NGEN User Manual

None

Spektro Audio

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1. NGEN – Algorithmic MIDI Workstation – User Manual

1.1 About NGEN

NGEN is a unique 16-track MIDI sequencer designed 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

Download PDF

Print Current Version

1.2 Firmware

Current version: 1.2 (Change-Log)

2024-10-11

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 to a MIDI-capable device via the MIDI Out jack.

The MIDI Clock generator is active by default, so NGEN should be ready to receive MIDI Clock from a DAW or external gear to NGEN.

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

> ⚠ **Attention - ADVANCED MODE**
>
> Many advanced settings (such as track routing and Clock Rate) are hidden by default to provide a more streamlined experience to new users.
> To access these settings, enable the "Advanced Mode" in the Settings / General page.
> To keep your current settings, save your settings after enabling Advanced Mode.

2.1.2 Step-By-Step Guide

This guide provides a step-by-step process to initiate NGEN:

1 - Connecting NGEN to your setup

In this first section, you'll learn how to connect NGEN to your setup and use it to sequence 1 instrument using the ACDGEN generator.

1. Establish a connection between NGEN and a computer or a MIDI-enabled hardware instrument. If you do not intend to use NGEN with a computer, you can power the unit externally.
2. Configure your MIDI instrument or destination to receive MIDI notes on Channel #1:

a. If you're utilizing NGEN with a computer, launch your preferred DAW, create an instrument/MIDI track, load a virtual instrument, and set it to receive MIDI from NGEN's Channel 1.

b. If you're employing a hardware synthesizer, ensure it's configured to receive MIDI on Channel 1.

3. Initiate one of NGEN's Clock Generators:

a. If you wish to synchronize NGEN to a MIDI Clock from your DAW or instrument, ensure they're configured to output MIDI Clock to NGEN via USB or the MIDI IN jack.

b. If you prefer to use NGEN's internal clock, navigate to the Main Menu, proceed to the Clock sub-menu, hold the `TRACK / CLK` button and move the `MENU ENCODER` to select the Free Clock, then click the encoder to activate it.

4. NGEN should now begin transmitting MIDI Notes to your instrument.
5. By default, NGEN will load ACDGEN as the generator for track #1 so you should hear a sequence being played on your instrument.

2 - Generating and Modifying Sequences Using ACDGEN

Now that NGEN is connected and transmitting MIDI notes to your instrument, let's see how to generate and modify sequences using the ACDGEN generator.

> **Attention**
>
> The first 3 sub-menus available in the **Main Menu** (Generator, MIDI FX and Track) are related to the selected track while the other sub-menus contain global settings.

1. Return to the **Main Menu** using the `RETURN` button and navigate to the **Generator sub-menu**. This sub-menu contains all the parameters available for the active generator in the selected track (in this case, ACDGEN).

> **Note**
>
> While in the Generator sub-menu, the NGEN displays the name of the active generator in the top-left corner and the selected track number in the right corner.

1. Use the `MENU ENCODER` to scroll through the **parameter list**.
2. To modify the value of the selected parameter, **click the** `MENU ENCODER` to select the value, scroll to adjust it, and click the encoder to return to the parameter selection.
3. The **main 4 parameters** of the active generator can also be accessed through the ** `PARAM 1-4` potentiometers** (except while in certain sub-menus). Additional 4 parameters can be accessed by holding the `FUNCTION` button and turning the `PARAM 1-4` potentiometers. More information about the behavior of the potentiometers can be found in the Hardware Controls section.
4. To **generate** a new sequence, click the `GENERATE` button.

For more information about Generators, check the Generators section.

3 - Activating a MIDI FX

Let's try adding a MIDI FX to the active track to modify the sequence generated by ACDGEN in real time.

1. From the Main Menu, navigate to the **Track sub-menu** to access the track's parameters. This sub-menu lets you activate/deactivate the track, select the active generator and MIDI FX, and adjust settings related to MIDI routing, clock division, and more.
2. Navigate to the **MIDI FX** parameter and click the `MENU ENCODER` to select the desired MIDI FX.
3. Scroll through the list of available MIDI FXs using the `MENU ENCODER`, select the Glitch MIDI FX, and click the encoder to confirm.
4. Return to the **Main Menu** and navigate to the **MIDI FX sub-menu** to access the parameters of the active MIDI FX.

> **Attention**
>
> While in the MIDI FX sub-menu, `PARAM 1-4` potentiometers control the parameters of the active MIDI FX as indicated by the knob icon on the top of the screen.

For more information about MIDI FXs, check the MIDI FX section.

4 - Adding More Tracks

Because NGEN is a multi-track sequencer, you can switch between tracks to edit their parameters and sequences. Let's add a new track and configure it to output MIDI notes to Channel 2.

1. To open the track selector, click the `TRACK|CLK` button from the Main Menu or any sub-menu.
2. Use the `MENU ENCODER` to scroll through the list of available tracks, select track #2, and click the encoder to confirm.
3. Use the shortcut `FUNCTION` + `TRACK` to jump to the **Track sub-menu**.
4. Only track 1 is active by default, so activate track 2 by scrolling to the **Active** parameter and clicking the `MENU ENCODER` to toggle it on.
5. Navigate to the **Generator** parameter and select a different generator for track 2.
6. By default, the 16 tracks available in NGEN are set to output MIDI notes to channels 1 through 16 sequentially. To access the parameters related to MIDI routing, clock division, and more, enable the **Advanced Mode** in the **Settings** / General page.

For more information about tracks, check the Track section.

5 - Using Patterns

NGEN allows you to create and store 8 patterns per project. In this section, you'll learn how to save and load patterns.

1. Click the `PATTERN` button to open the **Pattern** selector.
2. Use the `MENU ENCODER` to scroll through the list of available pattern slots.
3. To quickly save your active sequence to a pattern slot, press `FUNCTION` + `PATTERN`.
4. To load a pattern, scroll to the desired pattern slot and click the `MENU ENCODER`.
5. To access the pattern slot settings, click `FUNCTION` + `PATTERN` while in the pattern selector. This sub-menu lets you save, delete, copy and paste patterns.

For more information about patterns, check the Pattern section.

6 - Saving Your Project

In this final section, you'll learn how to save your project for future use.

> **Attention**
>
> Projects can be stored in the internal memory of NGEN or on an external microSD card. To save your project to the internal memory, ensure that the microSD card is not inserted.

1. Return to the **Main Menu** and navigate to the **Project** sub-menu.
2. Scroll to the **Save** parameter and click the `MENU ENCODER` to save your project.
3. Edit the project name using the `MENU ENCODER` and confirm.

For more information about projects, check the Project section.

2.1.3 Flow Diagram

The NGEN sequencing engine works by 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 is 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 other hardware instruments (such as modular synthesizers).

More information about the available CV modes is available in the Settings section.

The four outputs are available as two pairs of additional outputs available via the parameter in the Track sub-menu.

To route the output of a track to one of the CV outputs:

1 - Enable Advanced Mode (Settings / General).

2 - Select one of the available CV modes (Settings / CV Out).

3 - Select the track you'd like to route to one of the CV output.

4 - Open the Track sub-menu, navigate to the parameter and set it to or .

WARNING

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.

Note

Because of NGEN's low power consumption, certain USB power banks can dismiss it as an actively charging device and may turn off after a certain period. If this happens, try using a different power bank or a USB wall charger.

2.2.3 I2C Connection

NGEN features an 1/8 TRS I2C connection on it's left side wired with SDA on the TIP and SCL on RING.

