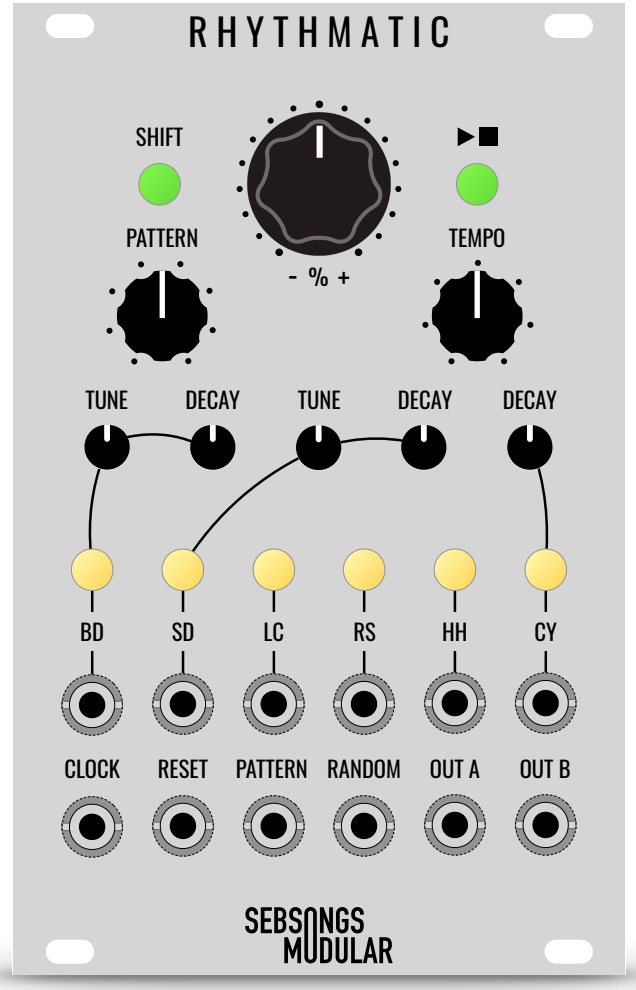
SEBSONGS MODULAR

RHYTHMATIC | User Manual



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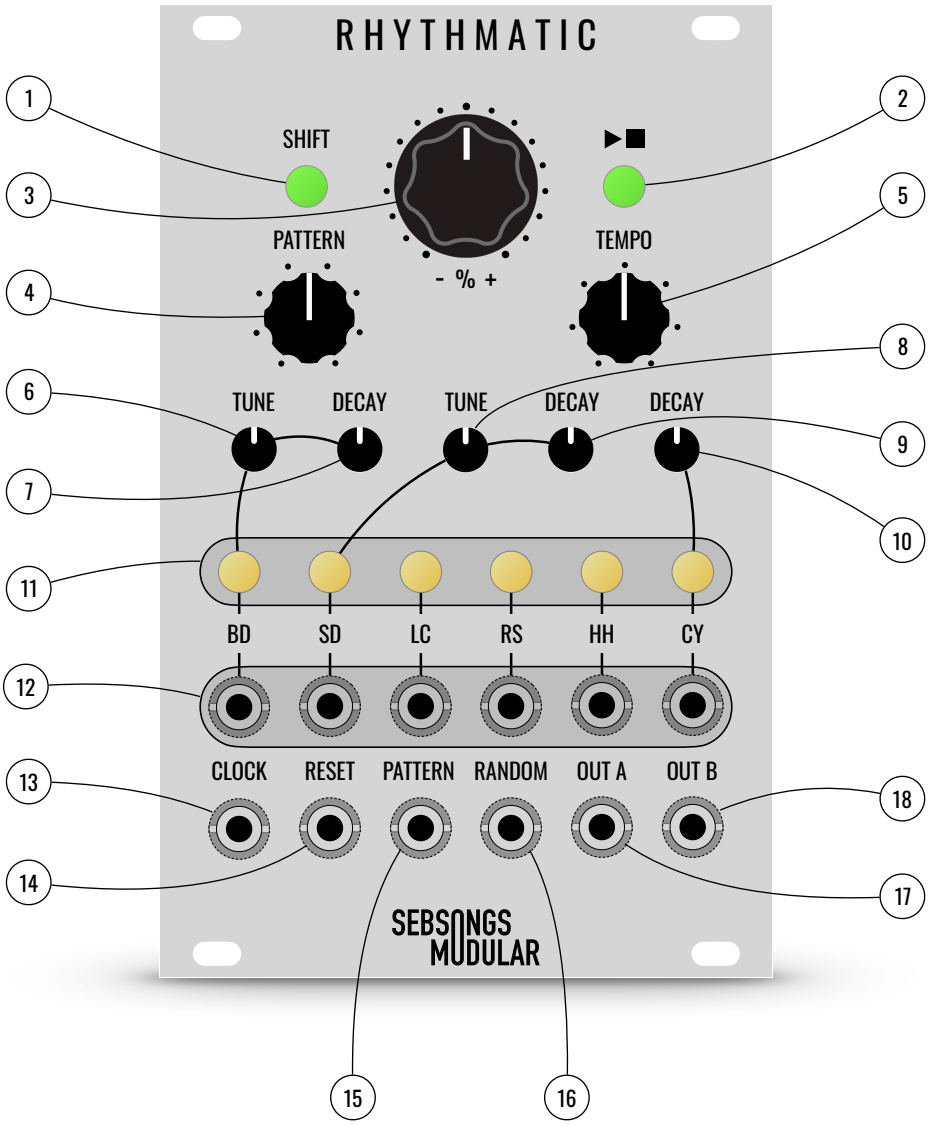

