

## Thanks!

Thank you for purchasing Chaos, our first “real” module. It was not so far away from our daily business since we were building guitar effects and cabinets so it represents a big step ahead from both a technical and intellectual point of view. We have always had a clear vision of how this module should be, even before acquiring the skills needed to realize it. No matter how difficult it could have been, nothing stopped us from studying and working on it all the time. Even during this hard Covid time. Every aspect was not left to chance, from ergonomics to every technical aspect. That’s why we hope you’ll enjoy it and could spend at least the same time as we did to experiment and have fun with it.

A special thanks goes to: Our families, partners and friends for the support, Samuele Nigro (a.k.a. Fluize), Dan Sanfufano (whose real name is yet to be known), Luca Romanelli (a.k.a. Mastrovalvola Pedals), Alessio Bianchi (AB elettronica) and Enrico Corsi.

Ciao, Andrea and Emanuele

## The concept

What is Chaos for real? Chaos is the hidden force that moves everything around us. It’s a random stream of events, whose correlation is impossible to understand. Nonetheless, as a living paradox in our life we are used to influence chaos in a very deterministic way by setting the limits of its dynamic behaviour: in this way we can preview events and make them possible.

We can set steady points, enclose them into cycling loops and then make them work for us as laws. That’s exactly what our Chaos does. A continuous stream of gates and voltages is produced by a sophisticated random engine controlled by a series of parameters that can be set to define its acting behaviour. Chaos is a six-channel-aleatoric brain where a random generator helps you to quickly finalize your idea, starting from an extremely chaotic mood to a really controllable and determined one with one-click distance. It’s like shaping a block of stone.

## Features

Chaos is thought to be the fulcrum of your system providing:

- An extremely wide range (10ms/10s) and stable master clock
- 6 gate outputs with independent probability, width and time control (synced or completely independent from the master clock)
- 6 voltage outputs with independent quantization, slew, random voltage windows selection and ground
- transpose
- For each channel the option of using the internal random generator or sampling an external incoming voltage
- Individual channel looping capability
- Save and recall (also under cv control) 10 slots with no lag
- The ability to randomize all the parameters of all the selected channels with entropy control setting
- External cv control for looping, chaos, slot recalling and random voltage cv in

With all these functions combined together Chaos is pretty flexible and can be easily used as a really powerful multi channel turing machine, drum sequencer, modulation generator, clock source, voltage recorder and many other duties.

Besides we’re in a pure digital domain, the random generation taste and the design are pretty analog. Chaos has been designed with playability on mind: all parameters are always readable and immediately available with no menu or hidden things to be remembered.

## Getting Started

Make sure your system is turned off then connect the module to the power bus using the ten to sixteen IDC cable provided. Red line on the cable corresponds to the the -12V power rail. On the back of the module a thick white line indicates where the -12V rail is located on the IDC connector.

Before powering up make sure to have completely installed the module by using the four panel screws provided. Devices must stay firm inside their case. Make sure the back is not touching other objects inside the case. The exposed electronics may cause shortcuts when pressed to other surfaces or objects.

