

Chiron

PLAY BOOK



ENVELOPE GENERATOR & STEREO VCA

with the Ch-X expander

- ADSR envelope with analogue-style curves
- Looping four-stage cycle envelope
- Stereo VCA with up to +6 dB drive and soft limiting
- Envelope and end-of-cycle outputs
- Per-stage CV control via the Ch-X expander
- Envelope out as a USB-MIDI controller

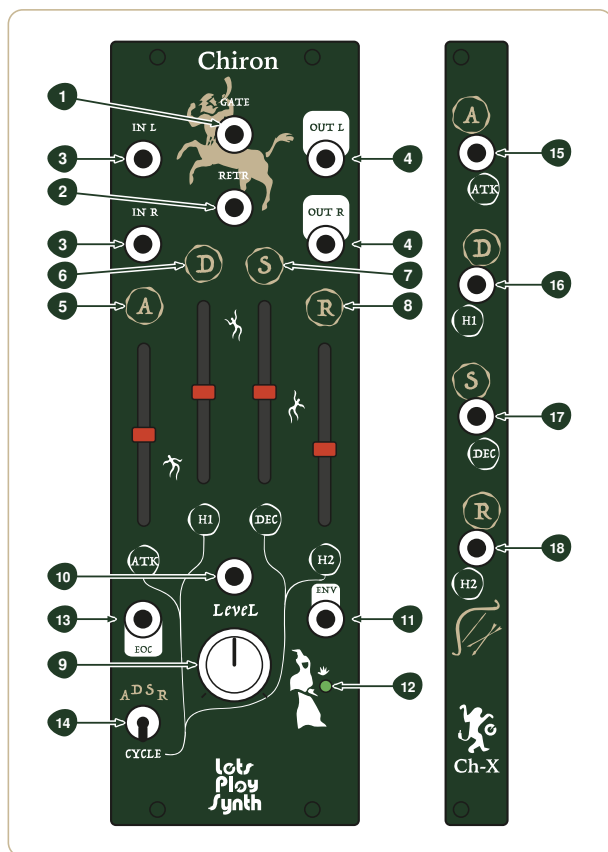


FIG. 1 Chiron and Ch-X front panels: layout and controls

Let's Play Synth! Chiron is an envelope generator and a stereo VCA on one 8HP panel. It shapes how each note begins and ends, so an oscillator and a gate are all you need for a finished note.

The envelope has two modes. In **ADSR** mode it follows the classic attack-decay-sustain-release shape. In **Cycle** mode the same four sliders turn Chiron into a looping function generator (attack, hold, fall, hold) that runs on its own or restarts on incoming gates.

The VCA can raise the signal to twice its input level, and a soft limiter rounds off the peaks. The **ENV** output carries the envelope, scaled by **LEVEL**, and **EOC** sends a trigger whenever an envelope ends.

The 2HP **Ch-X** expander, included with Chiron, adds a CV input for each of the four sliders.

✧ ADSR MODE

With the **MODE** switch (14) up, Chiron is a four-stage ADSR envelope (fig. 2). A rising edge above 2.5 V at **GATE** (1) starts

CONTROL	WHAT IT DOES
1 GATE	Starts the envelope; Cycle: hard reset
2 RETR	Restarts the attack; Cycle: soft reset
3 IN L · IN R	Audio in (IN L alone feeds both)
4 OUT L · OUT R	Audio out of the VCA, soft-limited
5 A · ATK	Attack · Cycle: rise to the peak
6 D · H1	Decay · Cycle: hold at the peak
7 S · DEC	Sustain level · Cycle: fall to zero
8 R · H2	Release · Cycle: hold at zero
9 LEVEL	VCA gain: ×1 at 60%, up to ×2
10 LEVEL CV	Adds to LEVEL; +10 V sweeps it all
11 ENV	Envelope out, up to +5 V
12 ENV LED	Shows the envelope level
13 EOC	Trigger when an envelope ends
14 MODE	Up: ADSR · down: Cycle

CH-X EXPANDER

15 A	CV for A · ATK, ±5 V = full travel
16 D	CV for D · H1
17 S	CV for S · DEC
18 R	CV for R · H2

the attack. The envelope rises to its peak, decays toward the sustain level, and stays there for as long as the gate stays high. Once the gate goes low, the release brings it back to zero.

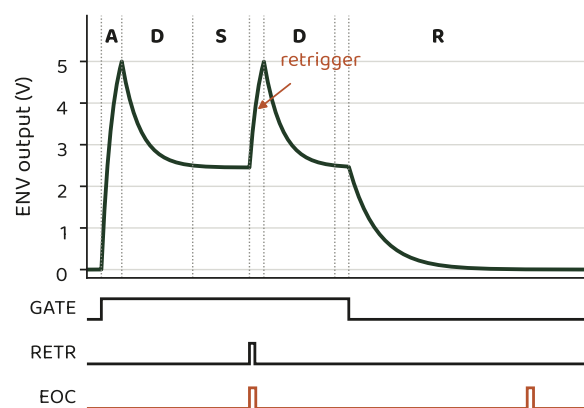


FIG. 2 ADSR mode: gate, retrigger and EOC

- **A** 5 sets the attack time. Slide it down for a faster, more percussive attack, or up for a slower attack that fades the sound in. Range: 1 ms to 60 s.
- **D** 6 sets the decay time: how long the envelope takes to fall from the peak to the sustain level.
- **S** 7 sets the sustain level, where the envelope rests for as long as the gate stays high.
- **R** 8 sets the release time: how long the envelope takes to fade to zero after the gate ends.

