ECLIPSE

User Manual

v1.0

Thank you for purchasing ECLIPSE.

Eclipse is a stereo analog morphing oscillator, combining the raw character of vintage analog oscillators with modern features for crafting rich, complex, and expressive sounds.

Its development began with a high-precision analog triangle oscillator that tracks accurately over 10 octaves, with all the I/O expected from a premium analog module.

While exploring ways to generate complex harmonics, we came across the VCS3's waveshaper. This unique feature sparked the idea to design our own from scratch, opening up a wide range of sonic possibilities and dynamic control.

In the process, we discovered the waveshaper's potential for stereo processing, which led to a dedicated section to spread and move waveforms across the stereo field while keeping a perfect balance at any setting.

Eclipse offers full CV control across all parameters, with smart normalization for global modulation from a single source. With features like Xtreme-FM, ULFO, SPAM, and RM/AM capabilities, Eclipse is much more than just a VCO.

Contact us

contact@blacknoisemodular.com

Warranty

BLACK NOISE warrants its products to be free of defects in materials or workmanship and to be conform with the specifications at the time of shipment for a period of two years from the date of purchase. During that period any malfunctioning or damaged units will be repaired, serviced and calibrated into your workshop.

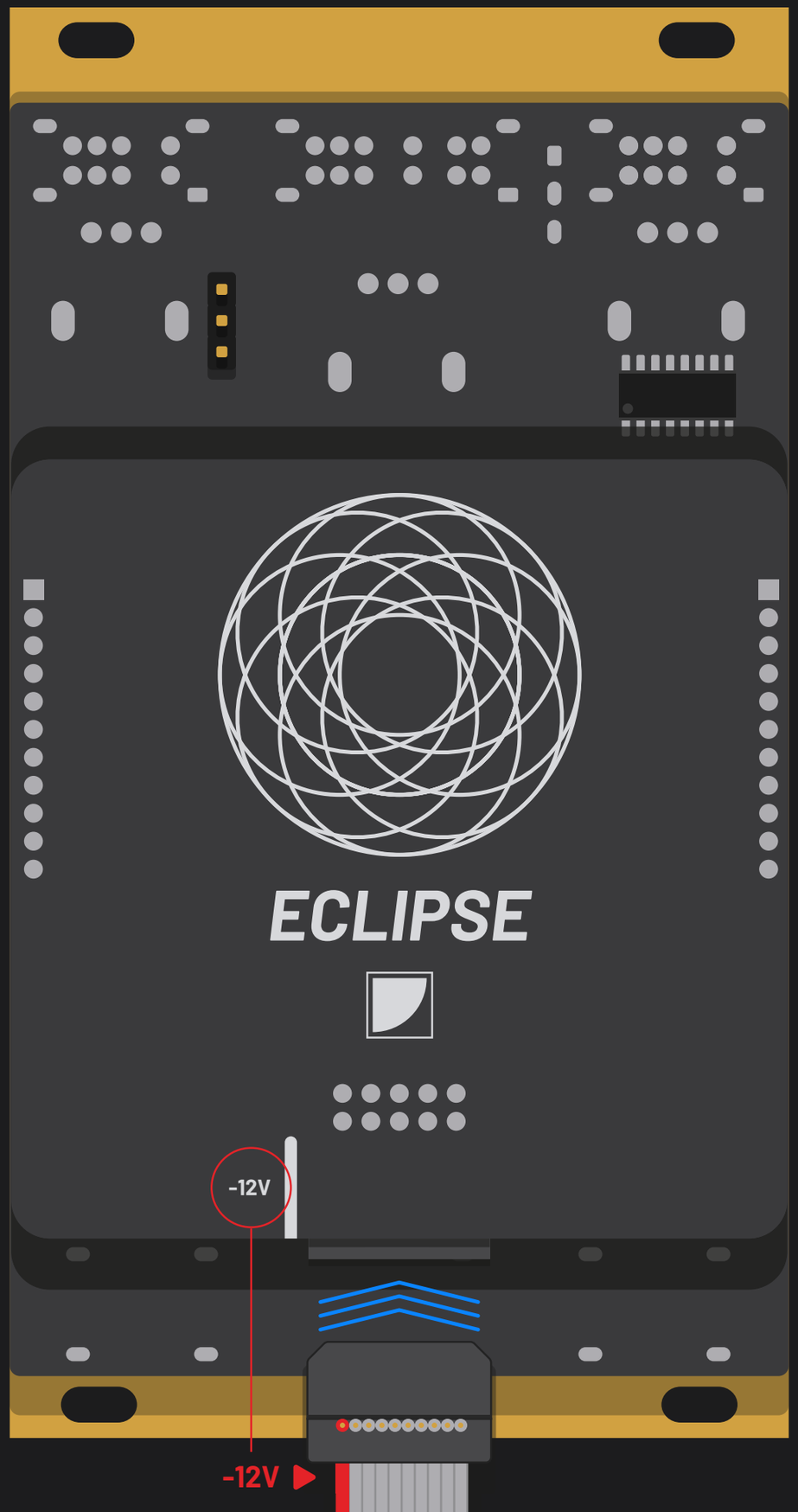
This warranty does not cover any problems resulting from damages during shipping, incorrect installation or power supply, abusive treatment, or any other obvious user-inflicted fault. If your product warranty has expired, it still can be serviced as long as parts are available in our workshop. We reserve the right to charge for labor, parts and transit expenses where applicable.

Before sending your product to our workshop please contact us for RMA and details. Any unsolicited parcel will be rejected and/or returned. The postage to our workshop is on the customer. The return of your module is on us. BLACK NOISE cannot take any responsibility for damages caused during transport.

Specs

Width	14HP
Depth	30mm
Power	**+12V**: 128mA **-12V**: 113mA **+5V**: 0mA

Contents



The Eclipse begins

Installation

1. Turn off your Eurorack system and unplug the power cord.
2. Connect the provided ribbon cable's 16-pin head to the system's power bus, making sure the red stripe matches the one indicated on the bus.
3. Connect the provided ribbon cable's 10-pin head to Eclipse, making sure the red stripe matches the "-12V" indicated on the module.
4. Place Eclipse on the rails of your system and attach it with the included screws.
5. Plug your system's power cord back in and turn it on.

The Eclipse begins

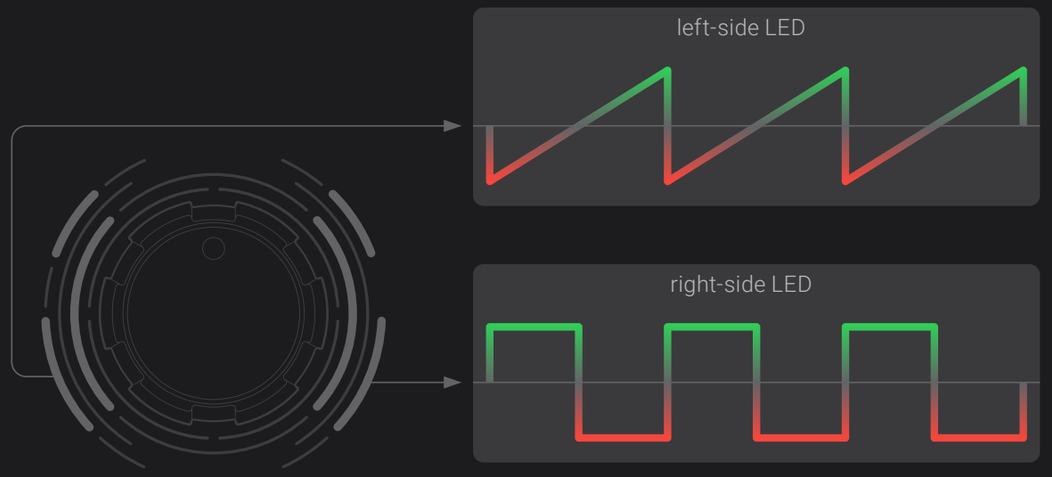
Test

1. Set the **FM**, **MORPH** and **SPREAD** knob fully counterclockwise (0%).
2. Set **all other knobs and switches** in center position.