### Dimensions

12Hp

### Power Consumption

+12V: 115mA

-12V: 0mA

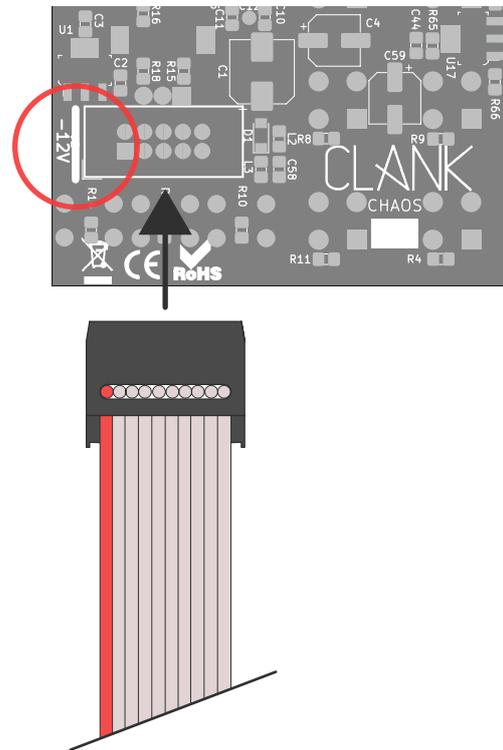
+5V: 0mA

## Warranty Policy

Clank offers a two years period of warranty on each product purchased from our site. During this period all defecting or malfunctioning devices will be repaired or even substituted with a new unit. Shipping costs will be refundend by Clank. This service will be applied unless an external damage is proven. Only Clank is allowed to repair its own products. Any external attempts of repair/modding will void the warranty. In case of out of warranty damages, devices could also be sent for servicing. In this case shipping costs must be covered by the owner. Requests must be sent by mail at the address: [info@clank.eu](mailto:info@clank.eu)

### DO NOT FORGET:

- The purchase invoice has always to be demonstrated and then included inside the shipped box
- Only units shipped with their own packaging will be serviced/repaired
- The packaging provided is not meant to be a shipping box itself. When shipping back, put everything inside a larger shipping enclosure. Remember to fill the gaps inside with some shock absorbing foam/paper
- We are not responsible for improper boxing and shipping damages



## Safety Instructions

- Do not power on before it's completely installed
- Never use or power it with the back of the panel exposed
- If you ever see or smell bad smokes when turned on, please turn off the power supply immediately. Exposition to erroneous voltages, currents, or shortcuts can damage the device in a few seconds
- Never turn on if there is water inside or over the case
- Never turn on if some external tools or objects are fallen inside the case
- Never use it with temperatures below 0° or over 50° degrees. In case of long exposition to unwanted temperatures let the device rest in a proper climate for a while before powering on
- The front panel can get warmed with the usage. Up to 30° is completely normal.

## Panel overview

On Chaos **first row**, counting from left to right, there are four inputs (*clock-in*, *loop*, *cv-in* and *chaos*) and one output (*clock out*). In the **middle row** there are six gate outputs, one for each channel. A dedicated led blinks everytime a gate signal is sent. Under those you have the six corresponding **cv outputs**.

There are two led bars on the module, one with six leds and the other one with ten. The first one is the **channel bar**, it indicates the selected channel in red and reflects its real time cv intensity by changing led luminosity. The ten led bar is the **value bar** and it is mainly thought for editing purpose. Press any button to show up the parameter value. By default, If anything is pressed it will display the current channel cv output value.

*This led system is meant to be a minimal yet effective way to control what is happening on all the cvs and gates of each channel. Everything is under your control and ready for action.*

To change the selected channel, simply rotate the **encoder** without pressing any button. When you reach the limit on the right all the leds will become red meaning you have selected all the channels together. In this way you can easily loop or change a modifier or configuration at the same time for all the channels.

The **white button** is used to enter the *loop mode*. (p.8)

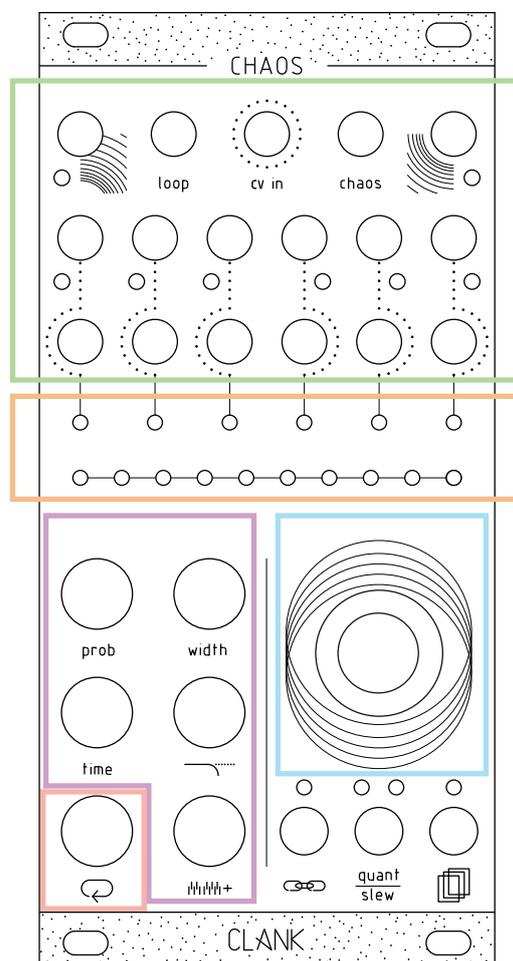
The **five black buttons** on the left are the *modifiers*. (p.6-7)

