

# Ecosystem

## User Manual

<http://dillonbastan.com>

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## INTRODUCTION

Ecosystem features a pseudo modular environment. Using 3 categories of modules (called organisms) you can create sound generators, synthesizers, experimental fx, and whatever else your imagination can come up with! Modules can connect together, sending audio or control signals to each other. You can send any signal to any input (just be careful of blowing up your signal)! The three categories of modules/organisms are:

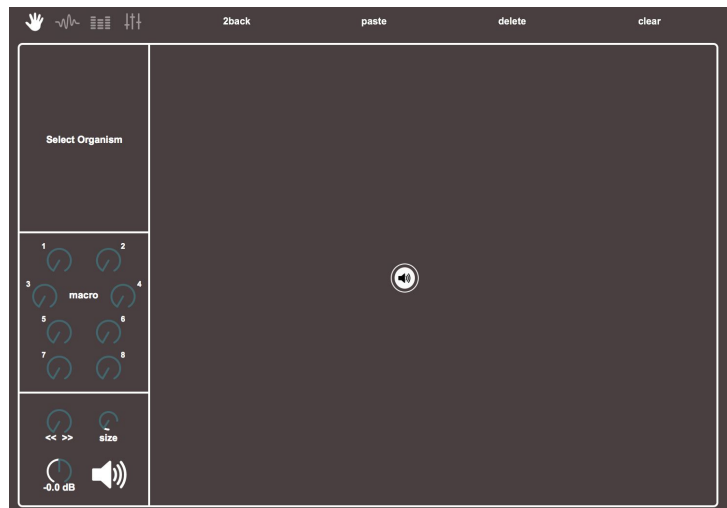
- (Sound Generator): a collection of basic waveform oscillators and a looper
- (Sound FX): a collection of signal processing effects (ie filter, delay, vocoder, etc)
- (Controllers): a collection of modules used strictly for control values (ie sequencer, envelope, etc)

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## INTERFACE WALKTHROUGH

To get started, drag in ecosystem and click the big button to open up the interface:

Here we see the interface with a few panels. In the large center panel we have our “ecosystem”, which is the area we can organize and manipulate our organisms and their connections visually. Each organism is represented by a circle with an identifying symbol on top. In this image, only the output organism exists in the ecosystem.



The **output organism** is a singularity as there is only 1 stereo out. It cannot be duplicated or destroyed.



The **input organism** is another singular object for the audio effect (Ecosystem FX) only. It sends out the incoming signal before the audio effect.

## Panels



This menu selects the interface mode. The hand (default)

allows you to click and drag organisms around the screen. To the right there are 3 modes for creating the 3 categories of organisms (sound generators, sound FX and controllers respectively). Simply click one of the 3 modes and then the ecosystem panel to create that organism.



This menu presents a few functions for your organisms. When an organism is selected: (2back) sends it to the back of all organisms, (paste) makes a duplicate of its parameters and connections, and (delete) erases the organism and its connections. (clear) deletes all organisms and connections (except output).



This menu shows parameters of selected organisms (except for the output). Parameters vary greatly between organisms. Currently, no organisms are selected.



These renamable macros are used in ecosystem for 2 main reasons. First is the ability to easily manipulate multiple controller organisms with one macro. The other and more crucial reason is to make

parameters accessible in Ableton (for mapping, automations, racks, etc). This is because parameters for individual organism cannot be used in Ableton as they are, because the UI for these parameters are puppets for the currently selected organism (meaning they are not used only for the selected organism, but all organisms of that category). However, these macros (as well as the values in the output menu below them) are already accessible in Ableton and ready to use. This may make more sense later as you learn about using the organisms' menus.