The LEDs around the large knob cycle between red and green in opposite phase.

The left-side LED fades from green to red, and abruptly back to red.

The right-side LED cycles abruptly between red and green.



Eclipse is working. Have fun!

If the test procedure described above comes to fail, don’t hesitate to reach out with BLACK NOISE.

The Eclipse begins

Quick Start

While the many ways to use Eclipse will be detailed in this manual, any sound explorers can immediately enjoy a wide range of results with the following as starting points for different journeys.

First ensure a consistent control of the pitch:

1. Set the top-left switch to **VCO** mode (right position).
2. Turn the **FM** knob fully counterclockwise (0%).
3. Set the **octave switch** and the **frequency** and **FINE** knobs to taste.
4. Control the melody through the **V/OCT input**.
5. While exploring the patches, modulate all parameters simultaneously by patching the **MORPH** input, which is normalled to the other controls. Use the trimpots to adjust the amount of modulation for each parameter.
6. Set the **SPREAD switch** and **output** connections following those different examples.

The Eclipse begins

Stereo VCO

Patching the **LEFT** and **RIGHT** outputs as a stereo source and **SPREAD switch** in center or left mode turns Eclipse into an animated saw/square oscillator with adjustable stereo width set by **SPREAD**.

Stereo Pulsed Saw Modulation : Saw wave with stereo multi-peak structure similar to a pulse width effect. **MORPH** controls the timbre with different results depending on the **MORPH switch.**

MORPH timbre

SPREAD stereo width

inv mono max

- oct. down width
- pulsed saw width
- sync like oct. up

Stereo Pulse Array Modulation : Two variable pulse waves spread across the stereo field. One is controlled by **PW**, **MORPH** controls the timbre of the other, with different results depending on the **MORPH switch**.

MORPH m-sqr pw

PW square pw

SPREAD stereo width

inv mono max

- oct. down width
- pulse width
- sync like oct. up

The Eclipse begins

Mono waveblending

Patching the **LEFT** output and **SPREAD switch** in center or left mode turns Eclipse into a multidimensional waveblending oscillator, with a wide variety of results defined by the **MORPH switch**.

Pulsed Saw Modulation : **SPREAD** fades from a saw wave to a multi-peak saw wave then to the morph-square, controlled by **MORPH**.

MORPH m-sqr pw → oct. down width / pulse width / sync like oct. up

SPREAD wave blend

m-sqr ↔ saw

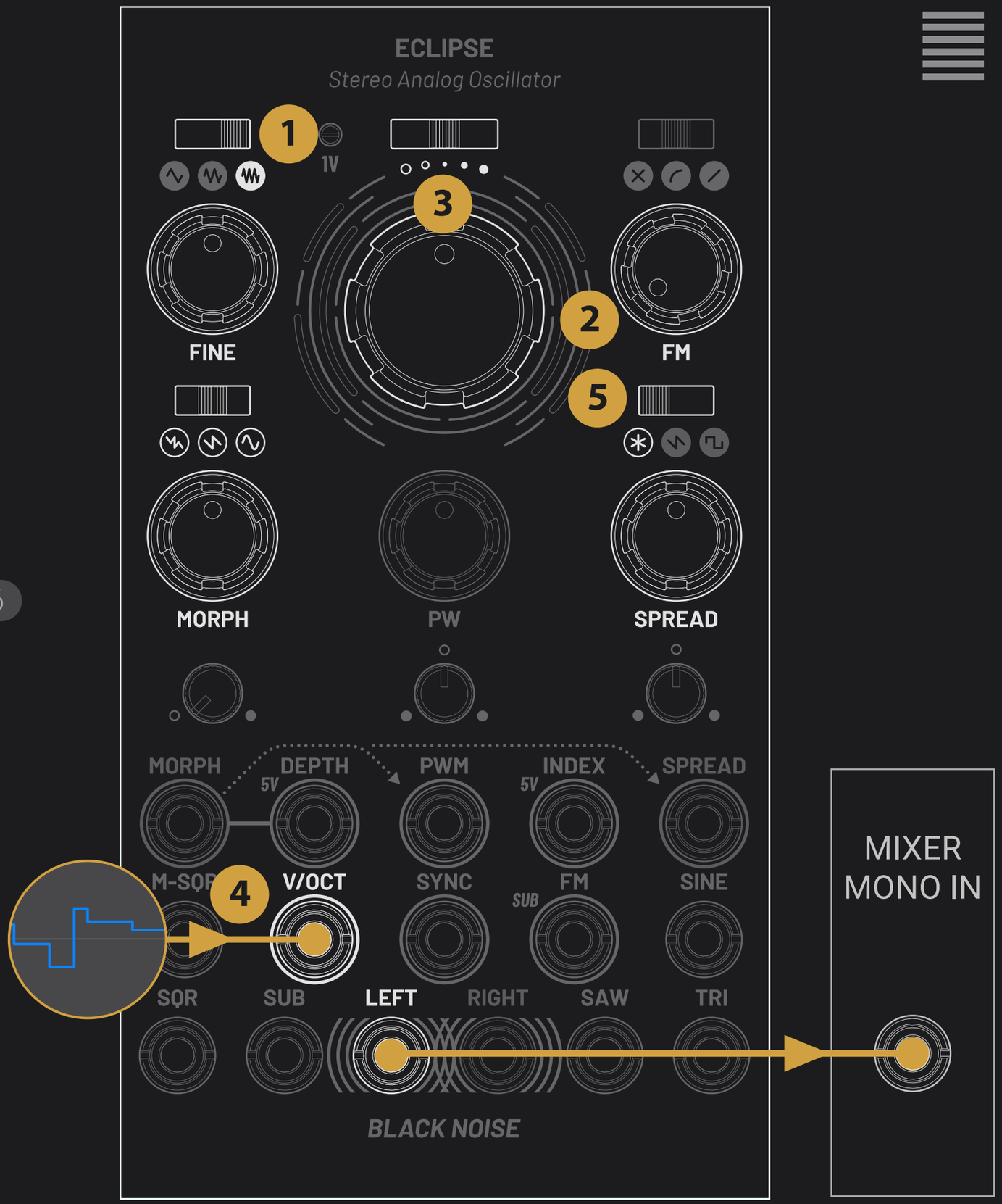
Pulse Array Modulation : **SPREAD** fades from a variable square wave controlled by **PW**, to a multi-level square, then to the morph-square, controlled by **MORPH**.

MORPH m-sqr pw → oct. down width / pulse width / sync like oct. up

PW square pw

SPREAD wave blend

m-sqr ↔ square



The Eclipse begins

Polarized morphing waveshaper

Patching the **LEFT** output and **SPREAD switch** in left position turns Eclipse into a complete mono sound device, with timbre adjusted by **MORPH** and amplitude set by **SPREAD**.

SPREAD input can be used for VCA duty. As it is bipolar, it can be used as a ring modulator when fed with another VCO.

!! This specific setting is recommended for mono purposes only. **LEFT** and **RIGHT** being phase inverted, using them both as a stereo voice may cause phase cancellations if the signal is summed to mono during mixing.

MORPH timbre

SPREAD amp/phase

inv — silent — max

- oct. down waveshaping
- saw to tri waveshaping
- sine waveshaping

Looking at the Eclipse

Eclipse is a single-core analog VCO offering precise tracking and classic waveforms.