A new gate starts the attack from the envelope's current level. Play a note during the release and the envelope rises from where it is, so fast legato playing stays free of clicks. If the gate ends during the attack, the envelope goes straight into the release.

RETR 2 restarts the attack from the current level while the gate is high. Use it to re-articulate a held note, or to add accents from a second rhythm. With the gate low, Chiron ignores **RETR**.

EOC 13 sends a 5 ms, +5 V trigger when the envelope falls below -60 dB. That happens at the end of the release, or, with the sustain at zero, at the end of the decay while the gate is still high. A new gate, or **RETR**, that starts the attack before then cuts the envelope short, and **EOC** fires at that moment too (Fig. 2).

✧ CYCLE MODE

With the **MODE** switch down, Chiron becomes a looping function generator (Fig. 3), and the sliders take the names printed below them:

- **ATK** 5 rises from zero to the peak, with the same curve as the ADSR attack.
- **H1** 6 holds the peak.
- **DEC** 7 falls from the peak to zero. The fall mirrors the attack: it aims below zero, so it hits zero at a definite moment with no long tail.
- **H2** 8 holds at zero.

At the end of **H2**, **EOC** fires and a new cycle begins with **ATK**. The loop starts as soon as you select Cycle mode and needs no gate. One cycle lasts **ATK + H1 + DEC + H2**, from 4 ms (250 Hz, well into the audio range) with all sliders at the bottom to 4 minutes with all sliders at the top.

The inputs synchronise the loop. A rising edge at **GATE** is a **hard reset**: the envelope jumps to zero and a new **ATK** begins. **RETR** is a **soft reset**: the **ATK** stage restarts from the current level, so the output never jumps. Either reset cuts the cycle short, so **EOC** fires then too (Fig. 3). Chiron ignores the gate's length and falling edge.

Switching **MODE** in either direction resets the envelope to zero.

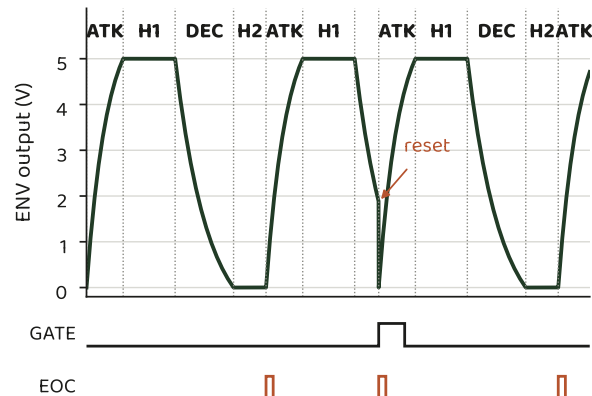


FIG. 3 Cycle mode: free-running loop and hard reset

✧ STAGE TIMES

Every time slider runs from 1 ms to 60 s: every quarter of its travel multiplies the time by about 16. The table lists how long a stage takes. For decay and release that is the time to fall by 60 dB, the point where **EOC** fires and the sound has died away. With the sustain above zero, the decay follows the same curve but levels off at the sustain level.

SLIDER	A · D · R · ATK · H1 · DEC · H2
0%	1 ms
25%	16 ms
50%	0.24 s
75%	3.8 s
100%	60 s

✧ THE VCA

The two VCA channels multiply the audio at **IN L** and **IN R** 3 by the envelope and by the **LEVEL** setting, and send the result to **OUT L** and **OUT R** 4. The envelope always controls the VCA: in ADSR mode the outputs stay silent between notes. **IN R** is normalised to **IN L**, so a mono source patched to **IN L** reaches both outputs.

LEVEL 9 sets the gain (Fig. 4, top). The first 60% (2 o'clock) of its travel goes from silence to unity gain (x1); the rest adds up to +6 dB (x2) of boost.

Chiron adds **LEVEL CV** 10 to the knob and keeps the sum within the knob's range: +10 V sweeps the whole range, and negative voltages turn the level down. Chiron applies the CV

without smoothing, so it works for tremolo and audio-rate amplitude modulation as well.

Both outputs pass through a soft limiter (fig. 4, bottom). Signals up to about ± 5 V pass untouched; above that, the limiter squeezes each peak harder the further it goes. Turn **LEVEL** past 60% to push more of the signal into the limiter for a denser, warmer sound.

The limiter affects only the audio outputs. **ENV** 11 carries the envelope scaled by **LEVEL**: up to +5 V with **LEVEL** at the top, +3 V at 60%.

