

# NOH



## COMPER - User Manual

V1.0

## Specs-

The NOH Modular Comper is a musical and complete preset gate sequencer for chord accompaniment. It has the following specs:

- Height- 3U
- Width- 4HP
- Depth- 27mm
- Power- +12V (55mA) // -12V (10mA)

## Description-

The Comper module selects and plays a sequence from a researched and extensive bank of widely used jazz, bossa nova, and pop chord rhythm patterns. It has an output with humanised bass gates, Swing/Straight 8th, and Metre. Finally, it can randomise the pattern at the touch of a button, and works with rhythms in three different time signatures (4/4, 7/8, 3/4).

## Giving Power to the Module-

Supplying voltage to the module requires a 10-pin (5x2) ribbon cable. The cable should be connected to the header on the back of the module. **Care should be taken in matching -12V, usually associated with the red stripe on the ribbon cable, to the “-12V” or the stripe indication on the board.**

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**CLOCK (IN)**



**RESET (IN)**



**RANDOM (IN)**



**RHYTHM (IN)**





**CHORD (OUT)**



**BASS (OUT)**



**EIGHTH (OUT)**



**METRE (OUT)**

**- INPUTS -**



**- CLOCK INPUT -**

The Comper module does not have a clock internally, so needs to be clocked externally. The three available clock resolutions (default is **24ppqn**) and the tested high speed-

<b>PPQN</b>	<b>24</b>	<b>6</b>	<b>4</b>
<b>BPM</b>	<b>320</b>	<b>320</b>	<b>320</b>

To switch the clock to different resolutions, there is a combination to execute when the module is turned on, this is explained later on in the manual ([page 9](#)). The clocks have been tested **up to** 320 bpm, higher tempos might work but could also skip clocks.

**NB - Switching to 4 PPQN can distort some rhythms, triplets will be lost.**



### - RESET INPUT -

When the reset input is pressed the sequence will be reset to zero at the next clock cycle. It expects a rising edge to reset.

This means that to re-reset, the input will first have to be low, and it will then re-reset only once it goes back high.



### - RANDOM INPUT -

The randomization will fully replace the bar by random eighth notes for generative rhythms, according to whether the current rhythm is swung or straight. This is to prevent swung feel on a straight rhythm or vice-versa. This will only affect the chord output.

*When pressed, the randomization will take effect on the next bar, and lasts a full bar at 4/4, 7/8, or 3/4 accordingly.*



### - RHYTHM INPUT -

The rhythm input is a CV input that spans across the entire modular range [-12V ; +12V] and will control the position of the rhythm knob by adding/subtracting to it.

*The rhythm knob is explained later on, the CV input will clip to that knob's range.*

## - OUTPUTS AND CONTROLS -



### - METRE OUTPUT -

The metre output is a quarter note gate at the start of every bar. This is very important as it keeps track of the time signature (4/4, 7/8, or 3/4) and indicates a new measure.

*The gate is a quarter note long no matter the time signature.*



### - EIGHTH NOTE OUTPUT -

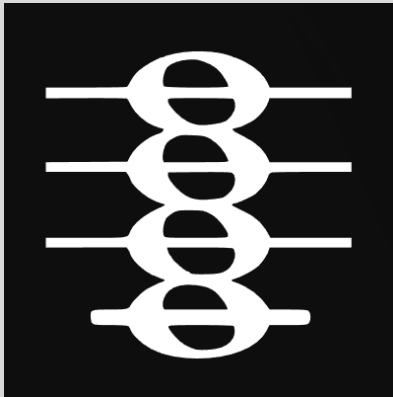
The eighth-note output is a constant sequence of 8th notes, this is important as it indicates whether the rhythm is **swing** or **straight**.

The swing on the Comper is a **triplet** swing. Both 8th note feels are played like the following -



- The top part shows a **straight** 8th feel, which is straight with tempo.

- The bottom part shows a triplet **swing** feel, where every **second** 8th note is slightly delayed to create a swung feel (very prominent in jazz).



### - CHORD OUTPUT -

The Comper has a researched and extensive bank of jazz, bossa, and pop preset chord rhythm patterns. The chord output will output these based on the position of the rhythm knob (below).

The Comper is a **gate** sequencer, so some gates will last for half-notes, some 8th notes, etc.



### - RHYTHM SELECT KNOB -

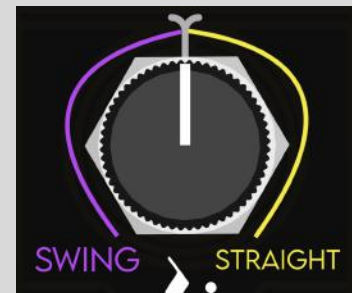
The rhythm knob selects the specific preset rhythm that the Comper plays. At the end of **each** bar, the Comper will read the knob's position (plus the input CV) and play the rhythm it selects. This means that when the knob is turned or the CV is changed, **one bar** will finish before updating to the new rhythm.

