RT-311 SWARM OSCILLATOR

A short summary in english…

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1.) The RT-311 Swarm Oscillator

The RT-311 SWARM OSCILLATOR is a DSP-based, Eurorack-compatible oscillator module with two groups of 8 mutually detuneable oscillators. Of course not all 16 oscillators have to sound at the same time. Depending on the settings, you can also use one single oscillator at each of the two outputs as a sound source. Both oscillator banks feature smooth transitions between waveshapes and the Spectralis known TLM modulation (a variation of the pulse width modulation, which can be applied to all waveforms) plus exponential frequency modulation (FM), linear FM modulation (PM) and oscillator synchronisation.
The sound parameters of the RT-311 can be automated. To do so, you save several snapshots of the parameter settings and later interpolate between a selectable number of these snapshots with an internal LFO or an external modulation source.

To control the pitch, the RT-311 has a control voltage input calibrated to 1V / Oct. This input can be quantized as required. During the quantization, only pitches of a certain tone sequence (scale) are output. In this way, you can create inspirational melodies and sequences by applying an LFO modulation voltage.

1.1.) Basic operating modes

The RT-311 Swarm oscillator has 6 operating modes:

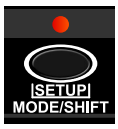
I. Manual Mode
II. Interpolator Mode
III. EDIT Snapshot Mode
IV. Configuration-Edit Mode
V. Save and load programs.
VI. Photo-Mode

1.1.1 Brief description of the operating modes:

I. Manual-Mode (default after power up or Tap the Mode-Button)

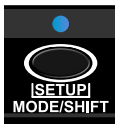
After switching on, the oscillator is in manual mode. The LED above the manual button lights green in this operating mode. In manual mode, the oscillator behaves like an analog module - the sound exactly matches what you would expect from the knob settings. In this mode, you will hear parameter changes directly. This mode is ideal for exploring the sonic possibilities of the Swarm oscillator. If you are in another mode, simply press the Manual-button until the LED above the button lights green.—>page 07

II. Interpolator-Mode (Tap Mode/Shift-button)



After tapping the Manual/Shift-button, the assigned LED lights up red and the Interpolator mode is active. In this mode, everything revolves around the cyclic traversal of sound settings (snapshots) with or without soft interpolation. Interpolation means that the snapshots are not switched abruptly, but are crossfaded from one setting to the next. The transition can be performed via a control voltage, an internal LFO or the big knob. If you want to go back to Manual mode, tap the Mode/Shift-button again. The LED will turn green. At the moment, the panel's sound settings are reloaded. Note that the current sound of the cycle mode will rarely match the sound of the panel settings. If you want to edit only one of the participating snapshots, switch to the third choice - the Edit Snapshot mode. ->page 11

III. Edit-Snapshot Mode (Hold Mode/Shift-button while selecting the desired snapshot with the Big Knob.



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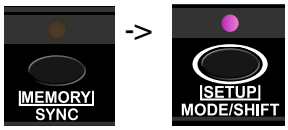
In this mode, you can edit, save, and delete the snapshots mentioned above. The selection is made by selecting a snapshot while holding down the Mode/Shift-button pressed. The LED of the Mode/Shift-button lights up blue in this mode. The controls are used to edit the selected snapshot and store it by pressing the Snap-button. If you want to save the snapshot to another position of the circle, simply select it and press the Snap-button again. In the Edit-Snapshot-mode, the controls operate in value-editing mode. You must then use the knob of the parameter to pick up the currently set value before a change is made. —>page 16

IV. Configuration-Edit-Mode (Hold Mode/Shift-button)

If you hold the Mode/Shift-button longer, you will see an LED animation of a circle that closes from the bottom to the top. As soon as all the LEDs of the circuit light up and one releases the Mode/Shift-button, you have reached the Configuration-Edit submenu. It now shines white. In configuration edit mode, you can set various device parameters. This includes for example the general brightness of the LEDs or the color of the snapshot animation, the modules tuning etc. —>page 17

