NGEN Manual

None

Spektro Audio

Table of contents

1. NGEN – Algorithmic MIDI Workstation – User Manual

1.1 About NGEN

NGEN is a unique 16-track MIDI sequencer design in São Paulo / Brazil that lets you combine multiple algorithmic / generative generators and MIDI FXs to sequence multiple hardware or software MIDI instruments.

It offers a completely new way of creating and performing music by abstracting the composition process. Instead of writing sequences from scratch, NGEN lets you quickly generate a new sequence for your drums, basslines, melodies, and chord progressions with a push of a button.

NGEN includes classic Spektro Audio generators (ACDGEN and Polyform), completely new algorithmic generators (Drumgen, Samba, Arper, MARP, Pop, Turing, Shuffler), and practical generators (Input

Sequencer, MIDI Player, Thru).Each generator features an algorithm to combine different composition techniques with randomness so each generated sequence is unique.After generating a sequence, you can tweak it in real time using the parameters available for each of the generators. Take things even further by applying MIDI FXs such as Chord or Glitch to your sequences.All tracks in NGEN follow the same key and scale so it’s easier to get multiple sequences that work well with each other.Quickly save and restore your creations using patterns and projects stored in the microSD card.

NGEN's design is primarily focused on live performance so it features a 1.3" OLED screen, a minimalistic and easy to read interface, mechanical switches (Gateron Green), shortcuts for accessing different features, per track Program Change selector and auto-variation, extensive MIDI CC implementation, and a Performance mode for controlling up to 4 parameters at the same time.

NGEN also includes a variety of tools to let you explore this world of algorithmic sequencing such as assignable CV outputs, a built-in MIDI monitor, different clock generators, and much more.

Product Page: http://spektroaudio.com/ngen

Video Tutorials: NGEN Playlist on Youtube

1.2 Firmware

Current version: 1.0 (Change-Log)

Last update: 2023-01-19

2. How to Use

2.1 Getting Started

2.1.1 Getting Started with NGEN

To get started with NGEN simply connect it to a computer or another USB-host device via USB or a MIDI-capable device via the MIDI Out jack.

Because the MIDI Clock generator is active by default, you only need to send a MIDI Clock from a DAW or external gear to NGEN.

By default, all 16 tracks are set up to output MIDI from channels 1 to 16 sequentially however only the first track is active when the device is turned on (more tracks can be enabled via the Track Settings).

2.1.2 Step-By-Step Guide

Here's a step-by-step guide to getting started with NGEN:

1. Connect NGEN to a computer or a MIDI-capable hardware instrument. If you don't plan on using NGEN with a computer you can power the unit externally.
2. Set your MIDI instrument/destination to receive MIDI notes on Channel #1:

a. If you're using NGEN with a computer, open your DAW of choice, create an instrument / MIDI track, load a virtual instrument, and set it to receive MIDI from Channel 1.

b. If you're using a hardware synthesizer, check if it's set to receive MIDI on Channel 1.

3. Start one of the NGEN's Clock Generators:

a. If you'd like to sync NGEN to a MIDI Clock coming from your DAW or instrument, make sure that they're set to output MIDI Clock to NGEN via USB or the MIDI IN jack.

b. If you'd like to use NGEN's internal clock go to the Main Menu, navigate to the Clock sub-menu, hold the [ ] button and move the [ ] to select the Free Clock, and click the encoder to set it's status to active.

4. NGEN should now start sending MIDI Notes to your instrument.
5. By default, NGEN will load ACDGEN as the generator for track #1. To control ACDGEN's settings, return to the Main Menu by pressing the [ ] button and navigate to the Generator sub-menu.

2.1.3 Flow Diagram

The NGEN sequencing engine works by using having a clock generator trigger the tracks' generators and MIDI FXs.

The notes generated by each track's generator and MIDI FX are routed to the track's main and auxiliary output. The MIDI output of all tracks are sent to external instruments via the USB and MIDI (A-style 1/8" jack) ports.

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2.2 Hardware Setup

2.2.1 Connecting NGEN to other your setup

NGEN can be connected to computers, drum machines and synthesizers via USB, MIDI and CV. These connections can also be used simultaniously.

Connecting via USB

The simplest way to use NGEN is to connect it to your computer via USB.

The USB connection powers the unit and it's capable of sending and receiving MIDI since it works as a Class Compliant MIDI device.

Connecting via MIDI

NGEN can also be connected to other gear via the MIDI IN and MIDI OUT 3.5mm TRS jacks (Type-A).

Please note that NGEN still needs to be powered via USB (check the Powering NGEN section below).

Connecting via CV

NGEN also features 2 pairs of CV + Gate outputs that can be used to sequence 1V/OCT synthesizers / modules.
To enable the CV output ports, set the AUX OUT of any of Tracks to CV1 or CV2.

The CV and GATE outputs on NGEN have a limited range of 3.3V and a resolution of 12bits so we recommend using an external MIDI to CV converter for a wider range and better resolution.

ATTENTION: The CV and Gate jacks are **OUTPUTS** only. **Do not** send any CV signals into them or you may run the risk of damaging your unit.

Please note that NGEN still needs to be powered via USB (check the Powering NGEN section below).

2.2.2 Powering NGEN externally

If you'd like to set up NGEN without a computer, you can power it using a USB power bank / battery or a standard USB wall charger.
NGEN's power consumption is minimal so even a 0.5A charger should work.

2.2.3 Setup Examples

NGEN + Computer

NGEN + Hardware MIDI Synthesizer

NGEN + Modular Synthesizer

NGEN + Multiple Gear

Last update: 2023-01-16

2.3 Hardware Controls

2.3.1 Hardware Controls on NGEN

The NGEN includes a main clickable encoder ( ), a return button ( ), 4 parameter knobs (through), and 4 buttons (, , , and) that can be used to access and control different features.

2.3.2 Encoder

The can be used for navigating menus, activating patterns, selecting the active track/clock, selecting different parameters and changing their value, and selecting files.

Turn the to select a different sub-menu, file or parameter.
Press/Click the to select a sub-menu or file or switch between parameter selection and value adjustment.

The can also be combined with other buttons to perform different operations.

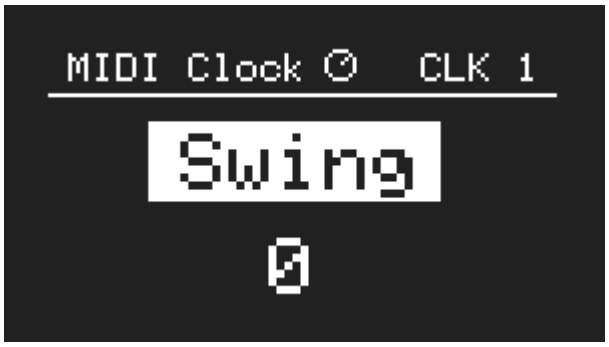
Please refer to the shortcuts table for more information.