1. Shift button.
2. Play/Stop button.
3. Random knob.
4. Pattern selection knob.
5. Tempo knob.
6. Tune knob for the Bass Drum.
7. Decay knob for the Bass Drum.
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12. Drum channel jacks for trigger inputs or outputs.
13. External clock input jack.
14. External sequencer reset input jack.
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Introduction

Rhythmatic is a fully featured drum machine with six selected analog drum voices derived from the classic CR-78. The available voices are Bass Drum, Snare Drum, Low Conga, Rim Shot, Hi-Hat and Cymbal. It expands on the original by offering adjustable tune and decay controls for the bass drum and snare drum, plus decay control for the cymbal.

The built in sequencer offers 64 programmable drum patterns, up to 16 steps in length. Each drum voice can have its own sequence length, making it possible to create polymetric sequences. Rhythmatic comes with 64 pre-programmed patterns, so you don't have to make your own to get started. The factory patterns contain many of the original CR-78 patterns plus pattern banks created by Sebsongs Modular, Konstantine and Salkinitzor.

A key feature of Rhythmatic is the big knob in the top center. This knob controls a random parameter, which either adds or subtracts steps from the pre-programmed patterns. If you want a more busy pattern, turn the knob clockwise, and if you want a more sparse pattern, turn it the other way. This parameter is a lot of fun for performing live and adding some extra random fills on the fly. Holding the shift button turns the random knob into a 4 bar loop recorder, which will record pattern changes and movement on the random knob.

Rhythmatic also features mute buttons for each of the voices, adding to the performance aspect of the module. Underneath the buttons there are also a jack for each of the voices, and these jacks can be configured to either be external trigger inputs for the drum voices, or trigger outputs from the built in sequencer. Each jack can be individually set to be an input or an output.

External clock and reset inputs are available and the pattern and random parameters can be voltage controlled. Audio output A contains the full mix of all 6 voices. Inserting a patch cable to output B splits the voices in half between the two outputs. All in all Rhythmatic offers classic sounds and rhythms, programmability and live performance features that make it a unique addition to the Eurorack drum module market.

Playing patterns

Selecting a pattern

The sequencer in Rhythmatic can hold 64 patterns and these are organised in 8 banks with 8 patterns per bank. To select a pattern, simply adjust the PATTERN knob. To select a bank, adjust the PATTERN knob while holding the SHIFT button. When patterns and banks are being selected, the LED lights in the 6 channel buttons will illuminate to show the currently selected pattern or bank. The first four LEDs from the left is displaying position one through four. The last two LEDs indicate if the first or the second half of the patterns is being selected.