They can be used to access and change the parameters of the random generator or the loop depending on the mode you're into:

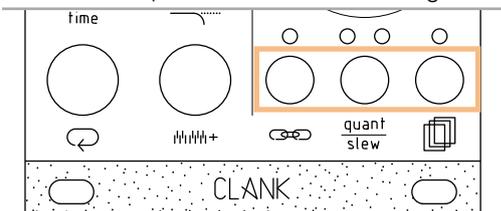
If you're in *loop mode* they will work on the recorded sequence, otherwise they will modify the random generator parameters.

Hold one to see the corresponding value, rotate the encoder to change it and release the button when you are done. Access and modify the loop parameters works the same, just hold also the loop button while pressing a modifier.

Keep in mind that random generator parameters and the loop ones are independent one from the other.



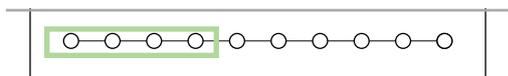
The **three small buttons** placed under the encoder correspond to the channel configuration:



- input assign
- scale quantization/slewing
- save/recall ability

### Input assign

*Input assign* could be used for self patching or let the rest of the world communicate with Chaos. Every channel has its own configuration. To change that, hold the input assign button: those **four leds** reflect the four inputs at the top of the module and their status. Rotate the encoder to select one and press it to flip the status. Green led means ON, white led means OFF



- Led 1 ON (default): the channel is synced to the master clock
- Led 1 OFF: the channel is unsynced and has its own timing expressed in millisecond between consecutive beats
- Led 2 ON (default): a gate sent in the loop in will activate the loop in this channel
- Led 2 OFF: sending a gate to loop in will not effect the selected channel
- Led 3 ON: All the new channel's cv values will be sampled from the CV IN excluding the internal random generator
- Keep in mind that modifiers will still have effect on the sampled voltage!
- Led 3 OFF (default): the internal random voltage generator will be used to generate the new values
- Led 3 orange: Hold the encoder until the led turns to orange. Now you can use a external voltage patched into *CV in* to move between the saved slots. (0-8V). Hold it again to go back to its normal functionality.

VERY IMPORTANT: this last function is global and not channel specific.

- Led 4 ON (default): chaos mode can be activated by a gate on the chaos input. The input assign led will quickly blink in violet
- Led 4 OFF led: gate signals on chaos input won't have any effects on the selected channel

### Scale quantization/slewing

A single press on the *quant/slew* button will slew the selected channel. The led on the right will light up in white to indicate that.

Hold the button and turn the encoder to scroll between the possible quantization modes:

- unquantized
- chromatic
- octave
- major
- major pentatonic
- minor
- minor pentatonic
- pelog
- hiroshi
- chinese

to select a scale simply release the button. The left led will stay on with current scale color.

### Save/recall

Six banks of ten slots each are available for saving.

Hold down the button to access to the function. The upper led bar indicates which one of the six banks is selected, the lower one indicates the slots.

Turn the encoder to select the slot you prefer, after the tenth one you'll skip to the next bank.

The white leds on the value bar will indicate the already saved slots. Release the save/recall button to load one of the available slots, press the encoder to save into it. Press the *probability button* to clear the selected slot. Recalling an empty slot will not have any effects on your session.

When saving, an exact picture of what is happening at the moment will be taken: If a channel is looped, the sequence with all its modifiers will be also recorded.

*Save and recall* non-looped channels is really useful for modulation duty or the recreation of a mood with a non precise recorded sequence.

## Time Control Modifiers

At its core Chaos is composed of six channels of clock generators, if no signal is applied at the clock input, channel one will be the master by default. All the channels can be individually synced to the master clock or be completely time independent (refer to Input Assing section for more information).

