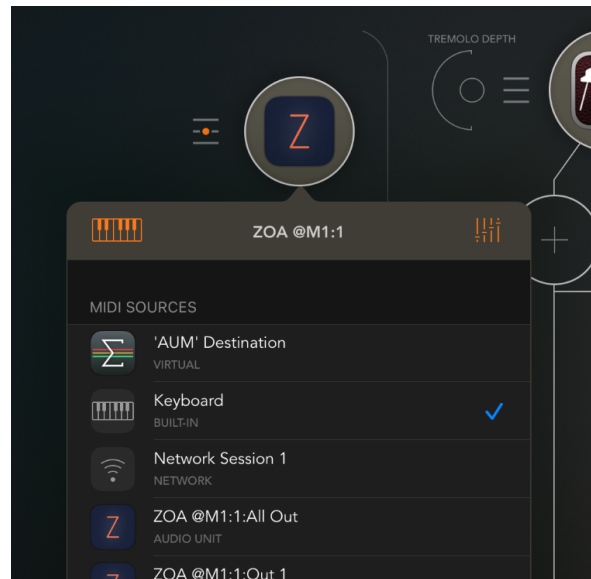
Channel: Sets the MIDI channel the playhead sends its notes on. *Range:* 1 to 16.

MIDI Behavior (Audio Unit)

ZOA is a MIDI Processor type audio unit. It must be loaded on a track that is able to load MIDI Processors. (Ex. ZOA must be on a MIDI track in AUM.)

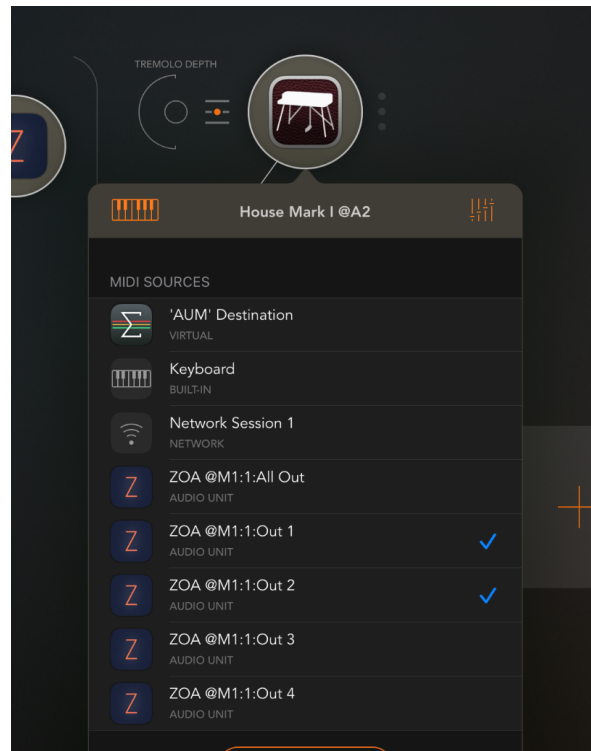
Once loaded in your host, ZOA can both receive and send MIDI.

MIDI Receive



MIDI receive is limited to note messages, which are used to set the root note and octave settings. This is useful for changing keys on the fly.

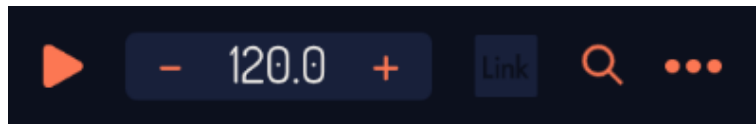
MIDI Send



ZOA has five MIDI outputs for sending note messages. One for all the playheads together and one for each playhead alone. This allows you to use ZOA to play multiple instruments simultaneously.

Top Bar (Standalone App)

When running ZOA as a standalone app, there are some additional settings and controls that are available in the top bar view.



Transport button: Start and stop ZOA's internal clock.

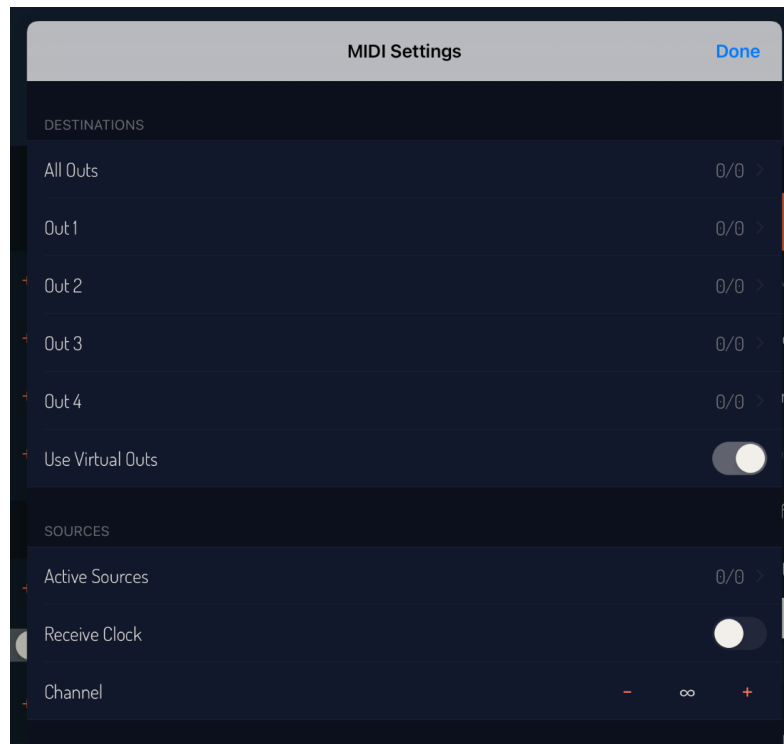
Tempo control: Set the tempo of ZOA's internal clock. Touch and drag to set quickly. Tap "+" and "-" to increment by 0.1. Double tap to round. Long press to type in a value.

Link button: You can sync ZOA's clock to other devices and apps using Ableton Link. Tap on this icon to display the Link settings. Orange when enabled, dark blue when disabled.

Bluetooth MIDI button: Displays a menu for connecting to Bluetooth MIDI devices.

MIDI settings button: Displays the MIDI settings menu.

MIDI Settings



Destinations:

ZOA has five MIDI outputs. One for all the playheads together, and one for each playhead by itself. You can set the MIDI destinations for each output by tapping on the appropriate cell and selecting where you want the MIDI to go.

The “Use Virtual Outs” switch determines whether ZOA sends MIDI on its virtual output ports.

Sources:

You can select a MIDI input for ZOA by tapping on the “Active Sources” cell and choosing an input.

You can sync ZOA’s internal clock to a MIDI clock by enabling the “Receive Clock” switch.

Set the MIDI receive channel with the channel stepper. Infinity is omni mode.

Thanks

ZOA makes use of the open-source library AudioKit. Just want to give a huge thanks to all the developers who maintain it and their supportive online community!