SATURN CORE Synthesizer – Rack Extension

CREATED BY **SYNTH SEDUCTION**

INTRODUCTION

Welcome user **Saturn Core Synthesizer RE** from Synth Seduction – a virtual synthesizer that merges the soul of classic analog with the boundless possibilities of the digital era.

Saturn Core is not just another Synthesizer RE. It is the essence of legendary, fat, and warm tone, filtered through inventive sound modulation solutions. At its heart lie three fully-featured oscillators (each with slightly unique capabilities), backed by a powerful sub-oscillator that captures the character of a certain iconic sub-waveform found in today's most revered analog synths... and a dedicated noise generator. It gives opportunity to create any musical style – from juicy basses and singing leads to gritty, distorted textures.

We designed it with intuition and workflow in mind. Rich sound-editing capabilities – from quick FM modulation on Oscillator 1, to a flexible mod matrix, and a versatile arpeggiator – are hidden behind a logical panel layout. This gives you direct access to the "beef" of that coveted analog character (if we can still call it that in the digital plugin age...), while simultaneously allowing you to dive into the depths of fascinating sonic textures in mere moments.

The Saturn Core Synthesizer RE is precisely that: the power of classic synthesis, supercharged with modern effects and modulation. Its greatest strength is the ingenious simplicity with which it creates complex, rich, and vibrant sounds, offering a wide palette of possibilities that have an immediate impact on the timbre you craft. Whether you seek an authentic homage to the classics or a unique sound that defines your style, this RE can become a true game-changer in your hands.

Dive into its capabilities. Turn that first knob. Let the sonic journey begin now!

2.1: Oscillators (OSC1, OSC2, OSC3)

- The oscillators are the heart of the **Saturn Core** synthesizer, generating the primary audio signal. The instrument is equipped with three main generators: **OSC1**, **OSC2**, and **OSC3**. OSC1 and OSC2 feature an almost identical set of parameters. OSC3 offers additional, advanced functions, which will be discussed in detail later in this chapter.

- Each oscillator provides a rich set of classic and advanced controls for precise tonal shaping.

2.1.1 Basic Tuning and Panorama Parameters:

- **OCTAVE:** Shifts the oscillator's fundamental pitch range up or down in full octave steps. This allows for quick setting of the oscillator's relative sonic position (e.g., bass, mid, soprano).

- **SEMI:** Tunes the oscillator within a +/- 12 semitone range (one octave). It enables the creation of harmonic intervals between oscillators (e.g., fifths, thirds) or subtle detune effects.

- **FINE:** Allows for very delicate detuning of the oscillator within a +/- 50 cent range (half a semitone). A key parameter for creating "fat" unison sounds by slightly spreading the oscillators' frequencies.

- **PAN:** Controls the stereo placement of the individual oscillator's signal. A value of 0 (center) places the sound centrally, negative values pan it to the left channel, and positive values to the right. This allows for creating a wide, spatial sound palette right at the signal generation stage.

2.1.2 Waveform Richness and Advanced Editing:

- **Saturn Core** offers 5 classic waveform shapes in oscillators 1 and 2 as a starting point. However, the true power lies in the advanced capabilities for modifying them.

- **"SMOOTH"** Edit Mode: This switch determines the character of transitions between successive stages of waveform modification (e.g., when changing the WARP position or switching WAVEFORM).

    o In the active (Smooth) position, changes are fluid. The synthesizer interpolates between wavetable indexes, gently morphing one shape into another. The effect is continuous, organic, and ideal for evolving pads or leads.

    o In the inactive position, changes are stepped. Transitions between waveform shapes or modification stages are instantaneous, creating a more aggressive, standard waveform character.

- **PHASE:** Controls the initial phase of oscillation (range 0-100%). It determines at which point in the waveform cycle the sound begins when a key is pressed.

    o A value of 0% means a standard start from the cycle's beginning.

    o Changing this value significantly impacts the timbre, especially in monophonic mode or with short attacks. It can soften or sharpen the sound and eliminate unwanted "clicks" on the attack. In polyphonic mode with the chorus effect enabled, changing the phase randomizes the start point for each voice, enriching and "fattening" the sound.