**Probability** it's a sort of coin loss to decretate if a gate of the selected channel will fire or not. Changing the probability value will reduce or increase its possibility to happen. The range of value is from 0% to 100% .If you're using channel 1 as master clock, changing its probability will affect its gate output but not the master clock data stream. Turn it to zero to mute a channel.

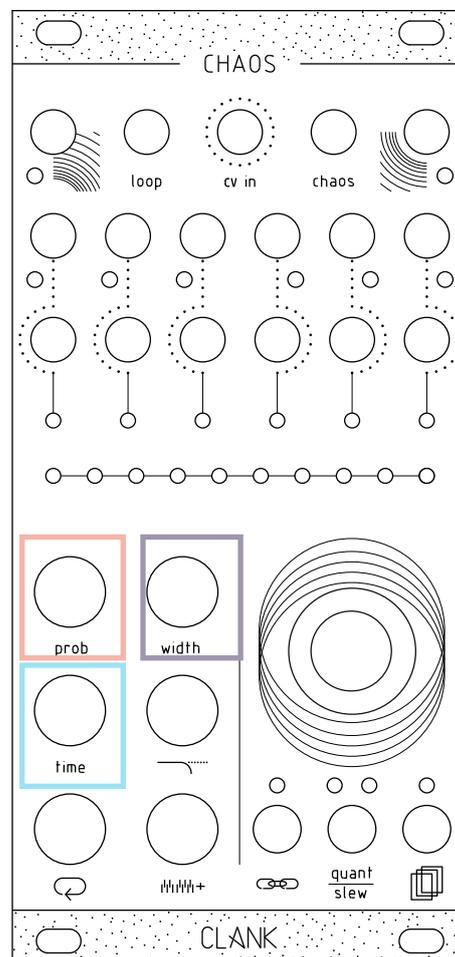
**Width** It's the length of the gate in percentage of the duty cycle. Range is from 0% (channel muted) to 100% (fully open).

**Time** if the selected channel is the master clock or if it's not synced to it, time will be expressed in millisecond between two consecutive gates. You can easily change it by pressing time and turning the encoder. Rotating it CCW will result in a faster clock. Rotate CW to make it slower.

*Time range goes from 10ms to 10 seconds. In the first window, in white, every led corresponds to 10ms. By reaching the upper limit you will enter in a second window in blue. Here every led corresponds to 1 second. Default value is 500ms (120bpm) each time the module is turned on.*

If the selected channel is synced to the master clock the Time button will work differently letting you set a multiplication or division of the master itself. The pulse of the two central led on the main bar means that the channel is at the same rate of the master clock. Rotating the encoder CW multiplies it (leds in white), CCW divides it (leds in orange). The available multiplication and division are from 1 to 8, then from 16 to 32.

*Keep in mind that Chaos can emit gates from one every 5.5 minutes to audio band (approx 100hz) so timing changes could be very dramatic.*



### TIMING SHIFT / POLYRHYTHM

*A primitive way to create polyrhythms or explore unconventional timings is to unsync one or more channel from the master clock and slowly altering its timing. Depending from how far you move it will go from out of phase syncopation (Steve Reich Clap Music, anyone?) to complete polyrhythmic madness.*

## Voltage control Modifiers

Every time a gate rises up a new random voltage from 0 to 8v will be available on the cv output of that channel.

With the **voltage window** modifcator you can limit the number of values that the generator can pick by reducing its maximum.

With the **ground transpose** you can shift the window of values that the generator can pick. Every encoder dent will increase the ground by a semitone.