These are processed through a waveshaper **MORPH** to create complex timbres, then combined in a dual crossfader **SPREAD** for stereo capabilities.

Each section will be explored in depth with various use cases in this manual.

Looking at the Eclipse

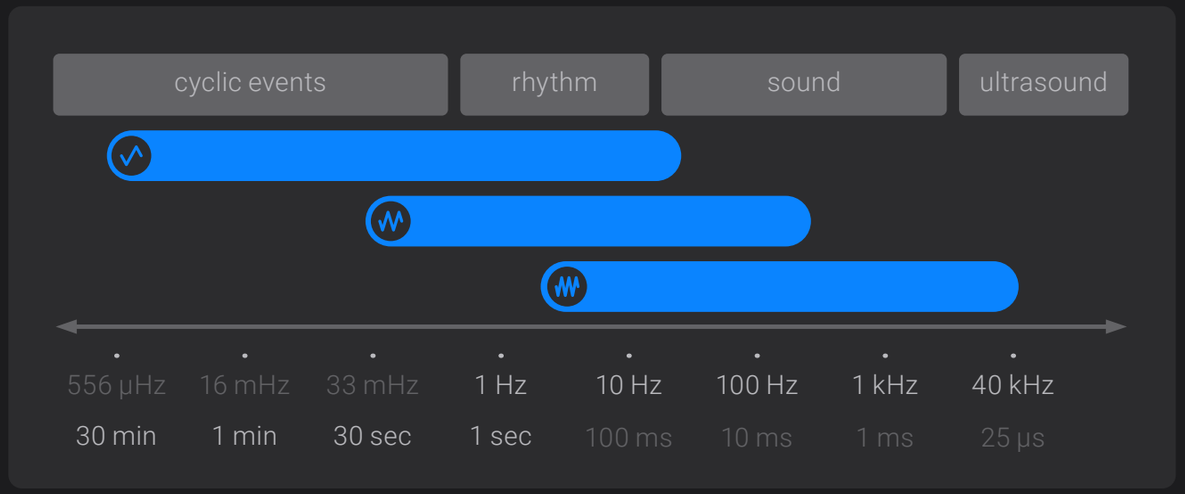
Pitch Control

Mode switch : sets the VCO in VCO mode, LFO mode, or ULFO mode. All defined ranges can be extended using the **V/OCT** and **FM inputs.** Minimum value can be twice lower using the **SUB output.**

VCO : covers sub-audio, audio, and supra-audio ranges for sound purposes, from 3 Hz to 40 kHz, with 1V/OCT tracking.

LFO : covers the sub-audio range for modulation purposes, from 3 minutes 35 seconds per cycle to 400 Hz.

ULFO : covers the sub-audio range for ambient and evolving modulation, from 32 minutes per cycle to 48 Hz.



Looking at the Eclipse

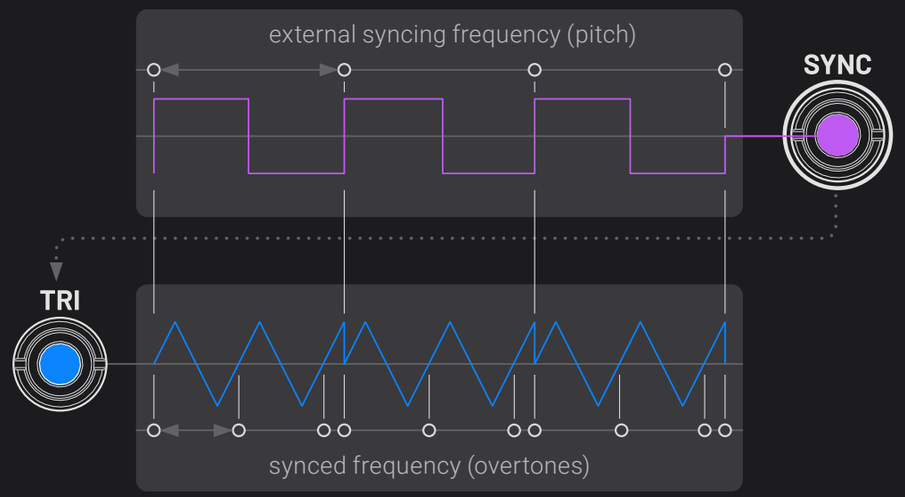
1 **Octave switch :** shifts through 5 octaves on the fly during performances.

2 **Frequency knob :** adjusts a large range of pitch defined by the Mode switch.

3 **FINE knob :** adjusts precise tuning of the pitch by ±3 semitones.

4 **V/OCT Input :** responds to any 1 volt/octave source (keyboard, sequencer, or MIDI-CV converter). For each volt received at this input, the frequency of the VCO doubles, resulting in an octave shift.

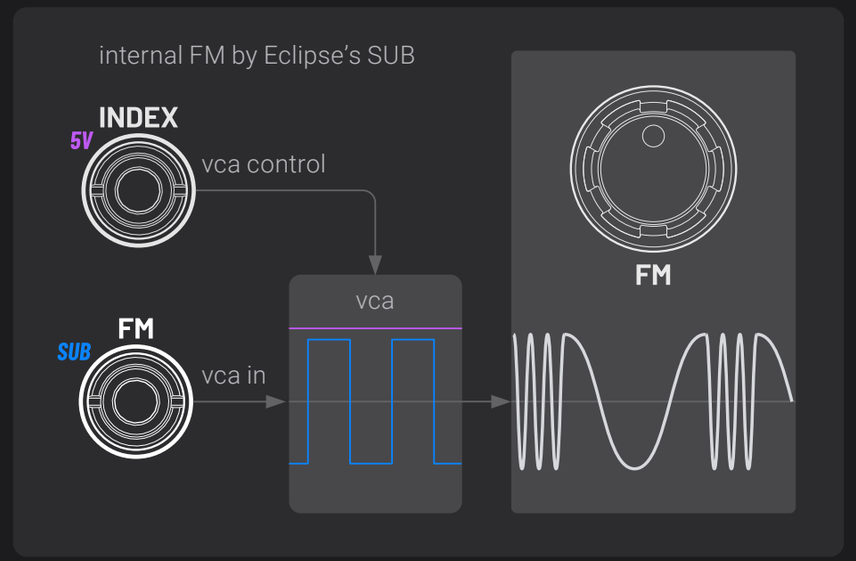
5 **SYNC Input :** resets the VCO's phase at each zero crossing of the input signal, often used with square waves from another VCO driven by the same V/oct signal.