2.3.3 Knobs

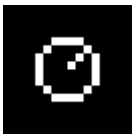
The 4 knobs (, , , and) in NGEN serve different purposes depending on which menu is active.

The default behavior of the 4 parameters is to control the main parameters of the selected **Generator** of the active **Track**.

Additional parameters can be controlled by turning the 4 knobs while holding down .



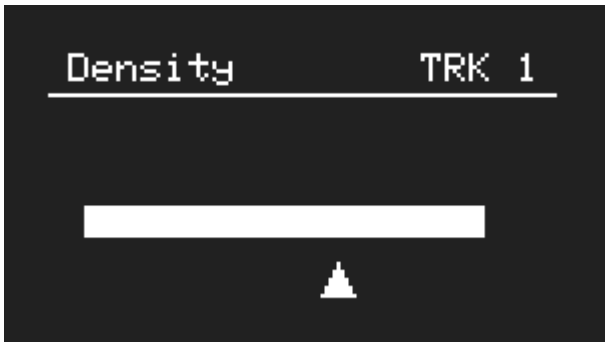
While in the **MIDI FX**, **SCALE** and **CLOCK** menus, the 4 knobs are mapped to parameters related to those features (note the knob icon on the top section of the display). Exiting those menus will revert the knob mapping to the **Generator** parameters.



Pick-up Behaviour

If the position of a knob does not match the value of the parameter that it's trying to control, the knob gets disabled and enters a pick-up state.

While in this state, a pick-up screen will be displayed to indicate the position of the knob relative to the parameter's value.



To re-enable the knob, turn the knob so its position matches the current value of the parameter.

2.3.4 Buttons

The four hardware buttons included in perform specific functions when pressed individually. Shortcuts and secondary functions can be accessed via Shortcuts (see table below).

- : Enables track/clock selection (by holding the button down and turning the).
- : Selects the active pattern.
- : Modifies the behavior of the other buttons to enable access to additional functions (see Shortcuts).
- : Call the main function of the active **Generator**, **MIDI FX** or **Clock**.
- : Returns to the previous menu.

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2.4 Menu Mavegation

2.4.1 Main Menu

The NGEN menu system is designed to be easy to navegate using the [ ] and the [ ] button.

The unit boots into the Main Menu which lets you access all the different features available in NGEN. We've limited the maximum depth of the menu system to two levels (MAIN MENU > FEATURE SUB-MENU).

Use the [ ] to scroll through the list of features and click the [ ] to navegate to a sub-menu. To return to the previous menu, press the [ ] button.

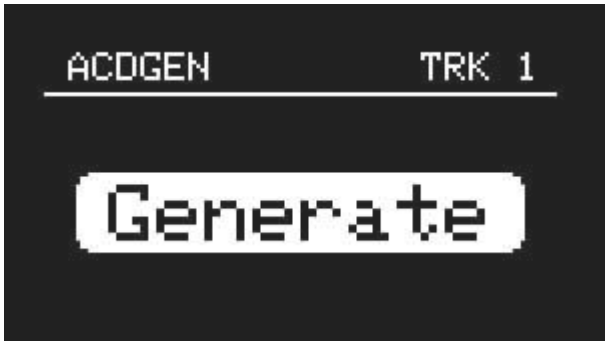
Different sub-menus can contain different menu items such as parameters, toggle switches, and actions which can be selected by scrolling the menu [ ].

- **Parameters** (indicated by the parameter name on top and value at the bottom) can be controlled by clicking the [ ] to access the parameter's value and scrolling the [ ] to change it's value.

Clicking the encoder on parameters switches between parameter selector and value

- **Switches** can be toggled by clicking the [ ].

- **Actions** (indicated by the action name displayed on the center of the screen) can be called by clicking the [ ].



2.4.2 Advanced Parameters and Settings

NGEN includes a variety of different features, settings and parameters that lets you use it in a variety of different ways but, to make it easier for you to get started, certain advanced parameters and settings are hidden by default.

To enable the advanced mode, go to Settings, enable Advanced and save your settings.

2.4.3 Display Modes

To better display the appropriate information, NGEN automatically switches between different modes (Menu Navigation, Idle, and Parameter Visualization).

Menu Navigation is the default mode of the display.

When moving one of the PARAM knobs, NGEN will display the name, current value, and range of the parameter currently mapped to that knob.

While in Generator or Clock sub-menus, the display will switch to the selected Idle mode (Animation or Parameter List) after 3 seconds of no hardware interaction unless Idle Mode is set to .

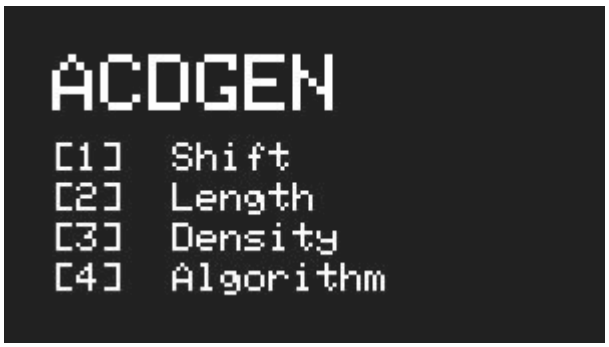
2.4.4 Idle Modes

Animations

NGEN includes unique animations for Generators and Clock Generators, designed to provide visual feedback of their current state/functionality.

While displaying an animation, parameters modified via the 4 PARAM knobs are displayed on the top section of the display to prevent obstructing the animation.

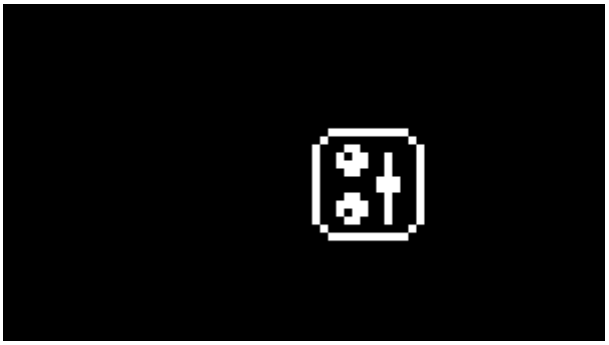
Parameter List



This idle mode displays a list of the parameters currently mapped to the 4 PARAM knobs and it's designed to help users get used to different mappings.

2.4.5 Screensaver

In order to prevent display burn-in, NGEN's display will go into screensaver mode after 5 minutes of no hadware interaction (unless it's displaying an animation). The screensaver does not affect other functions so NGEN will continue to work normally while in screensaver mode.



To exit the screensaver mode, move any of the knobs or click on any of the buttons.