For example, pattern 3 would be indicated like this:

And pattern 6 would be indicated like this:

Rhythmatic comes with 64 preprogrammed patterns. See appendix A for a complete list of the patterns and banks.

Starting and stopping the sequencer

To start playback of a currently selected pattern, simply press the ►■ button. The LED will illuminate in green and the sequencer will start playing. Press the same button again to stop playback. The sequencer will always start playing from the first step of the pattern.

Muting the drum channels

Each individual drum channel can be muted and unmuted. When the sequencer is either stopped or playing, the six channel buttons with yellow LEDs can be used for muting. Simply press once to mute (LED indicator will be steadily ON to indicate that the channel is muted) and press once again to unmute.

Adjusting Tempo

To adjust the tempo of the sequencer, simply turn the TEMPO knob. The range of the tempo knob is 30 BPM at the lowest setting and 960 BPM at the highest. The knob is weighted exponentially so that the most useful tempos are in the majority of the knob range, with 120 BPM approximately at 12 o'clock on the knob scale.

Adjusting Swing

The sequencer has the ability to swing the internal clock. To adjust the amount of swing, turn the TEMPO knob while pressing and holding the SHIFT button. When the TEMPO knob is at 12 o'clock on the knob scale, there is no swing added. Turning the knob clockwise postpones every other beat increasingly, creating positive swing. Turning the knob counter clockwise from the 12 o'clock position prepones every other beat increasingly, creating negative swing.

Note that the swing setting is stored for every pattern, and is thus not a global parameter.

Randomising playback

One of the unique features of the Rhythmatic sequencer is the random knob, labelled % on the panel. This knob controls a random function which either adds or subtracts steps randomly based on the preprogrammed patterns. If a more busy pattern is desired, turn the knob clockwise, and if a more sparse pattern is desired, turn it the other way. In its center position, the patterns are played back exactly as they are programmed. The more the knob is increased or decreased, the higher the probability will be of a drum hit being added or subtracted. The probability is 100% in the outmost positions, either resulting in total silence or every drum hitting on every step.

4 bar loop recorder

The random knob can also be a 4 bar loop recorder, which will record pattern changes and movement on the random knob and then play the loop back indefinitely.

To start recording into the loop, hold SHIFT and turn the random knob clockwise until you see the three rightmost voice button LEDs illuminate. Now let go of the SHIFT button. The loop will now store everything that is heard, so pattern changes and random knob movements.

To play back the loop, or "lock" the loop, hold down SHIFT and turn the random knob counter clockwise past its center position until the three leftmost voice button LEDs illuminate. Now the last 4 bars that was recorded will play back in a loop.
Note that the loop recorder is recording 4 bars and not 64 steps, which perhaps would be the most intuitive. However, patterns can be anything from 1 through 16 steps long, thus a 12 step pattern would result in a 48 step long loop, which would make more sense musically. To exit the loop mode and go back to normal pattern playback, hold SHIFT while returning the random knob to its center position, and watch the voice LEDs turn off completely.

The 4 bar loop is not saved when the module is powered off.

Adjusting the sound of the drum voices

Below the sequencer buttons and knobs there are 5 adjustment knobs for the drum voices:

BD Tone: adjusts the pitch of the bass drum.
BD Decay: adjusts the decay of the bass drum. It can go in to self oscillation depending on the pitch setting.
SD Tone: adjusts the pitch of the snare drum's tonal component.
SD Decay: adjusts the decay of the snare drum's white noise component.
CY Decay: adjusts the decay of the cymbal.

Programming patterns

The sequencer in Rhythmatic can be programmed two ways, either using the buttons on the front panel, or by connecting the module via USB to a computer and using the online pattern editor.

Rhythmatic comes preprogrammed with patterns and programming new patterns will overwrite the factory patterns. There is however a factory reset function (see "Calibration and reset operations") and the factory patterns can always be reinstated.

