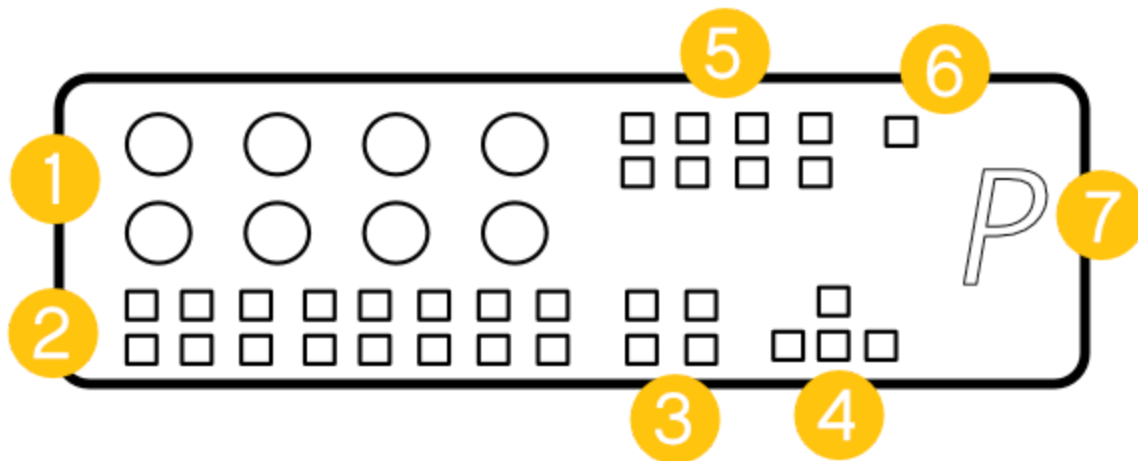


SYNTHOR and REMOTE by Percussa

1. Connect your REMOTE

Remote allows you to set parameters and configure your AudioCubes in SYNTHOR, the digital modular synthesizer application. It acts as a “base station” in the wireless cube network.

To switch on REMOTE, simply connect it with a USB cable to your laptop. Immediately, the P-sign will light up green.



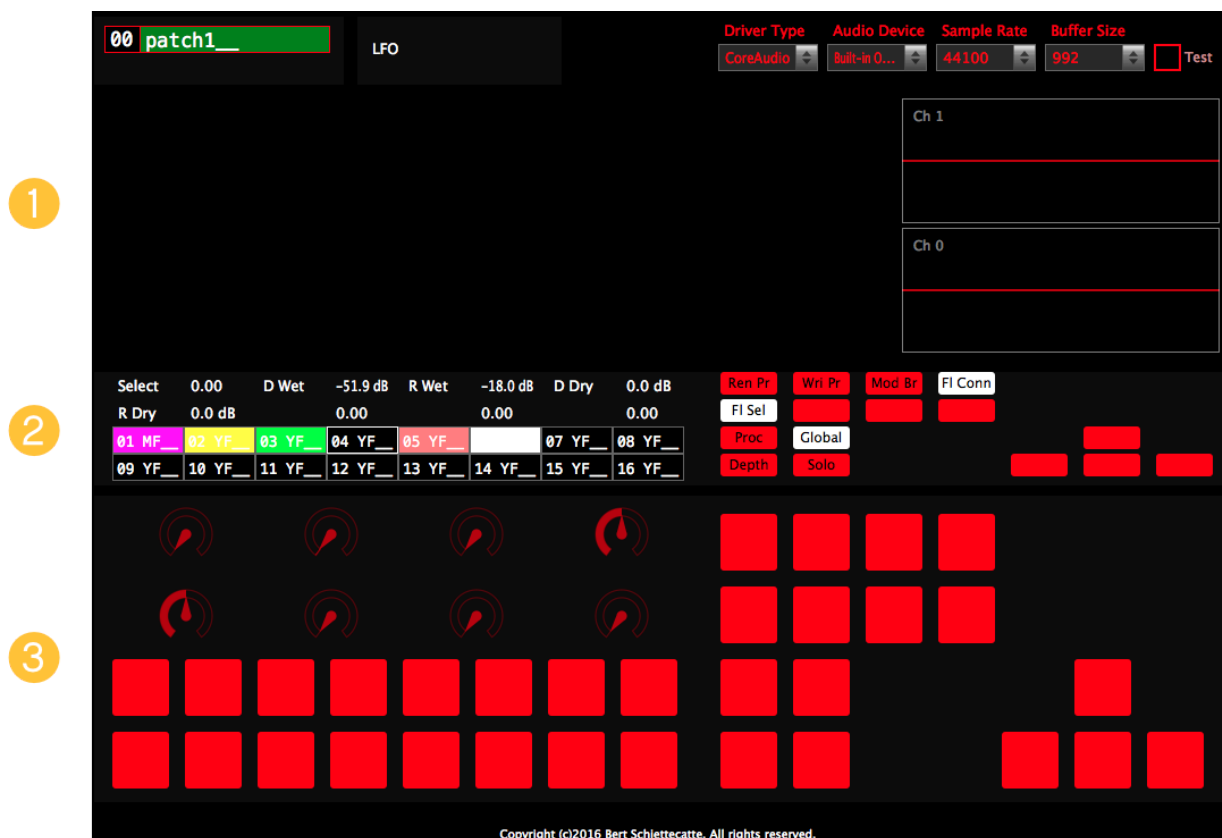
- 1 = encoders
- 2 = cube selection buttons
- 3 = editor selection buttons
- 4 = keypad buttons
- 5 = configuration buttons
- 6 = bootloader mode
- 7 = USB connector