2.4.6 Shortcuts

Shortcut	Description
[ ] + [ ]	Open Track Settings
[ ] + [ ]	Secondary Action (for Generators and MIDI FX)
[ ] + [ ]	Select a Track
[ ] + [ ]	Select a Clock Generator (while in Clock sub-menu)
[ ] + [ ]	Load a pattern
[ ] + [ ]	Save a pattern (while in the Pattern page)
[ ] + [ ] + [ ]	Delete a pattern (while in the Pattern page)
[ ] + [ ]	Load the next pattern
[ ] + [ ] + [ ]	Load the previous pattern

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2.5 MIDI Mapping

2.5.1 About MIDI Mapping

Most of the settings, parameters, and actions available in NGEN can be controlled, modulated, and automated via MIDI CC. This lets you automate parameters during a live set or even use an external MIDI controller to access certain parameters directly.

MIDI CC messages are routed to Tracks according to their IN CH (MIDI Input Channel) settings. The values received are processed depending on the behaviour of the parameter / setting / action (check MIDI chart below).
The different behaviours are:

- **Scaled:** values 0-127 are scaled to the parameter's minimum and maximum range.
- **Action:** values greater than zero trigger the action.
- **Absolute:** the value is used directly according to the range described (values outside of the described range are ignored).

Because NGEN uses MIDI Channel 16 for global settings, tracks set to IN CH 16 will only receive MIDI notes.

2.5.2 MIDI Chart

GLOBAL SETTINGS

Feature	Parameter	MIDI CC Number	Behaviour
Scale	Key	1	Scaled
	Scale	2	Scaled
MIDI Clock	Status	10	Scaled
	Swing	11	Scaled
Free Clock	Status	20	Scaled
	Generate	21	Scaled
	BPM	22	Scaled
	Length	23	Scaled
	Amount	24	Scaled
Bounce Clock	Status	30	Scaled
	Reset	31	Scaled
	Speed	32	Scaled
	Balls	33	Scaled
	Width	34	Scaled
	Height	35	Scaled
Perform	Macro 1	40	Scaled
	Macro 2	41	Scaled
	Macro 3	42	Scaled
	Macro 4	43	Scaled
Patterns	Load Pattern 1	50	Action
	Load Pattern 2	51	Action
	Load Pattern 3	52	Action
	Load Pattern 4	53	Action
	Load Pattern 5	54	Action
	Load Pattern 6	55	Action
	Load Pattern 7	56	Action
	Load Pattern 8	57	Action
	Load Previous Pattern	58	Action

Feature	Parameter	MIDI CC Number	Behaviour
	Load Next Pattern	59	Action
	Load Pattern #	60	Absolute (1-8)
	Save Pattern	61	Action
Tracks	Select Previous Track	70	Action
	Select Next Track	71	Action
	Select Track #	72	Absolute (1-16)
Menu	Open Track Settings	80	Actions
	Open Generator	81	Actions
	Open MIDI FX	82	Actions

GENERATORS

ACDGEN

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Variate	2	Action
Shift	3	Scaled
Length	4	Scaled
Density	5	Scaled
Algorithm	6	Scaled
KB Shift	7	Scaled
Octave	8	Scaled
Note Length	9	Scaled
Random Velocity	10	Scaled

ARPER

DRUMGEN

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Variate	2	Action
Density 1	3	Scaled
Density 2	4	Scaled
Density 3	5	Scaled
Density 4	6	Scaled
Length 1	7	Scaled
Length 2	8	Scaled
Length 3	9	Scaled
Length 4	10	Scaled
Note 1	11	Scaled
Note 2	12	Scaled
Note 3	13	Scaled
Note 4	14	Scaled

INPUT SEQUENCER

Parameter	MIDI CC Number	Behaviour
Shift	3	Scaled
Length	4	Scaled
Probability	5	Scaled
Quantize	6	Scaled

MARP

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Variate	2	Action
Shift	3	Scaled
Length	4	Scaled
Density	5	Scaled
Offset	6	Scaled
Length 1	7	Scaled
Length 2	8	Scaled
Length 3	9	Scaled
Length 4	10	Scaled

MIDI PLAYER

POLYFORM

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Variate	2	Action
Shift	3	Scaled
Length	4	Scaled
Density	5	Scaled
Delay	6	Scaled
Pitch Probability	7	Scaled
Gate Probability	8	Scaled
Chord Probability	9	Scaled
Random Velocity	10	Scaled

POP

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Shift	3	Scaled
Length	4	Scaled
Density	5	Scaled
Velocity	6	Scaled
Type Probability	7	Scaled
Chord Length	8	Scaled
Inversion Probability	9	Scaled
Balance	10	Scaled
Mode	11	Scaled

SAMBA

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Spread	3	Scaled
Length	4	Scaled
Density	5	Scaled
Random	6	Scaled
Rotate	7	Scaled
Probability	8	Scaled

SHUFFLER

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Variate	2	Action
Repeats	3	Scaled
Length	4	Scaled
Density	5	Scaled
Mode	6	Scaled
Note Length	7	Scaled
Random Probability	8	Scaled
Quantize	9	Scaled
Start	10	Scaled

THRU

Parameter	MIDI CC Number	Behaviour
Shift	3	Scaled
Max Velocity	4	Scaled
Probability	5	Scaled
Random Velocity	6	Scaled
Quantize	7	Scaled

TURING

Parameter	MIDI CC Number	Behaviour
Write	1	Action
Clear	2	Action
Shift	3	Scaled
Length	4	Scaled
Probability	5	Scaled
Loop	6	Scaled
Octave	7	Scaled
Spread	8	Scaled
Range	9	Scaled
Voices	10	Scaled

MIDI FXS

ACCENT

Parameter	MIDI CC Number	Behaviour
Generate	101	Action
Length	103	Scaled
Intensity	104	Scaled

CHORD

Parameter	MIDI CC Number	Behaviour
Interval 1	103	Scaled
Interval 2	104	Scaled
Interval 3	105	Scaled
Quantize	106	Scaled

ECHOES

Parameter	MIDI CC Number	Behaviour
Delay Time	103	Scaled
Feedback	104	Scaled
Probability	105	Scaled
Falloff	106	Scaled
Octave Random	107	Scaled

GLITCH

Parameter	MIDI CC Number	Behaviour
Repeats	103	Scaled
Gate Length	104	Scaled
Probability	105	Scaled
Random	106	Scaled
Pitch Mod	107	Scaled

HUMANIZER

Parameter	MIDI CC Number	Behaviour
Delay Probability	103	Scaled
Velocity Probability	104	Scaled
Max Delay	105	Scaled
Max Velocity	106	Scaled

MODULATOR

Parameter	MIDI CC Number	Behaviour
Sequence Amount	103	Scaled
Length	104	Scaled
Offset	105	Scaled
Depth	106	Scaled

PROGRAM SEQUENCER

Parameter	MIDI CC Number	Behaviour
Generate	101	Action
Length	103	Scaled
Hits	104	Scaled
Max	105	Scaled
Step 1	106	Scaled
Step 2	107	Scaled
Step 3	108	Scaled
Step 4	109	Scaled
Step 5	110	Scaled
Step 6	111	Scaled
Step 7	112	Scaled
Step 8	113	Scaled

SHAPER

Parameter	MIDI CC Number	Behaviour
Pitch Minimum	103	Scaled
Pitch Maximum	104	Scaled
Velocity Minimum	105	Scaled
Velocity Maximum	106	Scaled

SPRAY

Parameter	MIDI CC Number	Behaviour
Max Delay	103	Scaled
Max Repeats	104	Scaled
Probability	105	Scaled
Falloff	106	Scaled
Octave Random	107	Scaled
Velocity Random	108	Scaled

STRUM

Parameter	MIDI CC Number	Behaviour
Max Delay	103	Scaled

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3. Features

3.1 Clock Generators

3.1.1 About Clock Generators

NGEN includes 4 clock generators that can be used for clocking all 16 tracks.

