

# Schlappi Engineering – Angle Grinder

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## Using Schlappi Engineering Angle Grinder For Eurorack Sound Design

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**Angle Grinder** is a uniquely flexible quadrature oscillator and state variable filter with deep modulation possibilities. Its SPIN (oscillator/filter core) and GRIND (nonlinear waveshaper/comparator) sections enable a wealth of wild sonic territory. Here are creative modulation approaches to craft distorted percussion, gnarly basslines, and atmospheric pads.

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### Core Modulation Possibilities

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#### 1. FM1 / FM2 Inputs

- **FM1:** Switchable between **linear** and **exponential** FM via jumper. Deep, audio-rate modulation here creates classic metallic or chaotic timbres.
- **FM2:** Exponential FM, great for aggressive pitch bends and bass growls.

## 2. GRIND Sliders & CVs

- Control the amplitude of phase-compared square waves subtracted from the input, allowing dynamic waveform mangling.
- CV (0–5V) modulates grind amount per phase; envelope or sequencer control here is key for percussive and bass movement.

## 3. GRIND → SPIN / Damping

- The **GRIND → SPIN** knob controls feedback from the waveshaper to the oscillator, morphing the overall behavior between pure oscillation and wild filter feedback.
- Modulating this parameter by CV (using a VCA + LFO/envelope) adds evolving distortion and self-oscillation artifacts.

## 4. Inject and External Input

- **INJECT** bypasses GRIND and can soft-sync the core, used with gates or audio for phase resets and extra punch.
  - Regular INPUT takes in audio or CV to be wrangled by the GRIND comparators; try feeding percussion hits, FM modulator oscillators, or drones.
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# Creative Sound Design Techniques

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## A. Distorted Percussive Sounds

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1. **Patch**
2. Leave Angle Grinder in LOW or HIGH range—try LOW for snappy modulation.
3. Patch gate, drum trigger, or envelope generator to one or more GRIND CV inputs to create shape/pulse-dependent distortion.

4. Use a drum sound or noise burst into INPUT (or INJECT for sharper sync).

5. Turn GRIND → SPIN knob up for feedback-driven distortion.

## 6. Modulate

7. **GRIND sliders:** Sequence or envelope-modulate individual sliders for evolving timbre with each drum hit.

8. **FM1/2 Inputs:** Patch percussion sound, audio-rate LFO, or random stepped CV to FM1 or FM2 for pitch artifacts; use exponential FM for wilder chaos.

9. **Damping:** Modulate with slow LFO for rhythmic shifting from tight hits to dirty resonance.

## 10. Result:

11. You'll get squelchy, blown-out, bitcrushed percussive timbres—great for glitch, techno, and hard electro!

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## B. Dubstep/Drum & Bass Basses

### 1. Patch

2. Set Angle Grinder as main VCO: Use V/OCT for pitch sequencing.

3. Crank GRIND → SPIN for aggressive feedback mixing.

4. Mult out 0° or 180° output to your main audio, and another phase output to modulate a filter or VCA downstream for stereo movement.

5. Mult envelope or LFO to both GRIND CV and FM2 for dynamic growl and movement.

## 6. Modulate

7. Send fast envelopes or wobbly LFOs to FM2 for pitch sweeps and growls.

8. Use clocked ramp or stepped random to GRIND slider CVs for formant-like bass movement.

9. Patch accent gates or kicks to INJECT for rhythmically resetting/syncing the oscillator – creates sync'd bass punches.

#### 10. **Result:**

11. Brutal, vowel-like or metallic basses loaded with movement (think classic "talking" bass).
  12. Explode low-end with subharmonics by mixing both sine and GRIND outs.
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## C. Haunting Atmospheric Pads

#### 1. **Patch**

2. Set Angle Grinder to LOW range for LFO-speed quadrature outputs (modulate VCAs/panners downstream for enveloping stereo effects).
3. Patch drones or reverb-washed signals into INPUT; keep GRIND sliders low for subtle effect, or up for lo-fi color.
4. Use slow, unipolar LFOs on GRIND CVs to gently morph the waveshape.

#### 5. **Modulate**

6. **FM1 (linear)**, with slow LFO/attenuated noise or even recorded sample waveform for organic drift and detune.
7. **GRIND → SPIN**: Slowly move manually or with a slow envelope to sweep between pure, filtered, and feedback-warped tones.
8. **Damping**: Animate with footsteps, envelope, or random for evolving resonance and shimmer.

#### 9. **Result:**

10. Four drifting, phase-shifted outputs (all phase-locked) allow for lush quadraphonic or moving stereo textures.
  11. GRIND section adds brittle, spectral edges and eerie harmonic motion.
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# Bonus Tips

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- Use **ALL PASS** (phase shifted output) for unique layering and phasing effects.
  - Feedback external audio (resample) through INPUT or INJECT for abrasive, self-modifying noise textures.
  - The unlimited output headroom (up to 22Vpp!) lets you overdrive mixers and VCAs downstream for bonus saturation.
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For more patching inspiration, check out the [Angle Grinder PDF Manual](#).

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