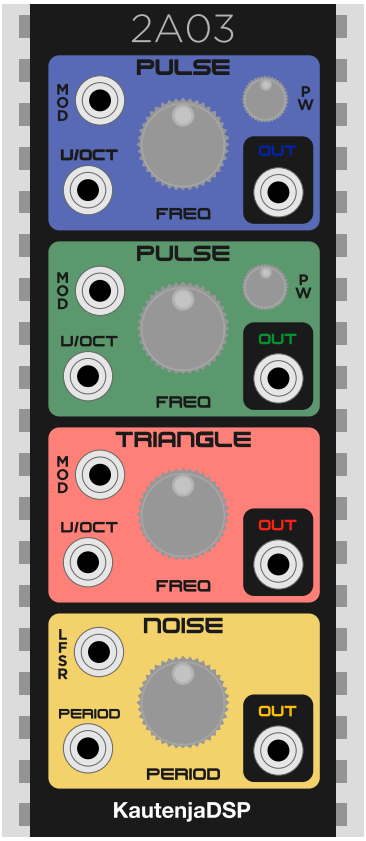
2A03



KautenjaDSP

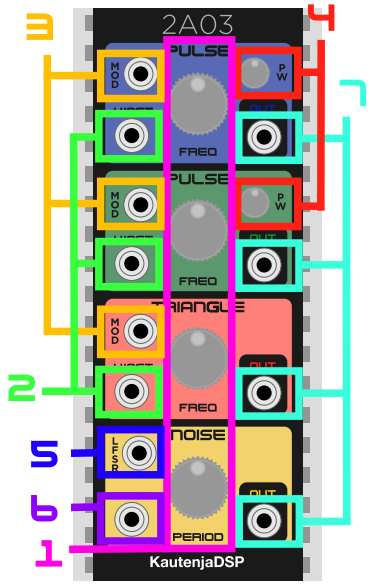
1 Overview

2A03 is an emulation of the 2A03 sound chip from the Nintendo Entertainment System (NES) for VCV Rack. The 2A03 chip contains two pulse wave generators, a quantized triangle wave generator, and a noise generator. The original chip featured a DMC loader for playing samples that has been omitted in this emulation.

2A03 provides the key features of the 2A03 chip, namely,

- **Dual pulse wave generator:** Dual 8-bit pulse waves with four duty cycles: 12.5%, 25%, 50%, and 75%;
- **Quantized triangle wave generator:** Generate NES style triangle wave with 16 steps of quantization;
- **Noise generator:** generate pseudo-random numbers at 16 different frequencies; and
- **Linear Feedback Shift Register (LFSR):** for that old-school 8-bit randomness!

2 Panel Layout



1. Coarse frequency control over the four channels.
2. V/Octave inputs for pulse1, pulse2, and triangle waveform generators.
3. linear CV frequency modulation for pulse1, pulse2, and triangle waveform generators.
4. Pulse width selector. Chooses between four duty cycles: 12.5%, 25%, 50%, and 75%.
5. CV LFSR gate, high at $2V$. Holds the LFSR generator as long as the input voltage is $> 2V$.
6. Period of randomness $\in [0, 15]$ for the noise generator. See `https://wiki.nesdev.com/w/index.php/APU_Noise` for approximate frequency and pitch mappings.
7. Channel outputs, $\approx 10V_{pp}$.

References & Acknowledgments

Green, S. (2003). Nes_Snd_Emu. http://www.slack.net/~ant/libs/.