Each clock generator has a separate clock count and can trigger all tracks relative to it. This means multiple clock generators can be active at the same time.

While in the CLOCK sub-menu, the most relevant parameters for the selected clock generator are mapped to the NGEN's potentiometers.

3.1.2 Selecting a Clock

To select a different clock, return to the **MAIN MENU** and select the **CLOCK** sub-menu.
While in the **CLOCK** sub-menu, hold down the [ ] button and turn the [ ].

3.1.3 List of Available Clock Generators

MIDI Clock

The MIDI Clock is the default clock generator used by NGEN. While active, the MIDI Clock will sync to 24 PPQN MIDI Clock signals received via the MIDI IN jack and USB.

Parameter List:

Parameter	Description	Hardware Mapping
Swing	Sets the swing amount for all tracks	

Free Clock

The Free Clock is the NGEN's internal clock and it can be used to generate an internal clock when no external MIDI Clock is available. It also features an 8-stage swing sequencer that can be used to create interesting swing patterns.

Parameter List:

Parameter	Description	Hardware Mapping
BPM	Sets the BPM for the internal clock	
Length	Sets the length of the swing sequence	
Amount	Sets the amount of swing	
Generate	Generates a new swing sequence	

Bounce Clock

The Bounce Clock is an experimental clock generator that uses virtual balls (dots) enclosed in a box to generate its clock signal. The clock advances whenever one of the balls collides with box boundaries. The number of balls and the shape of the box can be controlled via the available parameters.

Parameter List:

Parameter	Description	Hardware Mapping
Speed	Sets the speed of the balls	
Balls	Sets the number of balls	
Width	Sets the width of the box	
Height	Sets the height of the box	
Reset	Reset the position of all balls to the center	

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3.2 Generator

3.2.1 About Generators

The generators in NGEN are used to generate MIDI notes/sequences to play external MIDI instruments.

Each generator uses a specific algorithm to create a unique MIDI sequence based on certain ideas, musical styles, and production techniques. These sequences can then be modified and interacted with via the different parameters available in each generator.

The output of each generator is routed to the Track's both MIDI out and Aux Out (which can be used to send MIDI notes from one track to another).

Each track can load any of the available generators.

3.2.2 Generator Parameters

While in the **GENERATOR** sub-menu or the **MAIN MENU**, the main parameters of the selected generator are mapped to the NGEN 4 knobs (, , , and):

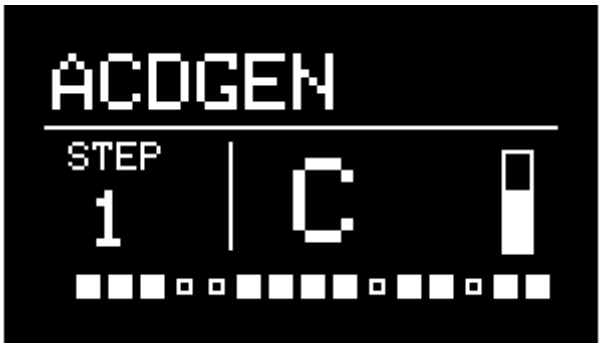
- 4 Parameters are mapped to the knobs directly.
- 4 Additional parameters are accessible by holding down while moving the knobs.

Some parameters such as Length, Shift and Density are available in many of the available generators. These common parameters are always mapped to the same knobs to improve usability and consistency.

A complete list of parameters available for the selected Generator can be accessed via the **GENERATOR** sub-menu available in the **MAIN MENU**.

3.2.3 List of Available Generators

ACDGEN



Generator Description:

ACDGEN is a generator that uses the Spektro Audio ACDGEN algorithms to generate melodies and basslines.

The 8 different algorithms available in ACDGEN can generate sequences that vary in style and purpose:

• *Normal*: A straightforward random algorithm.
• *Floor*: Uses a smaller selection of notes and has a higher probability of playing the fundamental / base note (great for basslines).
• *FifthOct*: Limits the note selection to the fundamental / base note and its fifth.
• *Upwards*: Generates a sequence that tends to go up in the active scale.
• *Up-Stepped*: Similar to Upwards but it can also alternate between higher notes and the fundamental / base note.
• *Downwards*: Generates a sequence that tends to go down in the active scale.
• *Down-Stepped*: Similar to Downwards but it can also alternate between lower notes and the fundamental / base note.
• *NEW*: Combines different techniques used in the other algorithms and regular arpeggiators.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence.	
Variate	Generates a new variation of the previously generated sequence.	+
Shift	Transposes the sequence diatonically.	
Length	Sets the length of the sequence.	
Density	Sets the sequence's note density.	
Algorithm	Selects the mode used to generate the next sequence.	
KB Shift	Toggles the keyboard shift feature.	–
Note Len	Sets the proportional note length of generated notes.	+
Random Vel	Sets the amount of random MIDI velocity.	+
Hold Prob	Sets the hold probability.	+
Octave	Sets the base octave for the sequence.	+
Slide Prob	Sets the probability of generating slide steps	–

ARPER

Generator Description:

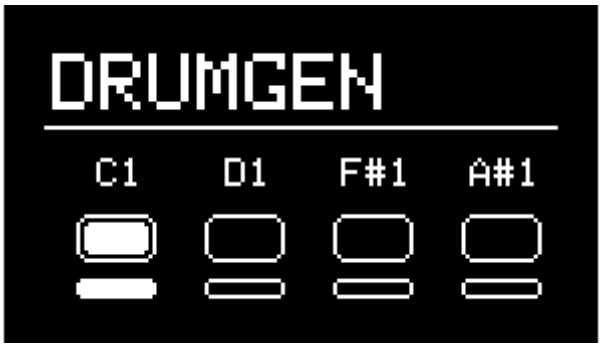
Arper is a generator designed to generate classic arpeggios using an algorithmically generated chord progression.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence.	
Restart	Restarts the sequence	-
Bass Shift	Transposes the bass note diatonically.	
Shift	Transposes the additional notes diatonically.	
Bars	Sets the length of the total sequence in bars	
Spread	Sets the distance between intervals	
Octave	Sets the base octave for the sequence.	+
Octave Random	Sets the probability of randomizing the octave of generated notes	+
Density	Sets the sequence's density.	+
Bass RPT	Sets how often the bass note gets played	+
Note Len	Sets the proportional note length of generated notes.	–

DRUMGEN

Generator Description:



DrumGen is a 4-part drum sequencer that uses 3D probability templates to generate sequences based on certain music styles.

