Rave Generation

PRESENTS

SY-1K

TRIGGER RHYTHM

ANALOG PERCUSSION SYNTH

USER MANUAL

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1. Introduction

SY-1K Trigger Rhythm is an authentic recreation of a legendary 1980s analog drum ‘synthesizer’, one of the most distinctive and influential electronic drum sounds of the era. From the thunderous toms on Phil Collins' "In the Air Tonight" to the cutting snares that defined the decade's pop and rock productions, this classic analog character shaped countless iconic recordings.

At its core, SY-1K features the dual CMOS 4069 triangle wave oscillators, authentic filter pole spreading with unequal integrator capacitors, envelope-based pitch sweeping, and characteristic CMOS asymmetries that created the legendary 80s drum sound. Building on this vintage foundation, we've added five modern waveforms, comprehensive LFO modulation with tempo sync, MIDI key tracking, and contemporary drive saturation.

Whether you're seeking the authentic 80s sound or exploring new territories with extended modulation capabilities, SY-1K Trigger Rhythm delivers the warmth, punch, and character that made the original a studio legend.

From classic gated reverb drums to modern EDM percussion, from vintage analog warmth to cutting-edge digital precision, SY-1K captures the essence of hardware drum synthesis while offering the convenience and flexibility of modern plugin technology.

2. Key features

Authentic 80s Drum Synth Recreation

- Complete dual CMOS 4069 triangle wave oscillator modeling
- Authentic filter pole spreading with unequal integrator capacitors (1nF, 2nF, 1nF)
- CMOS propagation delay artifacts and temperature drift simulation
- Mode E pseudo-sawtooth via +8V injection technique
- Classic envelope-based pitch sweeping

Extended Waveform Library

- 7 vintage modes: Triangle, FM, Dual Mix, Velocity Mix, Pseudo-Saw, Noise, FM+Noise
- 5 additional modern waveforms: Asteroid, Coconut, Bones, Boxeur, Bottle Cap
- Each mode with unique harmonic content and character profiles
- Authentic CMOS asymmetries and analog imperfections

Comprehensive LFO System

- Four waveform shapes: Square, Triangle, Sine, Sawtooth
- Tempo sync with 9 note divisions (1/1 to 1/16T)
- 0.1-50Hz frequency range for creative modulation
- Sample & Hold for vintage random pitch modulation

Advanced Trigger System

- Five trigger modes: Audio, MIDI, MIDI Key, Audio+MIDI, Audio+MIDI Key
- MIDI key tracking with full chromatic support (C1-B3)
- Note sync override for precise musical tuning
- Adjustable trigger threshold and sensitivity

Modern Enhancements

- Advanced drive algorithm with four saturation stages
- Professional envelope handling with click-free retriggering
- Comprehensive automation support with parameter smoothing
- LED trigger indicator for visual feedback

Professional Audio Quality

- 64-bit floating-point internal processing
- Anti-aliasing and reconstruction filtering
- Optimized for low CPU usage and real-time performance
- Zero-latency design suitable for live performance

3. Quick-start

Load SY-1K on your desired audio track or as a MIDI instrument

Select oscillator mode based on your desired sound:

- **A-D**: Classic Simmons triangle and FM-based sounds
- **E**: Pseudo-sawtooth for cutting leads
- **F-G**: Noise-based percussion and hybrid textures
- **H-L**: Modern Sub waveforms for contemporary sounds

Choose trigger mode:

- **Audio**: Triggered by input audio level (classic gate behavior)
- **MIDI**: Triggered by MIDI notes (standard drum synth operation)
- **MIDI Key**: MIDI notes with pitch tracking (chromatic tuning)
- **Audio+MIDI combinations**: Hybrid triggering for maximum flexibility

Set basic parameters:

- **Tune**: Adjust base frequency (10-5000Hz)
- **Decay**: Control envelope length (10-3000ms)
- **Width**: Set filter cutoff for brightness/darkness

Add movement:

- **Sweep Range/Speed**: Create classic pitch-diving effects
- **LFO Depth/Speed**: Add cyclic modulation for texture
- **S/H**: Enable sample & hold for random pitch variations

Shape the sound:

- **Drive**: Add harmonic saturation and punch
- **Output**: Set final level and presence
- **Mix**: Blend with original signal for parallel processing

Fine-tune:

- **Tune Sync**: Lock to specific musical notes
- **LFO Sync**: Sync modulation to host tempo
- **Trigger Sense**: Adjust sensitivity for audio triggers

4. User interface

Primary Controls (Top Row)

Control	Range	Description
Osc Mode	A-L (12 modes)	Selects oscillator waveform and synthesis method
Tune	10-5000 Hz	Base frequency/pitch of the oscillator
Tune Sync	OFF + 36 notes	Musical note sync override (C1-B3)
Decay	10-3000 ms	Amplitude envelope decay time
Width	0-100%	Filter cutoff frequency (brightness)
Sweep Speed	5-1000 ms	Pitch envelope decay rate
Sweep Range	0-100%	Amount of pitch modulation
Sweep Direction	Down/Up	Pitch envelope direction
Drive	0-100%	Harmonic saturation amount

Modulation Controls (Bottom Row)

Control	Range	Description
LFO Speed	0.1-50 Hz	LFO frequency in Hz
LFO Sync	OFF + 8 divisions	Tempo sync (1/1 to 1/16T)
LFO Depth	0-100%	LFO modulation amount
LFO Shape	4 waveforms	Square, Triangle, Sine, Sawtooth
Sample Hold	OFF/ON	Random pitch modulation
Output	-20 to +20 dB	Final output level

Control	Range	Description
Trigger Sense	-60 to 0 dB	Audio trigger threshold
Trigger Mode	5 modes	Audio/MIDI/Key tracking options
Mix	0-100%	Dry/wet blend for parallel processing

Visual Feedback

Indicator	Function
Trigger LED	Lights when voice is triggered (100ms duration)

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5. Oscillator modes (A-L)

Authentic Vintage Modes (A-G)

Mode A - Triangle Oscillator

- Single CMOS triangle wave with authentic asymmetries
- Classic clean analog tone, perfect for basic drum synthesis
- Ideal for: Toms, kicks, basic percussion sounds

Mode B - FM Synthesis

- VCO1 frequency-modulates VCO2 at aggressive modulation depth
- Creates complex harmonic content and metallic tones
- Ideal for: Snares, hi-hats, metallic percussion

Mode C - Dual Oscillator Mix

- Equal mix of VCO1 (fundamental) and VCO2 (perfect fifth higher)
- Rich harmonic content with musical intervals
- Ideal for: Thick toms, layered percussion

Mode D - Velocity-Sensitive Mix

- Same as Mode C, but sweep range responds to trigger velocity
- Harder hits create more dramatic pitch sweeps
- Ideal for: Expressive drum programming, dynamic performance

Mode E - Pseudo-Sawtooth

- Innovative +8V injection technique creates sawtooth-like character
- Sharp attack with complex harmonic content
- Ideal for: Cutting leads, aggressive percussion, special effects

Mode F - Noise Only

- Pure noise generation with all modulation affecting filter frequency
- Classic analog noise with filter modulation for texture
- Ideal for: Hi-hats, cymbals, percussion textures, wind effects

Mode G - FM + Noise (Enhanced Mode)

- 70% FM synthesis mixed with 30% white noise
- Best of both worlds: harmonic content plus realistic texture
- Ideal for: Realistic snares, textured percussion, hybrid sounds

Modern Enhanced Waveforms (H-L)

Mode H - Asteroid

- Complex evolving sound with multiple shifting harmonics
- Time-based modulation creates organic, breathing character
- Ideal for: Ambient percussion, evolving textures, modern EDM

Mode I - Coconut

- Smooth, hollow character with subtle formant shaping
- Coconut-inspired resonant qualities
- Ideal for: Ethnic percussion, wooden drum sounds, organic textures

Mode J - Bones

- Deep, resonant sound with strong sub-harmonic content
- Powerful low-end presence with character
- Ideal for: Deep kicks, bass percussion, rumbling effects

Mode K - Boxeur

- Punchy, asymmetric square-wave character with sub-bass
- Boxing-inspired sharp attack and power
- Ideal for: Punchy kicks, aggressive percussion, trap-style drums

Mode L - Bottle Cap

- Distinctive "pop" character with unique formant structure
- Bottle cap-inspired percussive attack
- Ideal for: Pop percussion, quirky drum sounds, foley-style effects

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6. Trigger modes & MIDI

Trigger Mode Selection

Audio Mode

- Classic analog drum synthesizer behavior
- Triggers when input audio exceeds threshold setting
- Trigger velocity based on input signal strength
- Perfect for: Live audio triggers, gate-style operation