- **OUTPUT:** This parameter defines the output configuration of each of the three oscillators' signals.

    o **SOLO** mode sends an identical, monophonic signal to both channels.

    o **DUAL/STEREO** mode generates two signals and distributes them to the left and right channels, respectively. This acts like a built-in, subtle stereo-widening effect, giving the sound immediate spaciousness and volume at the preliminary stage of sound generation.

2.1.3 Advanced Waveform Deformation (Warp):

- The WARP system is a powerful tool for transforming the basic waveform shape into radically new forms.

- **WARP MODE:** Selects the algorithm used to distort the waveform. Each mode offers a unique character:

    o **- (None):** Disables the warp module.

    o **Shape:** Applies a non-linear waveshaping curve, adding harmonics and compressing or stretching the signal.

    o **Clip:** Hard-clips (cuts off) the top and bottom of the waveform, creating aggressive, overdriven harmonics.

    o **Flip:** Shifts the point where the waveform's polarity flips, changing its symmetry and timbre.

    o **Noise:** Modulates the waveform with white noise, adding grit and graininess.

    o **Quantize:** Reduces the sample resolution (bit-crushing) or waveform length, simulating lo-fi, 8-bit tones.

    o **Skew:** Shifts the waveform's center of gravity left or right, asymmetrically changing its shape and harmonic balance.

    o **PWM (Pulse Width Modulation):** Dynamically changes the width of a pulse wave, creating the characteristic, pulsating, "notchy" sound. It also works on other waveform shapes.

    o **Sync:** Resets the oscillator's phase at a specified frequency, generating a sharp, "barking" series of harmonics.

- **WARP (Amount):** Controls the depth or intensity of the selected WARP MODE algorithm. Ranges from subtle enrichment to radical transformation of the core sound.

2.1.4 Individual Chorus Effect:

- Each oscillator is enhanced with a dedicated chorus effect, processing its signal locally before it reaches the main mixer.

- **CHORUS VOICES:** Determines the number of delayed, slightly detuned copies (from 1 to 4) added to the original signal. A higher number of voices creates a denser, more "watery," and symphonic effect.

- **CHORUS DRY/WET:** Balance between the original (DRY) signal and the signal processed by the chorus effect (WET).

  o DRY = You hear only the clean, unprocessed oscillator signal.

  o WET = You hear only the signal processed by the chorus effect.

  o Intermediate values mix both signals, allowing everything from delicate enhancement (20-30%) to full immersion in the effect (80-100%).

2.1.5 SUB WAVEFORM knob, physically located in the OSC1 panel section, is not part of oscillator 1. It is a separate, independent sub-bass generator (Sub Oscillator), which has its own volume fader in the mixer (SUB). Its waveform selection and volume are completely independent of OSC1 settings. A detailed description of the Sub generator is in chapter 2.3 Supplementary Sources. The SUB WAVEFORM offers an interesting sonic palette, starting with a triangle wave, smoothly transitioning into Pulse Width modulation (from narrow to wide pulse), and finally ending with a sawtooth wave. The entire sub-oscillator is set to -1 octave below the played note, providing a powerful low-end foundation.

2.1.6 Invert Phase Mod is a dedicated, single-knob solution that instantly activates and controls an advanced phase modulator with a predefined, rich sonic character.

This parameter engages an internal phase modulation algorithm with the following carefully selected configuration:

- Base delay time is set to 5.5 ms – the sweet spot for achieving flanger effects, comb filtering, and characteristic metallic resonance.

- Modulation type is set to Audio – meaning the delay time is modulated directly by the audio signal itself. This creates complex, interactive textures where the sound dynamically modulates itself, responding to its own volume and timbre.

- Feedback is set to 50% – providing the perfect balance between subtle resonance and distinct, repeating echoes. The effect is pronounced enough to add depth and character to the sound, yet restrained enough to avoid uncontrolled oscillation.

- Inverted Phase – this option is permanently enabled in this mode. This means the polarity of the delayed signal is inverted before being mixed with the original signal. Combined with Audio modulation, this creates deep, swirling, and piercing sonic spaces, accentuating the characteristic flanger "whoosh" and intensifying the phase-shifting effect.