#### 4/4 and 3/4 rhythm selection -

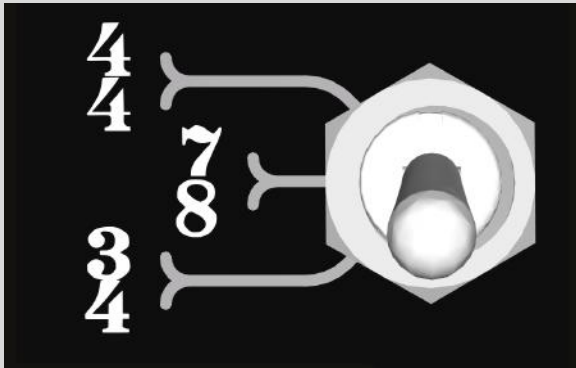
When the switch is on 4/4 or 3/4, the rhythms are sorted by **swing** on the 1st half and **straight** on the 2nd half. This is shown on the image →

#### 7/8 rhythm selection -

When the switch is on 7/8, **all** rhythms will be straight.



**NB -** All rhythms are also sorted by “density” *within* their swing/straight category. Density is defined by both the length of gates but also how many gates there are in a bar. The 1st rhythms in swing/straight have few sparse gates while the ones at the end have much denser rhythms.



### - TIME SIGNATURE -

The time-signature switch selects between three signatures:

- 4/4 (most common time signature)
- 3/4 (the waltz in an example in 3/4)
- 7/8 (less common, but fun to explore)

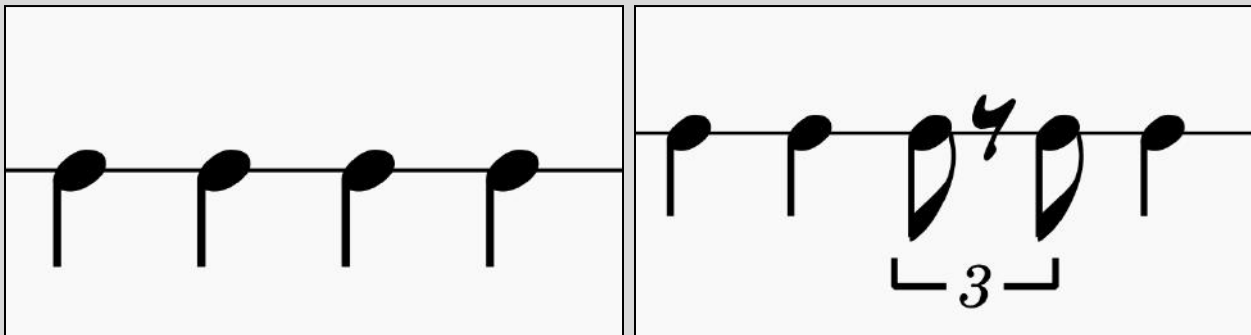
**TIP-** It is highly recommended to explore different time signatures, even if they are not fully understood. However, it is good to note that most 21st Century popular beats/songs are in **4/4**, so this is the go-to signature.



### - BASS OUTPUT -

The bass output is a rudimentary humanised bass rhythm pattern. It has a basic skeleton that is dependent on whether the 8th notes are swung or straight, and has random but musical variations over every bar to add a “human” feel. The skeletons (for swing and straight) are taken from respective jazz (walking bass), bossa nova, and pop bass patterns in order to match the feel of the chord rhythm.

#### Bass pattern for **SWING** rhythms



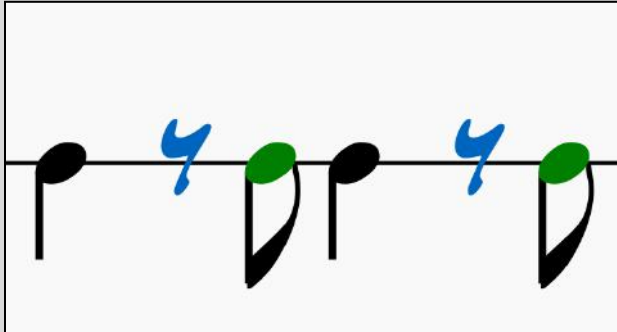
The skeleton for swing rhythms is the same for **all** time signatures, it is a sequence of quarter notes, to simulate a jazz walking bass. The first variation is a swung eighth-note **added before** any of the quarter notes (**1/16** chance). The second variation is that every **second** quarter note is **removed** to leave space (**1/16** chance).