2. Launch SYNTHOR

To download SYNTHOR, go to <https://www.percussa.com/downloads>. In case you don't have an account yet on our website, simply create a free account after which you'll be able to download SYNTHOR for free.

When launching SYNTHOR, REMOTE is automatically recognized by SYNTHOR as the “master” or “base station” of the wireless network.

As default, the P-sign will turn purple, flashes, and is assigned number “01” in the network.



2.1. 1 Top screen

Depending on the selected synth module or cube additional information will be displayed besides the oscilloscope on the right hand side of the screen. The oscilloscope visualizes the output sound wave over time.

2.2. 2 Middle screen

The middle screen displays the parameters for the selected cube or synth module.

2.3. 3 Bottom screen

At the bottom of the screen a virtual REMOTE is embedded which is one-to-one linked with every function shown in the middle screen.

When you select a button from the “editor selection buttons” or “configuration buttons”, the corresponding button on the middle screen will turn white to indicate this function has been enabled.

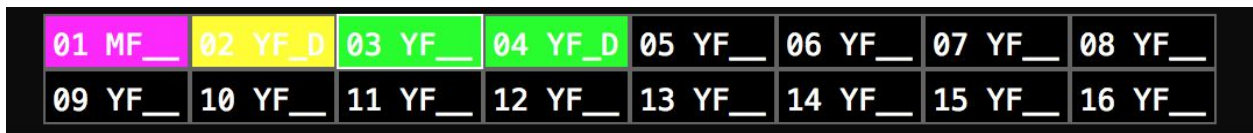
In the screenshot above 3 buttons are enabled: “FL Conn”, “FL Sel” and “Global”. More information regarding the function of each of these buttons will be detailed in the sections below.

3. Switch on your AudioCubes

Simply turn on each of your AudioCubes by clicking once the on/off button at the bottom of the cube, so the cubes can join the wireless network.

Automatically a synthesizer module and corresponding color is assigned to each AudioCube. To learn more on how to change the synth module assigned to a cube go to section 5.

In the screenshot below 3 cubes have joined the network. The color which has been assigned to each cube is also shown in the cube selector below.



To help you remember the role of each cube, colors are assigned to each cube. The default color scheme is as follows:

Remote - Master	violet
Output	yellow
LFO	green
Step Sequencer	pink
Sampler	purple
DC generator	red
Env generator	blue
Comb filter	orange

SVF	white
Noise	cyan
Waveshaper	light green
WTC oscillator	orange

The color of the selected cube changes based on the selected synth module, but these colors can easily be changed by holding the **“Proc”** button down and turning the first 3 encoders. By changing the values of these encoders you’re mixing the colors together.