We plan on adding I2C-related features in future NGEN firmware updates.

WARNING

Do not connect any CV outputs or other signals via 1/8 to the I2C connection otherwise you may damage your unit.

2.2.4 Setup Examples

NGEN + Computer

NGEN + Hardware MIDI Synthesizer

NGEN + Modular Synthesizer

NGEN + Multiple Gear

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2.3 Hardware Controls

2.3.1 Hardware Controls on NGEN

The NGEN includes a main clickable encoder (`MENU ENCODER`), a return button (`RETURN`), 4 parameter knobs (`PARAM 1` through `PARAM 4`), and 4 buttons (`TRACK/CLK` , `PATTERN` , `FUNCTION` , and `GENERATE`) that can be used to access and control different features.

2.3.2 Encoder

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

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

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

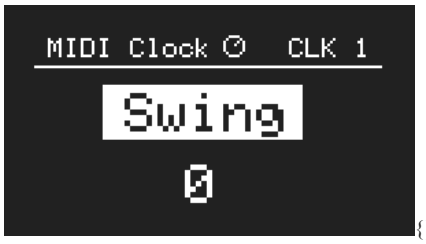
Please refer to the shortcuts table for more information.

2.3.3 Knobs

The 4 knobs (`PARAM 1` , `PARAM 2` , `PARAM 3` , and `PARAM 4`) 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 `FUNCTION` .



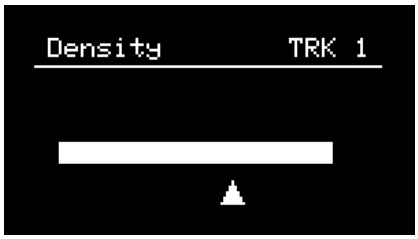
{}

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).

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

2.3.5 Shortcuts

A list of shortcuts available is available on the Menu Navigation page.

2.3.6 Special Behavior

Certain NGEN features (such as the scale editor, name editor, and file selector) can have more control over NGEN's hardware controls and, as such, can use the available hardware controls in different ways.

The standard behavior for NGEN's controls should be restored once you complete the operation or exit the feature (e.g. by pressing the `RETURN` button).

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2.4 Menu Navigation

2.4.1 Main Menu

The NGEN menu system is designed to be easy to navigate using the `MENU ENCODER` and the `RETURN` 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 `MENU ENCODER` to scroll through the list of features and click the `MENU ENCODER` to navigate to a sub-menu. To return to the previous menu, press the `Return` button.

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

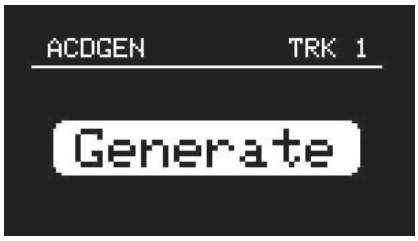
- **Parameters** (indicated by the parameter name on top and value at the bottom) can be controlled by clicking the `MENU ENCODER` to access the parameter's value and scrolling the `MENU ENCODER` to change it's value.

> **Note**
>
> Most parameter values are adjusted in real-time as you turn the encode but some (such as the Generator and MIDI FX selection in the Track sub-menu) require you to click the encoder to confirm the new value.

Clicking the encoder on parameters switches between parameter selector and value

• **Switches** can be toggled by clicking the MENU ENCODER.

• **Actions** (indicated by the action name displayed on the center of the screen) can be called by clicking the MENU ENCODER.



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).

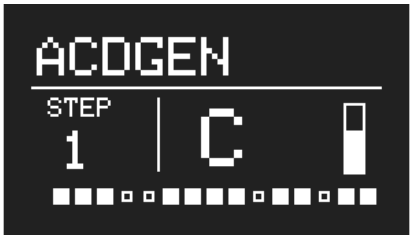
Menu Navigation is the default mode of the display.

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 5 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.

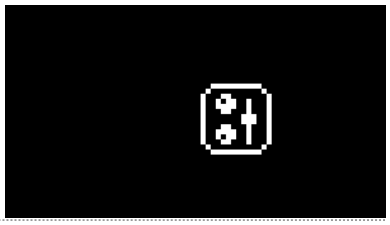
Parameter List

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 a certain period (determined by the Screensaver Period setting) 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
FUNCTION + TRACK/CLK	Open Track Settings
FUNCTION + GENERATE	Secondary Action (for Generators and MIDI FX)
TRACK/CLK + MENU ENCODER	Select a Track
TRACK/CLK + MENU ENCODER	Select a Clock Generator (while in Clock sub-menu)
PATTERN + MENU ENCODER	Load a pattern
FUNCTION + MENU ENCODER (Click)	Save a pattern (while in the Pattern selector)
FUNCTION + RETURN + MENU ENCODER (Click)	Delete a pattern (while in the Pattern selector)
PATTERN + GENERATE	Load the next pattern
PATTERN + FUNCTION + GENERATE	Load the previous pattern
TRACK / CLK + GENERATE	Generate Pattern
TRACK / CLK + FUNCTION + GENERATE	Variate Pattern

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2.5 File Management

2.5.1 About File Management

NGEN can use external files to store and load data for Projects, MIDI files, DrumGen templates, and NSL scripts. These files can be either be stored in the microSD card or in NGEN's internal memory.

During it's boot process, NGEN checks if a microSD card is inserted. If no microSD card is inserted, NGEN will use its internal memory instead.

NGEN currently doens't offer a way of transferring files between its internal memory and the microSD card (coming soon).

2.5.2 Using NGEN with a microSD card

We recommend using microSD cards with a capacity of 32GB or less, formatted as FAT32.

Before inserting a microSD card into NGEN, we recommend that you copy the Factory Content to the microSD card in order to have the necessary folders for MIDI files, DrumGen templates, and NSL scripts.

2.5.3 Factory Content

The Factory Content for NGEN (including MIDI files, DrumGen templates, and NSL scripts) is available on the NGEN Resources repository on Github.

If you'd like to download or update the Factory Content, follow these steps:

1 - Download a copy of the Factory Content available on the NGEN repository on Github.

2 - Navigate into the Factory Content folder and copy the contents to the root of your microSD card.

Attention

It's currently not possible to copy new files into NGEN's internal memory. If you'd like to use new files available in the Factory Content, you'll need to use a microSD card.

2.5.4 List of File Types

File Type	Description	Sub-Folder	Extension
NGEN Project	Stores data for Projects	/ (Root)	.HEX
MIDI File	MIDI files to be played by the MIDI Player generator.	/MIDI	.MID
DrumGen Template	DrumGen templates to be used by the DrumGen generator.	/DRUMGEN	.HEX
NSL Script	NSL scripts to be used by the NSL generator.	/NSL	.NSL

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2.6 MIDI Mapping

2.6.1 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.

Warning

In order to receive MIDI CC messages, you must first enable "MIDI CC RX" in Settings / MIDI sub-menu.

