

**ENDORPHINES<sup>®</sup>**  
**RUNNING ORDER** 3U & 1U

FIRMWARE V 2.5

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# WARRANTY

1-year warranty guaranteed from the product's purchase date in case of any manufacturing errors or other functional deficiencies during runtime.

The warranty does not apply in case of:

- damage caused by misuse
- mechanical damage arising from careless treatment (dropping, vigorous shaking, mishandling, etc.)
- damage caused by liquids or powders penetrating the device
- heat damage caused by overexposure to sunlight or heating
- electric damage caused by improper connecting

The warranty covers replacement or repair, as decided by us. Please contact us via email for a return authorization before sending anything. The customer pays shipping costs of sending a module back for servicing. Device complies with all EU regulations concerning RoHS lead-free manufacturing and WEEE disposal.

# VISIT US

<https://endorphin.es>

<https://www.youtube.com/@Endorphines>

<https://www.instagram.com/endorphin.es/>

<https://facebook.com/TheEndorphines>

[https://twitter.com/endorphin\\_es](https://twitter.com/endorphin_es)

<https://www.modulargrid.net/e/modules/browser/vendor:167>

For technical requests: **[support@endorphin.es](mailto:support@endorphin.es)**

For dealer / marketing inquiries: [info@endorphin.es](mailto:info@endorphin.es)

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# INTRO

Running Order is a two-track trigger sequencer / clock utility in 6 hp. It can be a precise master clock with zero-jitter clock generation or an incoming clock manipulate by acting as a divider / multiplier. Punch in your trigger sequences by either using the 101-style input or in Euclidean mode with a variety of ways to modulate your patterns both internally and externally. Ability to create tuplets for odd time signatures makes this the ultimate clock / rhythm mangling utility for your eurorack system.

Module overview videos with latest firmware features:

- <https://youtu.be/Sshs6XI9TZk>
- [https://youtu.be/l274TTSld\\_I](https://youtu.be/l274TTSld_I)
- <https://youtu.be/MgqLJGTdVm8>

## CONNECTING THE POWER

Before installing a new module in your case, ensure your power supply has a free power header and sufficient available capacity to power the module.

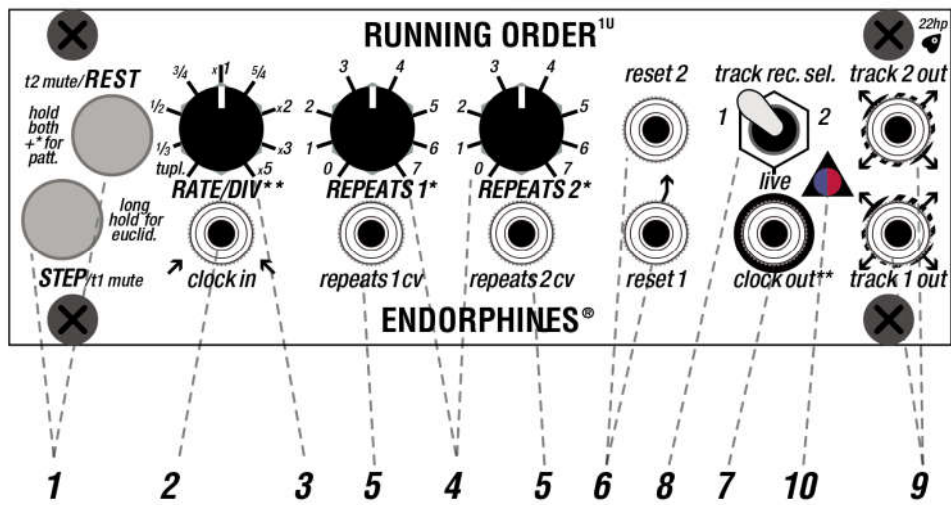
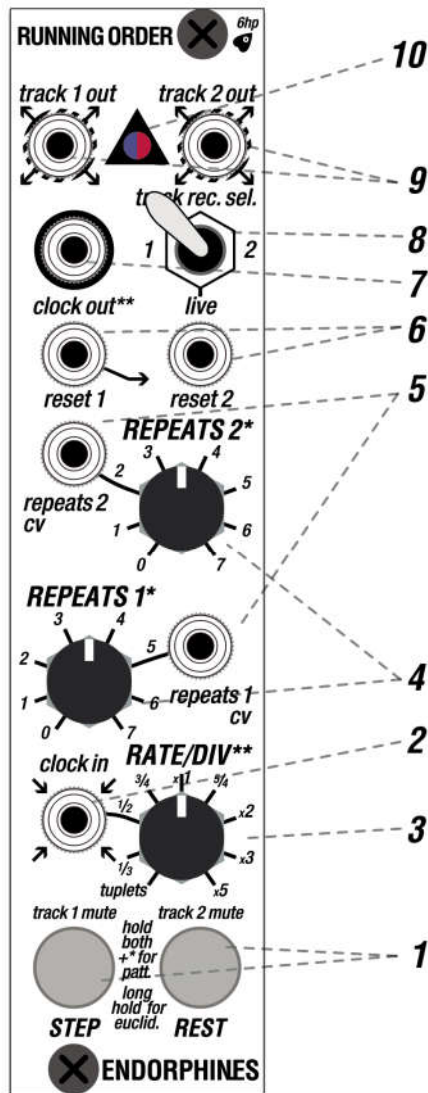
Connect the module directly to the power bus-board with supplied 10-16 ribbon cable like any other eurorack module. Pair of **RED/BROWN** pins on the multicolor ribbon cable corresponds to **NEGATIVE -12 VOLTS**.

