Black Cloud Industries

ERings

3 Channel Euclidean Sequencer

Introduction

In 2004, computer scientist Godfried Toussaint discovered that evenly distributing events around a circular sequence produced rhythmic patterns that followed an algorithm first described by Euclid in ~300BC. These patterns, while mathematically generated, turn out to be very common in traditional musical styles from around the world. The Brazilian *Bossa-Nova* and *Samba*, and the Cuban *tressillo* and *cinquillo* are just a few of the many rhythmic patterns that follow the Euclidean recipe.

ERings is a three-channel, 16 step Euclidean Sequencer that you can use to explore the rhythms of the Euclidean space.

- Individually adjustable sequence length (1-16 steps), number of “hits” (1-16) and rotation amount (0-15 steps) controls for each channel.
- Shared Clock (trigger) and Reset (gate) input. Clock inputs are ignored while the Reset gate is high.

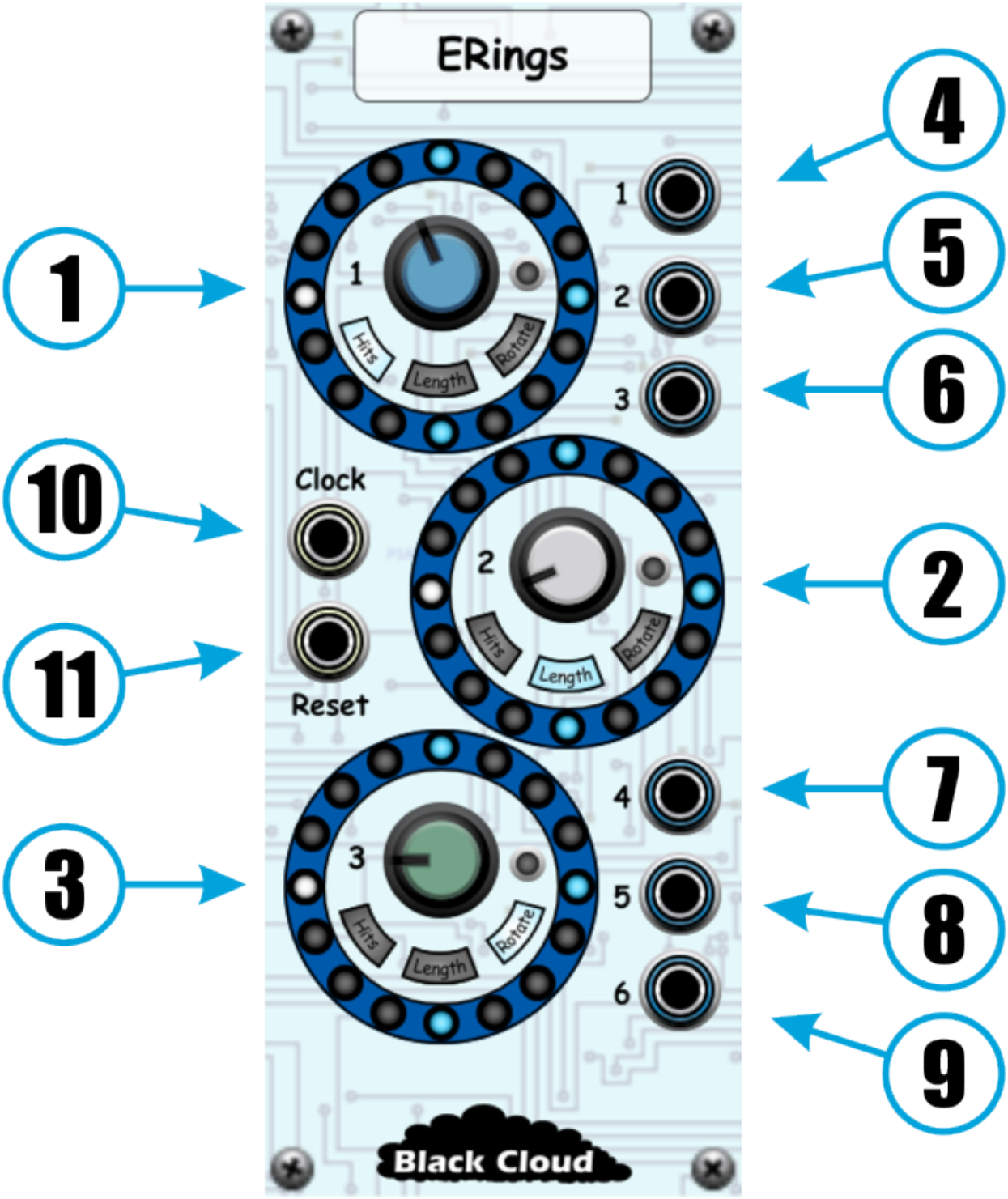
When clocked, Outputs 1, 2 and 3 generate trigger pulses for the corresponding channel if the current step is a “hit” while Outputs 4, 5, and 6 generate an inverted pattern, emitting trigger pulses for the corresponding channel if the current step is *not* a “hit”.