2.6.2 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
	Load Next Pattern	59	Action
	Load Pattern #	60	Absolute (1-8)
	Save Pattern	61	Action
	Generate Pattern	62	Action
	Variate Pattern	63	Action
Tracks	Select Previous Track	70	Action

Feature	Parameter	MIDI CC Number	Behaviour
	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
	Open Perform	83	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

Parameter	MIDI CC Number	Behaviour
Generate	1	Action
Variate	2	Action
Shift	3	Scaled
Length	4	Scaled
Density	5	Scaled
Bass Shift	6	Scaled
Octave	7	Scaled
Note Length	8	Scaled
Bass Repeat	9	Scaled
Spread	10	Scaled
Octave Random	11	Scaled
Restart	12	Scaled
Lock Bass	13	Scaled
KB Shift	14	Scaled

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

Parameter	MIDI CC Number	Behaviour
Shift	3	Scaled
Length	4	Scaled
Density	5	Scaled
Direction	6	Scaled
Quantize	7	Scaled

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
Inversion	10	Scaled
Trigger	11	Scaled
Chord Quality	12	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
Delay	8	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
Interval 4	106	Scaled
Quantize	107	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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2.7 NSL - NGEN SCRIPTING LANGUAGE

The NSL Engine Generator is a powerful tool that lets you create your own custom algorithms using a simple scripting language.

At it's core, the NSL Engine features a 32-step sequence (with individual pitch, velocity, length (in beats) and density per step) and standard parameters such Shift, Length and Density to control playback.

Instead of using a pre-defined algorithm to fill the 32-step sequence, the NSL Engine lets you load a script to generate it using your own custom algorithm.

Each NSL script consists of a series of hex values that are parsed into commands and values. Hex values above 160 (0xA0) trigger new commands and values below 160 are assigned as values / parameters for these commands. The engine also includes 32 registers (Memory Buffer) that can be used to store values and use them later in the script and 4 generic parameters (Param 1-4) with ranges from 0-100.

Warning

The NSL Engine is still in beta and it's not fully documented and implemented yet. This section of the manual will be updated as we continue to develop the NSL Engine. Faulty scripts can cause the NSL Engine to crash and require a reboot.

2.7.1 ngen_nsl Rust Library

ngen_nsl is a custom Rust library available via cargo / crates.io that make it easier to create and parse NSL scripts for the NSL Engine.

To add it to your Rust project, run the command in your project's directory.

Documentation for ngen_nsl is available at https://docs.rs/ngen_nsl.

2.7.2 NSL Programming Reference

Parameter Types

NSL commands require set of different parameters to execute correctly and each parameter's value is used according to the list below:

VALUE

The VALUE parameter type returns a constant values from to (0-127) and values stored in the NSL Engine's memory buffer from to (128-159).

DESTINATION / SOURCE

The DESTINATION / SOURCE parameters consists of 2 x parameters that are used in pair to retrieve values from different parts and features of the NSL Engine.

SOURCE parameters are used to retrieve data while DESTINATION parameters are used to set data.

The first in the pair (aka) is used to indicate the type / location of the value that follows it ( ) according to the table below:

PART / FEATURE	VALUE 1 (Address)	VALUE 2 (Value / Index)	VALUE 2 RANGE	SOURCE	DESTINATION	DESTINATIO RANGE
Constant Value	0x00	Value	0-127	✓	X	N/A
Random Value	0x01	Random Range	0-127	✓	X	N/A
Step Pitch	0x02	Step Number (Zero-Indexed)	0-31	✓	✓	0-127 (MIDI PITCH)
Step Velocity	0x03	Step Number (Zero-Indexed)	0-31	✓	✓	0-127 (MIDI VELOCITY)
Step Length	0x04	Step Number (Zero-Indexed)	0-31	✓	✓	0-32 (BEATS)
Step Density	0x05	Step Number (Zero-Indexed)	0-31	✓	✓	0-49
Memory Buffer	0x06	Step Number (Zero-Indexed)	0-31	✓	✓	0-255
Params 1-4	0x07	Parameter Number (Zero-Indexed)	0-3	✓	✓	0-100
Scale	0x08	Note position in scale	0-127	✓	X	N/A
Scale (Quantized)	0x09	Note position in scale	0-127	✓	X	N/A

Some features such as Constant and Random use the second in the pair ( ) as the actual value while the other types use it as an index to indicate the location of the value in the NSL Engine's memory.

Examples:

- : Returns a constant value (=) of 5 (=).
- : Returns the step pitch (=) at index 16 (=).
- : Returns a random value (=) between 0 and 32 (VALUE =).

INT16

The INT16 parameter type uses a pair (x and y) of 8-bit values (0-255) to create a 16-bit value (0-65535) by shifting the first value 8 bits to the left and adding the second value to it ( ).

List of Commands

0XA1 SET

Description: Sets the value of a destination to the value of a source.

Parameters:

Examples:

- : Sets the pitch of step 1 to a random value between 0 and 16.
- : Sets the velocity of step 1 to the velocity of step 1.
- : Sets the value of the memory buffer at index 0 to the density of step 5.

0XB0 ADD

Description: Adds the value of a source to a destionation.

Parameters:

Examples:

- : Add 2 ( ) to the pitch of the first step ( ).

0XB1 SUBTRACT

Description: Subtracts the value of a source from a destination.

Parameters:

Examples:

- : Subtract a random value between 0 - 16 ( ) from the pitch of the first step ( ).

0XC0 LOOP SET

Description: Enables looping and set the loop count to the value of a source.

Parameters: (Loop Count)

Examples:

- : Enables looping and set the loop count to 3.

0XC1 LOOP END

Description: Ends the current loop.

Parameters: None

0XC2 JUMP

Description: Jumps to a specific position in the program.

Parameters: (Jump Position)

Examples:

- : Jumps to position 548.

`0XFF` **END**

Description: Ends the program.

Parameters: None

[MORE INFORMATION COMING SOON]

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3. Features

3.1 Clock Generators

3.1.1 About Clock Generators

NGEN includes 3 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, navigate to the **CLOCK** sub-menu (from the **MAIN MENU**), hold down the `TRACK / CLK` button and turn the `MENU ENCODER`.

The name of the selected clock generator will be displayed on the top-left section of the display.

Each clock also has a unique animation that can be used to visualize its current state (if Idle Mode is set to).

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	`PARAM 1`

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	PARAM 1
Length	Sets the length of the swing sequence	PARAM 2
Modulation (MOD)	Sets the amount of clock modulation (swing)	PARAM 3
Swing	Sets the swing amount	-
Generate	Generates a new swing sequence	GENERATE

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	PARAM 1
Balls	Sets the number of balls	PARAM 2
Width	Sets the width of the box	PARAM 3
Height	Sets the height of the box	PARAM 4
Reset	Reset the position of all balls to the center	GENERATE

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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.

Info

The animations for each generator are displayed via the Idle Mode feature while in the Generator sub-menu. To see the animations, set Idle Mode is set to in the Settings, navigate to the Generator sub-menu and leave the machine idle until the display switch to the Idle Mode.