Make sure to align the power cable with the '**RED/BROWN STRIPE**' label on the module that corresponds to -12V, to the 10-pin connector and with typically a white line for the 16-pin connector on the bus board.

## TECHNICAL SPECIFICATIONS

- Width: 6 HP/TE for 3U version, 22 HP for 1U Intellijel format version
- Depth: 30 cm /  $1\frac{3}{16}$ " for 3U version, 25 cm / 1" for 1U version with inserted ribbon cable
- Current draw: +12V: 30 mA, -12V: 10 mA
- CV range: 0...+5V
- Triggers output: 0...+10V

# INTERFACE



## 1. **TRACK BUTTONS:**

- In *LIVE MODE*, those buttons are individual *TRACK 1* and *2 MUTE* buttons
- In *TRACK EDIT* mode, the buttons are used for adding steps and rests
- In *EUCLIDEAN EDIT MODE*, the buttons set the length of the Euclidean circle (+1 step pressing *STEP* and +16 steps by pressing *REST*)

## 2. **EXTERNAL CLOCK INPUT JACK:** 0...+5V or 0...+10V logical input with 0.65V threshold. Typical clock expected 16<sup>th</sup> notes (PPQN24÷6).

## 3. **RATE/DIVIDER KNOB:**

- If no patch cable is inserted into *CLOCK IN* jack (2), then this knob sets the speed of the internal clock in beats-per-minute: from 30 to 300 BPM
- If external clock applied via inserted patch cable into *CLOCK IN* jack (2), this knob sets the clock division / multiplication of the pattern
- If the *RATE/DIV* knob is set to *TUPLETS* (fully CCW), this activates a special mode where the *REPEATS* knobs (4) for each track are now stretched within a beat, which lets you create triplets, quadruplets and other interesting and uncommon rhythms in eurorack.

## 4. **REPEATS 1 & 2 KNOBS:** manual knobs with CV inputs. Set amount of active trigger repeats or Euclidean trigger fills. Additionally these are used to set internal pattern modifiers.

## 5. **REPEATS 1 & 2 CV JACK INPUTS:** when a CV cable is inserted, the last position of the *REPEATS* knob is remembered as an *offset value* and each knob acts as an attenuator for incoming CV further summed with the offset value. Expected CV input range: 0...+5V. A simple formula for the *REPEATS* parameter value with the cable inserted is: *Repeats value = Last stored value + (CV input value x Attenuator amount)*

## 6. **RESET / SYNC TRIGGER INPUTS:** each trigger applied into these jacks (6) resets a certain track's sequence to its first step. *RESET 1* input jack is normalled (pre-wired) to *RESET 2* if no cable is inserted into *RESET 2* input jack.