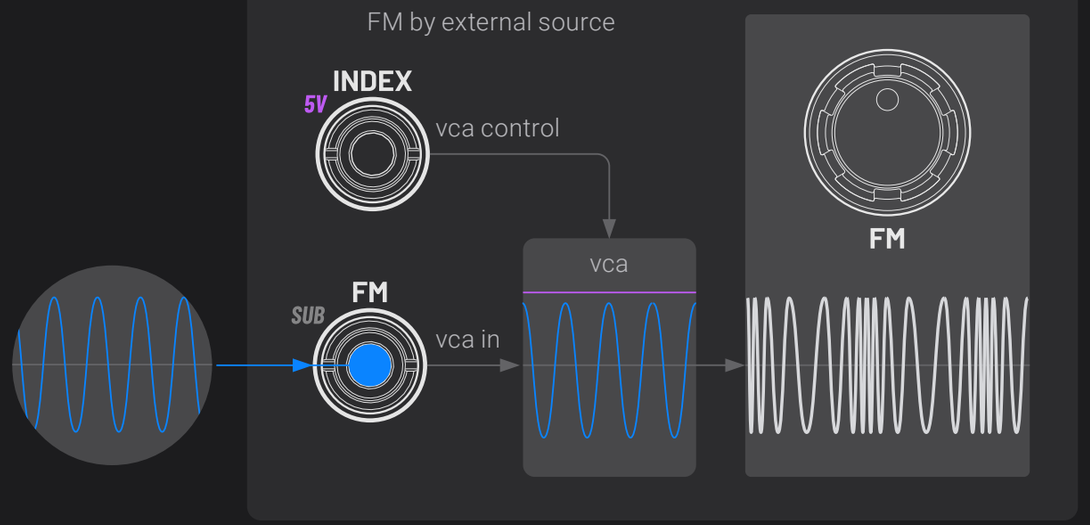


Looking at the Eclipse

Frequency modulation

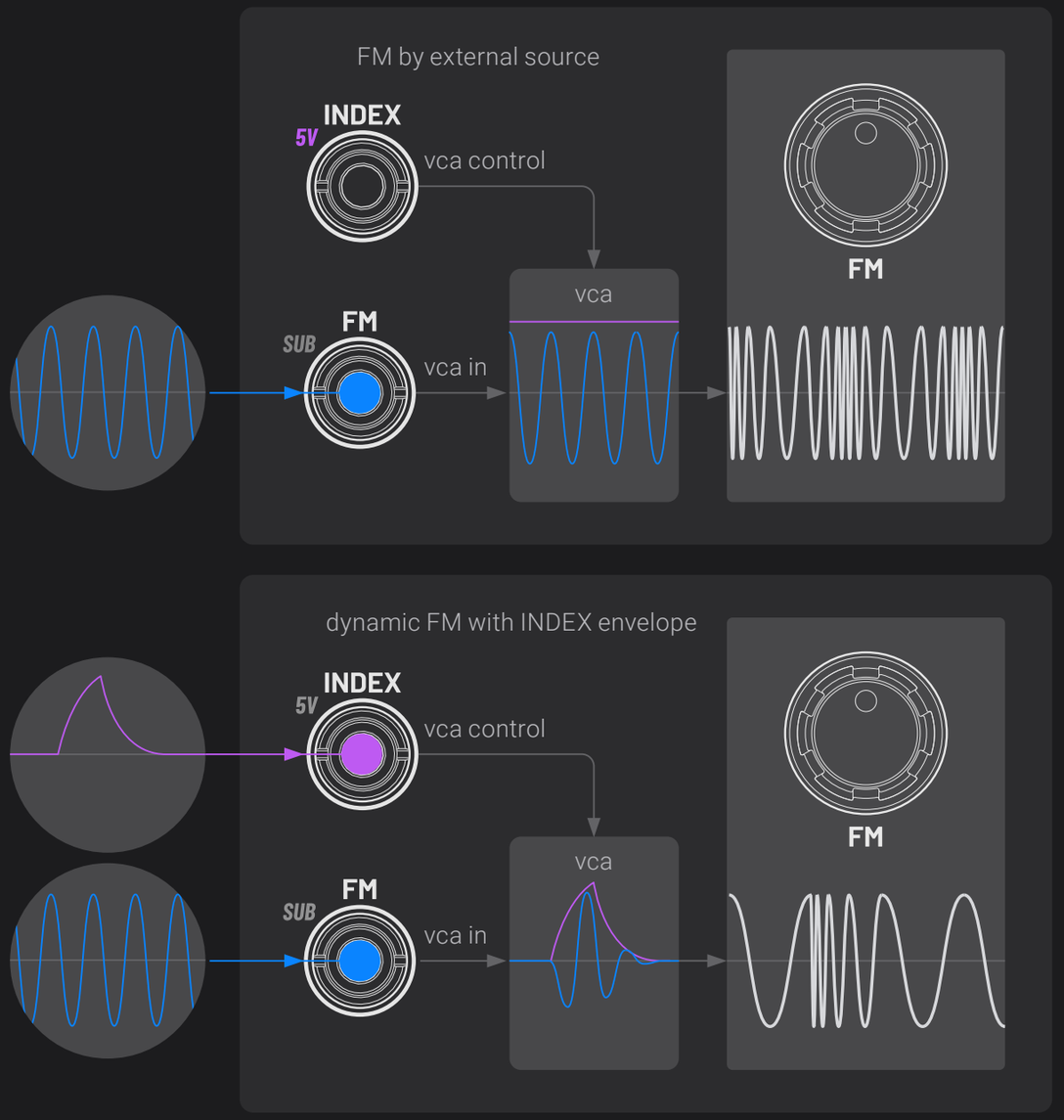
External CV or audio signals patched through the **FM input** modulate the VCO's pitch, with the **FM knob** controlling modulation amount. If unpatched, the FM input uses the **SUB output** for immediate sound effects.





Looking at the Eclipse

INDEX input : CV control over FM amount, similar to west coast's complex VCOs, enabling dynamic FM effects. The FM signal goes through an internal VCA controlled by the **INDEX input** before being attenuated by the **FM Knob**. The VCA is fully open when **INDEX input** is unpatched.



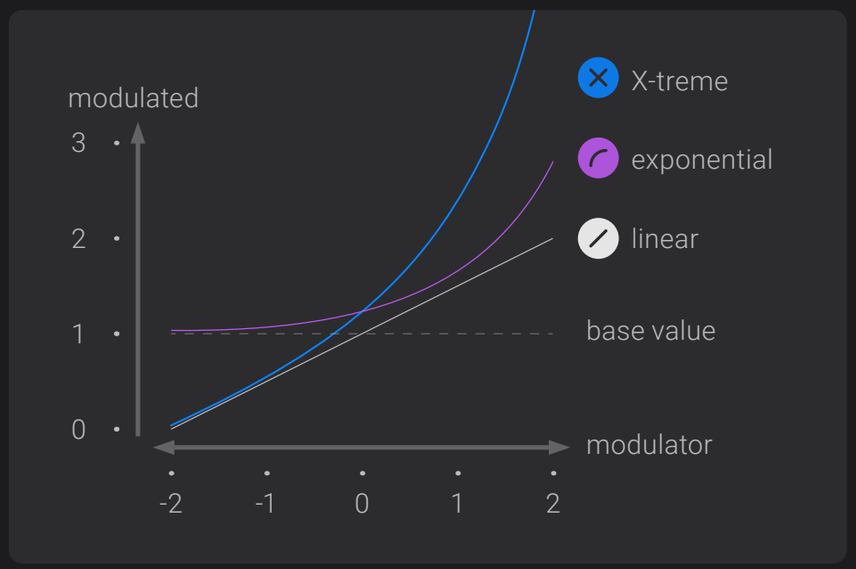
Looking at the Eclipse

FM switch : set the type of frequency modulation.

X-treme : custom mode with a stable and beefy sound in low amount and extreme sound effects in high amount.

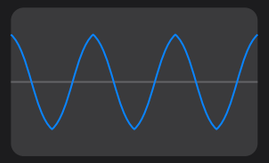
Exponential : efficient for vibrato and sound effects. Audio rate-modulation tends to shift up the center frequency, which is not recommended for tonal melodies.

Linear : efficient for tonal melodies. audio-rate modulation maintains the original center frequency.