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 (`PARAM 1` , `PARAM 2` , `PARAM 3` , and `PARAM 4`):

- 4 Parameters are mapped to the knobs directly.
- 4 Additional parameters are accessible by holding down `FUNCTION` 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.
• *ARP3*: Algorithm inspired by arpeggiated sequences. • *LEAD*: Generates sequences with longer and more sustained notes that can be used for lead lines and main melodies. • *LEGATO*: Generates sequences where all notes are played in legato (each note lasts until the next note)

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence.	GENERATE
Variate	Generates a new variation of the previously generated sequence.	FUNCTION + GENERATE
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the length of the sequence.	PARAM 2
Density	Sets the sequence's note density.	PARAM 3
Algorithm	Selects the mode used to generate the next sequence.	PARAM 4
KB Shift	Toggles the keyboard shift feature (transposition via MIDI input).	–
Note Len	Sets the proportional note length of generated notes.	FUNCTION + PARAM 2
Random Vel	Sets the amount of random MIDI velocity.	FUNCTION + PARAM 3
Hold Prob	Sets the hold probability (for generating notes longer than 1/16).	FUNCTION + PARAM 4
Octave	Sets the base octave for the sequence.	FUNCTION + PARAM 1
Slide Prob	Sets the probability of generating slide steps	–
Base Velocity ( )	Sets the base MIDI velocity of generated notes	–
Accent	Sets the accent amount	–
Offset	Sets a beat offset for the ACDGEN sequence (in 1/16 steps).	–

ARPER

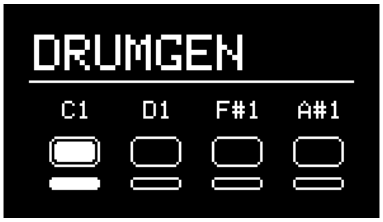
Generator Description:

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.	GENERATE
Restart	Restarts the sequence	–
Bass Shift	Transposes the bass note diatonically.	PARAM 1
Shift	Transposes the additional notes diatonically.	PARAM 2
Bars	Sets the length of the total sequence in bars	PARAM 3
Spread	Sets the distance between intervals	PARAM 4
Octave	Sets the base octave for the sequence.	FUNCTION + PARAM 1
Octave Random	Sets the probability of randomizing the octave of generated notes	FUNCTION + PARAM 2
Density	Sets the sequence's density.	FUNCTION + PARAM 3
Bass RPT	Sets how often the bass note gets played	FUNCTION + PARAM 4
Note Len	Sets the proportional note length of generated notes.	–
Bass Lock	Locks the bass note to the root note of the scale.	–

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.

New DrumGen templates can be created using the open-source DrumGen Template Editor.

Parameter List

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	GENERATE
Density 1	Sets part 1's probability	PARAM 1
Density 2	Sets part 2's probability	PARAM 2
Density 3	Sets part 3's probability	PARAM 3
Density 4	Sets part 4's probability	PARAM 4
Length 1	Sets part 1's sequence length	FUNCTION + PARAM 1
Length 2	Sets part 2's sequence length	FUNCTION + PARAM 2
Length 3	Sets part 3's sequence length	FUNCTION + PARAM 3
Length 4	Sets part 4's sequence length	FUNCTION + PARAM 4
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	FUNCTION + GENERATE
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.

During recording, the GENERATE button adds a silent / mute step and the FUNCTION + GENERATE shortcut adds a hold step.

Parameter List:

Parameter	Description	Hardware Mapping
Recording	Toggles recording	–
Direction	Sets the playback direction	PARAM 4
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the length of the sequence.	PARAM 2
Probability ( )	Sets the probability of playing back notes in the sequence.	PARAM 3
Note Length ( )	Sets the proportional note length of generated notes.	FUNCTION + PARAM 2
Quantize	Toggles pitch quantization of the sequence (based on the active Key and Scale).	–

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	GENERATE
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the total length of the sequence.	PARAM 2
Density	Sets the sequence's density.	PARAM 3
Offset	Sets the offset of the sequence.	PARAM 4
Length 1	Sets the length of the first note's sequence.	FUNCTION + PARAM 1
Length 2	Sets the length of the second note's sequence.	FUNCTION + PARAM 2
Length 3	Sets the length of the third note's sequence.	FUNCTION + PARAM 3
Length 4	Sets the length of the fourth note's sequence.	FUNCTION + PARAM 4

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.	GENERATE
Transpose	Transposes the sequence.	PARAM 1
Length	Sets the total length of the sequence.	PARAM 2
Density	Sets the sequence's density.	PARAM 3
Offset	Sets the offset of the sequence.	PARAM 4

NSL ENGINE

Generator Description:

The NSL Engine is a programmable generator that can run NSL files and features a 32-step sequencer.

For more information about NSL (NGEN Scripting Language), check out the NSL documentation.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence.	GENERATE
Variate	Generates a variation based on the current sequence.	FUNCTION + GENERATE
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the total length of the sequence.	PARAM 2
Density	Sets the sequence's density.	PARAM 3
Param 1	Generic parameter 1	FUNCTION + PARAM 1
Param 2	Generic parameter 2	FUNCTION + PARAM 2
Param 3	Generic parameter 3	FUNCTION + PARAM 3
Param 4	Generic parameter 4	FUNCTION + PARAM 4
Load File	Loads a NSL file	–

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.	GENERATE
Variate	Generates a variation based on the current sequence.	FUNCTION + GENERATE
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the total length of the sequence.	PARAM 2
Density	Sets the sequence's density.	PARAM 3
Delay	Sets the delay for generated note (x/16)	PARAM 4
Pitch Probability ( )	Sets the pitch probability.	FUNCTION + PARAM 1
Gate Probability ( )	Sets the gate probability.	FUNCTION + PARAM 2
Chord Probability ( )	Sets the chord probability.	FUNCTION + PARAM 3
Inversion Probability ( )	Sets the probability of random chord inversion	–
Inversion Range ( )	Sets the range of the chord inversions	–
Chord Quality ( )	Selects the preset of chord intervals used to generate chords	–
Trigger	Sets the mode for advancing Polyform's internal sequence	–

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.

The MIDI velocity of generated chords is determined by the Velocity and Balance parameters. Velocity determines the base velocity of the chords and Balance determines the correlation between MIDI velocity and note lenghts.
At 50, Balance uses the same velocity for short and long notes. At 0, short notes will have a higher velocity and long notes will have a lower velocity. At 100, short notes will have a lower velocity and long notes will have a higher velocity.

Modes:

• **STABS**: Generates a sequence of stabs (short chords) that can be used for house, techno, and other dance music genres. In this mode, Density disables certain chords in the sequence based on their density value.

• **FIXED LEN**: Generates a sequence of chords with a fixed length and a top melody. In this mode, Density controls the density of the top melody.

• **VARI LEN**: Generates a sequence of chords with variable length. In this mode, Density controls the density of generated chords.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence	GENERATE
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the total length of the sequence.	PARAM 2
Density	Sets the sequence's density.	PARAM 3
Velocity	Sets the base velocity of generated notes.	PARAM 4
Type Probability ( )	Sets the probability of different chord types.	FUNCTION + PARAM 1
Chord Length ( )	Sets the length of each chord.	FUNCTION + PARAM 2
Inversion Probability ( )	Sets the probability of chord inversions.	FUNCTION + PARAM 3
Balance	Sets the velocity of short x long notes.	FUNCTION + PARAM 4
Mode	Sets the POP mode.	–

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.

Note Length Modes:

• **FIXED**: All notes have the same length (1/16).

• **DYNAMIC 1**: Sets the length of the notes based on the length of each part's sequence.

• **DYNAMIC 2**: Sets the length of the notes based on the number of notes in each part's sequence.

Parameter List:

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

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:

• **Sequenced (SEQ)**: This mode uses a generated sequence to play the slices in a different order to create new variations of the loop.

• **Forward (FWWRD)**: Uses 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.

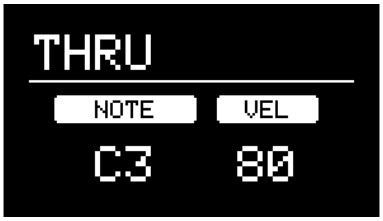
• **Backwards (BCKWRD)**: Similar to Forward except it'll play the slices in reverse/backward.