## 7. **CLOCK OUTPUT JACK:** logical out, output range is 0...+10V

- Internal clock output: 30...300 BPM in 16<sup>th</sup> notes (PPQN24÷6) when no external clock applied
- External clock output in 16<sup>th</sup> notes after *DIVIDER\*\** when external clock applied into *CLOCK IN* (2) jack.

## 8. **TRACK SELECTOR SWITCH:**

→ Record a trigger sequence or set the Euclidean length by switching to the left (*TRACK 1*) or right (*TRACK 2*)

→ *LIVE* / playback mode in the middle

9. **TRACK 1 & 2 TRIGGER OUTPUTS:** trigger outputs with length of 10 milliseconds and output range of 0...+10V.

## 10. **STATUS LED RED/BLUE:**

→ Blinks to BPM in blue in *LIVE MODE*

→ Lights up red in 101-style *TRACK EDIT MODE*

→ Lights up fuchsia in *EUCLIDEAN EDIT MODE*.

# OVERVIEW

Running order consists of two identical and independent trigger tracks (9) that are clocked by ultra-stable zero-jitter internal clock or by using external clock input (2), which can be additionally processed by the onboard divider / multiplier knob (3). Additionally, each track features a reset input (6) for further synchronization flexibility, mute button (1) for performance control and 8 pattern slots that can be stored and recalled later for each of the tracks.

# OPERATING MODES

Running order has two main operating modes:

→ **TRACK EDIT MODE** is accessed by flipping the TRACK switch (8) either to the left (*TRACK 1*) or to the right (*TRACK 2*). In this mode you are able to create (enter) new patterns or edit them using pattern modifiers.

→ **LIVE MODE** is accessed by keeping the TRACK switch (8) in the middle position. This mode is the main performance mode where you can mute tracks and save / recall patterns for each track.

# PATTERN TYPES

→ **101 STYLE** with 16<sup>th</sup> notes input mode (entering *STEPS* and *RESTs*) with manual or CV controllable amount of trigger repeats when the active trigger step happens, internal per step trigger probability and ratcheting.

→ **EUCLIDEAN**, where we set Euclidean total number of steps in the circle and amount of triggers happening in that circle. The pattern modifiers include Euclidean pattern rotation either internally or CV controlled and internal global trigger probability of the pattern.

## 101-STYLE SEQUENCING:

This pattern mode is inspired by old school sequencing methods used in the 80s, allowing users to create patterns very quickly on the fly with arbitrary pattern length (128 steps maximum). The operation is very simple and involves two types of steps, namely: **ACTIVE** and **REST** steps. Active steps create a *trigger* and Rest steps create *silence* (pause) at track 1 & 2 outputs jacks (9). By using these together you can build any type of trigger sequence. This way you can also create odd length patterns that will rotate in time and give extra dynamics, also known as *polymeters*. To insert an active step all you need to do is press the *STEP* button (**S**), to create a Rest step - press the *REST* button (**R**). For example if you want to create a simple 4/4 kick pattern you would need to press these buttons in the following order: S-R-R-R. Now let's create an offbeat hi hat pattern on *TRACK 2*, the pattern will look like this: R-R-S-R.

## RATCHETING AND PROBABILITY

Now that you understand the logic behind how 101-style sequencing works, let's dive deeper into the pattern modifiers, namely per step probability and ratcheting.

→ **RATCHETING PER STEP:** this works the same as the probability per step, but now we can set the ratcheting amount per step with *REPEATS 1* for *TRACK 1* and *REPEATS 2* for *TRACK 2*. The ratcheting value can be set in the range of 0 - 7, where 0 means the step will have no ratchets (only original trigger) and value of 7 meaning that you will have 1 normal trigger + 7 ratchets.

By default, the ratcheting value is set to 0 and just as with probability, to set the ratcheting amount per step for Track 1 you first need to enter Track mode, tweak the Repeats 1 knob and insert an active step with Step button. Every next active step will borrow the ratcheting value from the last time you tweaked the Repeats 1 knob, so if you only want 1 step to have ratcheting enabled, make sure to turn the Repeats 2 knob fully CCW before you insert another active step.