The Invert Phase Mod knob primarily controls the modulation depth (the intensity with which the audio signal influences the delay time) and, in conjunction with this value, the final mix of the processed signal.

Turning the knob to the right (increasing the value) progressively:

1. Increases the intensity of auto-modulation, making the effect more chaotic, nuanced, and aggressive.

2. Raises the wet signal level in the mix, gradually replacing the original dry sound with the processed audio.

3. Accentuates the inverted phase effect, which, combined with increasing audio modulation, leads from subtle "enrichment" to extreme, industrial textures.

With this configuration, the single Invert Phase Mod knob allows you to smoothly transition from a barely perceptible, stereo-widening "breath," through classic pulsating flanger, to wild, self-sustaining sonic structures where the audio signal shapes its own echo and phase.

This is another powerful feature within Saturn Core, enabling you to add movement, depth, and unpredictable character to your sound in an instant.

2.1.7 OSC 3

OSC 3 - features a completely different structure compared to the two previous oscillators, offering unique possibilities to further diversify and enrich your personal sound within SATURN CORE.

First, it is important to note that OSC 3 has its signal routed through the panorama in DUAL mode, resulting in an inherent stereo spread. Consequently, it offers four distinctive waveforms, each with its own character:

a) **SUPER OSC** - This is a powerful, multi-voice sawtooth generator. By utilizing the multi-oscillator voices parameter, it can generate up to 32 simultaneous voices. Combined with the inherent DUAL stereo signal, this creates an enormous, wide, and immersive soundscape. Additionally, a dedicated Detune control (ranging from 0 to 100%) allows you to progressively detune these voices, ranging from a subtle, classic unison thickening to an extreme, chaotic dissonance.

b) **Saw -** A single sawtooth wave, which can be further modulated using hard synchronization (Sync) for creating aggressive, harmonically rich tones.

c) **Triangle** - A classic triangle wave, also equipped with Sync modulation, allowing for bright, resonant timbres from a normally mellow waveform.

d) **Square** - featuring Pulse Width modulation (PWM) for dynamic tonal shaping, as well as Sync capabilities for complex harmonic generation.

For waveforms b, c, and d, the Phase parameter is available, allowing you to control the starting point of the waveform cycle for each note, further influencing the initial attack and tonal character.

3: Amplitude Envelope (AMP ENV)
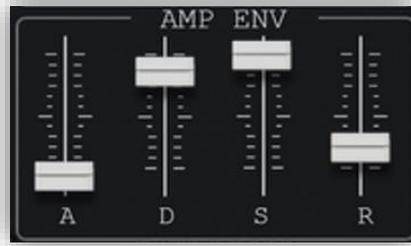
The Amplitude Envelope (AMP ENV) shapes the volume of the sound over time, from the moment you press a key until after you release it. It determines how the sound behaves dynamically—whether it attacks sharply, sustains indefinitely, or fades out slowly.

Saturn Core's AMP ENV is a classic ADSR envelope (Attack, Decay, Sustain, Release), providing precise control over the loudness contour of your sound.

ATTACK	Sets the time it takes for the sound to go from silence to maximum volume after pressing a key. • Low values (fast) – create sharp, percussive attacks (e.g., plucks, stabs). • High values (slow) – create gradual fade-ins (e.g., swelling pads, strings).
DECAY	Determines the time it takes for the sound to fall from the maximum (peak) volume down to the Sustain level. • Short decay – the sound quickly drops to the sustain level. • Long decay – the sound lingers at peak volume before settling.
SUSTAIN	Defines the volume level that is maintained as long as the key is held down. Unlike Attack and Decay, this is a level, not a time. • High sustain – the sound remains loud while holding the key. • Low sustain – the sound stays quiet or fades out even while holding the key.
RELEASE	Controls the time it takes for the sound to fade from the Sustain level to silence after the key is released.

4: Filter Envelope (FILTER ENV)
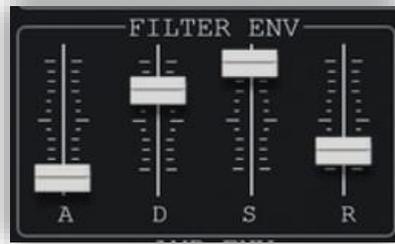
The Filter Envelope (FILTER ENV) shapes the timbre of the sound over time by modulating the filter's cutoff frequency. While the AMP ENV controls loudness, the FILTER ENV controls brightness and tonal evolution.