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## Bass pattern for **STRAIGHT** rhythms

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### 4/4

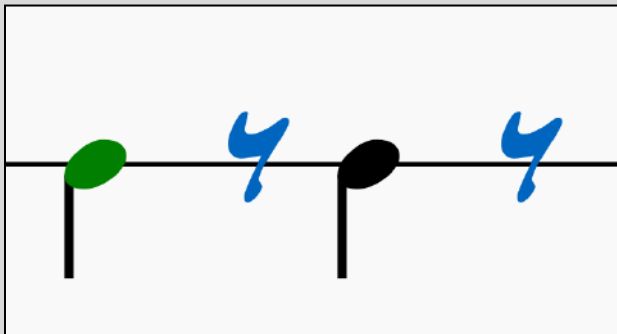


When the switch is on 4/4, the bass adopts a Bossa Nova bass pattern.

The variations are making the rests (**blue**) into notes or turning the eighth notes (**green**) into rests.

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### 3/4



When the switch is on 3/4, the bass adopts a skeleton where the bar is divided equally with quarter notes.

The variations are making the rests (**blue**) into notes (**1/16**) or turning the quarter note (**green**) into a rest (**1/2**).

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### 7/8



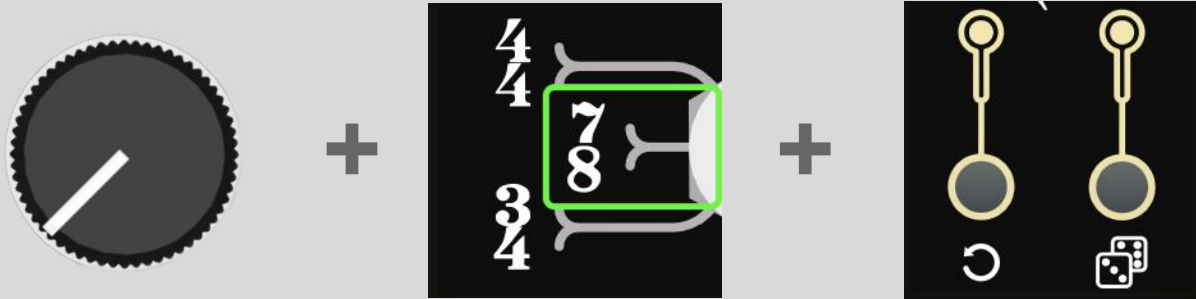
When the switch is on 7/8, the bass adopts a skeleton where every half note are quarter note gates.

The variation is making the rests (**blue**) into notes (**1/16**).



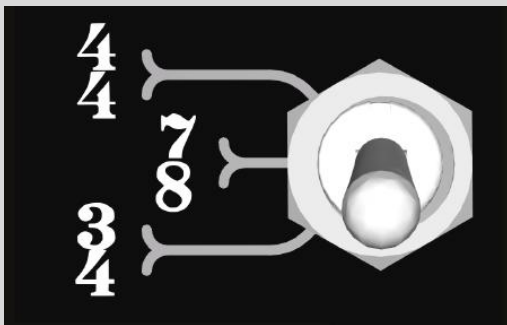
## - CHANGING THE CLOCK RESOLUTION -

### 1- Entering the PPQN menu



- To enter the PPQN menu, the Comper has to be turned **off**.
- Once off, set the rhythm knob at its **lowest** position, the time signature to **7/8**, and finally **hold both** the reset and the random buttons **on**.
- Keep the button pressed and turn the rack **on**, both Reset/Random LEDs should be **blinking**, indicating that the Comper is in the PPQN menu.

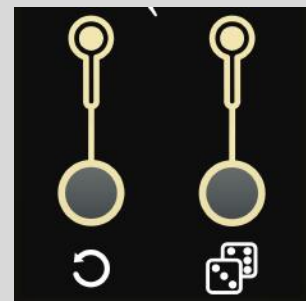
### 2- Setting the PPQN of the Comper



TIME SIGNATURE	PPQN
4 / 4	24
7 / 8	6
3 / 4	4

### 3- Saving the new PPQN setting and Exiting

- Once the new PPQN is selected (as shown above) turn the rhythm knob to its **highest** position, and **hold both** the reset and the random buttons.



- This saves and exits the menu.

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## - ENDING NOTES -

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*The Comper (v1.0) benefited from the help and support of amazing people -*

*Elizabeth Gounari -*

*Design help, prototype testing, and ideas throughout the process.*

**Thank you for reading through the user manual of the  
NOH-Modular Comper**

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