A new template can be selected via the **TEMPLATE** parameter or by pressing **SHIFT** + **Generate**.

The 4 parts are completely independent and can be set to individual sequence lengths, probability and MIDI notes.

Parameter List

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	
Density 1	Sets part 1's probability	
Density 2	Sets part 2's probability	
Density 3	Sets part 3's probability	
Density 4	Sets part 4's probability	
Length 1	Sets part 1's sequence length	+
Length 2	Sets part 2's sequence length	+
Length 3	Sets part 3's sequence length	+
Length 4	Sets part 4's sequence length	+
Note 1	Set part 1's MIDI note	--
Note 2	Set part 2's MIDI note	--
Note 3	Set part 3's MIDI note	--
Note 4	Set part 4's MIDI note	--
Template	Selects a new template	+
Random	Adds randomness to the sequence.	

INPUT SEQUENCE (`INSEQ`)

Generator Description:

The Input Sequencer is a non-algorithmic generator that lets you record incoming MIDI notes to it's sequence (up to 32 steps) and play them back.

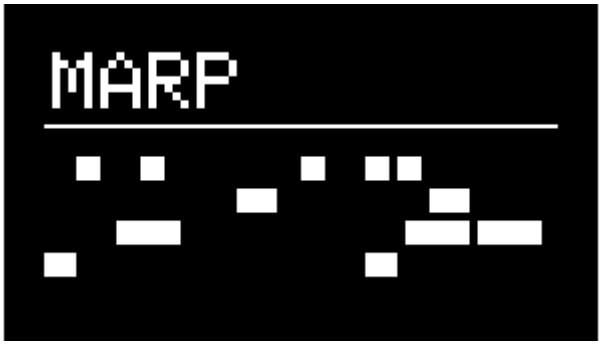
Recorded sequences can be manipulated using parameters such as Length, Probability and Note Length.

Parameter List:

Parameter	Description	Hardware Mapping
Recording	Toggles recording	
Direction	Sets the playback direction	
Shift	Transposes the sequence diatonically.	
Length	Sets the length of the sequence.	
Probability ( )	Sets the sequence's probability.	
Note Length ( )	Sets the proportional note length of generated notes.	+
Quantize	Toggles quantization of the sequence.	

MARP

Generator Description:



MARP is designed to generate arpeggios by creating separate note sequences for each of its 4 parts and combining them.

Each of these four parts is assigned to a different note (the first one is always set to the root note of the select key and scale) and also features individual Length parameters.

Changing the individual length of each of the 4 parts can result in interesting polyrhythmic sequences.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	
Shift	Transposes the sequence diatonically.	
Length	Sets the total length of the sequence.	
Density	Sets the sequence's density.	
Offset	Sets the offset of the sequence.	
Length 1	Sets the length of the first note's sequence.	+
Length 2	Sets the length of the second note's sequence.	+
Length 3	Sets the length of the third note's sequence.	+
Length 4	Sets the length of the fourth note's sequence.	+

MIDI PLAYER

Generator Description:

MIDI PLAYER lets you load MIDI loops from .mid files stored in the MIDI folder of the SD card. It was designed to give users an option to play back specific / pre-recorded MIDI loops during live performances.

Because it was designed to work with simple MIDI loops, MIDI PLAYER only works with .mid files that contain 1 channel and less than 128 notes.

Loops can be manipulated in real time by adjusting the Length, Direction, Shift and Density parameters. It's also possible to re-quantize the notes in the loop to the active Key and Scale.

Parameter List:

Parameter	Description	Hardware Mapping
Load File	Loads a new MIDI file.	
Transpose	Transposes the sequence.	
Length	Sets the total length of the sequence.	
Density	Sets the sequence's density.	
Offset	Sets the offset of the sequence.	

POLYFORM

Generator Description:

Polyform is a reactive generator based on the Spektro Audio Polyform Max for Live device. It uses a polyphonic algorithm designed to respond to incoming MIDI notes.

Because of its responsive nature, Polyform can generate polyphonic sequences based on an incoming monophonic sequence in real-time. Feed it a bassline and it'll automatically generate some chords to go on top of it. If the bassline changes, Polyform will adjust it's own sequences automatically.

In order to use Polyform, route the output of another Track to Polyform's track via the Aux Out.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence.	
Variate	Generates a variation based on the current sequence.	+
Shift	Transposes the sequence diatonically.	
Length	Sets the total length of the sequence.	
Density	Sets the sequence's density.	
Delay	Sets the delay for generated note (x/16)	
Pitch Probability ( )	Sets the pitch probability.	+
Gate Probability ( )	Sets the gate probability.	+
Chord Probability ( )	Sets the chord probability.	+

POP

Generator Description:

POP is designed to generate traditional chord progressions algorithmically.

When generating a new sequence, POP selects 4 chords and generates a gate sequence to play those chords. POP will advance to the next chord after a certain number of steps determined by the Chord Length parameter.

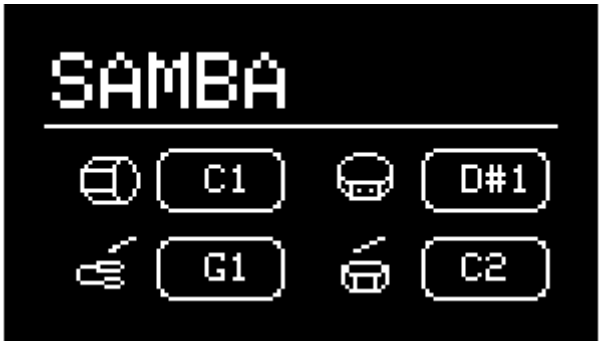
POP will generate triads (3-note chords) by default but it can also invert chords and generate different types of chords (+7, +9, +13, sus2, sus4) according to the Inv Prob and Type Prob parameters respectively.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	
Shift	Transposes the sequence diatonically.	
Length	Sets the total length of the sequence.	
Density	Sets the sequence's density.	
Velocity	Sets the base velocity of generated notes.	
Type Probability ( )	Sets the probability of different chord types.	+
Chord Length ( )	Sets the length of each chord.	+
Inversion Probability ( )	Sets the probability of chord inversions.	+
Balance	Sets the velocity of short x long notes.	+

SAMBA

Generator Description:



Samba is a percussive generator inspired by the Brazilian genre and based on a 4-part euclidean sequencer. All four parts are controlled by shared parameters. Although named after a specific genre, Samba is capable of generating percussing rhythms/ grooves that can be used for all kinds of different genres.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	
Spread	Offsets all four parts.	
Length	Sets the total length of the sequence.	
Density	Sets the sequence's density.	
Random	Sets the probability of random hits.	
Rotate	Rotates all four sequences forward.	+
Probability ( )	Sets the probability of all four parts.	+
Note 1	Set part 1's MIDI note	--
Note 2	Set part 2's MIDI note	--
Note 3	Set part 3's MIDI note	--
Note 4	Set part 4's MIDI note	--

SHUFFLER

Generator Description:

Shuffler is a generator designed to play and mangle sliced loops. To get the most out of Shuffler, it's recommended that loops are sliced by the grid (preferably 1/16 or 1/8).