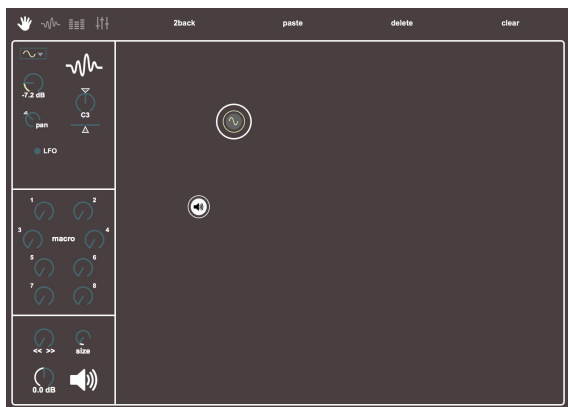


This output menu controls the values for the "spread" and gain of the main output. The spread (<< >>) is not a true spread, but a cheap effect of delaying the right signal slightly from the left.

The third parameter, (size), doesn't affect the output, but controls the size of the organism's circles

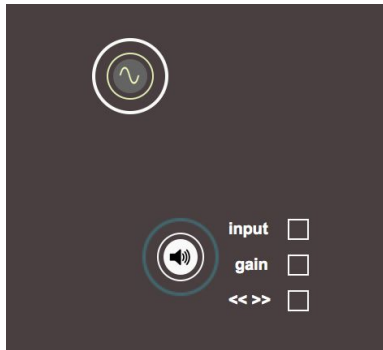
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## ORGANISMS AND CONNECTIONS



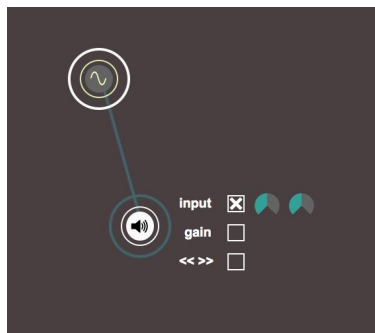
Here we see another organism has been created in addition to the output. This is a sine oscillator in the Sound Generator category. You can see the parameter menu now displays the oscillator's parameters. It has a volume, pitch (as MIDI note), fine tuning, panning and an option to convert to its LFO counterpart (which would be a low frequency, naive waveform). The larger white circle around the organism indicates it is the

selected organism. Now let's make a connection to the output to hear how it sounds!



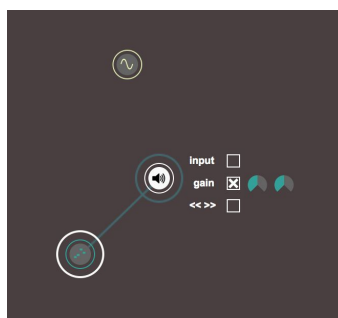
Once an organism is selected: when hovering the mouse above other organisms, a larger, dark green circle may appear. This indicates that a connection can be made to that organism, and the associated connection menu appears. This menu changes from organism to organism, as it shows the particular inputs available to that type of organism. The type of inputs are not all the same, for example they can be an input for an audio signal (stereo), or an input for a control value (mono), or even a specialty input. This will be discussed more as we go.

For the output organism we have an option for (input), which would be for an audio signal. Any signals sent to this input will be sent to ecosystem's audio output. (gain) is a control value option to modulate the master level of the output. And similarly, the spread (<<>>) input controls the spread value of the output. Even though some inputs are meant for control values and some for audio, any signal can be sent anywhere, which allows for complex control values or even desirable clicking noises in the audio output.

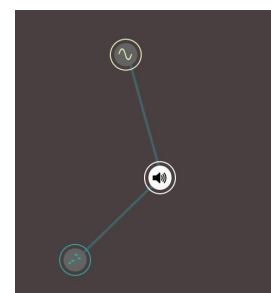


Clicking the box next to each input creates a connection. In this case, the stereo audio output of the sine wave oscillator is sending to the input of the output organism (indicated by the dark green line). Next to every connection, two dials appear. **For audio signal inputs** the left dial is a bipolar amount to send (-100% to 100%, centering at 0%). The negative amount flips the signal's phase. The right dial pans the stereo audio output. **For control signal inputs** the left dial is also a bipolar amount, while the right dial is instead an offset to the value (since control signals are a single channel and value). When a stereo audio signal become a control signal, its 2 channel values are summed and

halved.