Like the AMP ENV, Saturn Core's FILTER ENV is a classic ADSR envelope, but with an additional Envelope Amount control to determine how strongly the envelope influences the filter.

ATTACK	Sets the time it takes for the filter to sweep from its starting point to the maximum modulated position after pressing a key. • Fast attack – immediate brightness. • Slow attack – gradual brightening (e.g., "growl" or "warm-up" effects).
DECAY	Determines the time it takes for the filter to fall from the peak modulation position down to the Sustain level. • Short decay – quick return to sustain brightness. • Long decay – slow, evolving filter movement.
SUSTAIN	Defines the filter cutoff level that is maintained as long as the key is held down (relative to the Envelope Amount setting). • High sustain – the filter stays open/bright. • Low sustain – the filter remains closed/dark.

RELEASE	A short Release causes the filter to close abruptly, cutting off the brightness immediately after the note ends. A long Release allows the filter to gradually close, creating a smooth fade from bright to dark as the sound decays. This parameter is part of the Filter Envelope (ADSR) and adds expressive, dynamic control over the timbre during the note's final stage.

5. FILTER

FILTER CUTOFF - Sets the frequency point where the filter begins to take effect, ranging from 20 to 25 kHz. Frequencies below this point are affected according to the selected Filter Mode.

F. ENV (Filter Envelope Amount) - Determines how much the Filter Envelope modulates the Cutoff frequency. Positive values open the filter, negative values close it, and zero disables envelope modulation.

F. RESO (Resonance) - Boosts frequencies around the Cutoff point, creating a distinctive peak. At low settings, it adds emphasis and character. At higher settings, it produces a sharp, "squelchy" or "ringing" quality. At extreme settings, the filter can self-oscillate, generating its own tone.

F. MODE (Filter Mode) - Selects the type and slope of the filter, determining which frequencies are attenuated and how aggressively:

HP (High Pass): Attenuates frequencies below the Cutoff point. Allows high frequencies to pass. Creates thinner, brighter sounds.

BP (Band Pass): Attenuates frequencies both below and above the Cutoff point. Allows only a narrow band of frequencies to pass. Creates nasal, telephone-like, or focused sounds.

LP6 (Low Pass, 6dB/octave): Attenuates frequencies above the Cutoff point with a gentle slope. Allows low frequencies to pass. Provides subtle, transparent filtering.

LP12 (Low Pass, 12dB/octave): Attenuates frequencies above the Cutoff with a moderate slope. Classic synthesizer filter response, offering a balanced character.

LP18 (Low Pass, 18dB/octave): Attenuates frequencies above the Cutoff with a steep slope. Provides more aggressive filtering and stronger resonance behavior.

LP24 (Low Pass, 24dB/octave): Attenuates frequencies above the Cutoff with the steepest slope. Creates dramatic, resonant sweeps and precise tonal shaping, emulating classic analog ladder filters.

6. MOD MATRIX (Modulation Matrix)

The MOD MATRIX is the central routing system that allows you to create complex, evolving sounds by connecting modulation sources to modulation destinations. It determines which parameters are automatically controlled over time, adding movement, expression, and depth to your patches.

In Saturn Core, each oscillator (OSC1, OSC2, OSC3) features its own dedicated modulation matrix, giving you independent control over how each oscillator responds to modulation. This allows for incredibly detailed and layered sound design.

MOD SOURCE	Selects what will be used to control the modulation. Common sources include LFOs, Envelopes, Velocity, or external controllers. This is the "cause" of the modulation.
DEPTH Knob	Controls how much the selected source affects the destination. Turning the knob determines the intensity of the modulation—from subtle changes to extreme transformations (-100, + 100).
MOD DESTINATION	Selects what parameter will be modulated. This is the "effect" of the modulation. Destinations can include Pitch, Filter Cutoff, Waveform Warp, Pan, Phase, and many others.