MIDI Mode

- Standard MIDI note triggering without pitch tracking
- Fixed tuning based on Tune parameter or Tune Sync setting
- Velocity-sensitive triggering from MIDI note velocity
- Perfect for: Standard drum machine operation, fixed-pitch drums

MIDI Key Mode

- MIDI notes control both triggering AND pitch
- Each MIDI note triggers with its corresponding frequency
- Overrides Tune and Tune Sync parameters
- Perfect for: Chromatic playing, melodic percussion, pitched drums

Audio+MIDI Mode

- Responds to both audio triggers and MIDI notes
- Fixed tuning (no key tracking)
- Combines live audio and sequenced MIDI triggers
- Perfect for: Hybrid performance setups, reinforcement applications

Audio+MIDI Key Mode

- Responds to both audio triggers and MIDI notes with key tracking
- MIDI notes set pitch, audio triggers use current MIDI pitch
- Most flexible mode for complex performance scenarios
- Perfect for: Advanced live performance, complex trigger setups

MIDI Implementation

Note Range: Full 128-note MIDI range supported **Velocity Response**: 0-127 velocity affects trigger dynamics and sweep sensitivity (Mode D) **Note-Off**: Voices decay naturally (drum-style behavior) **Channel**: Responds to all MIDI channels

Key Tracking Range: C1 (32.7 Hz) to B3 (246.9 Hz)

- Tune Sync parameter provides GUI access to this range
- MIDI Key modes extend beyond this range chromatically
- Lower notes may be sub-audible depending on monitoring system

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7. LFO system & modulation

LFO Waveforms

Square Wave

- Abrupt switching between two pitch levels
- Creates rhythmic, on/off modulation effects
- Ideal for: Tremolo effects, rhythmic pitch switching

Triangle Wave

- Smooth, symmetrical rise and fall
- Linear pitch sweeps in both directions
- Ideal for: Classic flanging-style pitch modulation

Sine Wave

- Smooth, curved modulation envelope
- Most musical and subtle modulation shape
- Ideal for: Gentle vibrato, subtle movement

Sawtooth Wave

- Linear ramp from minimum to maximum
- Creates rising pitch sweeps
- Ideal for: Siren effects, ascending pitch movements

LFO Tempo Sync

When LFO Sync is enabled, LFO Speed is ignored and modulation locks to host tempo:

Setting	Division	Description
1/1	Whole note	Very slow, long-form modulation
1/2	Half note	Slow, musical modulation
1/4	Quarter note	Medium-speed musical timing
1/8	Eighth note	Moderate modulation rate
1/16	Sixteenth note	Fast, rhythmic modulation
1/4T	Quarter triplet	Triplet-based musical timing
1/8T	Eighth triplet	Medium triplet modulation
1/16T	Sixteenth triplet	Fast triplet modulation

Sample & Hold System

When Sample & Hold is enabled:

- Generates random values on each trigger
- Adds random pitch offset (±30% of base frequency)
- Creates vintage analog unpredictability
- Combines with LFO and sweep modulation
- Perfect for: Vintage analog character, random texture

Modulation Hierarchy

Pitch modulation combines in this order:

1. **Base Frequency**: Tune parameter or MIDI note frequency
2. **Note Sync Override**: Tune Sync parameter (if not OFF)
3. **Sweep Modulation**: Envelope-based pitch diving/rising
4. **LFO Modulation**: Cyclic pitch modulation
5. **Sample & Hold**: Random pitch offset per trigger

Total modulation range: ±1 octave maximum

8. Tips & Tricks

Classic 80s Drum Sounds

Phil Collins Tom Sound

- Mode A or C, Tune 100-150Hz, Decay 800-1200ms
- Sweep Range 60-80%, Sweep Speed 200-400ms, Direction Down
- Width 30-50%, no LFO, Drive 10-20%
- Add gated reverb in your DAW for authentic 80s character

Snare Crack

- Mode B or G, Tune 200-400Hz, Decay 150-300ms
- Sweep Range 40-60%, Sweep Speed 50-100ms, Direction Down
- Width 70-90%, Drive 30-50%
- Brief decay for tight, punchy snare hits

Hi-Hat Simulation

- Mode F, Decay 50-150ms, Width 80-100%
- LFO Triangle 5-15Hz, Depth 20-40%
- Sample & Hold ON for realistic texture variation
- Trigger Sense -30 to -20dB for responsive playing