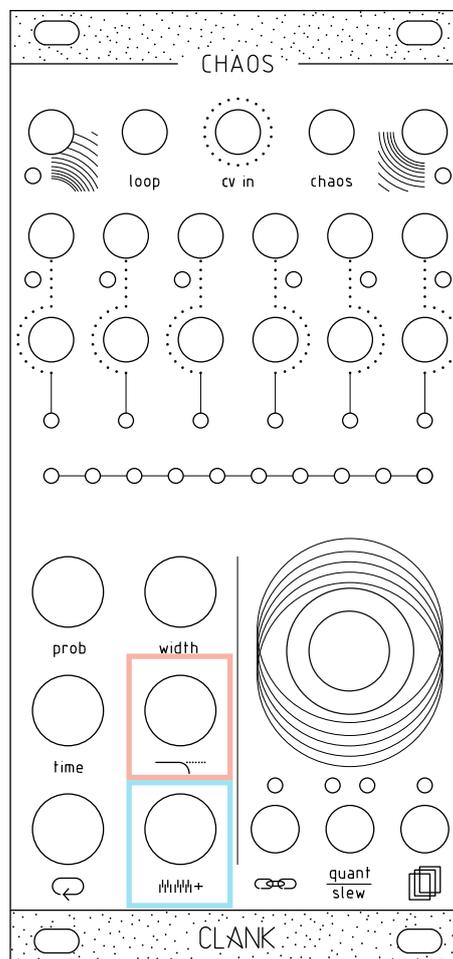
*Without limiting the ouput with the voltage window modifcator, Chaos has an extremely wide range of span: 0 to 8v means 8 octave of extension, it could result pretty wild and experimental.*

*To achieve more "classic and melodic" sequences, besides activate the quantization on the channel, we suggest you to reduce the voltage window to focus on a specific range of notes. Most of the time a span of 3 octaves is more than enough. Obviously it's all about your taste and what are you after.*

*Shifting it with ground transpose gives you the possibility to pass from a register to another. Those two modifciers, combined with the timing function, let you change quickly from a bassline to a lead sequence.*

*In this way you can finely tune the voltage stream to replicate what you have in mind pretty very accurately. Playing live with those two parameters can add a lot of variation to your sequence, which can be also recoderd later.*

*If you're after a modulation most of the times slew the channel result in a more fluid effect.*



### POLYPHONY, ANALOG SHIFT REGISTER & OTHER COOL FRIENDS

Chaos could be used also for polyphony up to six voices.

There are two ways of perform that, depending on what you prefer to use as a source. If you would like to create polyphony with an external source as a root, patch it to the CV IN. Abilitate then CV IN from the input assing in every channel you need. Since encoder dents correspond to one semitone of shifting in the ground voltages modifciers,

setting it differently on every channel will give you polyphony as a result. You can self patch a channel CV out to the CV IN to drive the others.

Setting different time modifciers on every channel will change the moment at which every one will update to the new note. This function transforms Chaos also in analog shift register module. Combining those two functions together can create many voices that share the same sequence but at different transposition, time and characteristics.

## Looping

All the six channels have an independent looping capability.

To start a loop press once the **white button**. The **value bar** and the **input assign led** will turn blue. Chaos is now stucked in a loop that reflects everything happened in the last steps.

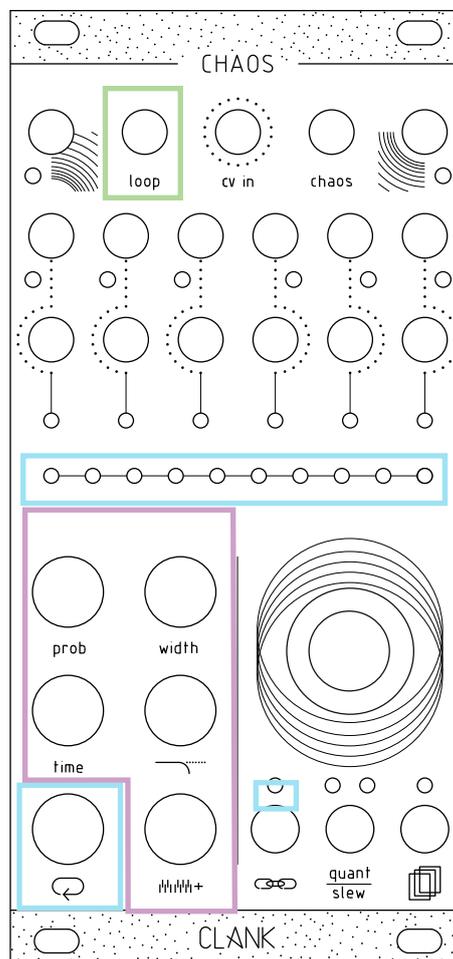
The loop lenght can be changed by holding the loop button and rotating the encoder to select from 1 to 8, 16 or 32 steps. Press the white button again to exit from this mode.