Settings Example :

- **Source:** LFO

- **Depth:** 50%

- **Destination:** Pitch

Result: The LFO will modulate the oscillator's pitch, creating a vibrato effect. The Depth knob determines how wide the pitch swing will be.

Because each oscillator has its own matrix, you could have:

- OSC1: LFO modulating **Pitch** for vibrato

- OSC2: Envelope modulating **Filter Cutoff** for dynamic brightness

- OSC3: Velocity modulating **Warp** for expressive texture changes

This powerful architecture makes **Saturn Core** incredibly flexible, allowing you to shape each sound source independently for truly unique and personal results.

7. CONTROL

WIDTH (Stereo) - Controls the stereo spread of the sound. At minimum (mono), the signal is centered. As you increase Width, the sound expands across the stereo field, creating a wider, more spacious image. Higher values can create an exaggerated, immersive stereo effect.

VELOCITY - Determines how sensitive the sound is to how hard you play the keys (velocity sensitivity). Higher values mean playing harder produces louder, brighter, or more modulated sounds (depending on other settings). Lower values reduce this sensitivity for a more consistent response.

MODE Poly - Switches between polyphonic (multiple notes at once) and monophonic (one note at a time) playing modes. When set to Poly, you can play chords. When set to Mono, the synthesizer plays only the most recent note, ideal for bass lines and leads.

GLIDE - Also known as portamento. Controls the time it takes for the pitch to slide from one note to the next when playing legato. Low values create quick, subtle slides. High values create dramatic, slow pitch sweeps between notes.

INVERT PHASE - Inverts the polarity (flips the waveform upside down) of the audio signal. This affects how sounds interact, particularly in stereo imaging and when layering multiple oscillators. Options include:
• Off – No phase inversion.
• On – Inverts phase for both channels.
• Left – Inverts phase only for the left channel.
• Right – Inverts phase only for the right channel.

SWAP CHANNEL - Swaps the left and right audio channels. This can be useful for correcting stereo placement, creating interesting panning effects, or ensuring compatibility with different monitoring setups.

8. LFO

Saturn Core features two independent Low Frequency Oscillators—LFO 1 and LFO 2—each designed to add rhythmic and cyclical modulation to your sound. Both LFOs share the same set of controls, allowing you to create anything from subtle vibrato and filter sweeps to complex, evolving textures.

LFO RATE - Controls the speed of the LFO oscillation. Lower values produce slow, gradual cycles (ideal for slow pads or filter sweeps). Higher values create fast, rapid modulation (suitable for tremolo or aggressive effects).

LFO WAVE - Selects the waveform (sine, triangle, sawtooth, square…etc.) shape that determines the character of the modulation.

LFO BPM SYNC - When activated, synchronizes the LFO rate to your DAW's host tempo. The Rate parameter then becomes quantized to musical note divisions (e.g., 1/4, 1/8, 1/16), ensuring the modulation stays perfectly in time with your project.

LFO RETRIGGER - Determines whether the LFO restarts its cycle from the beginning each time a new note is played.
• On – Every note triggers the LFO to start from the same phase, creating consistent, repeatable modulation patterns.
• Off – The LFO runs freely and continuously, independent of note triggers, resulting in more random and evolving modulation across notes.

9. VIBRATO

Vibrato is a dedicated modulation effect that adds expressive pitch fluctuation to your sound, mimicking the natural waver of a singer's voice or a string player's finger movement. In Saturn Core, the Vibrato section provides independent control over the speed, intensity, and character of this pitch modulation.

VIBRATO RATE - Controls the speed of the pitch fluctuation. Lower values create slow, gentle pitch wavering (ideal for expressive leads or pads). Higher values produce faster, more nervous vibrato (suitable for intense, dramatic effects).

VIBRATO DEPTH - Determines the intensity of the pitch modulation—how far the pitch deviates from the center frequency. Low settings create subtle, barely noticeable vibrato. High settings produce extreme, wobbly pitch swings that can transform the character of the sound entirely.

VIBRATO WAVEFORM - Selects the shape of the modulation that controls the pitch movement. Each waveform offers a different vibrato character:
• Sine – Smooth, natural, and round vibrato (classic vocal or string-like).
• Triangle – Similar to sine but with slightly more defined peaks and valleys.
• Sawtooth – Creates a rising or falling pitch effect, more aggressive and less traditional.
• Square – Produces abrupt pitch jumps between two values, creating a trill-like effect rather than smooth vibrato.