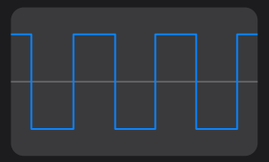


Looking at the Eclipse

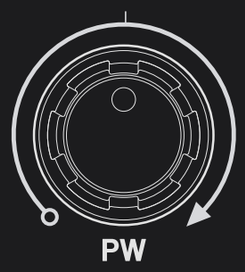
Outputs

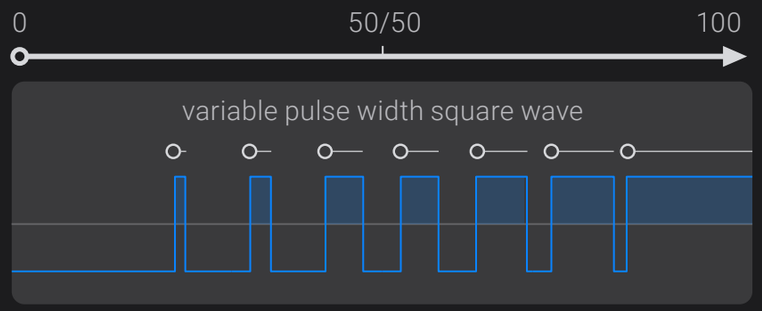


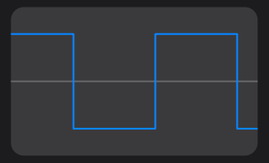
1 SINE : imperfect pointy sine wave inspired by vintage synthesizers circuits such as the VCS3, brings an interesting bite both as sound source and modulator.



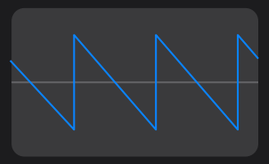
2 SQUARE : variable-width pulse wave with manual control by the **PW knob**, reaching silence at extremes positions (from 0% to 100% duty cycle). CV controllable though the **PWM input**, amount adjusted by its attenuverter.



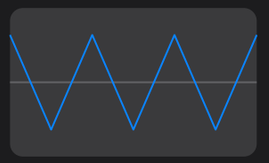




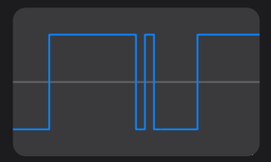
3 SUB : 1 octave down square wave with 50% duty cycle. This output is normaled to the **FM input.**

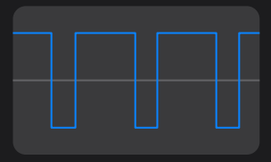


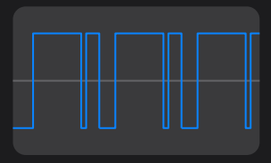
4 SAW : classic falling saw wave



5 TRI : classic symmetric triangle wave







Looking at the Eclipse

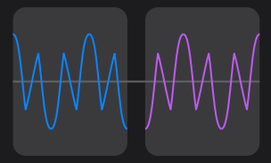
1 **MORPH-SQUARE** : complex square wave influenced by the Morphing waveshaper and its **morph switch**, explained in depth in a later chapter.

From square to octave down square with variable width on even duty cycles.

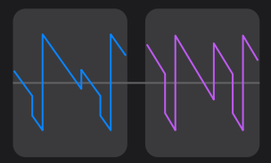
Square with variable width and mirror effect.

From square to octave up square with variable width on even duty cycles.

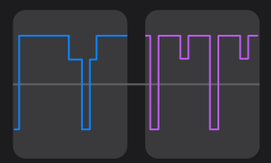
2 **LEFT** and **RIGHT** : stereo outputs providing 3 different results depending on the **spread switch** setting: explained in depth in a later chapter.



MorphX : result of the Morphing waveshaper section. **SPREAD** controls amplitude and polarity, **MORPH** controls the waveshape.



SPSM : Stereo Pulsed Saw Modulation. **SPREAD** controls stereo width, **MORPH** controls timbre.



SPAM : Stereo Pulse Array Modulation. **SPREAD** controls stereo width, **MORPH** and **PW** control timbre.

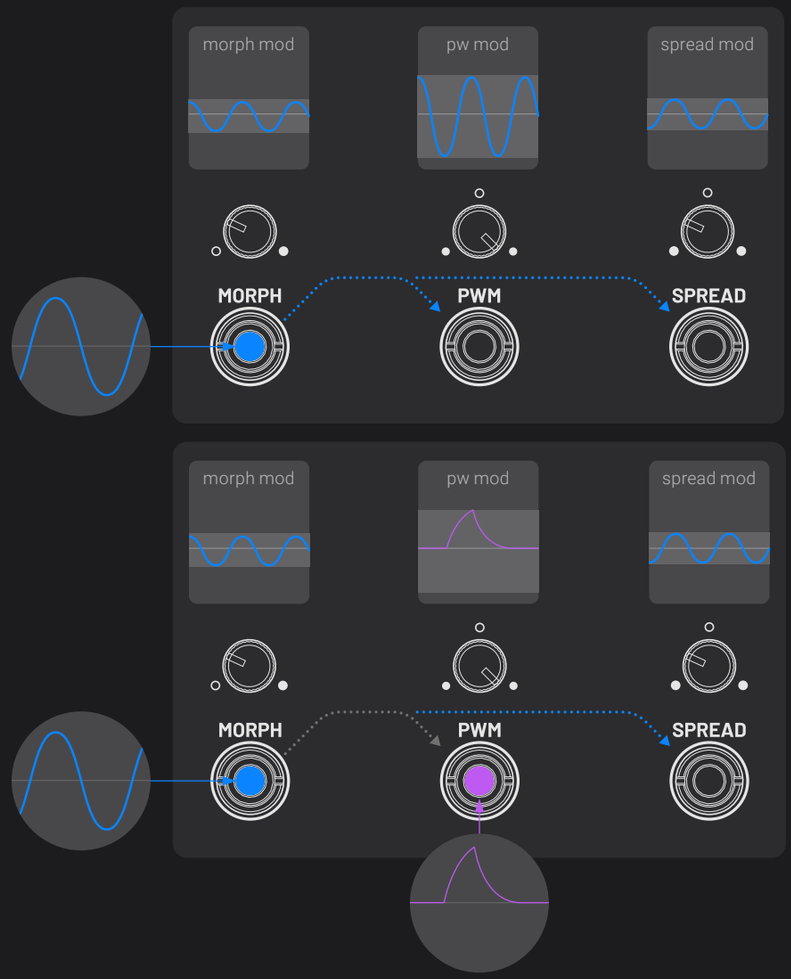
Looking at the Eclipse

Global Modulation Hub

The 3 main parameters can be modulated by a single CV signal, with specific amount for each.

Any signal patched to **MORPH CV input** is also sent to **PW** and **SPREAD** CV inputs, unless they are patched to their own modulation source.

The amount of this global modulation is set by each parameter's attenuverters.



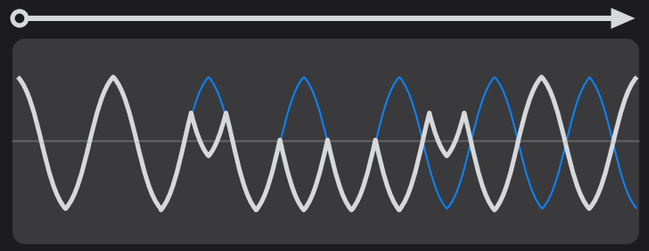
Looking at the Eclipse

Morphing waveshaper

For more complex waveforms, Eclipse is equipped with a waveshaper inspired by the VCS3, and designed from scratch for new sonic results.

The morphing waveshaper is a custom Thru-Zero full-wave rectifier. As the **MORPH** control increases, the waveform is gradually rectified, extra harmonics appear, reaching full-wave rectification at the midpoint, and then seamlessly reconstructed with a 180° phase shift. All timbral transitions occur in a continuous way.