4. Select and save a preset

To switch a preset click “global” - one of the 4 editor selection buttons in the middle screen - and use the up and down buttons (keypad buttons) to start a new preset or to switch to the preset you want to use.

You can rename a preset (max 8 chars long) by first clicking **“Ren Pr”** and select a character by using the first encoder. To confirm a character use the “right button” on the keypad. To change a character, use the “left button”.

When you are ready renaming a preset name, disable the **“Ren Pr”** button by clicking once, and select **“Wri Pr”** to save the changes. As soon as the changes are saved the preset label box switches from red to green.

Every time you make changes to the preset the preset label box will turn red. Please make sure to save your changes regularly by going to the **“Global”** editor and clicking **“Wri Pr”**.

You’re now ready to start working on a new preset :-)

5. Assign synth modules

Switch from **“Global”** editor to **“Proc”** editor.

Every cube represents a synth module and automatically a module is assigned to every cube that joins the wireless network. It is important to remember that at least one of the cubes needs to be the output cube.

By clicking one of the 16 cube selection buttons, you’re selecting one of the cubes. The color of the button is linked to the color of the cube. As a default setting, a cube is flashing when it is being selected. This helps you retrieve your cube more easily.

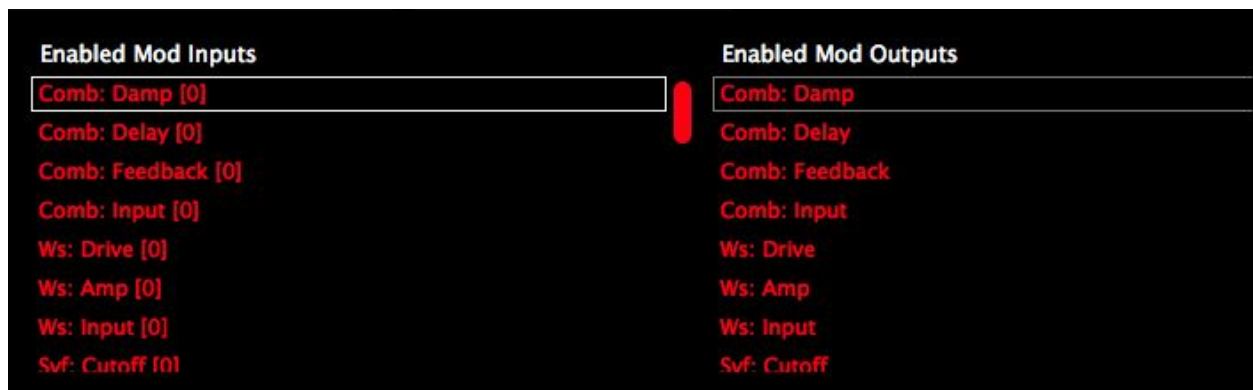
You can now change the synth module of this cube by using the “up” and “down” buttons on the keypad. On the top of the screen, next to the preset name box, you’ll see the name of the synth module changing.

6. Modulation behaviour of each cube/module

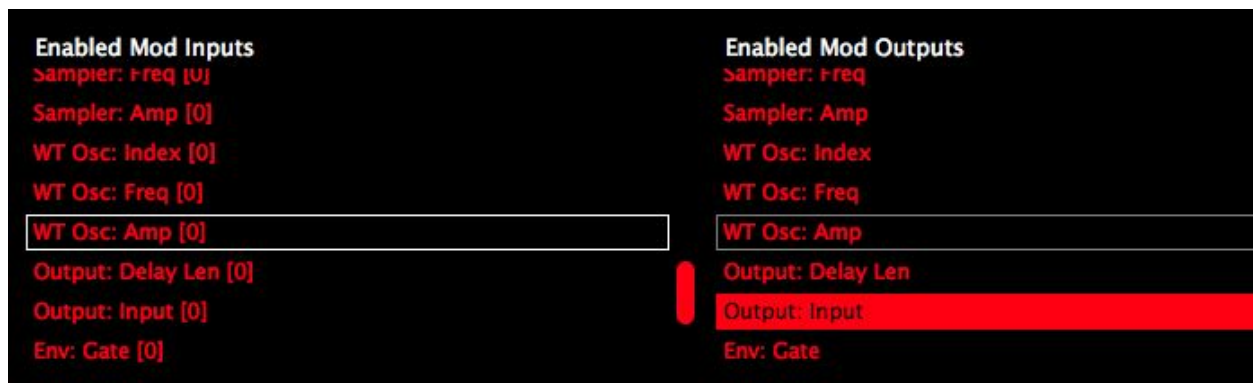
After assigning a synth module to every cube, you’re now ready to define their modulation behavior. Cubes that are not output cubes can output a signal that can modulate other cubes/modules. This is a very important step because you’re defining what other module it can modulate (outputs) and by what other module it can be modulated (input). For example, you can have an LFO that modulates frequency, or an LFO that modulates amplitude.