• Random – Random phase of vibrato.

10. PITCH ENV
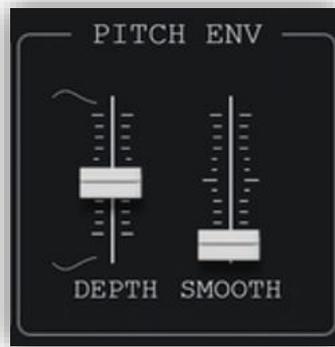
Pitch Env Depth - Controls the direction and amount of pitch modulation applied by the Pitch Envelope. When set to positive values, the pitch starts above the base note and falls down to the intended pitch. The higher the value, the higher the starting pitch deviation. When set to negative values, the pitch starts below the base note and rises up to the intended pitch. At zero, the envelope has no effect on pitch. This parameter determines *how far* the pitch moves from the target note at the beginning of the envelope.

PITCH ENV SMOOTH - Determines the speed at which the pitch returns from its initial modulated state (set by Depth) to the base pitch. This acts as a time control for the pitch glide—higher values create slower, more gradual returns (smoother pitch transitions), while lower values create faster, more abrupt returns. In essence, it functions like a combined attack/decay time for the pitch envelope, shaping how quickly the pitch settles into its intended frequency. If you play a note and hear the pitch dropping from above (positive Depth),

EFFECTS PANEL

Saturn Core features a comprehensive effects section with four independent processors: **Reverb, Delay, Compressor, and Limiter**. Each effect can be adjusted to shape the final character of your sound.

10.1 REVERB

REVERB SIZE - Controls the perceived room size of the reverb. Smaller values simulate tight, intimate spaces (like a closet or small room). Larger values create vast, cavernous environments (like halls or cathedrals).

REVERB WIDTH - Determines the stereo spread of the reverb tail. Narrow settings keep the reverb centered. Wider settings spread the reverb across the stereo field for an immersive, expansive effect.

REVERB TIME — Sets the duration of the reverb tail—how long the reverberation continues after the original sound stops. Short times create subtle ambience. Long times produce massive, lingering decays.

REVERB MIX - Balances the dry (original) signal with the wet (reverberated) signal. Lower values keep the sound natural. Higher values immerse the sound in reverb.

REVERB MODE - Selects the character of the reverb. There is a wide range of options, and each has its own distinctive reverb character.

10.2 DELAY

DELAY TIME – Sets the interval between repeats—the time it takes for the delayed signal to return. Shorter times create slap-back effects or doubling. Longer times produce distinct, rhythmic echoes.

DELAY FEEDBACK – Controls the amount of the delayed signal that is fed back into the delay input to create multiple repeats. Low values (0-30%) produce one or two echoes before they fade out. Medium values (30-60%) create several decaying repeats. High values (60-99%) generate cascading, infinite-sounding echoes that gradually fade. At maximum settings, the delay can self-oscillate, creating continuous, building resonance.

DELAY RATIO – Determines the stereo balance and distribution of the delay repeats between the left and right channels. This parameter shapes the spatial character of the echoes.

DELAY MIX - Balances the dry (original) signal with the wet (delayed) signal. Lower values add subtle echoes. Higher values immerse the sound in rhythmic repeats.

10.3 COMPRESSOR

COMPRESSOR ATTACK - Controls how quickly the compressor responds once the signal exceeds the threshold. Fast attack catches transients immediately. Slow attack allows initial transients to pass through uncompressed.

SOFT KNEE - Shapes how the compressor transitions from uncompressed to compressed states. Soft knee creates a gradual, musical transition. Hard knee provides abrupt, precise compression.

COMPRESSOR RELEASE - Determines how quickly the compressor returns to normal after the signal drops below the threshold. Short release can cause pumping effects. Long release provides smoother, more transparent compression.

COMPRESSOR RATIO - Determines the amount of gain reduction applied once the signal exceeds the threshold. Low ratios (e.g., 2:1) provide gentle, transparent compression. High ratios (e.g., 10:1) create aggressive limiting effects.