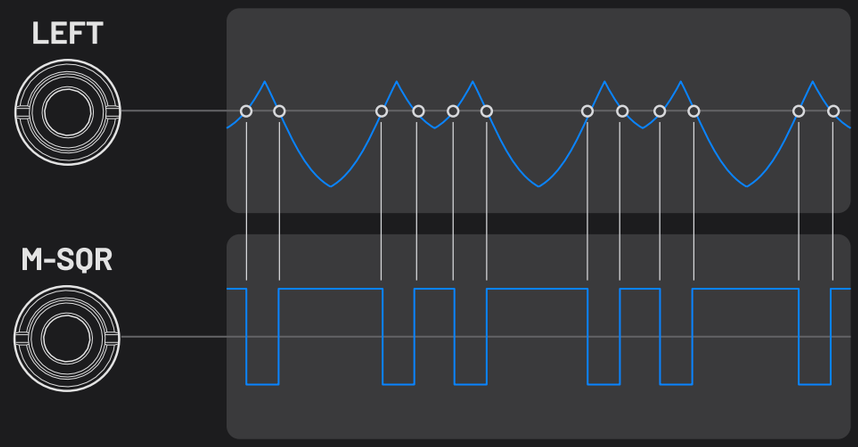
The way harmonics are reshaped varies greatly depending on the source signal, which is controlled by the morph switch, enabling a broad range of timbral effects, from pseudo low-pass filtering to saturation, octave-up effects, and subharmonics.



The direct result of the morphing waveshaper is accessed through the **L** out, with the **SPREAD switch** set to Morph Ring ⊛ and the **SPREAD knob** at 100%.

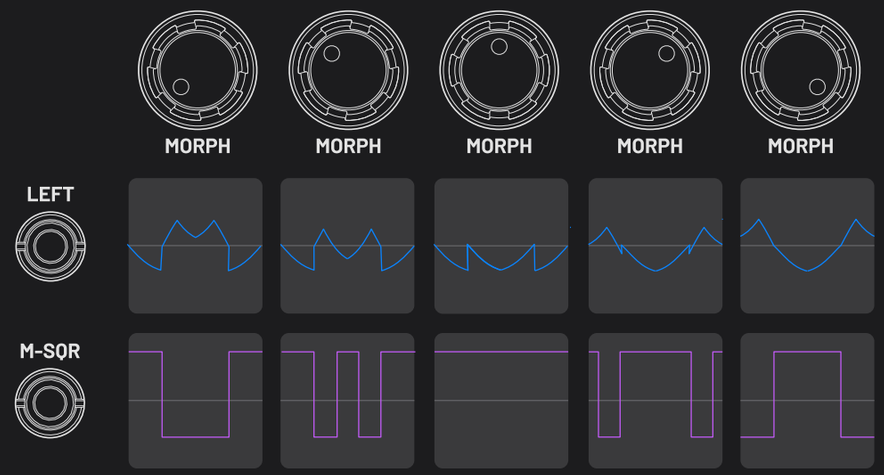
For a more modern bite, it includes a related morphing square wave output **M-SQR**, shifting at each zero-crossing of the waveshaper.

Looking at the Eclipse



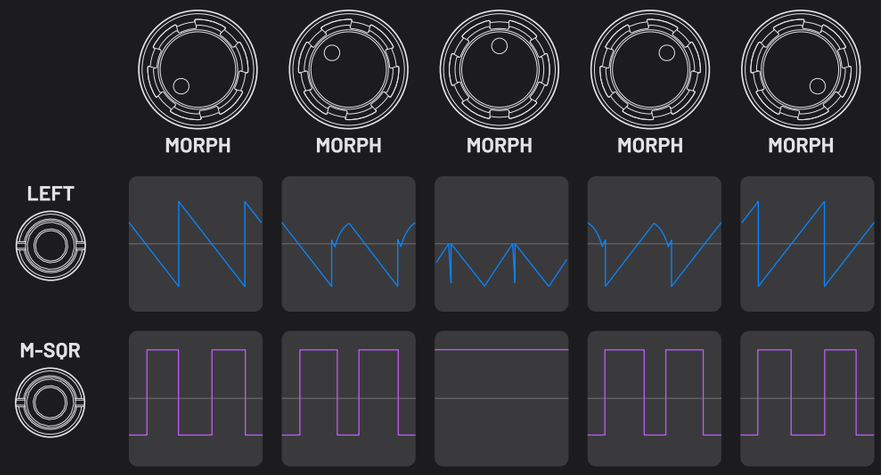
MORPH switch : chooses the source of the wave shaper. This greatly influence the result of both the morph shape and the **M- SQR** output.

Raw : a homemade blend of basic waveforms adjusted especially to have interesting morphing results. With a lot of bass and even harmonics to start with, these are redistributed along the morphing process over two octaves.

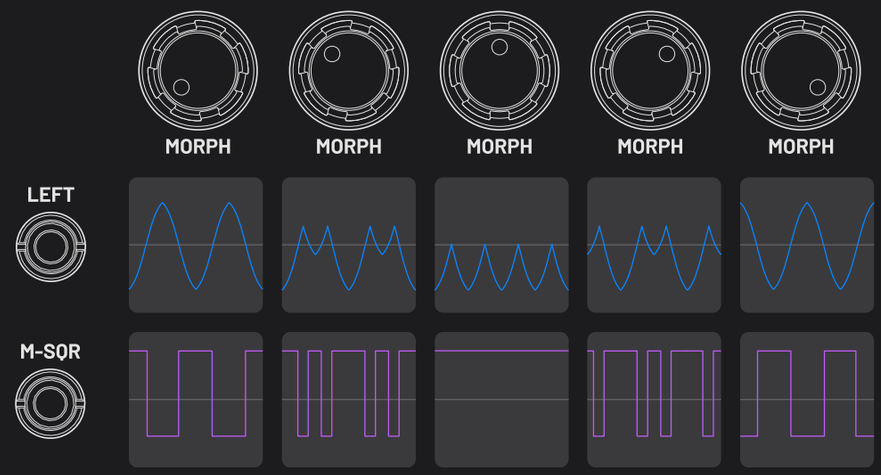


Looking at the Eclipse

Saw : the morphing process turns a basic saw wave into a shark tooth and then a triangle, attenuating the even harmonics for a pseudo low-pass effect.