To configure what they can modulate, switch from “Proc” to “Depth”.

On the top of the screen you’ll see 2 columns: **Enabled Mod Inputs** (left columns) and **Enabled Mod outputs** (right column).



To select the inputs and the outputs you can use the top left encoder. By turning the encoder you’ll see the selection box moving up and down in both columns. To confirm the input in the left column, you click on “**Togg I**” using the corresponding configuration button. To confirm the selected value as the output click “**Togg O**”.



In the screenshot above the “**Output: Input**” has been selected as Outputs.

Example: Output - LFO

Let’s start with a simple example. You want to make a basic preset with 1 output and 1 LFO. The LFO needs to send its signal to the output.

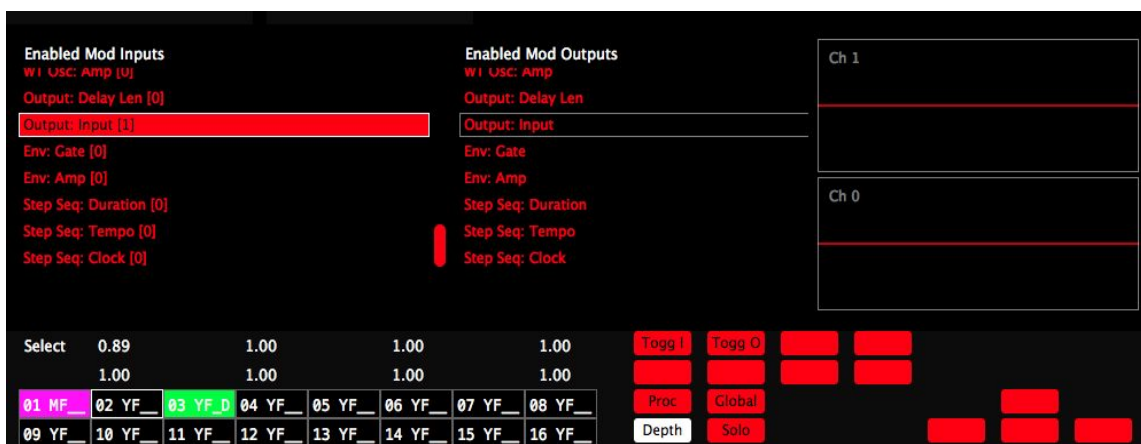
Step 1: Make sure 2 cubes are switched on and have joined the network. Let’s make sure one cube is the output and the other one an LFO. Follow the instructions described in section 5 to assign the output and LFO modules to each of your cubes.

Step 2: Select the output cube using one of the 16 cube selection buttons. Since the color of each button is linked to the color of each cube, you can easily find out which one is the output cube.

Step 3: Switch to “**Depth**” editor.

Step 4: Use the top left encoder to select the inputs and outputs. As a rule of thumb, an output cube only has an input, so you only need to select => **output:input** in the left column.