V. Memory Mode: Save and load programs (Hold the Memory/Sync-Button)

When you press the Memory button on the left side, you will see an LED animation that closes a circle from bottom to top. As soon as the circle is closed, you have reached the memory mode. The Manual LED will now light purple. In Memory mode, you can store and recall complete oscillator setups (oscillator settings plus snapshots and animation settings). ->page 18



VI. Photo-Mode (Hold Mode/Shift-Button and tap the Sync-Button)

One of the most important activities in the modern synthesizer studio is the creation of Selfies for the social networks. In order to display the Swarm Oscillator in the best light, you have the possibility to choose the color of the LEDs individually for a photo and to keep it permanently on. Hold down the Mode-button and tap the Memory-button. Now you can select an LED with the Big Knob and select the color with the Data/Value-knob. Pressing the Mode-button again will exit this mode.

1.2.) General operating instructions

I. Parameter value quantization

When setting parameters, you are likely to occasionally find a way to facilitate the specific selection of certain parameter values. So it is not uncommon to have two oscillators tuned to different octaves. At such moments, digital technology can play out its advantages! Turning the Octave Tune knob while holding the Mode/Shift-button will set the octaves on the knob without any intermediate steps. This function also works with many other parameters. Tuning in exact half-tone steps is just as easy as selecting the basic waveforms direct.

II. Parameter-Visualization A

When a parameter is set, the LEDs around the Big Knob are used to visualize parameter values. Steps up and down are visualized with a "wander" of the LED light. Since the LEDs around the Big Knob, besides this parameter visualization, also represent other things - such as the status and selection of a snapshot memory - they represent the value of a parameter only for a short moment during editing. The display then returns to the previous display back.

II. Parameter-Visualization B

In some menus, the color or brightness of an LED is changed to indicate a status change. As described above, snapshots are selected with the Big Knob in Edit Snapshot mode. The eight LEDs represent the status of the snapshot slots during the selection. Saved Snapshots appear in green color, muted snapshots in red, empty snapshot memories without color, and the selected snapshot lightens the LED color. The table shows the color representation of the LED circle.

Colors of the circle LEDs when selecting snapshots.				
Snapshot State		Saved	Saved but muted	empty
Led colors	Before selection			
	After selection			

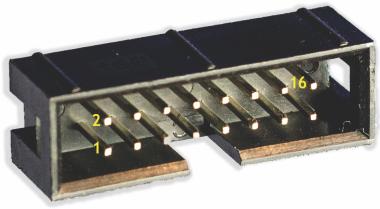
Later, when we look at the possibilities of snapshot automation, we will look more closely at the selection, storage, and mute of snapshots.

1.3) Installation of the module

Before going into the detailed consideration of the RT-311 features, we first look at the installation in the Eurorack housing.

Before you begin installing the module, you should disconnect the power plug or the power supply.