→ **PROBABILITY PER STEP:** this modifier can be accessed in *TRACK MODE* by *REPEATS 2* knob for *TRACK 1* and *REPEATS 1* knob for *TRACK 2*. By default, the probability is set to 100%, meaning that any active trigger that is inserted in the pattern will fire 100% of the time. If you want to set a different probability for an active step for *TRACK 1*, you have to first tweak the *REPEATS 2* knob and then insert an active step using the *STEP BUTTON* (*REPEATS 2* at fully CCW is 0% probability, at 12:00 - 50% and fully CW - 100%). Every next active step that you insert will have the probability value equal to the last change of the *REPEATS 2* knob, so if you want other steps to have 100% probability you will need to return the *REPEATS 2* knob to fully CW position. This functionality for *TRACK 2* is the same, but now *REPEATS 1* knob sets the probability value instead.

→ *Note on Repeats knobs for TRACK 1 and TRACK 2 in TRACK MODE: to not get confused which knob controls what for each track you can think of Repeats 1 and 2 knobs as primary and secondary parameters. For TRACK 1 the primary modifier is RATCHETING, hence REPEATS 1 controls this value. For TRACK 2 the primary modifier is also RATCHETING and is controlled by REPEATS 2. Similarly for PROBABILITY, for TRACK 1 this is a secondary parameter and is controlled by REPEATS 2; for TRACK 2 this is also a secondary parameter and is controlled by REPEATS 1. Generally speaking: pattern modifiers are inverted for TRACK 1 and TRACK 2.*

Once you are back to *LIVE MODE* (*TRACK* switch in the middle position) *REPEATS 1* and *REPEATS 2* knobs (4) control the number of *step repeats*. Step repeats add extra steps after the last active step; do not confuse this with ratchets that add (stretch) extra triggers within a single step. By adding step repeats you are extending the overall pattern length that can lead to many different variations and overlaps of the patterns you create, this is where *TRACK RESETS* (6) are your friend to keep the pattern cycles synchronized for more of a structural feeling.

## TUPLET MODE

When the Running Order is externally clocked, you can set the *DIV KNOB* to fully CCW position named *TUPLETS*. This will switch the way repeats behave in the time domain. Usually repeats add extra steps to your sequence, but in *TUPLET MODE* they are stretched within one *beat* or within one  $\frac{1}{4}$  measure. This allows you to create new type of polyrhythms that are usually very hard to achieve using modular synthesizers. And using *REPEATS CV 1 & 2* inputs can make the changes dynamically.

→ **EXAMPLE:** *TUPLET MODE* engaged. If you set the *REPEATS* knob to 3 o'clock, these repeats will play as triplets. If you set *REPEATS* to 4 o'clock, you will get quadruplets and so on. This mode is global, so if both tracks are set to 101-style pattern mode, then the functionality of *REPEATS KNOBS* (4) for both tracks will change to *TUPLET* mode.

# EUCLIDEAN SEQUENCING

The second pattern type is called *EUCLIDEAN*, which is programmed by setting 3 main parameters: *EUCLIDEAN CIRCLE LENGTH*, *EUCLIDEAN FILL AMOUNT* and *PATTERN OFFSET ROTATION*.

To access this mode you first have to enter the *TRACK MODE* by flipping the *TRACK* switch (8) to either *TRACK 1* or *TRACK 2* and hold pressing the *STEP / REST* button for *TRACK 1* or *2* respectively for a few seconds until the main LED on the top lights up in fuchsia color.

By default, the ***EUCLIDEAN CIRCLE LENGTH*** is set to 16 steps, but this can be overwritten by either pressing the *STEP* button to increment the pattern length by +1 step or by pressing the *REST* button, which will increment the pattern length by +16 steps. This way it is easy to create longer patterns, yet still having 1 step precision where you need it.

To set the ***EUCLIDEAN FILL AMOUNT*** (the number of equally spaced active steps within the Euclidean circle), switch back to the *LIVE MODE* and now *REPEATS 1* will set the *FILL AMOUNT* for *TRACK 1*. If *TRACK 2* is also set to Euclidean mode, then *REPEATS 2* will control the *FILL AMOUNT* for *TRACK 2*.