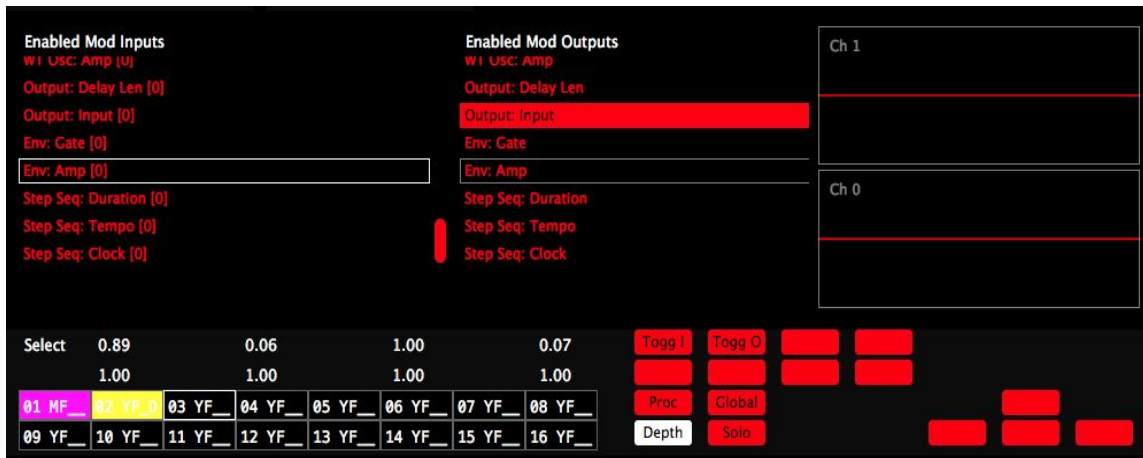
Step 5: To confirm the input of this module click “**Togg I**”.



Step 6: Select the LFO cube using one of the 16 cube selection buttons in the “**Proc**” editor. Switch then back to the “**Depth**” editor.

Step 7: Use the top left encoder to select the inputs and outputs of the LFO module. In this example we only want the LFO to send its signal to the output cube. Therefore, we choose “**output:input**” for its **Mod Outputs**.

Step 8: Confirm this output by clicking “Togg O”.



Step 9: To save your work don't forget to go the “Global” editor and press “Wri Pr”

You're now ready to test your first preset :-)

Put the LFO next to the output cube to hear the sound going through the output module. The output signal is also visualized in the oscilloscope. By changing the distance between the LFO and output, the modulation depth will change as you will see in the oscilloscope on the screen.

In the next sections, we'll discuss how to change the parameters for each of the synth modules.

7. Using distance to scale modulation signals

The distance between the cubes is used to scale the modulation signals. If you have two cubes, and one is modulating the frequency of the other, the distance will automatically be used to scale the modulation signal (i.e. frequency modulation depth in this case).

8. Synth Modules

SYNTHOR comes with 10 different modules. In the sections below, we'll describe the parameters of each of these modules.

IMPORTANT: before changing the parameters of each of the modules you first need to:

- Switch to the “**Proc**” editor using one of the 4 editor selection buttons.
- Select the module/cube of which you like'd to change its parameters using one of the 16 cube selection buttons.

8.1. Output

The output cube will accept any cube next to it and will allow you to listen to the sound of that cube. You need at least one output cube.

You can apply effects on the output cube by switching to “**Proc**” editor and selecting the output cube. Use one of the 8 encoders to change the effects below:

- D Wet (Delay Wet)
- R Wet (Reverb Wet)
- D Dry (Delay Dry)
- R Dry (Reverb Dry)
- D Len (Delay Length???)
- Ch W/D (Chorus Wet/Dry)
- Cr R (BitCrusher Reverb)
- Cr B (BitCrusher ????)



8.2. Low Frequency Oscillator (LFO)

In SYNTHOR the oscillator and LFO are embedded into the same module: LFO.

By turning the frequency of the LFO module very low, you get an LFO and by increasing the frequency value you're turning it into an oscillator. You can set the frequency of the oscillator/LFO by changing the “coarse” and “fine” parameters.

Using the third encoder you can change the waveform type (sine, square, triangle, saw). It corresponds to the label "Type" in the middle screen.



8.3. Noise

There are two types of noise: simple white noise or toggle noise. Toggle noise is similar to white noise except that it has a variable frequency. The frequency determines how many times per second a random value is picked.

You can set the following parameters of the noise generator using the first 3 encoders:

- Coarse
- Fine
- Type (toggle/white)



When choosing “white” noise changes to coarse and fine won’t have an effect anymore.

