

Schlappi Engineering — Angle Grinder

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Using Schlappi Engineering Angle Grinder For Eurorack Sound Design

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.

Core Modulation Possibilities

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.

Creative Sound Design Techniques

A. Distorted Percussive Sounds

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 Bases

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

- 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.

For more patching inspiration, check out the [Angle Grinder PDF Manual](#).

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