COMPRESSOR TRESHOLD - Sets the level at which compression begins. Signals above this point are reduced in gain. Lower thresholds engage compression more easily. Higher thresholds allow more signal to pass uncompressed.

10.4 LIMITER

LIMITER DRIVE - Controls the amount of input gain fed into the limiter. Increasing Drive pushes the signal harder against the limiting ceiling, resulting in louder, more saturated output. At extreme settings, it adds harmonic distortion and warmth while preventing digital clipping.

LIMITER RELEASE - Determines how quickly the limiter returns to its inactive state after the input signal drops below the limiting threshold. A short release causes the gain reduction to cease almost immediately, which can sound abrupt but preserves transients. A long release allows the gain reduction to fade out gradually, creating a smoother, more natural transition but potentially softening subsequent sounds

LIMITER MODE - Determines the character and behavior of the limiter when processing peaks. Each mode offers a different approach to gain reduction, affecting both the transparency and the tonal quality of the output:

- **SOFT** – Applies gradual, musical gain reduction as the signal approaches the ceiling. The limiting curve is gentle and rounded, resulting in a transparent, natural sound with minimal distortion. Ideal for mastering, mix bus processing, or when you want peak protection without audible artifacts.
- **HARD** – Provides firm, precise gain reduction with a sharper knee. The limiter responds more aggressively once the signal exceeds the threshold, catching peaks decisively while maintaining relatively low distortion. Suitable for drum buses, individual tracks, or when you need tighter peak control.
- **CLIP** – Engages a hard-knee clipping behavior. Instead of traditional gain reduction, the waveform is literally "clipped" at the ceiling level. This introduces harmonic distortion and saturation, adding warmth, edge, or grit to the sound. Perfect for drums, bass, or any time you want aggressive, colored limiting with character.

- **LIMITER MAXIMIZE** - A specialized gain optimization feature that automatically adjusts the limiter's ceiling and input gain to achieve the loudest possible output without distortion. When engaged, Maximize analyzes the incoming signal and continuously sets the optimal balance between the Drive (input gain) and the Maximum Output ceiling. This ensures your sound is pushed to its maximum perceived loudness while maintaining transparency and preventing clipping. Ideal for finalizing patches, mastering, or when you need consistent, competitive levels without manual tweaking.

12. LOW/HIGH FILTER

High Pass Filter allows frequencies above the Cutoff point to pass through while attenuating (reducing) frequencies below it. As you increase the Cutoff frequency, more low-end content is removed, making the sound progressively thinner, brighter, and less boomy.

Low Pass Filter allows frequencies below the Cutoff point to pass through while attenuating (reducing) frequencies above it. As you lower the Cutoff frequency, high-frequency content is gradually removed, making the sound progressively darker, warmer, and more muffled

13. ARPEGGIATOR

The Arpeggiator is a powerful pattern generator that automatically transforms held chords into rhythmic sequences of individual notes. Instead of playing a chord as a static block of sound, the arpeggiator breaks it apart into a repeating pattern, cycling through the notes in a defined order. This creates everything from simple, cascading melodic lines to complex, evolving rhythmic textures.

ARP RATE - Sets the speed of the arpeggiated sequence. The value is displayed as a musical note division (e.g., 1/16, 1/8, 1/4, etc.) and is synchronized to your DAW's host tempo, ensuring the arpeggio stays perfectly in time with your project. Lower values (e.g., 1/4) produce slower, quarter-note patterns. Higher values (e.g., 1/32) produce rapid, cascading sequences.

ARP SWING - Adds a **groove** or **shuffle** to the arpeggio by introducing a slight delay to every second note in the sequence. Ranging from **0% to 100%**, low values create a tight, straight feel, while higher values produce a relaxed, syncopated, or "swung" rhythm that adds human-like feel and movement.

ARP RETRIG. - Determines whether the arpeggio pattern restarts from the beginning each time a new chord is played. When active, the sequence resets with every new note or chord. When inactive, the pattern continues its cycle uninterrupted, creating seamless, evolving sequences when changing chords.