Here we see a sequencer organism sending its signal value to control the the output's gain or volume. When an organism is selected, you can only see its connections to other organisms. When no organism is selected, you can see all connections made.



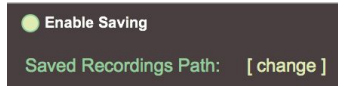
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## RECORDING SAVING



Clicking the floppy disk button reveals a window for managing saving recordings and drawings with sampler buffers.

Sample values in a buffer are saved to a set location when recordings are stopped, and when a drawing is made. You can change the location by pressing the [ change ] button, or disable saving by unchecking "Enable Saving".



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## INDEX OF ORGANISMS



### SOUND GENERATORS

#### **Sine Oscillator**

Synopsis:

- Outputs a stereo sine wave signal



Inputs:

- Pitch (overall, not fine tuning. However it is frequency based and not step based)
- Gain
- Pan
- Input (For Looper)

Parameters:

- Gain
- Pitch (in half steps or hertz for LFO)
- Fine tune (from -1 to +1 half steps)
- Pan
- LFO mode (Lowers frequency range and switches to naive waveform)
- LFO Sync (syncs LFO phase to the transport)

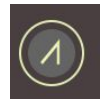
#### **Triangle Oscillator**

Same as Sine oscillator, but outputs a triangle waveform.



#### **Saw Oscillator**

Same as Sine oscillator, but outputs a saw waveform.



#### **Square Oscillator**

Same as Sine oscillator, but outputs a square waveform.



#### **Noise Oscillator**

Same as Sine oscillator, but outputs a noise waveform.



#### **Looper**

Synopsis:

- Playback a sample, outputs a stereo audio signal

Inputs:

- Pitch (overall, not fine tuning)
- Gain
- Pan
- Input (L/R input for recording into looping buffer)

Parameters:



- Gain
- Transpose (which affects speed)
- Fine tune (from -1 to +1 half steps)
- Pan
- Playback direction
- Sample loop selection
- Buffer Size (Sets an empty buffer for recording audio input)
- Loop point selection tool
- Draw tool (draw samples on buffer)
- Fade (sin window fade)



## **SOUND FX**

### **Add**

Synopsis:

- Sums all incoming signals

Inputs:

- Input
- Gain

Parameters:

- Gain



### **Multiply**

Synopsis:

- Multiplies the left input signal by the right

Inputs:

- In\_L (left input, left side of operand)
- In\_R (right input, right side of operand)
- Gain

Parameters:



- Gain



### **Filter**

Synopsis:

- Applies a basic biquadratic filter to the signal

Inputs:

- Input
- Cut (frequency cutoff of filter)
- Q (Resonance)
- Morph (blends the different filter types)

Parameters:

- Frequency cutoff
- Resonance (Q)
- Type (Type of filter: None, LP, HP, BP, Notch)

### **Drive**

Synopsis:

- Overdrives a signal, for distortion effect



Inputs:

- Input
- Gain
- Drive (amount of overdrive)

Parameters:

- Gain
- Drive

### **Delay**

Synopsis:

- Delays a signal



Inputs:

- Input
- Time (Delay time)
- Feedback

Parameters:

- Delay time (ms/sync)
- Sync Time (enables syncing delay to clock)
- Feedback (%)

### **Vocoder**

Synopsis:

- Applies a single band vocoder effect on the carrier signal. Basically, the modulator and carrier signals are identically bandpass filtered, the filtered modulator then undergoes an envelope follower and that value is applied to the volume of the carrier signal.