Parameter List:

Parameter	Description	Hardware Mapping
Generate	Generates a new sequence (for SEQ mode)	GENERATE
Variate	Generates a variation based on the current sequence.	FUNCTION + GENERATE
Repeat	Set the number of note repeats.	PARAM 1
Length	Sets the length of the sequence.	PARAM 2
Density	Sets the sequence's note density.	PARAM 3
Mode	Sets the playback mode.	PARAM 4
Note Length ( )	Sets the proportional note length of generated notes.	FUNCTION + PARAM 2
Random Probability ( )	Sets the probability of playing a random note.	FUNCTION + PARAM 4
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.	PARAM 1
Max Velocity ( )	Sets the max MIDI velocity.	PARAM 2
Probability	Sets the probability of playing back incoming notes.	PARAM 3
Random Velocity ( )	Sets the amount of random velocity.	PARAM 4
Quantize	Enables pitch quantization	–
Delay	Delays incoming note by x beats	–

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.	GENERATE
Clear	Clears the shift register.	FUNCTION + GENERATE
Shift	Transposes the sequence diatonically.	PARAM 1
Length	Sets the length of the sequence.	PARAM 2
Probability ( )	Sets the probability of flipping the first bit.	PARAM 3
Loop	Sets the probability of copying the last bit back into the first bit.	PARAM 4
Octave	Sets the base octave for the sequence.	FUNCTION + PARAM 1
Spread	Spreads the shift register read position between the different voices.	FUNCTION + PARAM 2
Range	Sets the pitch range of the sequence (in semitones).	FUNCTION + PARAM 3
Clock Shift ( )	Sets the clock shift (offset) for the shift register (in 1/16 steps).	-
Voices	Sets the number of voices.	FUNCTION + PARAM 4

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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 `FUNCTION` while moving the potentiometers.

Certain MIDI FX's also use the `GENERATE` 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
Generate	Generates a new accent sequence	`GENERATE`
Length	Length of the accent sequence	`PARAM 2`
Intensity	Increases the velocity of all MIDI notes to 127	`PARAM 3`

CHORD

Chords transforms single notes into chords by adding up to 4 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
Quantize	Quantizes all intervals to the active key / scale	–
Chord Interval 1	Interval of the first chord note	PARAM 1
Chord Interval 2	Interval of the second chord note	PARAM 2
Chord Interval 3	Interval of the third chord note	PARAM 3
Chord Interval 4	Interval of the third chord note	PARAM 4
Probability	Probability of triggering a chord	FUNCTION + PARAM 3

ECHOES

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

List of Parameters:

Parameter	Description	Hardware Mapping
Delay Time	Delay time in milliseconds	PARAM 1
Feedback	Feedback amount	PARAM 2
Probability ( )	Probability of the echoes	PARAM 3
Falloff ( )	MIDI Velocity falloff of the echoes	PARAM 4
Octave Random ( )	Randomizes the octave of the echoes	FUNCTION + PARAM 1

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
Repeats	Maximum number of note ratchets	PARAM 1
Gate Length	Length of the note ratchets	PARAM 2
Probability	Probability of a glitch happening	PARAM 3
Random	Amount of glitch randomization	PARAM 4
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
Delay Probability ( )	Probability of delaying a MIDI note	PARAM 1
Velocity Probability ( )	Probability of a modulating a note's velocity	PARAM 2
Max Delay	Maximum delay length	PARAM 3
Velocity Modulation ( )	Depth of velocity modulation	PARAM 4

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
Generate	Generates a new modulation sequence	GENERATE
Send	Sends a CC message (for mapping purposes)	FUNCTION + GENERATE
Sequence Amount ( )	Amount of sequence modulation	PARAM 1
Length	Length of the modulation sequence	PARAM 2
Offset	Sets the offset value (minimum value)	PARAM 3
Depth	Sets the modulation depth (maximum value)	PARAM 4
CC Out	CC number to send	–

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 are multiple different instruments being played sequentially.

List of Parameters:

Parameter	Description	Hardware Mapping
Generate	Generates a new program change sequence	GENERATE
Length	Length of the program change sequence	PARAM 2
Hits	Number of MIDI notes needed to advance the sequence	PARAM 3
Max Program ( )	Maximum program change number	PARAM 4
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	FUNCTION + PARAM 1
Step 2	Sets the program change number of the second step	FUNCTION + PARAM 2
Step 3	Sets the program change number of the third step	FUNCTION + PARAM 3
Step 4	Sets the program change number of the fourth step	FUNCTION + PARAM 4
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
Mode ( )	Sets the mode of the Shaper (Clip / Scale / Drop)	–
Pitch Minimum ( )	Lowest possible note (0-127)	PARAM 1
Pitch Maximum ( )	Highest possible note (0-127)	PARAM 2
Velocity Minimum ( )	Lowest possible velocity (0-127)	PARAM 3
Velocity Maximum ( )	Highest possible velocity (0-127)	PARAM 4
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
Max Delay	Maximum delay time (in milliseconds)	PARAM 1
Max Repeats	Maximum number of repetitions of delayed notes (similarto feedback)	PARAM 2
Probability ( )	Probability of spraying a note	PARAM 3
Falloff ( )	MIDI Velocity falloff of sprayed notes	PARAM 4
Octave Random ( )	Randomizes the octave of the sprayed notes	FUNCTION + PARAM 1
Velocity Random ( )	Randomizes the velocity of the sprayed notes	FUNCTION + PARAM 2

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
Max Delay	Maximum delay time (in milliseconds)	PARAM 1
Velocity Multiplier ( )	Decreases the delay time according to MIDI velocity	–
Random	Switches between sequence or random order for the delay time	–

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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 contains 8 pattern slots that can be saved, copied, pasted, and deleted from the Pattern Selector menu (accessible via the **PATTERN** button).

The **Pattern Selector** displays the active pattern on the left ( ), the selected pattern on the center ( ) and the Generator and MIDI FX selected for the first 3 active tracks.

3.4.2 Loading / Queuing Patterns

NGEN offer 3 methods for loading / queuing patterns:

1 - Press the `PATTERN` button to open the Pattern Selector, select the pattern using the `MENU ENCODER` and click on the encoder to load.

2 - Turn the `MENU ENCODER` while holding down the `PATTERN` button to select a pattern, release the button to load the selected pattern.

3 - Use the shortcuts `PATTERN` + `GENERATE` to load the next pattern in the sequence or `PATTERN` + `FUNCTION` + `GENERATE` to load the previous pattern in the sequence.

Patterns are queued and loaded at the beginning of the next bar if NGEN is playing or immediately if NGEN is stopped.

3.4.3 Saving Patterns

The changes you make in NGEN are not automatically saved to the current pattern to avoid accidental overwriting of patterns.

To save the current pattern to one of the available slots, follow these steps:

1 - Open the Pattern Selector by pressing the `PATTERN` button.

2 - Select which pattern slot you'd like to save the current pattern to by turning the `MENU ENCODER`.

3 - Open the Pattern Edit menu by holding down the `FUNCTION` button and pressing the `PATTERN` button.

4 - Select the option to save the current pattern to the selected slot.

It's also possible to use the shortcut `PATTERN` + `MENU ENCODER` to save the current pattern to the selected slot while in the Pattern Selector.

3.4.4 Pattern Generation

NGEN includes a new Pattern Generation feature that lets users generate an entire pattern at once by holding down `TRACK | CLK` and pressing the `GENERATE` button. This shortcut will generate new sequences for all active tracks.