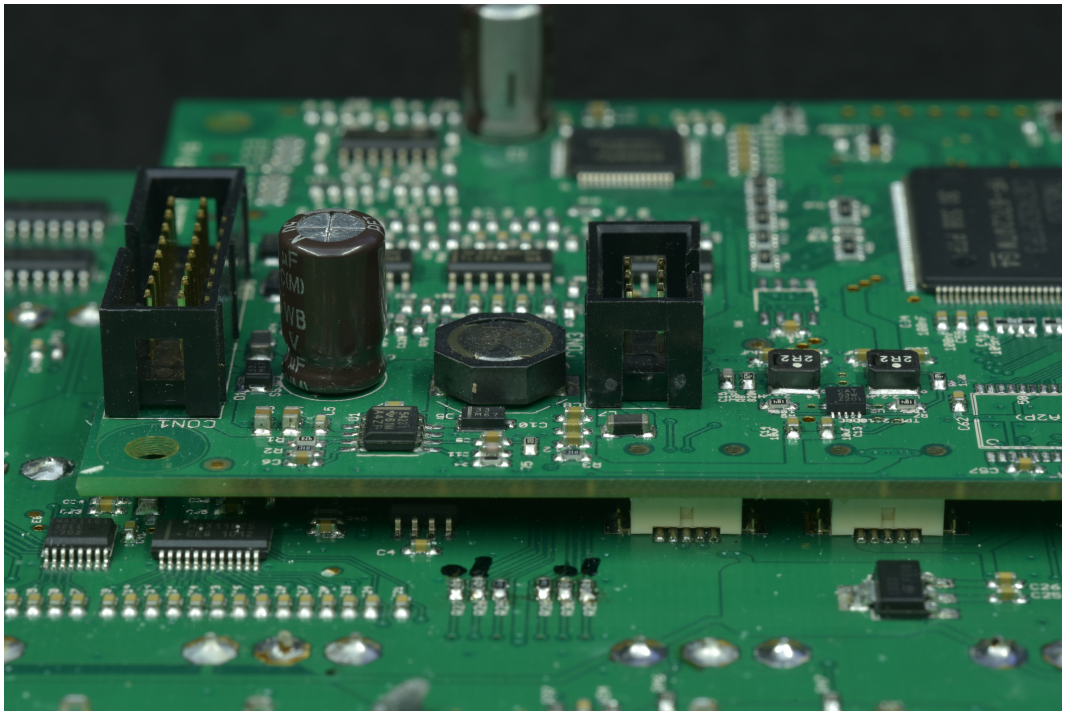
Next, you will need to measure the power requirements for all modules installed in the enclosure plus the new RT-311 Oscillator (12V 250mA, -12V 80mA). To estimate the current consumption, simply sum positive currents of all modules and then all the modules negative currents. The power requirement of all modules should be below the specifications of the housing power supply.



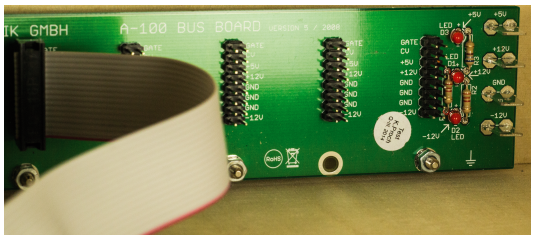
In the Eurorack world a 16-pin IDC connector system has prevailed. In the illustration above you see a typical 16-pin box connector plug, but unfortunately it is not used by all manufacturers. The good thing about such a plug is that you can connect the IDC sockets of a flat ribbon cable only in one direction with the plug. IDC sockets have a "nose", which must be inserted into the box connector as seen above - and of course this only works with correct alignment. But even more important - the delicate pins of this plug connection are protected against mechanical loads with the help of the box. On "bended" follows quickly "break", if one tries to bend the pins into shape multiple times.

The RT-311 module consists of two PCB boards that are stacked on top of each other. The smaller board is the DSP circuit board, the larger carries the controls and is bolted to the front plate. Before installing the module in the Eurorack housing, you should check the correct position of the DSP board. Make sure that all circuit board connectors are straight and have a firm hold.

Now take the included flat ribbon cable and plug it into the 16-pin idc box socket of the DSP board. The 16 pin box socket is easy to recognize (CON1). Make sure that the DSP board is not exposed to unilateral pressure while inserting the idc socket into the box plug, and that the backplane connectors remain in place.



Now take a look at the power supply bus board of the modular system and the connection cable of the new module. The first wire is marked red in the supplied flat ribbon cable. On the bus board in a Eurorack housing, the lowest two contacts carry -12V. Please ensure that the first wire with the red marking is always connected to the -12 7Volt side of the base. Unfortunately, the bus system does not have any polarity protection.



Once you have connected the cable, you can place the module in the correct position and install it using the enclosed screws and washers. Please use the plastic washers - so you can largely exclude damage to the painting and silkscreening.

If everything has worked out and you have checked the connections, you can turn on the power. At the same time a few of the LEDs should light up. If this is not the case, interrupt the current immediately and search for the error. In most cases, however, the oscillator will now work and we can focus on the operation.