Godfried's paper on Euclidean rhythms (“*The Euclidean Algorithm Generates Traditional Musical Rhythms*“) is available here: http://cgm.cs.mcgill.ca/~godfried/publications/banff.pdf

The visual style for **ERings** comes from Vladimir Pantelic's “*Euclidean Circles*” euro-rack module: https://vpme.de/euclidean-circles/

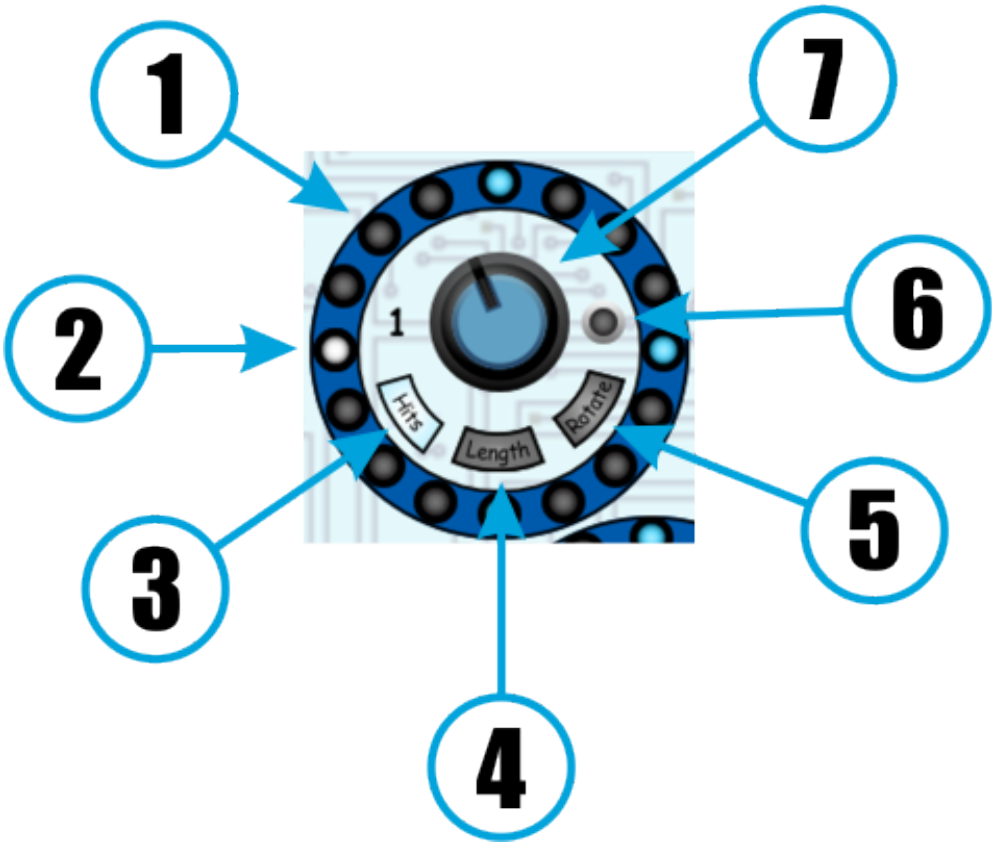
Knobs, Buttons and Sliders

Overview



1	**Channel 1 Ring and Controls** Controls and indicator LEDs for channel one.	**7**	**Channel 1 Secondary Output** When clocked, generates a trigger pulse for if the current step of Channel 1 is *not* a “hit”.
2	**Channel 2 Ring and Controls** Controls and indicator LEDs for channel two.	**8**	**Channel 2 Secondary Output** When clocked, generates a trigger pulse for if the current step of Channel 2 is *not* a “hit”.
3	**Channel 3 Ring and Controls** Controls and indicator LEDs for channel two.	**9**	**Channel 3 Secondary Output** When clocked, generates a trigger pulse for if the current step of Channel 2 is *not* a “hit”.
4	**Channel 1 Primary Output** When clocked, generates a trigger pulse for if the current step of Channel 2 is a “hit”.	**10**	**Clock Input** A positive going trigger on this input will advance all three channels one step and generate the appropriate output triggers.
5	**Channel 2 Primary Output** When clocked, generates a trigger pulse for if the current step of Channel 3 is a “hit”.	**11**	**Reset Input** A positive going gate on this input will reset all three channels to step 1. Clock inputs are ignored while the reset input is active.
6	**Channel 3 Primary Output** When clocked, generates a trigger pulse for if the current step of Channel 2 is a “hit”.		

Channel Controls



1	**Step LEDS** Blue (On) LEDS represent “hit” steps.	**5**	**“Rotate” Radio Button** Enables the Rotation Amount parameter adjustment knob.
2	**Current Step Indicator** A White LED highlights the currently active step in the sequence	**6**	**Primary Output Active LED** Flashes when the channels primary output is generating a trigger pulse.
3	**“Hits” Radio Button** Enables the Hit Count parameter adjustment knob.	**7**	**Parameter Adjustment Knob** Depending on the state of the radio buttons, adjust either the hit count (Blue knob), Sequence Length (White Knob) or Rotation Amount (Green Knob) for the channel.
4	**“Length” Radio Button** Enables the Sequence Length parameter adjustment knob.		