8.4. State Variable Filter (SVF)

A SVF lets you extract low-frequency or high-frequency portions of the audio signal. It needs at least one other cube or synth processor next to it such as an LFO. When putting the output cube next to the SVF you should hear the signal from the LFO passing through the SVF.

OUTPUT - SVF - LFO

You can use the cutoff/resonance sliders to play with the filter and you have different options to extract the audio signal: High, Low, Band, Peak.

To change cutoff, resonance, and type you can use the first 3 encoders as you can see in the screenshot below.



8.5. Env Generator

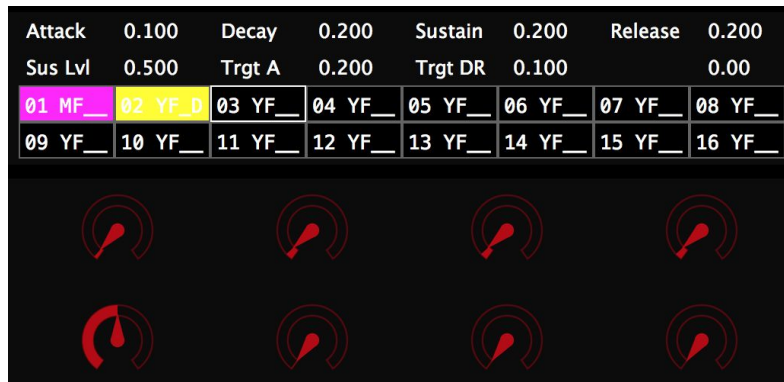
It’s an ADSR envelope generator which can be used to modulate the frequency or amplitude of other processors. The envelope is per default looping.

When putting a step sequencer next to it you need to make the envelope non looping (disable “Loop”) to have it triggered by the step sequencer.

By enabling “invert” you can invert the envelope waveform.

Besides the normal settings such as Attack, Decay, Sustain and Release (all in seconds), we also embedded 3 other settings: SusLvl, Trgt A, Trgt DR.

- Sustain Level (Sus Lvl): changes the level of Sustain vertically
- Target Attack (Trgt A): exponentially rising/decaying attack
- Target Decay Release (Trgt DR): exponentially rising/decaying decay and release