2.) The operation in detail

We come to the actual operation. It is best to make three connections:

1.) RT-311 OUT 1 - this is the audio output of the first Oscillator bank.
2.) RT-311 OUT 2 - this is the audio output of the second Oscillator bank.

Connect both outputs so that you can listen to both oscillators.

3.) 1V/Oct Input - this input connects to the CV output of a CV keyboard, a MIDI/ CV interface or or to any modulation source.

When you have established the connections, we start learning the module in manual mode.

2.1) Manual-Mode

When testing the Manual-mode, please make sure that the Mode/Shift-button LED is lit green. If this is not the case, tap the Mode/Shift-button until the LED color changes to green. In most cases, this is the case after a single tap.

2.1.1) Oscillator 1

TUNE

The Tune knob in the upper left shifts the pitch of both oscillators by semitones. With it, the entire Swarm oscillator can be transposed. The pitch change is smooth but if you hold down the Mode/Shift-button during the input, the parameter locks at Halftones without intermediate stages. The value visualization of the LED ring reminds on the arrangement of the keys on a keyboard. White buttons are displayed with white LEDs and black buttons with two dark blue LEDs. In the middle position "C" the LED lights up bright in the middle. A position to the right follows on the keyboard a C # - a black button. When you turn the Tune knob to the right, the middle LED and the closest one are dark blue. This is followed by a white key on the keyboard. Since it is the second white key, the second LED lights up brightly.

OCTAVES

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The Octaves knob changes the frequency of both oscillators by several octaves infinitely. Holding down the Mode/Shift-button while setting it will switch the frequency by whole octaves instead. The behavior then corresponds to the rotary octave switches of vintage synthesizers.

WAVE

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With the Wave-Knob, you can adjust the waveshape infinitely. By pressing the Mode/Shift button, the selection of the oscillation shape can be engaged at the fundamental waveforms like the sine, triangle, sawtooth and rectangle/PWM. The LEDs then display the selected waveshape.

TLM

TLM (Time Linearity Modulation) deforms the waveshape of the oscillator waveform. A modulation of time linearity? You are sure to ask yourself spontaneously whether it is possible to travel through time with the help of TLM? But we must disappoint you. The physical phenomena involved are not yet sufficient. At least our TLM does not prevent time travelling.

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TLM is a modulation which splits any waveforms in the middle and subsequently expands and compresses the first and second half waves. Thus, while the first half is stretched, the second half is compressed by the same amount so that the resulting pitch remains the same. They all know this from pulse width modulation. The more universal application of the TLM allows you to change the sound of any waveform.

If you press and hold the Mode/Shift-button, you can reach the center neutral position more conveniently, because the parameter will get a catch range at the neutral position and snap into place.

2.1.2) Oscillator 2

DETUNE

In the following description, we will assume that the octave parameter knob of oscillator 2 is in the neutral center position. Now you can return to the Detune knob. In the middle position the oscillators are not detuned. If the knob is turned to the left, the two oscillators or oscillator swarms will be detuned in opposite direction.
In doing so, oscillator 1 is pitched down and oscillator 2 is pitched high. The tuning range to the right of the center position is designed for larger pitch intervals. Therefore, only the tuning of oscillator 2 will change in this range when turning the knob to the right. Pressing the Shift/Mode key will snap into semitone steps. Above the interval range, this controller produces cluster sounds when the swarm density is set to - a wild mix of different pitches, which is well suited for the production of bell-like sounds.

OCTAVES

In the middle position, the second oscillator plays the same octave as oscillator 1. Values above and below shift the pitch. Press and hold the Mode/Shift-button to cycle through the octaves. With this control you can create drastic sound changes, if the oscillator synchronization has been activated (press the SYNC key). The pitch is determined exclusively by oscillator 1 in this case. Oscillator 2 is synchronized to oscillator 1 and the sound is dependent on the frequency ratio of the two oscillators.

