Nervous Squirrel — Zeno's Paradox

- Manual PDF

Zeno’s Paradox Manual (web)

Using Nervous Squirrel Zeno’s Paradox for Dense, Hyper-Complex Percussion

Zeno’s Paradox is a Eurorack clock divider with *30 outputs*, each halving the frequency of the previous, dividing down to over a billion. Its *audio-rate capable* clock input and CV/reset flexibility make it a unique source for generating dense, polyrhythmic, and intricate time-based patterns suitable for complex percussion.

Core Musical Uses

1. Generating Complex Rhythmic Grids

- **Patch a Master Clock**
  Start with a master clock (for example, 16th notes at 120bpm) into `CLOCK IN`.
  Each output (e.g., `/2`, `/4`, `/8`, ... `/1073741824`) gives you a new rhythmic subdivision, ranging from fast to glacially slow.
- **Stack and Layer Rhythms**
  Route multiple divider outputs to trigger separate drum or percussion modules. E.g.:
- `/2` → Kick
- `/3` (see notes below on using odd divisions) → Snare
- `/5`, `/7`, `/11`, etc. → Percussive accents, using cascading modules for odd divisions

- `/64`, `/128`, `/256` → Subtle events or fills (occasional ghost notes, FX, resets)
  You get distinct polyrhythmic layers, even by just using binary divisions.

2. Achieving Polyrhythms and Odd Meters

- **Patch Odd-Numbered Divisions**
  Zeno's Paradox uses powers-of-two divisions natively. For true odd divisions (like 3, 5, 7), chain clock dividers or use logic modules to AND/OR these outputs with others, or combine multiple instances of Zeno's Paradox.
- **Reset Input for Metric Modulation**
  Use the `RESET IN` to reset the counter at unusual intervals (generated by another clock/divider), causing timebase to shift—generate complex metric modulations and "cycling" polyrhythms.

3. Complex Patterns via Audio-Rate Input

- **Audio-Rate as Clock**
  Feed audio or fast LFOs into `CLOCK IN`—outputs clock down the audio, producing subharmonics or low-frequency rhythms, great for *sub-oscillator* effects in light of percussion.
- **Noise/Drums into Clock**
  Put white noise, percussion tracks, or dense rhythmic audio into `CLOCK IN`—you get variously "filtered" noise/clock patterns out, leading to unpredictable, crunchy, lo-fi grooves, which can be gated or used for syncopated percussion hits.

4. Manipulating Output for Percussive Uniqueness

- **Squarewave Suboctave Sound Source**
  Outputs are square waves at octave intervals (when audio is normal stably clocked). Patch these into VCAs with fast envelopes for punchy, "bitcrushed" digital percussive hits.
- **Choke/Accent Percussion**
  Use faster divisions to "choke" or mute slower output triggers via

switch or logic modules, hyper-synchronizing or desynchronizing elements for extra density and variation.

- **Feedback Patch**
  Mult one output (e.g., a mid-range division) and mix it (attenuated) with audio input, generating recursive rhythms and unexpected phase-locked artifacts.

5. "Meta" Drumming with Long Cycles

- **Super Slow Patterns**
  Use outputs that only fire every several bars, minutes, hours, or years! These can trigger rare, dramatic sound events or generative changes, making for “meta” polyrhythms across hours or performances.

Bonus Tips

- **Cascading for Complexity**
  Chain multiple Zeno's Paradox modules — the *manual* mentions that cascading two or more enables patterns with astronomical periodicity, ideal for generative ambient or evolving drumlines.
- **Manual "Hands-On" Performance**
  Use the MANUAL RESET button live to introduce fills, dropouts, or sudden pattern changes.

Technical Notes for Advanced Use - **Inputs:** Accepts any voltage over 1V, making it extremely compatible with both gate and audio signals. - **30 simultaneous outputs:** Experiment with logic modules (AND/OR/XOR) to create hybrid, interleaved triggers. - **Works well with sequencers:** Reset in sync with unusual meter sequencers for advanced time signatures.

Example Patch: Generative Poly-Polyrhythms

1. Master clock module → Zeno’s Paradox `CLOCK IN`
2. `/2` output → Kick (VCA+envelope+osc)
3. `/5` output (created with cascade/divider) → Snare
4. `/7` output (as above) → Clap or rimshot

5. `/128` and `/512` outputs → Randomly interjecting percussion (pinged LPG, noise hit)
6. White noise → Second Zeno's clock in → Outputs → Pinged filter or ring mod

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