Rhythmatic consists of 6 drum channels, and each channel can be individually programmed for every pattern and bank. The maximum step length for each pattern is 16, however each channel can be programmed to different lengths. The bass drum pattern could for instance be 9 steps long while the snare drum pattern is 12 steps long. This enables a lot of creativity with the possibility of making evolving polymetric patterns.

Please note: entering programming mode will not erase the pattern that is being programmed! This can be a bit confusing in the beginning because the patterns are programmed one channel at a time, and the preexisting patterns of the other channels that are not being programmed at that moment will still be there until they are overwritten. The sequencer is designed that way so that patterns can be easily edited on the fly without losing data unintentionally.

To create a pattern from scratch, start by programming a one step rest into every channel. Then proceed with programming the desired pattern.

Entering and exiting the programming mode

To enter the programming mode, simply double press the SHIFT button. The SHIFT LED will start flashing rapidly. To exit programming mode, press the ▶■ button. The SHIFT LED will turn off to indicate that programming mode has been exited.

Programming or editing a pattern via the front panel

1. Start by selecting a bank and pattern, for instance bank 1, pattern 1.
2. Enter programming mode as previously described.
3. Select a drum channel to be programmed by pressing the corresponding button, for instance BD.
4. The LED of the selected drum channel will illuminate. Now the BD channel is ready to be programmed.
5. To program a step, press the drum channel button. The drum voice will be triggered to indicate that it has been programmed.
6. To program a rest/pause, press the SHIFT button.
7. When finished programming, either press the ▶■ button to exit programming mode, or press another drum channel switch to continue programming the next drum channel. Pressing another drum channel will firstly turn the previous channel LED off, and pressing the new drum channel again will turn the new channel on. Then go back to step 5 and continue in the same manner.

Programming or editing a pattern via the online pattern editor

The online pattern editor can be found here: https://rhythmatic-editor.sebsongs.com/

Programming patterns via the online pattern editor gives more control and overview of the programming process. In addition to programming patterns, the online pattern editor can also generate random patterns and save batches of patterns to .csv files.

There are some prerequisites for using the online pattern editor:

- Mac or Windows PC running a recent version of Google Chrome.
- Micro USB cable.

1. Connect the USB cable to the microcontroller board (Raspberry Pi Pico) on the back of the module, and connect the other end to your computer.
2. Power up the module.
3. Start Google Chrome and go to the previously mentioned website.
4. Click the “Connect Device” button. It will list “Pico” as a device. Click “Connect”. The connection between the computer and the module should now have been established.
5. By default, bank 1 and pattern 1 has been selected in the editor. Try clicking “Read Current Pattern” to read pattern 1 from bank 1 in to the editor. The editor should now visually update to show the pattern.

6. Make some edits to the patten and click “Send Current Pattern”. Press play on the module to listen to the new pattern.

Control inputs and outputs

Drum channel trigger inputs/outputs.

For all 6 drum channels there are corresponding jack sockets. As default they are configured to be inputs for triggering the separate drum voices externally. The inputs are protected from negative voltage and can handle normal clock and modulation signals in the Eurorack environment.

Each channel jack can also be configured to be a trigger output for the internal sequencer, making it possible to use the internal sequencer to trigger other drum voices and modules, or perhaps to clock external sequencers. To learn how to configure the drum channel jack sockets as inputs or outputs, see section “Configuration mode”.

Please note that the maximum output voltage that the drum channel jacks can produce is around +3.1V, and it may not be enough for every module on the market. However, in testing, most modules have responded well to the trigger signals of Rhythmatic’s drum channel outputs.

Clocking the sequencer externally

To clock the sequencer with an external signal, use the CLOCK input. As soon as a patch cable is inserted to the CLOCK input, the internal clock is disengaged and the sequencer waits for external clock. The sequencer steps one step forward on a rising edge of a clock, gate or trig signal. Signals can be anything from +3V to +10V, and the input tolerates negative voltages as well.

Resetting the sequence externally

The RESET input resets the sequencer to the first step of the currently selected pattern. Any trigger, gate or LFO signal can be used for resetting the sequencer.