WAVE

The Waveshape knob of Oscillator 2 behaves like the Waveshape controller of Oscillator 1.

TLM

The behavior of the TLM parameter is identical to the TLM parameter of Oscillator 1

2.2) Swarm Parameters

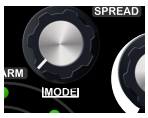
DENSITY

Density controls the number of oscillators involved in the swarm. In the 0 position, the module operates like an ordinary dual oscillator. If the control is adjusted to the right, up to 7 additional copies of the oscillators are added. You may wonder that adding additional oscillators will not cause a volume change. For simpler adjustment in the modular system, we have compensated for the change in loudness. Thus the RT-311 always remains approximately the same regardless of the number of oscillators used - a constant adjustment of the following modules is not necessary.

Mode/Shift + Density (Akkord-Auswahl)

When you turn the density parameter knob while holding down the Mode/ Shift-button, you can use the knob to select complete chords as tuning presets for the swarm oscillator copies. In the middle position the normal swarm sounds without chord tuning. To the right of the center you will find major chords and left of the middle minor chords. The chords are always composed of a maximum of 8 notes. How many notes of a selected chord can be heard are controlled by the density control after releasing the mode /shift-button. If the density control is set to 0, you will not hear a chord, of course, because the swarm is not active and only the root note will sound. If you only want to hear three-part chords, simply set the density knob to 2 swarm copies. At higher density settings you will hear greatly expanded chords in different versions.
HINT: Keep in mind that you can store chord settings into the snapshot memories. Via the external Pos (position) input, you can therefore call snapshots with different chords via a sequencer line and control the pitch via a second sequencer line. Complex chord connections are possible in this way.

SPREAD



In Manual-Mode the spread parameter controls the detuning of the oscillator swarm. In the Interpolator-Mode this knob has a different meaning. We will learn the spread control later in connection with the snapshots and their interpolation with additional functions.

2.3) Modulation-inputs and modulation-depths.

FM01, FM02 and DEPTH-knobs

Via the FM-01 input, you can feed in an audio or modulation signal that modulates oscillator one's pitch. The Depth knob controls the amount of frequency modulation. If there is no cable in the input connector, the controller sets the internal frequency modulation (left from center) or the linear frequency modulation (PM) through oscillator two (right from center). Turning this FM-depth parameter knob all the way to the left, the pitch tracking of the Oscillator 1 FM voltage input tracks with 1V/octave. This option offers oscillator 2 at its FM-2 input as well. In this way, the RT-311

can be controlled like a two voice polyphonic module. Both oscillator swarms have independent outputs. That allows for processing both audio signals independently. In conjunction with our RT-451 Dual Filter Module, you have independent multimode filters for both outputs.

1V/Oct-Input and Scale-knob

This jack accepts the keyboard voltage in Volt/Octave. The corresponding parameter knob for setting the scale quantize function is directly there above. In the middle of the range, the quantization grid is switched off and the pitch control is infinitely variable. To the right, you can select scales that have a major character and to the left you will find minor scales. Here is a list of all available Scales:

-7: PentatonicMinor
-6: BluesMinor
-5: GipsyMinor
-4: MelodicMinor
-3: HarmonicMinor
-2: NatureMinor
-1: Dorian
-0: Not quantized/default (mid position)
+1: Chromatic
+2: DiatonicMajor
+3: Lydian
+4: Mixolydian
+5: Hexatonic
+6: BluesMajor
+7: PentatonicMajor

With the Tune control of Oscillator 1, one can transpose the scales into other keys.

FM-02 and Depth

You can probably imagine this - this is about the external or internal frequency modulation of Oscillator 2.

Out1 and Out2 and Mix-knob

These are the two oscillator outputs. The Mix control above the jacks allows you to change the output routing of the oscillators. In the center position of the MIX controller, the oscillator 1 signal passes to output 1 and the oscillator 2 signal to output 2.
Turning the control to the left, the oscillator 2 signal is added to the oscillator 1 signal (OUT1). Oscillator 2, however, output 2 is still obtained. To the right of the control path, the output behaves accordingly, except that the output signal from oscillator 1 is added to the signal of oscillator 2. Oscillator 1 continues to appear at output 1 in this setting.