If the Randomize State setting is enabled, NGEN will also assign random states to all tracks when generating a new pattern.
For more information about track states, check out the Track States section in the Track documentation.

It's also possible to generate variations of the current pattern by holding down `TRACK | CLK` + `FUNCTION` and pressing the `GENERATE` button.

3.4.5 Pattern Menu

The pattern edit menu can be accessed by holding down the FUNCTION button and pressing the PATTERN button (accessible from the Main Menu or from the Pattern Selector).

The menu includes options for saving, copying, pasting, and deleting the selected pattern.

3.4.6 Generate All / Variate All

The last 2 options in the Pattern menu are **Generate All** and **Variate All**. These options let you explore NGEN's algorithmic pattern generation capabilities by generating or variating all patterns at once starting from the selected pattern.
These features can be used to create all 8 patterns in a project at once or to fill subsequent empty patterns.

Generate All generates 8 unique patterns and automatically saves them to the current project.

Variate All generates 8 variations of the current pattern and automatically saves them to the current project.

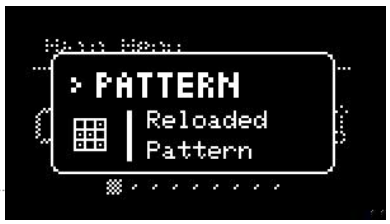
Warning

Generate All and Variate All won't affect / overwrite already saved patterns. If you'd like to overwrite a pattern, make sure to delete it first.

3.4.7 Pattern Reloading

NGEN includes a new feature that lets users quickly reload the active pattern from it's last saved state by holding down PATTERN and pressing the RETURN button.

This feature is useful for quickly reloading an entire pattern after making changes to it during a live performance.



3.4.8 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.

2024-07-26

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 `MENU ENCODER` 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 `MENU ENCODER` to select the displayed parameter.

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

3.5.3 Track Muting

While in the `PERFORM` sub-menu, you can use the 4 buttons (`TRACK | CLK`, `PATTERN`, `FUNCTION`, and `GENERATE`) to mute/unmute the first 4 tracks.

Muting works by disabling the track instead of affecting the Generator's parameters.

2024-02-05

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 a microSD or directly to NGEN's internal memory (HW version 1.1 and above).

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 or option. Save As option will prompt you to name the project file.

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

To **create a new project** file, navigate to the Projects sub-menu, select the option. This will clear all data from the current project and create a new one.

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).

3.6.2 Loading and Saving Projects During Playback

It is possible to load and save projects while NGEN is playing without any interruptions.

Projects are cached and loaded at the beginning of the next bar. This allows you to switch between projects as if you were switching between patterns. This feature is particularly useful for live performances and jam sessions where projects can used to different songs or sections of a song.

NGEN uses a separate core to handle the loading and saving of projects, ensuring that the audio engine is not interrupted during the process.

> **Attention**
>
> If you plan on switching between projects during a performance, make sure you have the same Clock Generators enabled in the projects you're switching between.

2024-07-26

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**).

A global Octave control is also available under the Scale sub-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 ( )
- Phrygian ( )
- Chromatic ( )

3.7.3 Scale Editor

The Scale Editor allows you edit the currently selected scale by enabling or disabling notes.

Use the `MENU ENCODE` to select a note and press the `MENU ENCODE` to toggle it on or off.

To return to the Scale menu, press the `RETURN` button.

> **Warning**
>
> The Scale Editor is a beta feature and subject to change. Changes made in the Scale Editor are only temporary. Selecting a different scale will reset the changes made in the Scale Editor.

2024-10-08

3.8 Tools

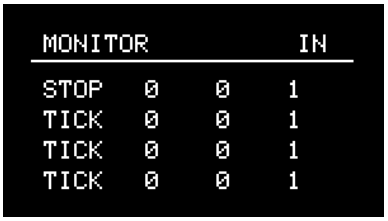
3.8.1 About Tools

The Tools sub-menu contains different features that can be used to monitor, control, and configure NGEN's settings.

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 GENERATE button.

TEMPLATE

The Template tool lets you load different track setup templates (Generator / MIDI FX / Clock Rate / Routings) to your current pattern.

Available templates:

HOUSE:

Track Number	Generator	MIDI FX	Input Channel	Output Channel	Aux Output	Clock Rate	Note
1	DRUMGEN	-	1	1	-	1/16	Main drums
2	ACDGEN	-	2	2	3	1/16	Bass
3	POLYFORM	-	3	3	-	1/16	Polyphonic short synth
4	ACDGEN	-	4	4	-	1/16	Lead synth
5	ARPER	-	5	5	-	1/16	Percussive instrument
6	POP	HUMANIZER	6	6	-	1/16	Piano
7	SAMBA	-	7	7	-	1/16	Percussion

JUNGLE:

Track Number	Generator	MIDI FX	Input Channel	Output Channel	Aux Output	Clock Rate	Note
1	SHUFFLER	-	1	1	-	1/8	1/8 Sliced Drum Break
2	ACDGEN	-	2	2	-	1	Pads / Legato Synth
3	ACDGEN	-	3	3	-	1/8	Sub Bass
4	ACDGEN	-	4	4	-	1/8	Sampled Stab
5	ARPER	HUMANIZER	5	5	-	1/8	Arp Synth

GEN DEMO:

Track Number	Generator	MIDI FX	Input Channel	Output Channel	Aux Output	Clock Rate	Note
1	ACDGEN	-	1	1	-	1/16	
2	ARPER	-	2	2	-	1/16	
3	DRUMGEN	-	3	3	-	1/16	
4	INSEQ	-	4	4	-	1/16	
5	MARP	-	5	5	-	1/16	
6	MIDIPLAYER	-	6	6	-	1/16	
7	POLYFORM	-	7	7	-	1/16	
8	POP	-	8	8	-	1/16	
9	SAMBA	-	9	9	-	1/16	
10	SHUFFLER	-	10	10	-	1/16	
11	THRU	-	11	11	-	1/16	
12	TURING	-	12	12	-	1/16	
13	NSL	-	13	13	-	1/16	

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3.9 Tracks

3.9.1 About Tracks

The NGEN features 16 tracks that work similarly to MIDI tracks in standard DAWs. Each track contains different settings for active Generator, MIDI FX, Program Change, routing, and more.

These settings can be accessed via the **TRACK** sub-menu (available in the **MAIN MENU**) or the `FUNCTION` + `TRACK` shortcut.

3.9.2 Track Selection

Because NGEN's controls are mapped to the active track by default, it's important to be able to quickly switch between tracks.

To select a different track:

1. Press the `TRACK / CLK` button to open the track selection screen.
2. Use the `MENU ENCODER` to scroll through the available tracks.
3. Press the `MENU ENCODER` to select a track.

For quicker selection, turn the `MENU ENCODER` while holding down the `TRACK / CLK` button.

3.9.3 Tracks Internal Routing

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

The MIDI output of the MIDI FX is then routed 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, on the other hand, can be used to send a copy of the MIDI messages generated by the track (post-MIDI FX) to different destinations such as 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	

3.9.5 Track Edit

The Track Edit sub-menu can be accessed via the shortcut `FUNCTION` + `TRACK | CLK` from the Track sub-menu and it contains options for copying, pasting and clearing the track.

The **Copy** and **Paste** options let you quickly copy the settings of one or more tracks and paste them into another track. Keep in mind that internal data for the selected Generator and MIDI FXs (including sequences and parameter settings) are not copied.

The **Clear** option resets the track's settings to their default values.