*Keep in mind that every change of parameter made before looping will be recorded and then played back. In this way even time changes can be looped!*

When chaos is in *loop mode* the recorded sequence can be altered just holding the loop button together with one of the **five modifiers buttons**. Looping modifiers are totally independent from random ones except for time and width. When on this mode the first will work as a mult/div of the random value while the second could only be reset to the initial value. In this way you can easily transpose a loop or modificate its timing and return to the initial loop in a moment.

Loop mode can also be activated by sending a gate to its **dedicated input**. In this case, on the input assign menu the second led has to be green.

*With this workflow, looping can be even more expressive than just recording. It could be thought as a pre determinated variance to the whole random generation!*



## Chaos function

Every time you send a gate into the **Chaos In** or press the encoder, Chaos will fire up and the input assign led will blink in purple.

Each time every modifiers value will be randomized creating a new mood.

Since Chaos limits are very vast, changes could be quite dramatic.

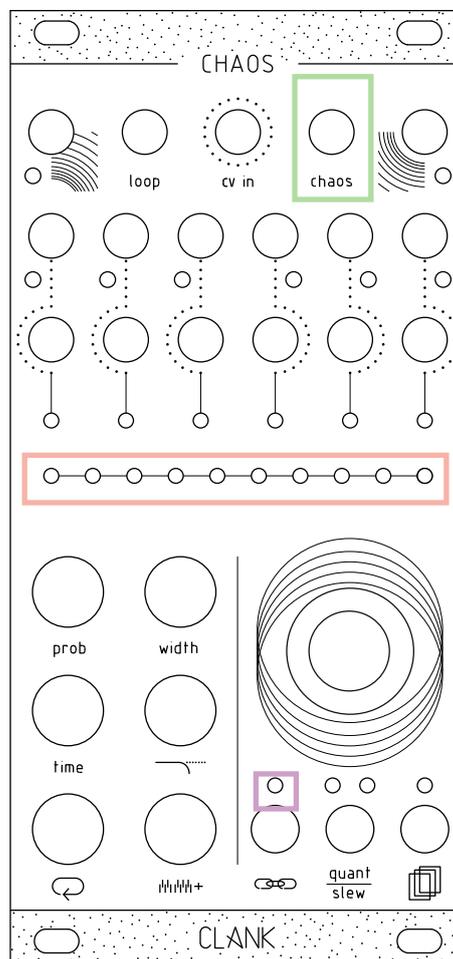
That's why *entropy* factor is pretty useful: a percentage of how much the new value could be distant from the current one, from subtle differences to complete ignote.

This could be set indipendently on each channel: to change it, hold down and rotate the encoder CCW to reduce entropy, turn it CW to increase it. The **entropy percentage** could be visualized on the value bar.

Chaos function could be used in many different ways, self-patching a gate out to the Chaos cv in will bring you instantaneously into the magic world of self-generating music. Limiting the variance with the entropy on some channels and set the modifiers to the preferred position will create a pseudo controlled random where you set the starting point, you set the limits and chaos do the rest.

*When you need a small help to start a new part, Chaos function could quickly suggest infinite combination to choose from. It's like zapping between more and more style of moods. Instead, if you're pretty satisfied of what you've created but you need to add some variances to it, a low entropy use of Chaos function could be the way to go.*

*Combine it with loop and you will enjoy many and many hours of evolving patterns and fun.*



### Calibration

Chaos CV outs are already calibrated by factory. If, somehow, internal DACs scaling needs to be adjusted, that can be done by following this procedure:

- Hold down the encoder while powering up the module.
- After the initial led transition they all will turn to purple.
- Now you can release the encoder and the first channel led will be selected.
- Connect the channel CV output to a multimeter-
- Turn the encoder until you read a steady 8V voltage.
- When the first channel is calibrated, press the encoder and it will skip to the next channel. Repeat that for every channel and when the last one is setted.
- Chaos will go back to standard operation mode.

While on calibration mode, press anytime the probability button to erase all the saved slot memory.