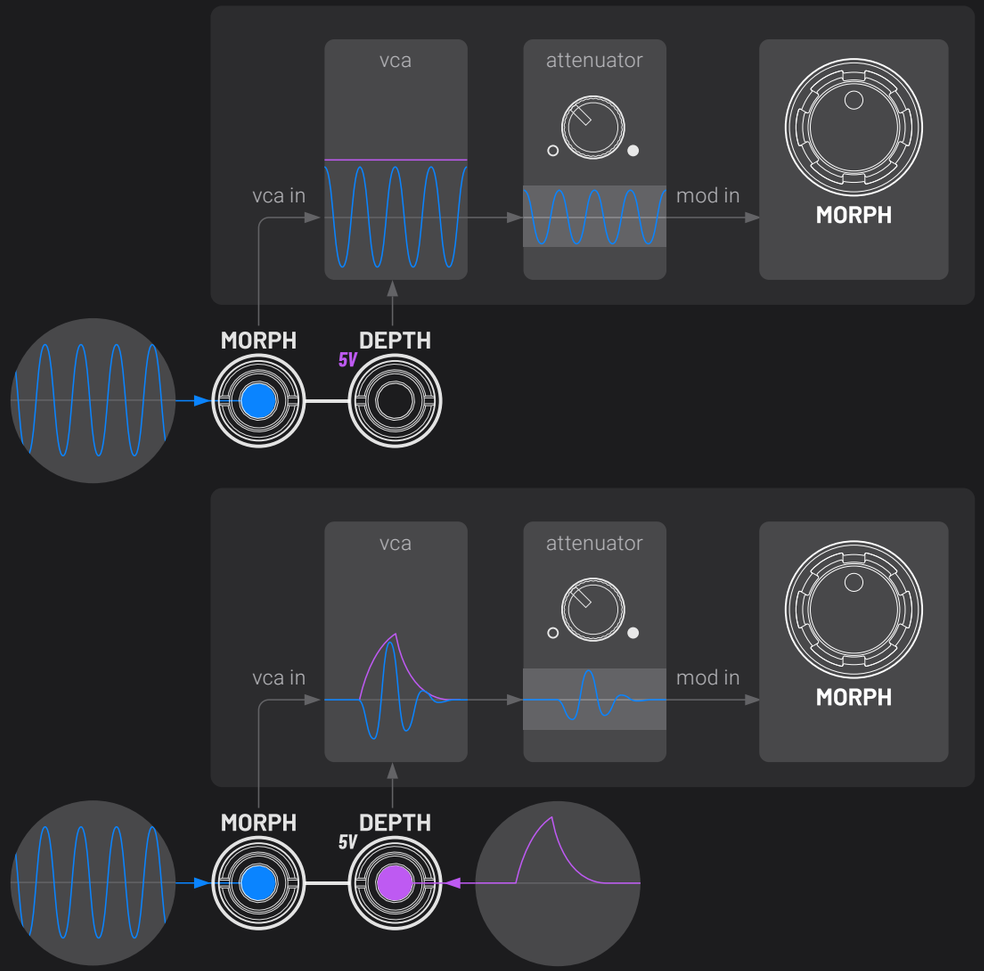
Sine : the sinewave is fully rectified during the morphing process, adding a lot of odd harmonics and shifting the sound one octave higher



Looking at the Eclipse

1 **MORPH IN**: CV control over **MORPH**, amount adjusted by **attenuator**.

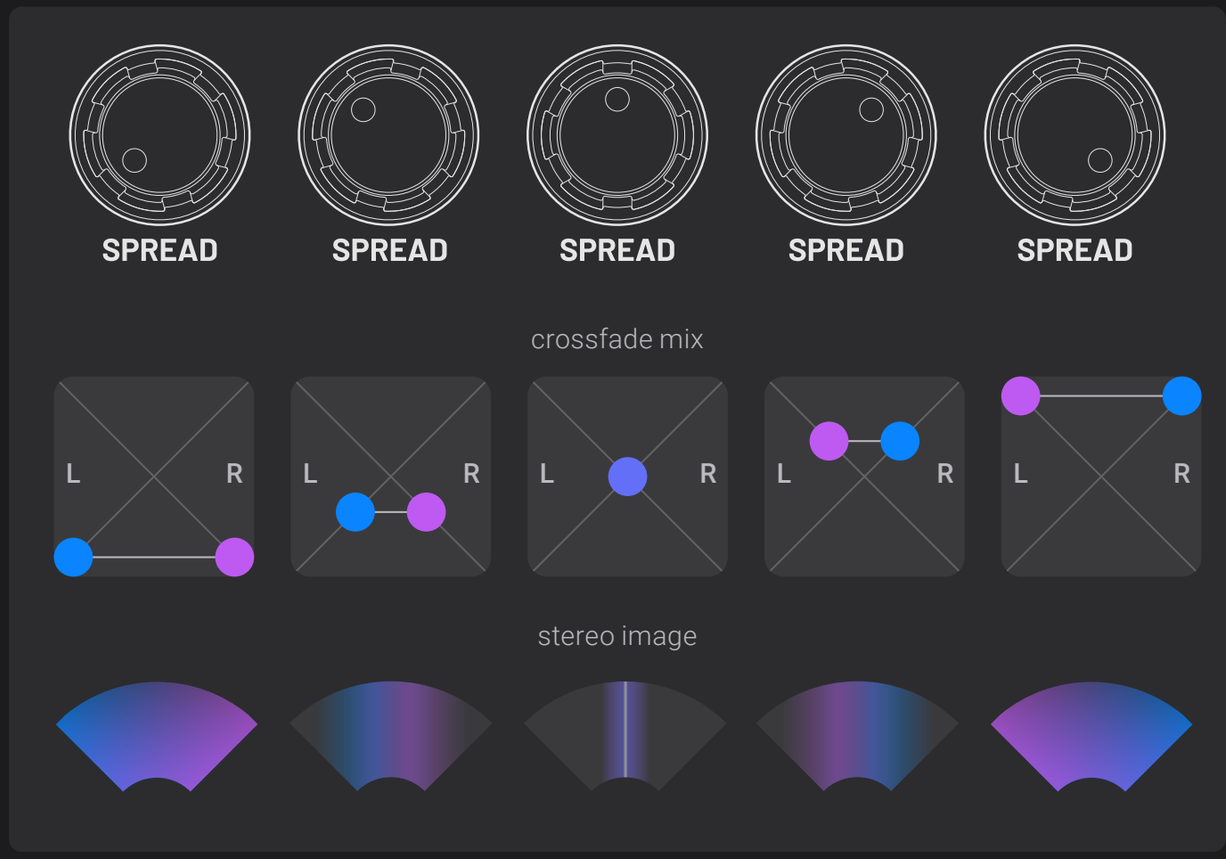
2 **DEPTH IN**: CV control over **MORPH** CV amount, similar to complex VCOs on the west coast, enabling dynamic timbral effects. The **MORPH CV** signal goes through an internal VCA controlled by the **DEPTH** input before being attenuated. The VCA is fully open when **DEPTH** is unpatched.



Looking at the Eclipse

Stereo Spreader

1 Eclipse uses crossfaded mixing techniques to produce various results depending on the **SPREAD switch and knob** settings, including stereo field effects, mono wave blending, phase inversion, VCA, ring mod, or amplitude mod.



2 **SPREAD Input :** CV control over **SPREAD**, amount adjusted by attenuverter.

Looking at the Eclipse

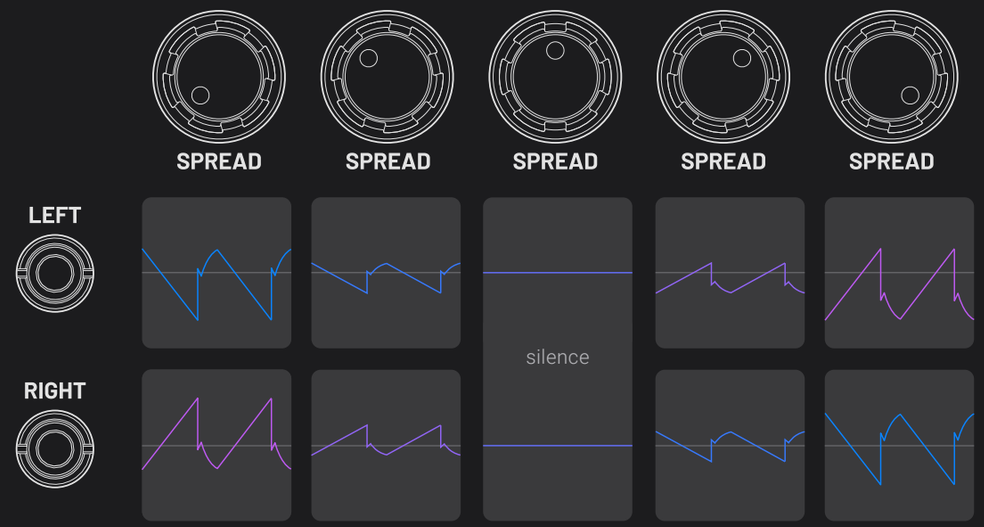
SPREAD Switch : selects the sources of the crossfade, offering 3 completely different results and behavior.