3.9.6 Track States

To create more dynamic patterns, NGEN can control the prominence of each track in new patterns via the Track State feature.
When generating new patterns (`TRACK` + `GENERATE`), NGEN can assign a random state to each track (according to the Randomize State setting).
When a new state is assigned to a track, it randomizes key parameters of the active Generator within ranges defined by the state.

Available states:

State	Description
Standard	Medium intensity and sequence length
Low	Low intensity and medium sequence length
Mute	Mutes the track (via Density or Probability parameters)
Fill	High intensity and shorter sequence lengths
Sparse	Lowest intensity and longer sequence lenghts

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4. Tips & Techniques

4.1 About this section

NGEN can be used in a variety of different ways and this section is designed to help you get started with some of the most common techniques.

4.2 Tips & Techniques

4.2.1 Tips for Live Performance

Here's a list of some tips that can help you get the most out of NGEN when performing live:

Organizing your songs

One way to organize song ideas is by utilizing the 8 available patterns within each project to store distinct sections of a song. For instance, you can use pattern 1 for the intro, pattern 2 for the verse, pattern 3 for the chorus, and so on.

Additionally, projects can be used to store different songs. For example, you can use project 1 for song 1, project 2 for song 2, etc.

NGEN is capable of loading projects and patterns while playing so you can use this to switch between songs and sections of a song while performing. Switching between different projects and patterns is always done in sync with the clock and it's designed to be as smooth as possible.

Using shortcuts

NGEN includes several shortcuts that can help you during your performance. A list of all shortcuts can be found in the Menu Navigation section of the manual.

Using the Performance Mode

The Performance Mode is a powerful tool for live performances. You can use it to control multiple parameters of different tracks at the same time. You could use the Performance Mode, for example, to control the density, octave, and mode of multiple tracks at once.

Using an external MIDI controller for NGEN

While NGEN may only feature 4 hardware knobs, it's possible to control most of its parameters and features via MIDI CC. This means that you can use an external MIDI controller to control NGEN's parameters and expand the number of real-time hardware controls available.

If you have a MIDI controller with a 3.5mm MIDI jack, you can connect it to NGEN's MIDI IN jack. Controllers with MIDI DIN jacks can be connected to NGEN via a MIDI cable and a DIN to 3.5mm (Type-A) adapter.

Because NGEN works as a USB client, USB MIDI Controller can only be used with a separate USB Host device or a computer (that forwards the MIDI messages from the controller to NGEN).

A full list of NGEN's MIDI CC mappings can be found in the MIDI Mapping section of the manual.

Automating parameter changes via MIDI CC

The MIDI CC mappings can also be used to automate parameter changes via a DAW or other MIDI-capable device. This can be used to perform programmatic/automatic changes to NGEN's parameters (such as Key and Scale) according to the needs of your performance.

4.2.2 Combining Multiple Tracks for 1 Instrument

The standard workflow for NGEN is to utilize one track per instrument, but it's also possible to employ multiple tracks for the same instrument. This approach allows you to combine different Generators and MIDI FX to create more intricate and complex sequences.

To achieve this, simply set the Output Channel of all tracks to the same value. From there, you can use the second track to add or modify the notes generated by the first track.

Here's a list of some great combinations that we've found during our testing:

- DRUMGEN + Samba: DrumGen can be used to sequence the main elements of your drum section (kick, snare, hihats) while Samba can sequence other percussive elements.
- POP + Arper: In this combination, POP can be used to generate the main chord progression while Arper can be used to add a repeating arpeggio pattern on top of it.
- 2X ACDGEN: Two ACDGEN tracks can be combined to create more intricate sequences. Try setting the 2 ACDGEN tracks to different algorithms and/or octaves for more interesting results.

Extra tips for combining multiple tracks:

- Use different clock rates for each track (1/16 and 1/8 for example).
- Explore contrasting settings for the generators. Use the available parameters to set different densities, octaves, and voicing modes (monophonic vs. polyphonic).
- Use MIDI FXs like the Shaper to control the velocity of the notes generated by each track.

4.2.3 Using DRUMGEN and SAMBA to generate melodic sequences

DrumGen and Samba are primarily designed to sequence percussive instruments however it's also possible to use them to generate interesting polyphonic sequences. Use the Note 1 through 4 parameters to set them to any other 4-note chord.

The Note Length parameter in Samba allows you to switch between different length modes, which can have a significant impact when used with melodic instruments.

4.2.4 Chaining MIDI FXs

While NGEN only allows one MIDI FX per track, it's possible to chain multiple MIDI FXs by using the Aux Output of a track and the Thru Generator.

To chain MIDI FXs, follow these steps:

- Select the track you'd like to chain MIDI FXs to.
- Set the MIDI FX of that track to the first MIDI FX you'd like to use.
- Set the Aux Output to another available track.
- Select the track that you set the Aux Output to and set its Generator to Thru.
- Set the MIDI FX of the Thru track to the next MIDI FX you'd like to use.

Repeat these steps for each MIDI FX you'd like to chain.

> **Attention**
>
> Keep in mind that each track will continue to output MIDI to the selected Output Channel so, to avoid sending duplicate MIDI messages, set the Output Channel of each track to a different value.

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5. System

5.1 Settings

5.1.1 About Settings

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

Settings are stored in the device's internal memory and are retained even after the device is powered off.
To save your current settings, select the option.

5.1.2 List of Available Settings

General

Setting	Description
Advanced	Enable or disables advanced parameters and settings
Variation Amount (`Var Amount`)	Sets the global variation amount for all generators
Randomize State (`Rndmize State`)	When enabled, NGEN will randomize the states of all tracks when generating new patterns (Track States).

Display

Setting	Description
Menu List	Enables list mode for menus (except for the Generator sub-menu)
Menu Wrap	When enabled, scrolling past the last item in 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 (5 seconds): **OFF** **ANIMATION**: display's the active Generator's animation **PARAM**: displays a list of the parameters currently mapped to the 4 knobs
Idle Time	Sets the amount of time before the display goes idle
Screensaver Period (`Screensavr`)	Sets the amount of time before the screensaver is activated
Brightness	Sets the display's brightness level

MIDI

Setting	Description
MIDI CC Rx	Enables or disables MIDI CC input
MIDI Thru	Enables or disables Soft MIDI Thru

> **Attention**
>
> When using the MIDI Thru feature, make sure to check your MIDI routing to avoid MIDI feedback loops.

CV OUT

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

Modes:

- **CV 1-2**: converts MIDI notes from the CV Out 1 and 2 aux tracks to 1V/OCT signals.
- **4xTrig**: converts selected MIDI notes (based on parameters Note Trg 1-4) to 4 gate outputs. This mode is designed to be used with drum / percussive generators such as DrumGen and Samba.

> Keep in mind that these are still experimental settings.

Parameter	Description
Mode	Set the mode for the CV outputs (CV 1-2 / 4xTrig)
Octave	Set the base octave for the CV output (CV 1-2 mode)
Note Trg 1-4	Select a MIDI note to be converted to a gate signal (4xTrig mode)

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. This feature works on a per-track basis and can be enabled or disabled for each track via the Auto Vari8 toggle available on the Track sub-menu.

When enabled, the Auto Variate feature will generate a new sequence variation for the track after a certain number of bars. The probability of the variation being generated can be set via the `` parameter, and the amount of variation can be set via the `` parameter.

Auto Variate settings are global and affect all tracks that have the feature enabled.