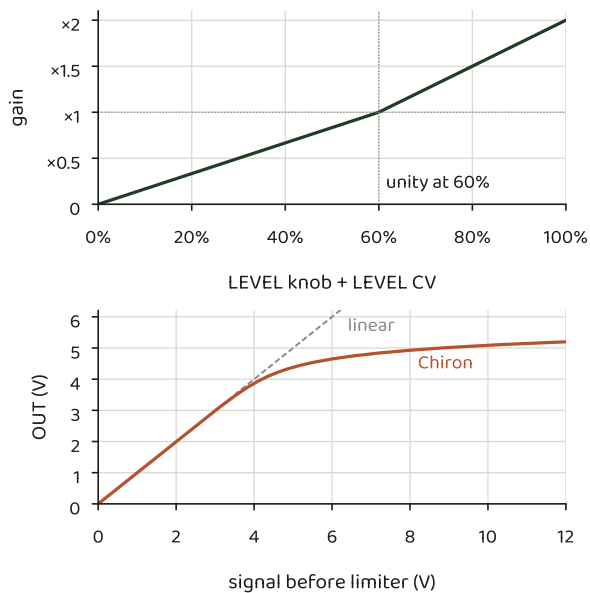


FIG. 4 LEVEL response and output limiter

✧ THE LED INDICATORS

The red LEDs in the slider caps 5–8 show which stage is running, in either mode, and grow brighter as the envelope rises. The green **ENV** LED 12 shows the envelope level at a glance.

✧ USB-MIDI

Over its USB-C socket Chiron sends the envelope as a MIDI control change: CC 74 (brightness) on channel 1 by default, scaled by **LEVEL**. The CONFIG page of the LetsPlaySynth tool changes these or turns the CC off.

✧ THE CH-X EXPANDER

Ch-X adds a CV input for each of Chiron's sliders (fig. 1).

Chiron adds each input 15–18 to the position of the matching slider. +5 V moves the slider by its full travel, –5 V by its full travel in the other direction, so 1 V equals 20% of travel.

✧ PATCH IDEAS

• **A complete voice.** Patch Apsaras **GATE** to **GATE**, Genesis **OUT L** and **OUT R** to **IN L** and **IN R**, and **OUT L/OUT R** to Plan. In ADSR mode, set **A** and **S** to zero, **D** and **R** to about 40% for a pluck. For a pad, try **A** at 60%, **S** at the top and **R** at 65%.

• **Timbre that follows the note.** Patch **ENV** to Genesis **x CV** through an attenuator. Each note now sweeps through the wavetable as it rises and fades, like a filter envelope.

• **Clock-synced LFO.** In Cycle mode, patch a clock to **GATE**. Each pulse restarts the shape. Set the stages so that one natural cycle runs a little longer than the clock period, and use **ENV** as a modulation source.

• **Shaping the loop.** Short **ATK** and **DEC** with long holds give a trapezoid close to a square wave. With both holds at the bottom, you get a smooth triangle-like wave. A short **ATK**, **H1** at the bottom and a long **DEC** make a falling ramp.

• **Envelope as oscillator.** With all four sliders near the bottom, the loop runs at about 180 Hz. The VCA then amplitude-modulates the audio at the inputs and adds metallic sidebands, close to ring modulation.

• **Chains.** Patch **EOC** to the **GATE** of a second Chiron to play envelopes one after another. Patch **EOC** to Apsaras **CLK IN** and the loop clocks the sequencer, which ties pitch to loudness.

• **Drive.** Set **LEVEL** to 80–100% to push loud sources into the limiter. Patch a second envelope into **LEVEL CV** to saturate the accented notes.

• **Living envelopes.** Patch a random or sample-and-hold source into Ch-X **D**, so each note gets a decay of its own. A slow LFO into Ch-X **S** makes held notes swell and recede.

TECHNICAL SPECIFICATION

WIDTH	DEPTH	POWER	CURRENT_DRAW
Chiron 8HP Ch-X 2HP	35 mm	±12V 10-pin header with reverse-polarity protection	+12 V 55 mA -12 V 30 mA +5 V not used

INPUTS		OUTPUTS	
IN L / IN R	±5 V	OUT L / OUT R	soft-limited ±5 V
GATE, RETR	5 V gate or trigger	ENV	+5 V
LEVEL CV	+10 V = full knob range	EOC	+5 V trigger, 5 ms pulse
Ch-X A · D · S · R	±5 V = ± full slider travel	USB-C	MIDI CC# firmware updates

MODES	VCA GAIN
ADSR, Cycle	0 ... ×2 (+6 dB), unity at 60%

STAGE TIMES	CYCLE PERIOD
1 ms ... 60 s	4 ms ... 4 min



THE LETSPLAYSYNTH FAMILY

GENESIS	wavetable VCO with built-in unison
APSARAS	RandomArp sequencer
CHIRON	envelope generator and stereo VCA
PLAN	balanced output and headphone monitor

**lets
Play
Synth**

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Designed by KX, Lua, Lui
Made in Taiwan
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PLAY BOOK rev.1.0