Selecting patterns via control voltage

The PATTERN control voltage input enables voltage control over the pattern selection parameter. It works in tandem with the PATTERN knob, so if the knob is at the center position, a negative voltage on the CV input will select a pattern below the knob position and vice versa.

Note that the PATTERN control voltage is also engaged when selecting a pattern bank, thus holding SHIFT and feeding a modulation source into the PATTERN control voltage input will result in the pattern bank being changed.

Randomising the sequence via control voltage

The RANDOM control voltage input enables voltage control over the random parameter. It works in tandem with the random knob, so if the knob is at the center position, a negative voltage on the RANDOM CV input will decrease the random parameter and vice versa.

Note that the RANDOM control voltage is also engaged when holding SHIFT, thus and feeding a modulation source into the RANDOM control voltage input will result in the 4 bar looper being engaged.

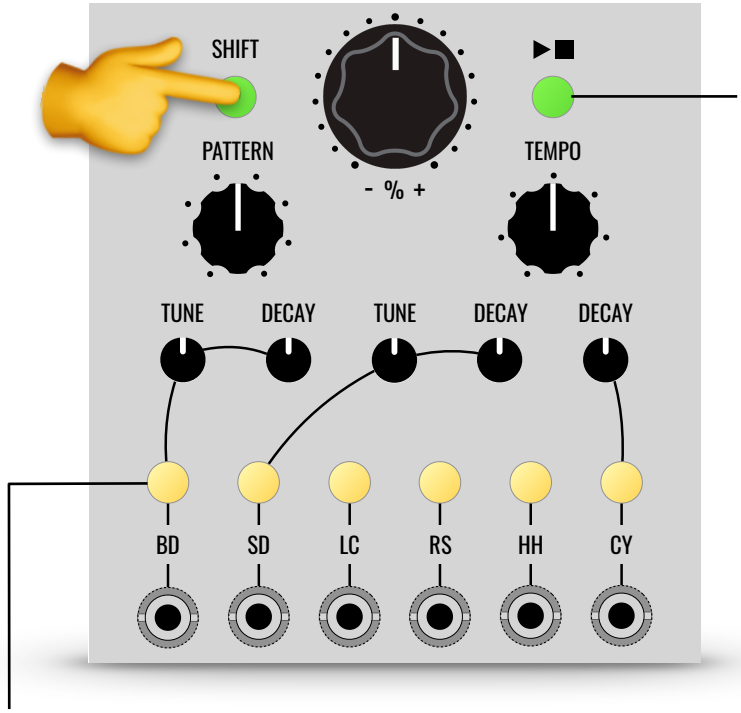
Audio outputs

Rhythmatic is equipped with two audio outputs; output A and output B.

Output A is the main output and it delivers the full mix of all six drum voices. Plugging a patch cable into output B splits the drum voices between output A and B. In this case, output A contains BD, SD and LC, and output B contains RS, HH and CY. This can be used to give some more mixing variation or to process some of the voices separately, for instance putting the BD, SD and LC through distortion.

Configuration mode

To enter configuration mode, press and hold the SHIFT button for around 3 seconds. The SHIFT LED will start flashing in a slow pace. Keep the SHIFT button pressed to stay in configuration mode. To exit configuration mode, simply let go of the SHIFT button.



Pattern selection behaviour

LED OFF: The new pattern plays instantly on the next clock pulse.

LED ON: The last pattern finishes before a new pattern is played. Note that for polymetric sequences, the pattern length is determined by the longest channel sequence.

Drum channel jacks behaviour

LED OFF: The corresponding drum channel jack is configured as INPUT to trigger the drum voice from an external source.

LED ON: The corresponding drum channel jack is configured as OUTPUT to trigger external drum voices or clocking sequencers.

Calibration and factory reset

Restoring factory patterns and settings

To restore the factory patterns and reset all settings to their default states, please follow this procedure:

1. Power OFF the module.
2. Press and hold the SHIFT and ▶■ buttons.
3. Continue to hold the buttons pressed down as the module is powered back ON.
4. The drum channel LEDs will animate as a progress bar going from left to right.
5. When the LED animation has stopped, let go of the buttons. Factory reset has been successful!