Mode/Shift button

The Mode / Shift button toggles between Cycle mode and Manual mode. It can also quantize parameter changes during editing. To do this, hold down the key during the parameter input. Some controllers have an alternative controller assignment. The alternative parameter is highlighted with an upwardly open frame.

3.) Interpolation-Mode

You might wonder what the word "interpolator" should mean at all. It is a device for softly overlaying sound properties. Just imagine a synthesizer whose sound colors you do not switch, but its parameters are soft and smooth to the new value of the new sound color. In other words, the interpolator is a way to create novel sound sequences. The override can be done with the loop controller, with an external control voltage or with an internal LFO. When controlling by LFO, there are a total of four different playback functions:

1.) Circular interpolating between snapshots.
2.) Smooth commuting of Snapshots.
3.) Quantized Commuting of Snapshots
4.) Circular skipping of snapshots.

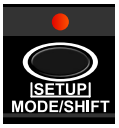
As you can see, two of the operating modes are basically not crossfading, but rather quantized switching.

3.1) Preparing for snapshot automation

In Interpolator mode, the Big Knob, an LFO oder an external control voltage can be used to load snapshots or to interpolate between snapshot parameter sets. However, these snapshots are created in the manual mode just described. Therefore we leave the manual mode not yet, but save a few snapshots first. To do this, simply set the parameters until you are satisfied with the result. I always recommend keeping an eye on the pitch. When you have create 8 snapshots that contain up to seven different pitch settings, editing all the snapshots only to get them tuned equally is a time consuming and frustrating procedure.
Storing snapshots is easy. Use the Big Knob to select a memory location. In this case, already occupied memory spaces appear green, muted red and blank black. Your current selection is displayed with a white LED color. To store the settings on this snapshot, simply press the Snap button once

Then edit a sound variation, select a new snapshot memory with the loop control, and press the Snap button again. Basically, you need at least two snapshots for sound animation. For a sound with pulse width modulation, you need two snapshots with a selected rectangular waveform and different TLM values.

3.2) Switch to interpolator mode



After you've placed a few snapshots, you can start recall them or process a transition between them. To do this, push the Mode/Shift-Button once - the Mode LED should now light red. If it does not light red, please press the button a second time.

If there runs already an animation in the LED circle, first turn it off. To do this, set the speed control to the center position and the spread control to the center position at 12:00 and the tempo control also to the midpoint 12:00. Now the animation should have stopped.

With the Big Knob, you can now access the various snapshots. In the factory default setting, the snapshot selections are processed with soft transitions, which allows many intermediate sounds. The LEDs indicate the transitions with different brightness values.

SPEED Input and Speed-Knob

The speed input is intended for the external control of the speed of the cycle interpolator. The input automatically distinguishes between an applied clock and a control voltage.

POS

The POS input allows you to process the snapshots transition with a control voltage.

Data/Value

DATA controls the value of a control voltage for external modulation targets. The set value is stored in the snapshots. The control voltage of the Data/Value knob can be read from the Data-output. The control outputs of the data output are either gently faded or hard-switched according to the snapshot settings. A popular application is controlling the filter frequency. But, of course, you can also control other Swarm oscillators or our effect device "EFFEXX" and realize even more crazy sound sequences with the help of this control voltage.

Big Knob

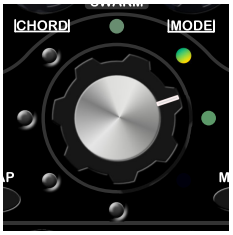
With the Big Knob you can select the different interpolation snapshots. The parameter interpolates between the different snapshots. In the case of a "pendulum" modulation, the position of the controller provides the center point of the motion modulation. The strength of the deflection is controlled by the SPREAD control. If the potentiometer is in the maximum position, the lower and the upper end point can be reached with 2.5 volts.