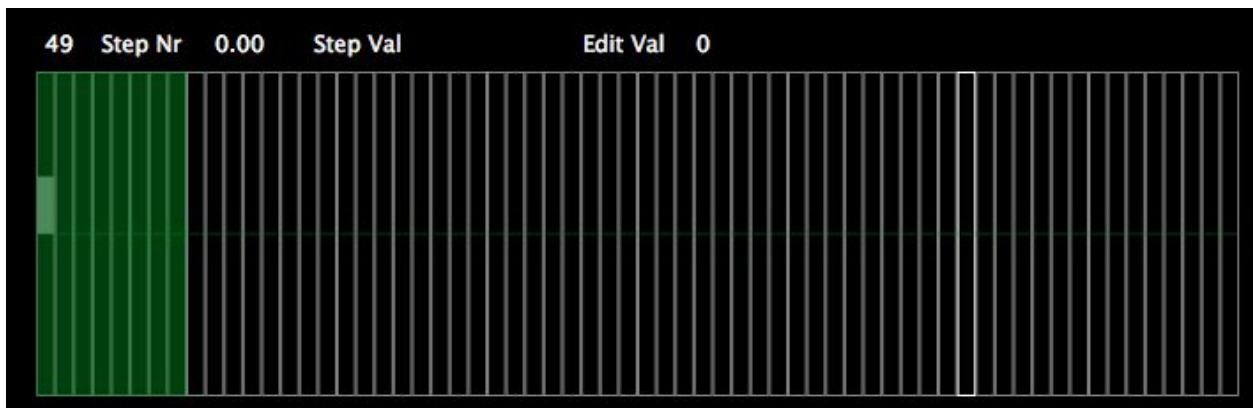


8.6. Step Sequencer

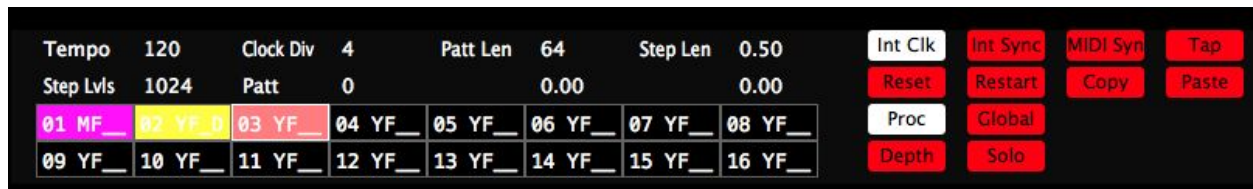
The step seq processor cannot be modulated in any way yet. You can use it to modulate other processors in frequency, amplitude, etc.

The Step Sequencer consists of 64 steps and you can select a set of 8 steps by using the **left/right** buttons on the keypad. By clicking on these buttons a different part of the step sequencer is highlighted in green as shown in the screenshot below.

To draw the steps use one of the 8 encoders. Each encoder corresponds to 1 step in the selected area.



To go back to the main settings of the step sequencer click “**Proc**”.



By using one of the 6 encoders you can change the following settings:

- **Tempo:** by turning the 1st encoder you can change the tempo of the step sequencer.
- **Clock Division:** you can divide the internal clock by a value which of course impacts the tempo of the step sequencer.
- **Pattern Length:** limit of the sequence length (default is 64 steps)
- **Step Length:**
- **Step Levels:** you can change the step levels to quantize the step sequence (i.e. limit it to 4 values above and 4 values below zero). Default is 1024.
- **Patterns:** each step sequencer can have 64 patterns (from 0 until 63).

Besides changing the values as discussed above you can also use the settings on the right hand side:

- You can also set the tempo by clicking several times in a row on “**Tap**”.
- You can undo the value received from using the “tap” button by clicking “**Reset**”.
- Patterns can easily be shared between step sequencers by using the “**Copy**” and “**Paste**” button. To copy a pattern to another step sequencer, you first click “copy” after which you can go the step sequencer which you’d like it have copied to. Make sure to select the pattern number of where you’d like it to have copied to and click “paste”.
- **Int Clk:** you can now use an internal clock or drive the sequencer using an arbitrary signal as a clock.
- **Int Sync:** sequencers which run independently can be synced using this option.
- **MIDI Sync:** sync the sequencers to the MIDI clock signals and divide the clocks to the sequencers.

8.7. Sampler

The sampler allows you to load up to 8 samples, and then trigger these samples using a signal from the step sequencer, for example.

Each level of the signal corresponds to a different sample slot, so you can trigger samples using any signal you want. When triggering a sampler using a step sequencer you can use the distance to trigger different samples.

The step sequencer has quantization built in (adjustable) so that helps to quickly program patterns.

What's really interesting is to run the sampler in loop mode, and then also layer the samples. This will mix all 8 samples together and then loop them. You can then use the start and length settings to turn the layer into a complex waveform. If you switch off the auto-frequency setting, you can set the frequency of oscillation/looping using the frequency sliders (fine and coarse). You can get some really amazing textures using the sampler. I've used a TR-808 set myself and it's really interesting you can get completely new pad-like sounds from a percussion kit like that.

By using the encoders you can change the following values:

- **Select:** scroll through the list of samples using the 1st encoder. To upload new samples you need to create a folder called "samples" which you place in the same directory of where your SYNTHOR application is located.
- **Coarse:** set the frequency of the oscillation/looping. This only works when "Auto" (auto-frequency) setting is switched off.
- **Fine:** set the frequency of the oscillation/looping. This only works when "Auto" (auto-frequency) setting is switched off.
- **Start:** choose the start of the waveform.
- **Length:** choose the length of the waveform.

Besides changing the values as discussed above you can also change the settings on the right hand side:

- **Load:** to select a sample click “Load”. Each time you click “load” the selected sample will be added to the next slot.
- **View:** gives a visualisation of the samples that are stored in a certain slot. Each time you click “view” the visualization of the next sample is shown.
- **Auto:** frequency of the oscillation/looping is set to automatic.