The different modes available in Shuffler are capable of sequencing the slices in different ways:

- Mode 0 (Forward): Mode 0 will use a non-quantized rising note sequence according to the Start note and Length. This mode will play loops sliced in 1/16 in their original form.
- Mode 1 (Backward): Similar to Mode 0 (Forward) except it'll play the slices in reverse/backward.
- Mode 2 (Sequenced): This mode uses a shuffled sequence to play the slices in a different order to create new variations of the loop.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	
Variate	Generates a variation based on the current sequence.	++"FUNCTION++ +
Repeat	Set the number of note repeats.	
Length	Sets the length of the sequence.	
Density	Sets the sequence's note density.	
Mode	Sets the playback mode.	
Note Length ( )	Sets the proportional note length of generated notes.	+
Random Probability ( )	Sets the probability of playing a random note.	+
Quantize	Enables pitch quantization	
Start	Sets the pitch of the first slice	

THRU

Generator Description:

The Thru generator is a simple pass-through generator that can be used for duplicating notes generated from a different track or further processing sequences through an additional MIDI FX slot (routed via the Tracks' Aux Output).

Parameter List:

Parameter	Description	Hardware Mapping
Shift	Transposes incoming MIDI notes.	
Max Velocity ( )	Sets the max MIDI velocity.	
Probability	Sets the probability of playing back incoming notes.	
Random Velocity ( )	Sets the amount of random velocity.	
Quantize	Enables pitch quantization	

TURING

Generator Description:

Turing is an algorithm inspired by the Music Thing's Turing Machine. It uses a lockable 16-bit shift register to generate evolving sequences.

Parameter List:

Parameter	Description	Hardware Mapping
Write	Flips the first bit.	
Clear	Clears the shift register.	+
Shift	Transposes the sequence diatonically.	
Length	Sets the length of the sequence.	
Probability ( )	Sets the probability of flipping the first bit.	
Loop	Sets the probability of copying the last bit back into the first bit.	
Octave	Sets the base octave for the sequence.	+
Spread	Sets the read distance between the different voices.	+
Range	Sets the pitch range of the sequence (in semitones).	+
Voices	Sets the number of voices.	+

Last update: 2023-01-19

3.3 MIDI FXs

3.3.1 About MIDI FXs:

NGEN features a number of different MIDI FX's that can be used to manipulate and enhance sequences played by the Generators non-distructively.

3.3.2 MIDI FXs Parameters:

As with Generators, each MIDI FXs contains a set of parameters that can be adjusted via the sub-menu available in the .

While in the MIDI FX sub-menu, the most relevant parameters for selected MIDI FX are mapped to the NGEN's potentiometers:

- 4 Parameters mapped to the potentiometers directly.
- 4 Additional parameters are accesible by holding down **SHIFT** while moving the potentiometers.

Certain MIDI FX's also use the button to generate new internal sequences.

3.3.3 List of Available MIDI FXs:

ACCENT

Accent changes the MIDI velocity of incoming MIDI notes according to it's internal velocity sequence in order to create more repeatable and prominent accent patterns.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Generate	Generates a new accent sequence		
Length	Length of the accent sequence		
Intensity	Increases the velocity of all MIDI notes to 127		

CHORD

Chords transforms single notes into chords by adding up to 3 notes on top of incoming notes based on specified intervals. There's also an option to quantize those additional notes or leave them unquantized.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Quantize	Quantizes all intervals to the active key / scale		
Chord Interval 1	Interval of the first chord note		
Chord Interval 2	Interval of the second chord note		
Chord Interval 3	Interval of the third chord note		

ECHOES

Echoes is a MIDI delay effect that creates additional notes that are delayed by the specified delay time.

List Of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Delay Time	Delay time in milliseconds		
Feedback	Feedback amount		
Probability ( )	Probability of the echoes		
Falloff ( )	MIDI Velocity falloff of the echoes		
Octave Random ( )	Randomizes the octave of the echoes	+	

GLITCH

The Glitch MIDI FX can be used to mangle and glith up sequences via a random ratcheting processor and pitch / velocity modulation. It's great for spicing up sequences and adding some IDM-style glitches to a performance.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Repeats	Maximum number of note ratchets		
Gate Length	Length of the note ratchets		
Probability	Probability of a glitch happening		
Random	Amount of glitch randomization		
Pitch Mod	Enables octave randomization		

HUMANIZER

Humanizer is designed to make sequences sound more natural as if it was played by a human. It works by adding random amounts of delay and velocity modulation to incoming notes.

It's great for making polyphonic sequences sound less mechanical and static.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Delay Probability ( )	Probability of delaying a MIDI note		
Velocity Probability ( )	Probability of a modulating a note's velocity		
Max Delay	Maximum delay length		
Velocity Modulation ( )	Depth of velocity modulation		

MODULATOR

The Modulator FX can be used for modulating MIDI control changes (CC) of external instruments. A common use-case would be to use it to modulate a filter cutoff frequency of a synthesizer via MIDI CC.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Generate	Generates a new modulation sequence		
Send	Sends a CC message (for mapping purposes)	+	
Sequence Amount ( )	Amount of sequence modulation		
Length	Length of the modulation sequence		
CC Out	CC number to send		
Depth			

PROGRAM SEQUENCER (PROG SEQ)

The Program Sequencer MIDI FX offer a way of sequencing MIDI Program Changes creatively. When used with synthesizer / drum machines that respond quickly to program changes, these program change sequences will make it sound as if there're multiple different instruments being played sequentially.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Generate	Generates a new program change sequence		
Length	Length of the program change sequence		
Hits	Number of MIDI notes needed to advance the sequence		
Max Program ( )	Maximum program change number		
Sync	Waits for the next clock pulse to send the next program change		
Delay			
Step 1	Sets the program change number of the first step		
Step 2	Sets the program change number of the second step		
Step 3	Sets the program change number of the third step		
Step 4	Sets the program change number of the fourth step		
Step 5	Sets the program change number of the fifth step		
Step 6	Sets the program change number of the sixth step		
Step 7	Sets the program change number of the seventh step		
Step 8	Sets the program change number of the eighth step		

SHAPER

The Shaper MIDI FX scales incoming MIDI notes based on an adjustable pitch and velocity range. It also includes options to multiply note lengths and to map MIDI notes to different MIDI channels based on their pitch (useful for triggering certain drum machines / samplers such as the Elektron Digitakt and Octatrack).