SNAPSHOT

If you wish to overwrite the current step, press the Snap key.

MUTE/REMOVE

A step selected with the Big Knob can be switched off and on again with the Mute button. This function does not sound as powerful as it actually is. It greatly changes the character of possible intermediate sounds. The interpolator always fades between two active steps. If there are one or more muted steps between the two active steps, they have no effect on the sound sequence. "Demute" one, the sound again takes a new course. New features in products are always a little startling. But I'm sure you'll appreciate just this functionality. Always keep your other modules in mind. Check the interpolator with an envelope curve, a step sequencer, an S & H



voltage, or a velocity dynamics or an aftertouch. A wide range of dynamically playable sound colors is thereby opened up. You can approach new sound changes just with the aid of the mute, the spread parameter and the circle controller.

SPREAD

The Spread parameter knob has three other functions in the interpolator mode: In the two "pendulum" settings, you determine between how many snapshots the interpolator interpolates. Use the Big Knob to set the center position of the pendulum control, and use the spread control to set the maximum deflection to the right and left of it. By the way, we called "pendulums" with a different name - the "wiper" mode. The position of the spread controller determines the direction in which the pendulum takes place first. To the left of the center, it starts counterclockwise and clockwise from the center. In the standalone operation has of course no meaning. Note, however, that the interpolator LFO can be synchronized.

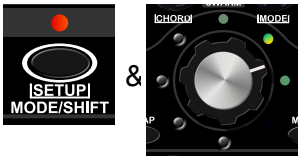
When one of the two circle animation modes is selected, the spread control selects the circular movement direction. To the left of 12:00, the interpolator rotates counterclockwise and clockwise clockwise.

3.3) Change the direction of movement

When you press and hold the Mode/Shift-Button while setting the spread control, you can choose from four different interpolator modes:

09 o'clock: Circular processing of Snapshot transitions.
11 o'clock: Pendulous processing of Snapshot transitions.
01 o'clock: Pendulous switching of Snapshots.
03 o'clock: Circular switching of Snapshots.

4.) Edit Snapshot Mode



Sometimes the interpolator animation is almost perfect but with one or the other snapshot you would like to make fine adjustments. In manual mode, this fine-tuning is hardly possible, because you have to adjust all parameters until the sound in manual mode corresponds to the stored snapshot before you even can begin. For this reason you can edit existing snapshots. To do this, hold down the Mode/Shift-Button and select the desired snapshot with the Big Knob. When you release the Mode/Shift-Button, you entered the Edit Snapshot mode. The LED of the Mode/Shift-Button lights up blue in this mode.

The controls behave differently in Edit Snapshot Mode than in Manual Mode. You will probably get the impression that they do not work at all. But we can calm you down. The controllers have only changed the operating mode. You are now working in the value-pick-up mode. You must first pickup to the stored value of a parameter with the knob and then tweak the parameter beginning from the stored value.

When you have changed all the desired parameters, press the Snap button to save. If, on the other hand, you want to leave the Edit Snapshot mode, or if you wish to discard the changes, press the Mode/Shift button to return to Manual Mode.

4.1) Deleting of Snapshots

In Edit Snapshot mode, you can also completely delete snapshots. To do this, select a snapshot with the circle controller and press the Mute button. The selected snapshot is deleted.

5.) Configuration-Edit Mode

In configuration edit mode, you can set general system parameters. This includes, for example, the basic tuning, the LED brightness, the LED color of the interpolator LED animation and the setting for a quantizer sync clock output. Calling up the configuration edit menu is very easy. Press and hold the Edit/ Manual-Button. You will then see an LED animation in which the LEDs to the right and left of the Big Knob are displayed ascending. When the animation has been completed, release the Mode/Shift-Button. The LED lights up white in Configuration Mode. In addition, the upper mid LED lights red (12 o'clock). The color should make it easier for you to find the menu items. Each color represents a different configuration parameter. Selected parameters can always be changed with the Data/Value Knob.