ARP MODE - Defines the direction in which the notes of the held chord are played. Options include:
• UP – Notes are played in ascending order (lowest to highest).
• DOWN – Notes are played in descending order (highest to lowest).
• U&D (Up & Down) – Notes ascend then descend, creating a symmetrical "ping-pong"

pattern.

• D&U (Down & Up) – Notes descend then ascend, the reverse of U&D.

ARP LATCH - When activated, latches the arpeggiator so that it continues playing the pattern without requiring you to hold down the keys. Press a chord once to start the sequence; it will play indefinitely until you press another chord or deactivate Latch. This is ideal for live performance or for freeing your hands to manipulate other controls while the arpeggiator runs.

ARP GATE - Controls the duration of each individual note within the arpeggio pattern. Ranging from 0% to 100%:

• Low values (0-30%) – Create short, staccato notes with gaps of silence between them.

• Medium values (40-60%) – Produce balanced, natural note lengths.

• High values (70-100%) – Generate long, legato notes that overlap or nearly fill the entire step, creating a smoother, more connected flow.

14. EQUALIZER

LOW EQ - Controls the low frequency content of the sound, typically affecting the bass and sub-bass regions. Turning this knob up adds warmth, weight, and punch to the low end. Turning it down reduces boominess and clears up muddiness, allowing other elements in the mix to breathe.

MID EQ - Adjusts the midrange frequencies, where the fundamental character of most sounds resides. Boosting the mids adds presence, body, and definition, making the sound cut through a mix. Cutting the mids creates a softer, more distant quality, often useful for pads or background elements.

HIGH EQ - Shapes the high frequency content, affecting the brightness, air, and shimmer of the sound. Boosting the highs adds sparkle, clarity, and detail, while cutting them results in

a darker, smoother tone. This band is ideal for taming harshness or adding top-end excitement.

15. MIXER Section

The Mixer is the central hub for balancing the levels of all sound sources before they are routed to the filter and effects sections. It allows you to blend the three main oscillators, the dedicated sub-oscillator, and the noise generator to create the perfect tonal foundation.

OSC 1 / OSC 2 / OSC 3 - Independent volume faders for each of the three main oscillators. Adjust these to set the level contribution of each oscillator to the overall mix.

SUB - Volume control for the dedicated sub-oscillator. This adds low-end weight and is completely independent of OSC1.

NOISE - Volume control for the noise generator. Use it to add texture, percussive elements, or atmospheric background hiss to your sound.

Frequency Modulation (FM) Controls

The FM section is specifically routed to **OSC1**, allowing you to apply frequency modulation. This creates complex, metallic, and harmonically rich timbres.

FM AMOUNT	Controls the **depth** of frequency modulation applied to OSC1. Turning this knob up increases the intensity of the FM effect, ranging from subtle harmonic enrichment to extreme, dissonant textures.
FM RATIO	Sets the **harmonic ratio** between the modulator and the carrier. Values range from **0% to 32%**. This parameter determines the tonal character of the FM effect.
FM VELOCITY (FM Mode Velocity)	Enables **velocity sensitivity** for the FM Amount. When engaged: • **Soft keystrokes** – produce little to no FM effect. • **Hard keystrokes** – apply the full FM Amount, making the effect dynamic and expressive. This feature adds natural variation and playability, allowing the FM intensity to respond to your performance.

Drive Section

The **DRIVE** control adds harmonic saturation and character to the signal, emulating the warmth and grit of classic analog circuitry. Three distinct modes are available, each offering a unique flavor of distortion.

Parameter   Definition

DRIVE	A general **drive amount** control that sets the intensity of the selected saturation mode. Higher values increase harmonic distortion, compression, and tonal coloration.
MODE: TUBE	Simulates the warm, smooth saturation of a **vacuum tube** circuit. This mode adds gentle harmonic warmth and subtle compression, ideal for adding body and analog character without harshness.
MODE: DIODE	Emulates the crisp, aggressive clipping of **diode-based distortion**. This mode produces more pronounced, cutting harmonics with a tighter response, perfect for adding edge to leads or basslines.
MODE: TRANS	Models the character of **transistor** (solid-state) saturation. This mode delivers a raw, punchy distortion with a slightly grittier texture, suitable for adding attitude and presence to any sound.