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Pitch Minimum ( )	Lowest possible note (0-127)		
Pitch Maximum ( )	Highest possible note (0-127)		
Velocity Minimum ( )	Lowest possible velocity (0-127)		
Velocity Maximum ( )	Highest possible velocity (0-127)		
Length Multiplier ( )	Multiplies the length of incoming MIDI notes		
Channel Mapping ( )	Maps incoming MIDI notes to different MIDI channels based on their pitch *		
Map Pitch ( )	Sets the pitch of converted MIDI notes (while in)		

Pitch Based Channel Mapping

C notes are mapped to the Track's Output Channel and all other pitches are mapped according to their distance from C (in semitones), so D notes are mapped to Out Ch + 2, D# to Out CH + 3, and so on. After being mapped to their respective channels, all notes are set to the same pitch (Map Pitch).*

SPRAY

The Spray MIDI FX creates a delay-like effect by generating copies of incoming MIDI notes based on probability and random delay time.

List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Max Delay	Maximum delay time (in milliseconds)		
Max Repeats	Maximum number of repetitions of delayed notes (similarto feedback)		
Probability ( )	Probability of spraying a note		
Falloff ( )	MIDI Velocity falloff of sprayed notes		
Octave Random ( )	Randomizes the octave of the sprayed notes	+	
Velocity Random ( )	Randomizes the velocity of the sprayed notes	+	

STRUM

The Strum MIDI FX can be used to create a strumming effect by adding a short random delay between notes received within the same 1/16 clock step.

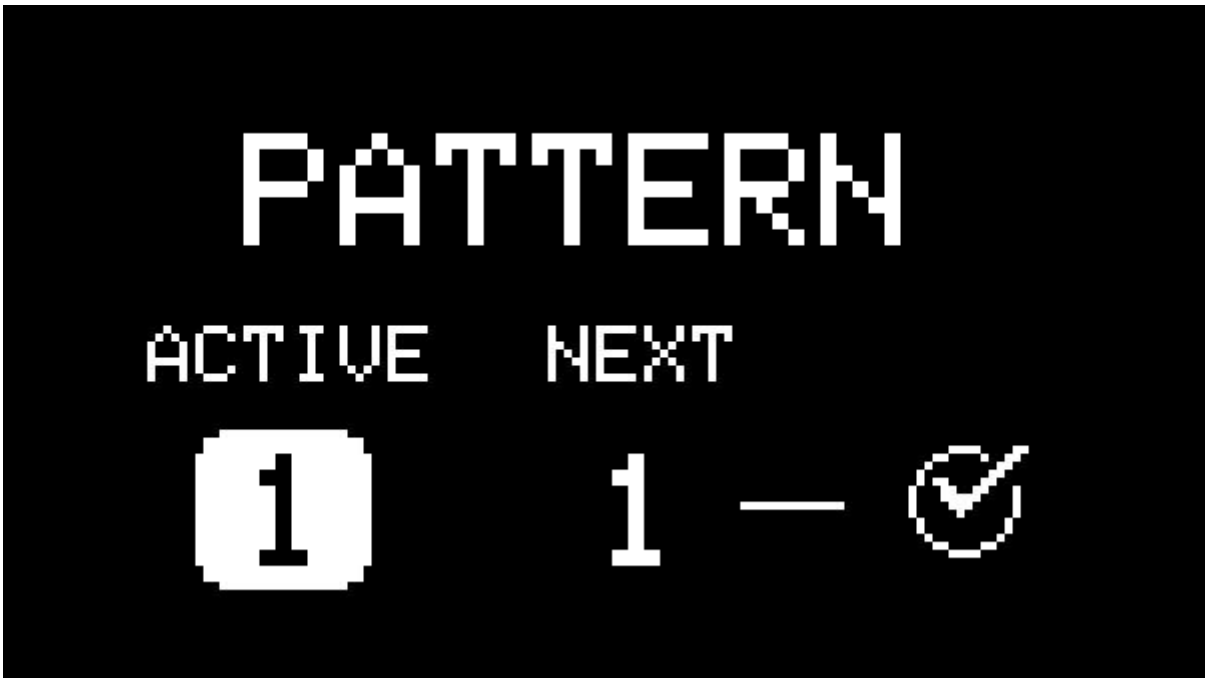
List of Parameters:

Parameter	Description	Hardware Mapping	Advanced
Max Delay	Maximum delay time (in milliseconds)		

Last update: 2023-01-19

3.4 Patterns

3.4.1 About Patterns



The pattern system in NGEN is designed to let users create and perform different sections of a song/ project. Patterns can store and recall settings for all tracks (including their Generators and MIDI FX). Global and clock settings are only stored in **Projects**.

Each Project can store up to 8 patterns.

To use patterns, you must first activate a Project by either saving or loading from the microSD card via the sub-menu. Once a project is active, you can save and recall different patterns.

To **load a pattern**, press the button once to open the **Pattern Selector**, select the pattern using the , and click on the encoder to load.
The circle on the right side of the Pattern Selector indicates if the selected pattern is empty or filled. Selecting an empty pattern won't affect the active sequences and parameters.

To **save a pattern**, return to the Main Menu, hold down **PATTERN** + **FUNCTION**, and press the encoder.

Saving a pattern automatically overwrites that pattern in the active Project file therefore it's not necessary to save the Project afterward.

3.4.2 Workflow Suggestion

The pattern system can be used to create, store and load different variations based on the initial pattern.

After creating your first pattern, return to the Main Menu and save it as pattern one.
You can then create different variations by tweaking the different parameters and generating new sequences. To save each variation, load an empty pattern and save the current variation to it.

Last update: 2023-03-13

3.5 Performance Mode

3.5.1 About Performance Mode

NGEN includes a dedicated performance mode available under the `PERFORM` sub-menu.

Performance Mode includes 8 macro parameters that let you map up to 4 parameters of any Generator or MIDI FX, in any track, per macro and set specific ranges for each mapping.

Macro mappings are stored in Project files and are recalled automatically when you load a Project.

3.5.2 Macro mapping

Macro mapping process

To map a parameter to a macro:

1 - Navigate to the `PERFORM` sub-menu

2 - Select a macro and click on the [ ] to adjust the macro mappings.

3 - Select the parameter slot number( ).

3 - Select the [ ] to activate mapping mode (indicated by the **M→** icon on the display's top section).

4 - Navigate to a parameter and press the [ ] to select the displayed parameter.

5 - Adjust the minimum and maximum values via the [ ] and [ ] settings.

Last update: 2023-01-16

3.6 Projects

3.6.1 About Projects

Similarly to standard DAWs, NGEN can save and load entire sessions as project files. These files are stored in the microSD as .HEX files inside the Projects folder.

A project file contains data for Tracks (including data for the active **Generators**, **MIDI FX** and I/O routings), **Clock Generators**, **Scale**, Perform Mode, and **Patterns**.

After saving or loading a project, that project becomes the active project for all Patterns.

To **save a project**, navigate to the Projects sub-menu, select the Save File option, and select what file you'd like to save your project to.