Calibrating the Pattern and Random knobs

To ensure the precision of the pattern and random knobs, they can be calibrated with this easy procedure:

1. Power OFF the module.
2. Turn the pattern and random knobs all the way counter clockwise i.e., to their minimum positions.
3. Press and hold the SHIFT button.
4. Continue to hold the SHIFT button pressed down as the module is powered back ON.
5. The drum channel LEDs will light up from both sides animating in towards the middle.
6. When the LED animation has stopped, let go of the SHIFT button. The pattern and random knobs are now calibrated!

Adjusting the LC drum voice.

The LC (Low Conga) pitch and decay can be adjusted via small blue trimmer potentiometers on the back PCB:

- R15, also marked LC PITCH, adjusts the pitch of the LC voice.
- R29, also marked LC DECAY, adjusts the decay of the LC voice.

Please note that adjusting the decay can easily send the LC voice into self oscillation, so make the adjustment with the volume on your speakers/headphones turned down low.

Adjusting the white noise levels for SD and HH/CY.

The SD, HH and CY voices share a common noise generator, however the levels of the noise for the voices can be adjusted via small blue trimmer potentiometers on the back PCB:

- R56, also marked SN NOISE, adjusts the audio volume of white noise for the snare drum.
- R60, also marked CY NOISE, adjusts the audio volume of white noise for the cymbal and hi-hat.

Please note that the trimmers are inverted, turning them clockwise decreases the volume and vice versa.

Specifications

- Size: 16 HP
- Depth: 40 mm
- Current draw: +142 mA / -10 mA
- CV input range: +/- 5V
- Gate & Trigger input voltage: +3,3 - 10V
- Trigger output voltage: +3,1V

Appendix A

List of factory patterns and banks

Bank 1 - CR-78 Patterns
1. ROCK - 1A
2. ROCK - 1B
3. ROCK - 2A
4. ROCK - 2B
5. ROCK - 3A
6. ROCK - 3B
7. ROCK - 4A
8. ROCK - 4B

Bank 2 - CR-78 Patterns
1. DISCO - 1A
2. DISCO - 1B
3. DISCO - 2A
4. DISCO - 2B
5. BOSSA NOVA - A
6. BOSSA NOVA - B
7. SAMBA - A
8. SAMBA - B

Bank 3 - CR-78 Patterns
1. MAMBO
2. CHA CHA
3. BEGUINE
4. RUMBA
5. FOXTROT
6. TANGO
7. ENKA - A
8. ENKA - B

Bank 4 - CR-78 Patterns
1. SHUFFLE - A
2. SHUFFLE - B
3. SLOW ROCK - A
4. SLOW ROCK - B
5. SWING - A
6. SWING - B
7. BOOGIE - A
8. BOOGIE - B

Bank 5 - Sebsongs' Shuffle Patterns
1. SHUFFLE 1 (OXYGEN IV)
2. SHUFFLE 2
3. SHUFFLE 3
4. SHUFFLE 4
5. SHUFFLE 5
6. SHUFFLE 6
7. SHUFFLE 7
8. SHUFFLE 8

Bank 6 - Konstantine's Funky Patterns
1. FUNKY 1
2. FUNKY 2
3. FUNKY 3
4. FUNKY 4
5. FUNKY 5
6. FUNKY 6
7. FUNKY 7
8. FUNKY 8

Bank 7 - Konstantine's Even & Odd Patterns
1. EVEN & ODD 1
2. EVEN & ODD 2
3. EVEN & ODD 3
4. EVEN & ODD 4
5. EVEN & ODD 5
6. EVEN & ODD 6
7. EVEN & ODD 7
8. EVEN & ODD 8

Bank 8 - Salkinitzor's Patterns
1. FUNKY SWING 1
2. FUNKY SWING 2
3. AMEN 1
4. AMEN 2
5. HEAVY METAL
6. SMOKE BREAK
7. FUNKY SWING 3
8. HENRIK