

# Nano Rand v2

Sample & Hold / Random Voltage Generator / Noise Source



# QU-BIT

## Description

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Back by popular demand!

Nano Rand v2 is a reissue of our classic micro random module. It features a sample and hold, noise source, and random voltage generator in 4HP. It takes inspiration from and improves upon the analog concept of a random voltage module; moving forward in leaps and bounds into the digital domain. At its' core is an 8 bit microcontroller which allows for an extremely versatile, and more importantly, musical type of random.

Containing four random voltage algorithms that include random stepped voltages, random LFO waveforms and frequencies, random frequency audio rate square waves, and a combination of all algorithms, Nano Rand creates a signal that would otherwise take a multitude of modules to produce.

On top of the fluctuating random voltage output, it is also capable of producing the most musical random gate output in the Eurorack format. When externally clocked, Nano Rand generates random gate outputs that are musically related to the incoming clock signal. It chooses between eighth, sixteenth, quarter and many other rhythmic divisions, creating unique evolving rhythms. With a clean, intuitive interface and more random per square millimeter than ever before, Nano Rand is the ultimate in musically significant aleatoric meanderings.

- 4 switchable random voltage algorithms
- Can be internally or externally clocked
- Random gate source that generates musical derivatives of incoming clock
- Generates random frequency audio rate square waves allowing it to be both audio and control source
- Random voltage can be unipolar or bipolar

Changes from v1

- Noise output converted to analog white noise circuit with extremely flat frequency response
- Algo button converted to smaller version
- Added reverse power protection

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## **Installation**

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To install, locate 4HP of space in your Eurorack case and confirm the positive 12 volts and negative 12 volts sides of the power distribution lines. Plug the connector into the power distribution board of your case, keeping in mind that the red band corresponds to negative 12 volts. In most systems the negative 12 volt supply line is at the bottom. The power cable should be connected to the Nano Rand with the red band facing the left side of the module.

## Specifications

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**Format:** 4HP Eurorack module

**Depth:** 38.1mm (Skiff Friendly)

**Max Current:** +12V = 60mA  
-12V = 17mA  
+5V = 0mA



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11a.

11b.

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## General Functions Overview

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### 1. Rate:

If *rate* is far left, then the internal clock will be as slow as possible. If *rate* is far right, then the internal clock will be as fast as possible. The LED will show the current clock rate of either the internal or external clock source.

**When externally clocked**, *Rate* will control the rhythmic probability of the random gates. If the knob is far left, the rhythmic values for the random gate output will be limited to eighth notes. As the knob is turned to the right, the rhythmic possibilities for the gate output will increase and begin to include smaller, larger and triplet derivatives of the incoming clock. When the knob is far right, each incoming clock signal causes Nano Rand to choose between all available rhythmic values (See “**9. Gate Out**” for a more detailed explanation of the random gate functionality).

The knob's color will indicate which random algorithm is active (See “**5. Rand**” for random algorithm descriptions and associated colors).

### 2. Range:

Switches the internal clock between high range and low range. When *range* is in the up position the range is high, when *range* is in the down position the range is low.

### 3. S+H In:

Sample & hold input. Accepts both audio rate and control rate signals. Range is  $\pm 8V$ .

### 4. S+H Out:

Sample & hold output. Range is  $\pm 8V$ .

### 5. Rand – Random voltage output.

- **Magenta** – Random stepped voltages.
- **Cyan** – Random LFO waveforms and frequencies.
- **Amber** – Random frequency audio rate square waves.
- **Green** – Combination of all algorithms

### 6. Uni/Bi (Polarity):

Switches random voltage output between unipolar positive and bipolar polarity. Unipolar positive random voltage range is 0V – 5V. Bipolar random voltage range is  $\pm 8V$ .

### 7. Clk:

When internally clocked, *clk* acts as a CV input that will modulate the internal clock rate. When externally clocked, *clk* acts as a gate input for an external clock source.

### **8. Int/Ext:**

Switches between internal clock and external clock. When *int/ext* is up, Nano Rand will run from the internal clock. When *int/ext* is down, it will run from an external clock.

### **9. Gate Out:**

When internally clocked, *gate out* produces periodic gate signals at the rate of the internal clock. When externally clocked, *gate out* produces random gate signals that are derived from the external clock source. Upon each incoming clock, Nano Rand calculates a musical derivative of the incoming clock rate and outputs a random gate signal at that frequency. A new rhythmic value is randomly chosen each time *clk* receives a gate.

### **10. Noise:**

Analog white noise output.

### **11a. Rand Algo Switch:**

Gate input that causes the current random algorithm to switch to the next sequential algorithm. Threshold voltage is 2.5V.

### **11b. Rand Algo Button:**

Button that causes the current random algorithm to switch to the next sequential algorithm.