To **load a project**, navigate to the Projects sub-menu, select the Load File option, and select what file you'd like to load.

To **create a new project** file, navigate to the Projects sub-menu, select the New File option, edit the file name, and confirm.

Projects can not be renamed through NGEN's interface. To rename a project, connect the microSD card to your computer (via a microSD to USB adapter) and rename the files inside the Projects folder (we suggest limiting the filename to 10 characters).

Last update: 2023-01-16

3.7 Scale

3.7.1 About Scale

Because NGEN is designed with live performance in mind, most of the Generators process notes in terms of musical intervals rather than specific notes. Therefore these Generators use the selected **Key** and **Scale** in the **SCALE** sub-menu to translate those intervals to the appropriate notes.

This approach lets the user change the **Key** and **Scale** of all **Tracks** simultaneously via the **SCALE** sub-menu (available in the **MAIN MENU**).

3.7.2 List of Available Scales

- Minor
- Major
- Harmonic Minor ( )
- Melodic Minor ( )
- Major Pentatonic ( )
- Minor Pentatonic ( )
- Blues
- Dorian ( )
- Lydian ( )
- Locrian ( )
- Arabic ( )
- Augmented ( )
- Wholetone ( )

Last update: 2023-01-16

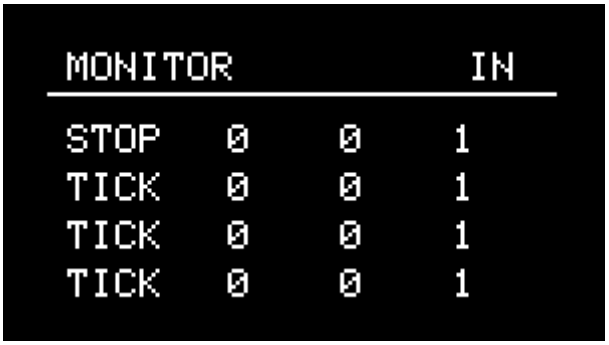
3.8 Tools

3.8.1 About Tools

NGEN also includes some extra tools that can be used to improve your workflow.

3.8.2 List of Available Tools

MIDI MONITOR (`MONITOR`)



The built-in MIDI Monitor lets you track incoming and outgoing MIDI messages. It can be used to make sure that NGEN is receiving MIDI clock, notes, and control changes from other devices and that it's also sending MIDI messages appropriately.

The four columns in the MIDI Monitor represent message type, number (note or CC number), value, and channel.

To switch between and , press the button.

CV OUT

This sub-menu contains some parameters available for the CV outputs.

Keep in mind that these are still experimental settings.

Parameter	Description
Out 1 Oct	Set the base octave for the CV 1 output
Out 2 Oct	Set the base octave for the CV 2 output

AUTO VARIATE (`AUTO VARI8`)

The Auto Variate feature in NGEN is designed to automatically generate sequence variations for enabled tracks after a certain number of bars.

Parameter	Description
Bars	The number of bars before the variation is generated
Probability (`PROB`)	The probability of the variation being generated
Variation (`VARIATION`)	The amount of variation to be generated

Auto Variate does not affect the following Generators: Input Sequencer, MIDI Player, and Thru Generators.

Last update: 2023-03-13

3.9 Tracks

3.9.1 About Tracks

The NGEN features 16 tracks that work similarly to MIDI tracks in standard DAWs. Each track can be set to a different Generator, MIDI FX, Program Change and I/O settings.

The track settings can be accessed via the **TRACK** sub-menu available in the **MAIN MENU** or via the [ ] + [ ] shortcut.

3.9.2 Selecting a Track

To select a different track, press the [ ] button, use the [ ] to scroll through the different tracks and press the [ ] or the [ ] button to return to the previous screen. Alternatively, turn the [ ] while holding down the [ ] button to automatically return to the previous screen.

When a new track is selected, it automatically becomes the **active** track, meaning the four NGEN knobs (as well as the [ ] button) will affect its parameters.

3.9.3 Tracks Internal Routing

When triggered by a Clock Generator, a track will trigger the selected Generator. The MIDI output of the Generator is then sent to the input of the selected MIDI FX.

The MIDI output of the MIDI FX is then sent to the track's main and auxiliary outputs.
The main output is always routed to the USB / MIDI Out on the selected MIDI channel (OUT CH). The

auxiliary output can be used for sending MIDI messages generated by a track (post MIDI FX) to the input of another track or one of the CV outputs.

Tracks can also receive MIDI from external sources (via USB or MIDI IN) and other tracks (routed via the AUX OUT). Some Generators (such as Polyform) can process incoming MIDI notes.

3.9.4 Track Settings

Setting	Description	Advanced
Status	The Status toggle lets you enable or disable certain tracks. Disabled tracks will not be processed and will not generate any MIDI notes	
Generator	Selects one of the available generators for the track	
MIDI FX	Selects one of the available MIDI FX for the track	
Clock Rate	Sets the clock rate used by the Generator and MIDI FX (MIDI Clock only)	✓
Auxiliary Output (`AUX OUT`)	Sets the track's auxiliary output (for routing the track's output to another track's input)	✓
Output Channel (`OUT CH`)	Sets the track MIDI output channel	✓
Input Channel (`IN CH`)	Sets the track MIDI input channel	✓
Program Change (`PROGRAM`)	Sets the MIDI Program Change number which gets send to the MIDI output when loading a project or a pattern	✓
Auto Variate (`AUTO VAR`)	Enable / disable the Auto Variate mode	✓

Last update: 2023-01-19

4. System

4.1 Settings

4.1.1 About Settings

NGEN features a number of settings that let you customize your unit to better suit your needs.

Keep in mind that Settings are not stored in your device's memory by default so, if you'd like to keep your current settings, make sure to Save.

4.1.2 List of Available Settings

Setting	Description
Menu Wrap	When enabled, scrolling past the last item in menu
Menu List	Enables list mode for menus (except for the Generator sub-menu)
Show Icons	Enables or disables graphical icons on the Main Menu
Show Value	When enabled, parameters mapped to the knobs will be displayed on the screen while being modified
Idle Mode	Determines what is displayed when the display goes idle (3 seconds): **OFF** **ANIMATION**: display's the active Generator's animation **PARAMS**: displays a list of the parameters currently mapped to the 4 knobs
Advanced	Enable or disables advanced parameters and settings
Brightness	Sets the display's brightness level
Save	Saves the current settings to the device's internal memory
Restart	Restarts the device
Info	Shows device information

Last update: 2023-01-16

4.2 Firmware Update

4.2.1 How to update the NGEN firmware

1 - Download the latest version of the NGEN firmware:

2 - Download and install TyTools: https://github.com/Koromix/tytools/releases/

3 - Connect the NGEN to your computer via USB

4 - Open the TyUploader application

5 - Select the NGEN from the drop-down menu and click on the Upload button

6 - Select the firmware file (.hex extension)

4.2.2 Change-Log

Version 1.0

- Initial Version

Last update: 2023-03-13