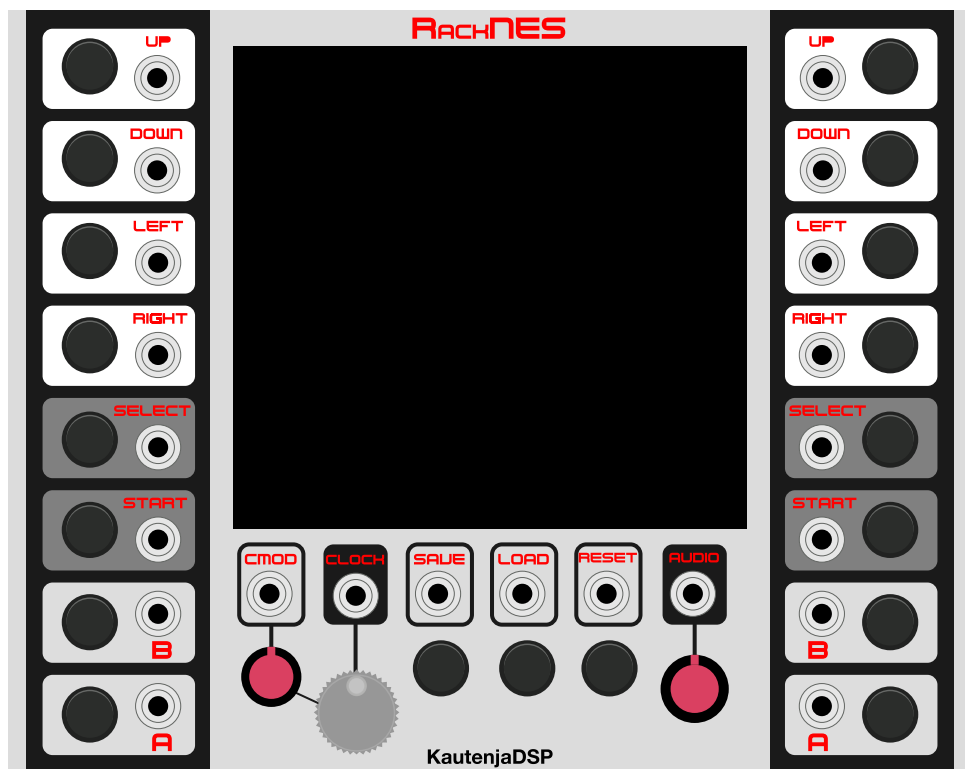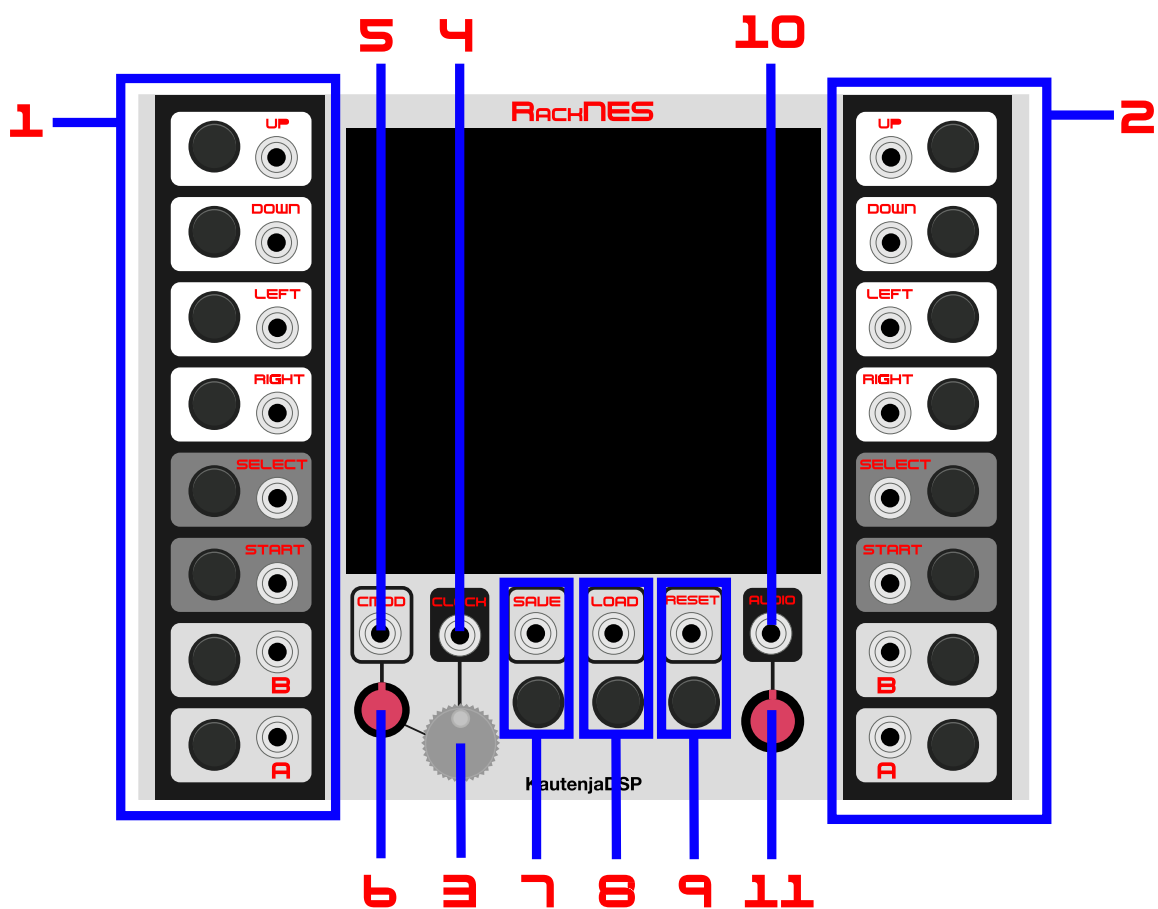# RackNES

KautenjaDSP

RackNES is a Nintendo Entertainment System (NES) emulator for VCV Rack with control voltage inputs and outputs. RackNES offers several key features, namely,

- **Clock Source:** Use NES as a clock source for downstream modules;

- **Clock Rate Modulation:** Control the clock rate of the NES with direct knob and CV;

- **NES Audio Output:** Sample audio from the NES in real-time at any sampling rate;

- **Sampling/Ratcheting:** Save and restore the NES state for interesting musical effects; and

- **Full CV Control:** CV inputs for Reset, Player 1, Player 2, and more.

1. Player 1 controller input triggers; high at $2V$

2. Player 2 controller input triggers; high at $2V$

3. NES Clock rate control. Controls the frame rate of the emulation from $2Hz$ to $1KHz$.

4. NES Clock output. Pulse wave with 50% duty cycle; high at $10V$, low at $0V$.

5. NES Clock rate CV modulation. Modulates the clock rate parameter according to CV with half the range of the clock rate control knob.

6. NES Clock rate CV attenuverter. Controls strength and polarity of clock rate CV input.

7. Save state trigger; high at $2V$. Saves the current state of emulation.

8. Load state trigger; high at $2V$. Loads the existing save state back into the emulation.

9. Reset emulator trigger; high at $2V$. Equal to pressing "Reset" on the NES, resets the game.

10. NES Audio output; $10V_{pp}$. Audio output from the internal mixer of the NES.

11. NES Audio output volume level; $[0\%, 200\%]$. Controls the gain of the audio output signal. 100% is roughly $5V_{pp}$ and 200% is roughly $10V_{pp}$ (though some clipping may occur).