Modern Enhancements

EDM Kick with Modern Waveforms

- Mode J (Bones) or K (Boxeur), Tune 50-80Hz
- Decay 400-800ms, Sweep Range 30-50%, Direction Down
- Drive 40-70% for harmonic saturation
- LFO Sine 0.5-2Hz, Depth 10-20% for subtle movement

Ambient Percussion Textures

- Mode H (Asteroid), Tune 80-200Hz, Decay 1000-2500ms
- LFO Shape Triangle, Speed 0.2-1Hz, Depth 30-60%
- Sample & Hold ON, Mix 60-80% for parallel processing
- Long decay times reveal evolving harmonic content

Chromatic Percussion

- MIDI Key mode with Mode E (Pseudo-Sawtooth)
- Tune Sync OFF (let MIDI control pitch)
- Decay 200-500ms, Width 60-80%
- Play chromatically for melodic drum patterns

Advanced Techniques

Velocity-Sensitive Sweeps (Mode D)

- Use MIDI velocity to control sweep intensity
- Soft hits = subtle sweeps, hard hits = dramatic dives
- Perfect for expressive drum programming
- Combine with velocity-sensitive decay in your DAW

Parallel Processing with Mix Control

- Set Mix to 60-80% to blend original with synthesis
- Preserves attack transients while adding analog character
- Ideal for enhancing existing drum tracks
- Use on drum bus for subtle analog warming

Tempo-Synced Modulation

- LFO Sync to 1/8 or 1/16 for rhythmic pitch movement
- Creates polyrhythmic effects against straight drum patterns
- Triangle or Sine waves work best for musical results
- Depth 20-40% prevents extreme pitch shifts

Multi-Trigger Setup

- Audio+MIDI modes for redundant triggering
- Live drums trigger synthesis, MIDI provides backup/enhancement
- Audio trigger handles dynamics, MIDI provides timing precision
- Perfect for live performance reliability

Problem Solving

Avoiding Trigger Sensitivity Issues

- Start with Trigger Sense at -20dB, adjust up/down as needed
- Too sensitive: Increase threshold (move toward 0dB)
- Not sensitive enough: Decrease threshold (move toward -60dB)
- Use Audio+MIDI mode for backup triggering

Managing Extreme Modulation

- LFO Depth over 60% can create wild pitch swings
- Sample & Hold adds unpredictability - start with moderate settings
- Sweep Range over 80% creates dramatic effects - use sparingly
- Mode F (Noise) responds differently - modulation affects filter, not pitch

8. Installation & specifications

System requirements

- **Operating System**: macOS 10.13+ or Windows 10+
- **Processor**: Intel Core i5 or equivalent
- **RAM**: 4 GB minimum (8 GB recommended)
- **Plugin Formats**: VST3, AU (macOS)
- **DAW**: Any compatible host (Logic Pro, Ableton Live, Studio One, FL Studio, etc.)

Installation process

1. Download the installer from the official website
2. Run the installer and follow on-screen instructions
3. Launch your DAW and rescan plugins if necessary
4. Locate "SY-1K Trigger Rhythm" in your plugin list

Troubleshooting

- **Plugin not appearing**: Ensure plugin path is correct in your DAW settings
- **MIDI not triggering**: Check MIDI routing and trigger mode selection
- **Audio triggers not working**: Verify input signal and adjust Trigger Sense
- **No sound output**: Check Mix parameter and Output level settings
- **Activation issues**: Check internet connection and license key accuracy

Technical specifications

Audio processing

- **Sample Rates**: Supports all standard sample rates (44.1-192 kHz)
- **Internal Resolution**: 64-bit floating-point processing
- **Latency**: Zero-latency feed-forward design
- **Dynamic Range**: >120dB internal headroom

MIDI implementation

- **Note Range**: Full 128-note MIDI range
- **Velocity Sensitivity**: 128 levels with smooth response curves
- **Controllers**: Standard MIDI CC automation support
- **Channels**: Responds to all MIDI channels

Formats

- **VST3**: Windows and macOS (32/64-bit)
- **AU**: macOS (64-bit)
- **Compatibility**: Native C++ code, no additional frameworks required

The end...

SY-1K Trigger Rhythm - Authentic analog drum synthesis for the modern studio

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For more resources, updates, and preset packs, visit **ravegeneration.io**.

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