Inputs:

- Modulator (Signal to be filtered and modulate the carrier)
- Carrier (Signal which will be outputted after filtering and volume modulation)
- Cut (Center frequency of the filters)
- Rel (Release time of modulator envelope)

Parameters:

- Formant (Center frequency of the filters)
- Width (Bandwidth of the filters, higher value is a smaller width)

- Release (Release time of modulator envelope)

### **Follower**

Synopsis:

- Turns incoming signal into a control value via envelope following. The incoming signal is averaged as an absolute value with options for ramp times between values (attack and release).



Inputs:

- Input

Parameters:

- Gain (Added gain to adjust envelope magnitude)
- Attack
- Release

### **Sah (Sample and Hold)**

Synopsis:

- Samples and outputs the input signal value whenever the trigger signal goes below and then above a threshold value. Useful for creating bit reduction and related effects.



Inputs:

- Input
- Trigger

Parameters:

- Trigger threshold (Sets the value that the trigger signal value must go below and then above again to output a new value sampled from the input signal)

### **Monitor**

Synopsis:

- Uses an oscilloscope to monitor a signal. Options for monitoring/passing through left and right channels individually.



Inputs:

- Input

Parameters:

- Left Channel On
- Right Channel On

- Range (Sets the +- value range to view on the scope)



## CONTROLLERS

### **Dial**

Synopsis:

- Outputs a control signal based on the dial's position. Used to control one or many parameters simultaneously, and/or to connect a parameter with a *macro* knob so it may be used in Ableton (for racks, automations, mapping, etc).



Inputs:

- Center (the center value of the dial)

Parameters:

- Center (the dial value)
- Macro (If set, the dial value will be controlled by the assigned macro knob. IMPORTANT: if set to a macro, all center values for this individual organism will be controlled by that macro, ie. the sequencer, MIDI, automation).

### **Sequencer**

Synopsis:

- Outputs a control signal based on the current step value of the sequencer, and offset by the value of the center dial. This object also outputs a trigger value when step values change for controlling envelope organisms (more below).



Inputs:

- Center (center value of step value range)
- Rate (Interval time between steps)

Parameters:

- Center (Offsets the step values)
- Number of Steps
- Playback Direction
- Step Values
- Glide (Glide time between step value changes)

- Rate
- Rate Sync (If enabled, rate is in note intervals and steps are synced to Ableton's transport. Otherwise, rate is in seconds).

### **MIDI**

Synopsis:

- Outputs a control signal based on the last received MIDI note pitch from the last MIDI note on message. Lower pitches output lower values, and higher pitches output high values. This object also outputs a trigger value when note on/off messages are received for controlling envelope organisms (more below).



Inputs:

- Center (Offset the current value)

Parameters:

- Center (Offset for output signal value)

### **Envelope**

Synopsis:

- Works in conjunction with objects that output trigger values (currently just MIDI and sequencer). A received trigger (value above 0) will start the envelope, which will output a control signal based on the envelope's position (peak value being the same as the non zero trigger value received). A trigger value of 0 will end (release) the envelope.



Inputs:

- Attack
- Decay
- Sustain
- Release
- Trigger (A special input that only works for organisms that output triggers,

currently just MIDI and Sequencer. This controls starting and releasing the envelope)

Parameters:

- Legato (When enabled, if a new trigger value is received during the envelope, the envelope begins at the current value. When disabled, the value will drop back to 0 and start a new envelope from there).
- ADSR (Multislider to set the ADSR times and values)

### **Automation**

Synopsis:

- Record and playback the automation of the center dial value changes. Outputs a control signal of the recording.



Inputs:

- Center (Offsets the playback value)

Parameters:

- Center (When recording: records the movements of the center dial. When playing back: Offsets the recorded values).
- Playback direction (forward and backward)
- Play
- Record
- Loop Points (select the portion of the recording to playback)

Thank you for your interest in Ecosystem! Have fun, and for any questions, comments, or if you just want to share a creation, reach out to me at [dillonbastan@gmail.com](mailto:dillonbastan@gmail.com).