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.
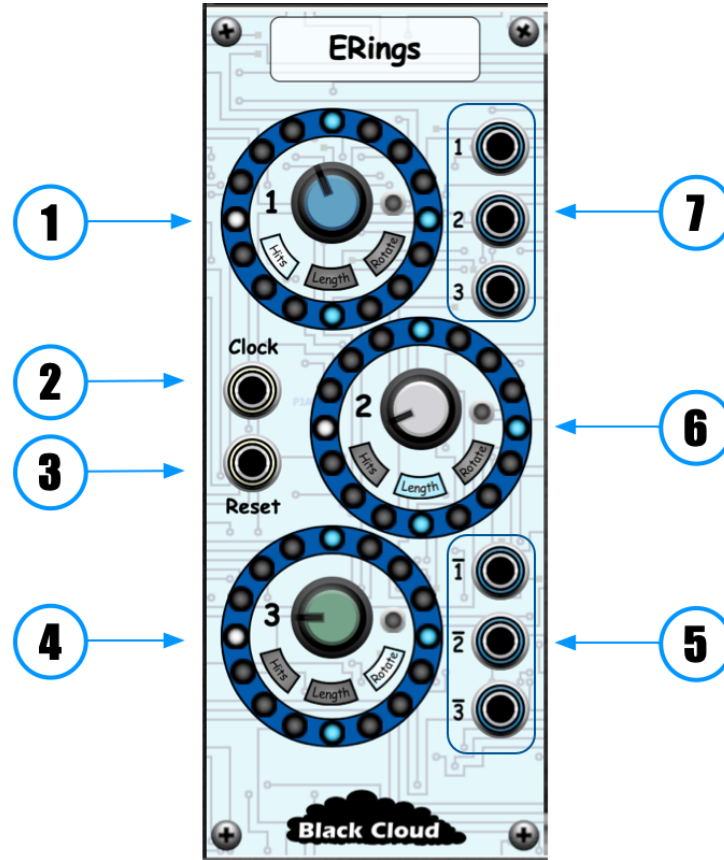
- Individually adjustable number of "hits" (1-16), sequence length (1-16 steps) and rotation amount (0-15 steps) controls for each channel.

- 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 Bar 1, Bar 2, and Bar 3 generate an inverted pattern, emitting trigger pulses for the corresponding channel if the current step is *not* a "hit".

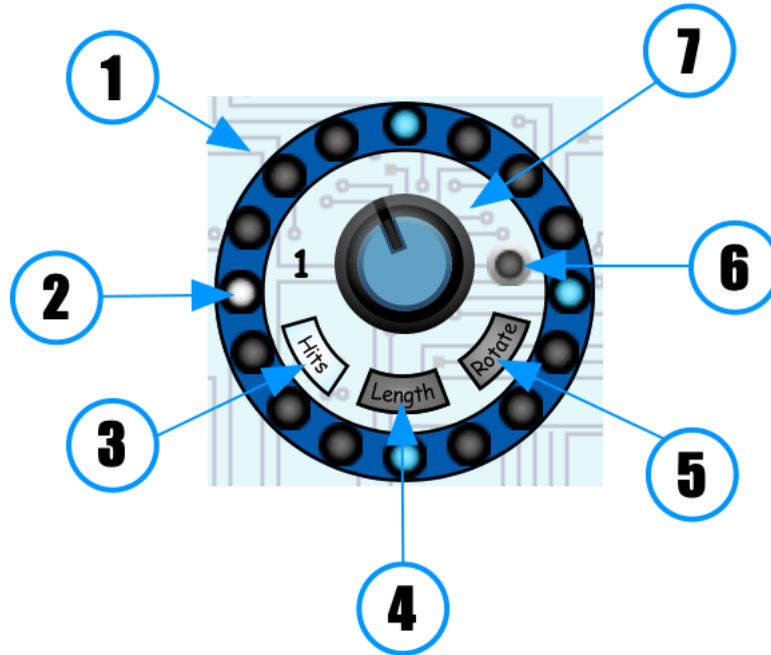Godfried's paper on Euclidean rhythms ("*The Euclidean Algorithm Generates Traditional Musical Rhythms*") is available here: http://cgm.cs.mcgill.ca/~godfried/publications/banff.pdf

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

1	Channel 1 Ring and Controls Controls & indicator LEDs for Channel 1.	5	Channel 1-3 Secondary Outputs When clocked, generates a trigger pulse if the current step of the channel is *not* a "hit".
2	Clock Input A positive going trigger on this input will advance all three channels one step and generate the appropriate output triggers.	6	Channel 2 Ring and Controls Controls & indicator LEDs for Channel 2.
3	Reset Input A positive gate on this input will reset all three Channels to step 1. Clock input is ignored while the reset input is active.	7	Channel 1-3 Primary Outputs When clocked, generates a trigger pulse if the current step of the channel is a "hit".
4	Channel 3 Ring and Controls Controls & indicator LEDs for Channel 3.		

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.			