5.1) Adjust the LED brightness (red)

The first menu item at 12:00 is the setting of the LED brightness. If desired, you can switch off the LEDs completely here - but this is not recommended if you want to operate the device. Use the Data/Value Knob to adjust the desired brightness.

5.2) Set the LED color for the interpolation mode (yellow)

The next parameter to the right allows you to adjust the LED color in interpolator mode. The color is displayed with the entire LED ring as soon as you turn the Data/Value knob.

5.3) Enable the Sync-Trigger for the CV Quantiser (dark purple)

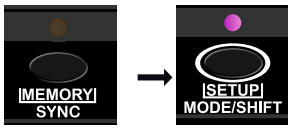
If you have connected a constantly changing control voltage to the CV input of the RT311 and have selected a pitch scale, you can use this parameter to ensure that a trigger is to be send for each scale level reached. The sync trigger is output at the data output. The trigger is deactivated left from the mid position and activated right from the mid position.

5.4) Master tuning of module and electronic tuning fork (bright purple)

In this menu, you can tune your oscillator. It would be foolish to carry out tuning with the tune or octave knob of the oscillator. You could not go back to the possibility of stepped interval and octave selection with the help of the Mode/Shift button. Therefore, it is useful to carry out the tuning in the configuration mode. The Master Tune is saved and reloaded automatically the next time you turn it on. If you select the displayed LED position and color with the Big Knob, you are in Master Tune-Mode. You should hear a tone at the output of the oscillator (pitch tone A). In the center position of the Data / Value controller, you reach 440 hearts. Now you can tune the swarm oscillator to a mechanical instrument, as well as tuning the other modules with the help of the tuning tone.

6.) Save and load programs

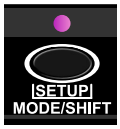
The swarm oscillator not only allows for the storage of individual snapshots, but also the storage and loading of 8 complete programs including the 8 snapshots.



To enter the Memory-Menu, press and hold the Memory/Sync-Button. An animation is running in the LED circle as with the call of the Configuration-Menu. When the animation is completed, you can release the button and are in Memory-Mode. The Mode/Shift LED now lights up in a purple color and the already occupied memory areas are also displayed with the color purple in the LED ring. Unused space is not illuminated. A memory space selected by a Big Knob lights up considerably brighter than the remaining occupied memory locations. When you move the circle controller, the oscillator plays a circular animation with the snapshots stored in the memory space. In this case, you have the option of listening to the target memory once again, or selecting a different memory location, if you need to overwrite a memory space.

Press the SNAP key to overwrite the selected memory location. (In the current version, the newly saved memory location is not displayed directly by the LED, but only when the memory menu has been exited and re-entered.) We ask you to ignore this beauty error until the next version.)

If you select a memory location and press the Sync / Memory button instead of the Snap button, the selected memory location will be loaded. After loading, the oscillator is automatically in interpolator mode.

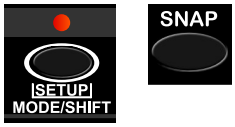


If you want to leave the memory menu without saving or loading anything, simply press the Mode/Shift button.

7.) Exchange and archive programs

8 storage is not much and it would be great, if one could archive his sound creations somewhere. Also the exchange of settings with other Swarm Oscillator users could be an interesting additional feature. We also thought about this and gave our swarm a memory dump function. You can always transfer the current program to memory with all snapshots. The module sends the data via the data output and receives the data via the speed input.
The data is output as a sophisticated audio file. For example, you can include the settings in your DAW. But basically you can also perform the data directly with a cable connection between the two oscillators or record and play the data with your mobile phone.

To dump the oscillator settings, proceed as follows:



1.) Change to Interpolator-Mode by tapping the Mode/Shift-Button. The Mode/Shift LED must light up red.
2.) Press and hold the Snap button until the LED animation has expired.
3.) Release the snap button.

Now you can listen to or record the data transfer.