- **MorphX :** outputs the direct result of the Morphing waveshaper through a 4-quadrant multiplier in the **L** output, and a phase-inverted copy in the **R** output.

  !! For this mode, we recommend using either the **LEFT** or **RIGHT** output, for mono purposes only. Using both L and R as a stereo source may cause phase cancellations if the signal is summed to mono during mixing.

  SPREAD controls amplitude and polarity. Center position is silent, clockwise raises the amplitude while counterclockwise raises the amplitude with inverted phase. CV control enables VCA, sidechain, ducking, ring modulation, and amplitude modulation effects.

MORPH switch and knob control timbre as explained in the morphing waveshaper section.

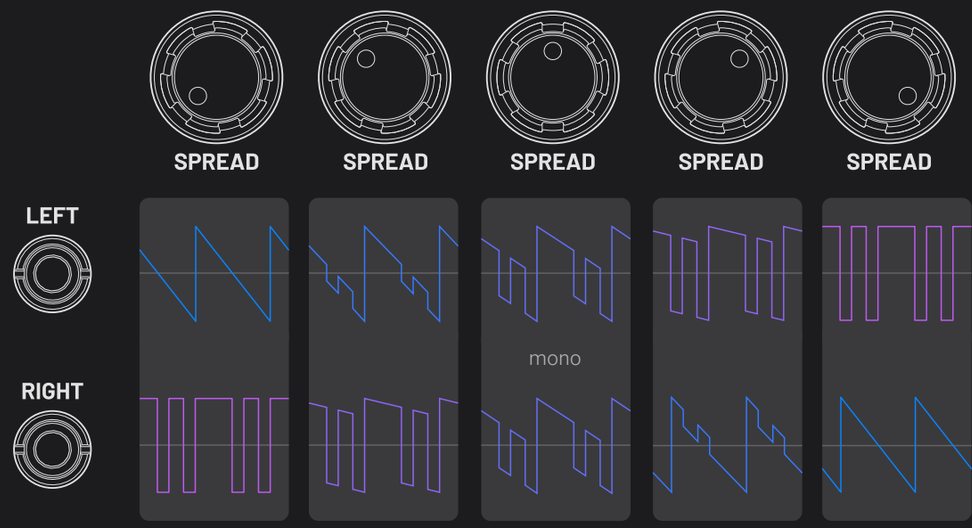


Looking at the Eclipse

PSM : pulsed saw modulation. This mode uses the morphing square wave to modify the saw wave, resulting in a multiple-peak saw. The **LEFT** and **RIGHT** outputs can be used together for a wide stereo field or separately to blend the two waves.

SPREAD controls stereo width and blend.

MORPH switch and knob control timbre.

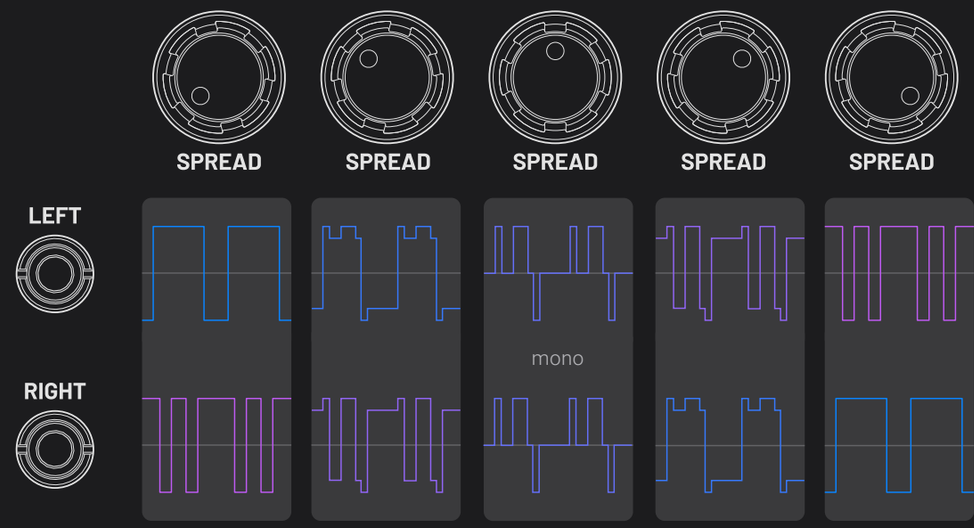


Looking at the Eclipse

PAM : Pulse Array Modulation. This mode uses the morphing square wave to modify the square wave, allowing stereo PWM. The **LEFT** and **RIGHT** outputs can be used together for a wide stereo field or separately to blend the two waves.

SPREAD controls stereo width and blend.

PW, MORPH switch and knob control timbre.



Misalignment of the planets

Tracking Troubleshooting Test

Eclipse comes with a factory-calibrated 10-octave tracking range. Like all analog VCOs, Eclipse needs to be turned on for ±15 minutes to reach its best performance. The following test procedure is only required if the tracking is not perfect despite this waiting time.

1. Unplug all cables from Eclipse and set the **top-left switch** to VCO mode (right position).
2. Set the **FM knob** fully counterclockwise (0%).
3. Set the **octave switch** to the lowest octave (left position).
4. Connect the **TRI output** to a tuner.
5. Adjust the **frequency and FINE knobs** to reach an exact C2.

Test different octave positions. The result should stay consistent on the tuner.

If it does, the tracking problem is likely to come from the V/OCT source (sequencer, keyboard, MIDI to CV converter).

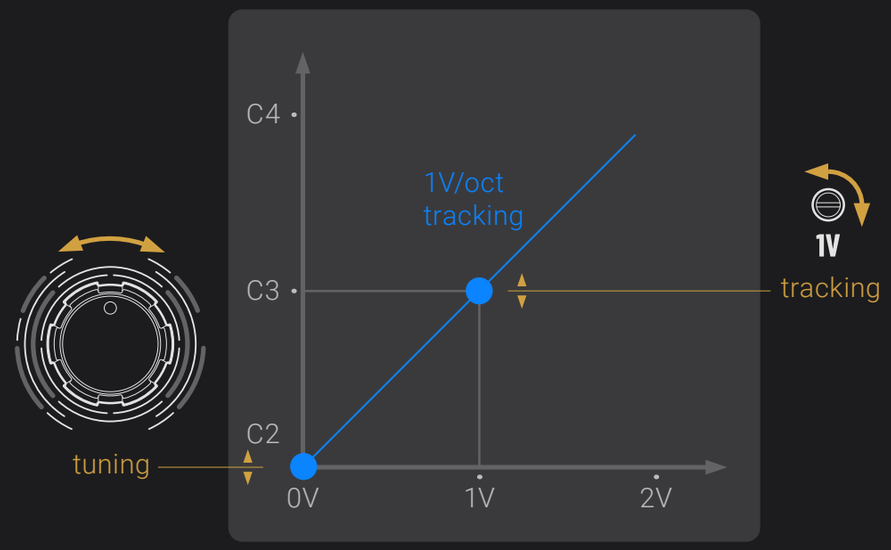
If the octave switch gives imprecise results, start the following calibration procedure.

Misalignment of the planets

Calibration Procedure

This is an advanced procedure to perform only if the tracking test failed. If it ain't broke, don't fix it! Leave all settings and connections as they are at the end of the tracking test.

1. Set the **octave switch** to the lowest octave (left position).
2. Adjust the **frequency and FINE knobs** to reach an exact C2.
3. Set the **octave switch** to the highest octave (right position).
4. Adjust the **1V** trimmer to reach an exact C6.
5. Repeat steps 1. to 4. as many times as needed.



If the procedure described above fails, don't hesitate to reach out to BLACK NOISE.