If the Repeats knob (4) is fully CCW, then the fill amount will be 0, meaning that you will not hear any active steps.

# EUCLIDEAN PATTERN MODIFIERS

Now that you understand the basics of this mode let's dive deeper into the internal pattern modifiers available inside the *TRACK MODE* for each of the tracks. Similar as with the 101-style pattern mode there are 2 internal pattern modifiers.

This time the primary parameter controlled by *REPEATS 1* knob for *TRACK 1* is the ***PATTERN ROTATION OR PATTERN OFFSET***. This lets you shift your pattern to make it fit rhythmically with the other patterns. For example if you have the following Euclidean pattern *X-0-0-0-X-0-0-0*, a pattern rotation by 1 step will make it look like this: *0-X-0-0-0-X-0-0*.

The second pattern modifier is ***PROBABILITY***, but this time it is applied to all the steps of the pattern. For *TRACK 1* the pattern probability is set by *REPEATS 2* knob while you are in *TRACK EDIT* mode. Fully CCW means none of the steps will output a trigger and fully CW means the probability of each trigger is 100%.

For *TRACK 2* the pattern modifiers are reversed: *REPEATS 1* controls the pattern probability and *REPEATS 2* controls pattern rotation.

# PATTERNS

Each track has 8 patterns selected by pressing both the *STEP* and the *REST* buttons and rotating the *REPEATS 1 OR 2* knob at the same time. Patterns can be combined as they are selected separately for *TRACK 1* and *2*.

Pattern sequences and last selected patterns are recalled on the module's next power cycle.

The pattern is always stored to the currently selected slot: this is how the pattern saving works on the RUNNING ORDER. The moment you change your pattern, the last changes are stored to memory first and then the new pattern is loaded.

## FIRMWARE UPDATE

Download latest firmware for RUNNING ORDER:

<https://www.endorphin.es/modules/p/running-order>

For that update, you will need to play back the WAV audio file from your computer.

1. Power OFF your modular system.
2. Unplug all the cables from Running Order except simple mono or stereo cable connecting audio output from your computer headphones output to *REPEATS 1 CV IN* jack (4) of the module.
3. Set the output volume of your computer slightly lower than 100%. Disable alarms and notifications during the update process as they will most likely interrupt the update procedure, flight mode on phones is recommended.
4. Hold *STEP* button while powering your system ON again: you will see the status LED (10) slowly blink **BLUE**.
5. Open *Running\_Order\_Update\_xxx.wav* file with any audio player. Hit Play and wait 1-2+ minutes while the firmware is updating. STATUS LED (10) will quickly blink **BLUE\*** during that procedure.
6. If STATUS LED (10) blinks **RED** during update - that means an error occurred in the update and you have to stop the audio file playback, reset the firmware listening to start (single *REST* button press), adjust the audio file playback volume and then start it again.
7. Generally, if you are sending the audio from your computer or phone, we recommend setting the volume to maximum - 1 bar and keeping the *RATE* knob (3) around 9:00.
8. The module will reboot automatically after new firmware is installed.
9. Enjoy new features.

## CREDITS

**ENDORPHIN.ES® – RUNNING ORDER** <sup>3U & 1U</sup>

**FIRMWARE VERSION V 2.5**

**COLLECTION SPRING/SUMMER 2023**

Module idea, hardware design, direction and manual by Andreas Zhukovsky

Manual proofreading, beta testing and demo videos by Wisdom Water

Endorphin.es are made in Barcelona, Spain

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# COMPLIANCE

## FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes / modifications not approved by ENDORPHIN.ES (doing business as Furth Barcelona, S.L.) could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

## CE

This device meets the requirements of the following standards:

EMC: 2014/30/EU

EN55032:2015 ; EN55103-2:2009 (EN55024) ; EN61000-3-2 ;

EN61000-3-3

Low Voltage: 2014/35/EU

EN 60065:2002+A1:2006+A11:2008+A2:2010+A12:2011

RoHS2: 2011/65/EU

WEEE: 2012/19/EU