Parameter	Description
Probability	The probability of the variation being generated
Length (Bars)	The number of bars before a new variation is generated
Variation Amount (`Amount`)	The amount of variation to be generated

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

Device

Setting	Description
Save	Saves the current settings to the device's internal memory
Reboot	Reboots the device
Factory Reset	Resets the device to factory settings
Firmware Upgrade (`FW Upgrade`)	Upgrades the device's firmware
User Manual	Displays a QR code for the NGEN User Manual
Info	Shows device information

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5.2 Firmware Update

5.2.1 How to update the NGEN firmware

To update the firmware on your NGEN, you'll need to download the latest firmware version from the links below and follow the instructions for your hardware version.

If you have any questions or need help updating your NGEN, don't hesitate to get in touch with us via the Contact page on our website.

NGEN HW v1.0 (Batch #1 / Micro USB / Serial #0001 - 0020)

1 - Download the latest version of the NGEN firmware for HW v1.0

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)

TyUploader will then upload then new firmware to your NGEN units and restart it after it's finished.

We highly recommend that you perform a Factory Reset (available in Settings) after updating.

Attention

NGEN HW V1.1 and newer (Batch #2 and newer / USB-C)

1 - Download the latest version of the NGEN firmware for HW v1.1.

2 - Connect NGEN to your computer via USB.

3- Navigate to the Settings page and select the "FW Update" option.

4 - NGEN should now appear as a USB flash drive on your computer.

5 - Drag the latest version of the firmware (.uf2) to the NGEN's USB flash drive.

6 - NGEN should automatically apply the update and restart after it's finished.

7 - After rebooting, apply a Factory Reset (files will not be deleted).

ALTERNATIVE METHOD

NGEN HW v1.1 also features a backup method for updating the firmware that can be used in case of issues with the primary method or failed updates.

This method does require some minor disassembling so we only recommend using it as a backup.

1 - Remove the 4 screws on the side of the unit and the microSD card if present.

2 - Detach the bottom panel of the case. It should come off without removing any knobs or screws from the top panel.

3 - Locate the BOOT button on the back side of the PCB (visible). It should be located on the center of the PCB.

4 - Connect the unit via USB while holding down the BOOT button.

5 - NGEN should mount as a USB drive on your computer. Once mounted, release the BOOT button.

6 - Follow steps 5-7 of the primary method to update the firmware.

7 - Disconnect the USB and re-assemble the case.

5.2.2 Change-Log

Version 1.2

ADDED

- New internal framework for better threading / multicore processing (HW 1.1).
- New internal framework for generating and manipulating chords.
- New internal framework for managing available chords based on the active Key / Scale (for polyphonic Generators).
- MENU SYSTEM: Added fast scrolling for List Selector (Function + Menu Encoder).
- MENU SYSTEM: The list selector now sorts items alphabetically.
- PROJECTS: Added "New" option under Projects.
- PROJECTS: Project changes are now quantized to 1 bar (while NGEN is playing).
- SETTINGS: Added viewable QR code for User Manual.
- SETTINGS: Added new MIDI Thru setting.

IMPROVEMENTS

- Improved display response.
- Improved Param 1-4 response on all hardware versions.
- DRUMGEN: Improved Random.
- MENU SYSTEM: Track number indicator now displays active status of the selected track.
- MENU SYSTEM: Improved rendering of OS notifications.
- MENU SYSTEM: Improved display refresh rate when showing parameter values during animations.
- MENU SYSTEM: The confirmation dialog now shows the active project name when saving projects.
- PERFORM: Macro mapping will now only get cancelled from the Main Menu (Return button).
- POP: Integrated support for the new chord frameworks.
- POP: Improved state randomization.
- PROJECTS: Updated project file format to include support for upcoming features.
- PROJECTS: Reduced glitches and stutters when processing projects (saving / loading / deleting) during playback (using the new threading framework).
- PROJECTS: Improve support for loading projects saved with previous firmware versions (projects are now automatically updated to the new format).
- TRACK: Disabled tracks are now properly restored when loading patterns / projects.
- TRACK: Tracks will now send MIDI note-offs for all active notes when disabled.
- Update display transmission for HW v1.1.
- General performance improvements and optimizations.

FIXES

- DRUMGEN: Templates are now properly reloaded when loading projects / patterns.

- GENERATORS: Param 1-4 are now properly mapped when selecting a new Generator from the Track sub-menu.
- GLITCH: Fixed bug that caused the Glitch MFX to output MIDI notes to incorrect MIDI channels.
- MENU SYSTEM: Fixed a bug that caused the hardware controls to stop working when entering Track or Pattern selection immediately after a notification.
- MENU SYSTEM: The Param List Idle Mode now renders correctly when entering Idle Mode.
- FREE CLOCK: Fixed bug that caused Free Clock to drop MIDI notes.
- PERFORM: Macro 5-8 control via Function + Param 1-4 now work correctly.
- SCALE: Key and Scale can now be properly controlled via Param 1 and 2 while in the Scale sub-menu.
- PROJECTS: Project > Save now properly overwrites the currently active project.

Version 1.1.2

ADDED

- Updated internal framework for apps / tools that require custom UI / controls.
- New list selector based on the updated framework.
- PERFORM: Added option for removing a mapping.
- MENU SYSTEM: Added new confirmation modal for important actions.
- SCALE: Added new Scale Editor (beta).

IMPROVEMENTS

- Improved potentiometer readings for better accuracy and smoother operation.
- Improved list scrolling / selection.
- Upgraded the Name Editor to new framework.
- Upgraded the Info view to new framework.
- SETTINGS: Renamed "Restart" to "Reboot".
- MENU SYSTEM: Improved navigation during Idle Mode.
- PROJECTS: Improved project management for forward and backwards compatibility.

FIXES

- NGEN can now output to MIDI Channel #16 correctly
- The MIDI channel of incoming MIDI notes via 3.5mm MIDI IN is now properly detected.
- SETTINGS: MIDI CC RX now properly saves and loads.
- MENU SYSTEM: When receiving MIDI CC values, the UI now updates to display the correct values.
- PATTERNS: NGEN no longer re-loads the previous pattern when saving a new one.
- POP: Balance parameter now works correctly.
- THRU: Delay now works after loading a pattern / project.

Version 1.1.1

ADDED

- CV OUT: Added new 4xTrig mode and Trigger 1-4 parameters.
- The MENU SYSTEM now retains the position of each menu during navigation.
- AutoVari8 and CV Out settings are now stored as global settings on the device EEPROM (requires manual save via the Settings sub-menu).

IMPROVEMENTS

- SCALE: Updated scale engine to improve support for scales of different sizes.
- SETTINGS: Improved menu order.

- TRACK: Improved Aux Output support.
- Moved AutoVari8 and CV Out sub-menus to Settings.
- POP: Improved algorithm.

FIXES

- NGEN can now properly boot when powered via external power supplies (rev1 only).
- Incoming MIDI notes are now properly routed to tracks.
- SETTINGS: The Firmware Update screen now displays correctly.
- TRACK: Track 1 Aux Out is now disabled by default.
- DRUMGEN: Opening the template selector no longer causes system delays.

Version 1.1

ADDED

- New NGEN Framework: The entire NGEN's internal framework has been re-factored to improve performance and make it easier to add new features.
- Pattern Generation: algorithmically generate or variate an entire pattern.
- TEMPLATES: Use templates to quickly set up multiple tracks in your current pattern.
- Pattern & Track reloading: Quickly reload a pattern or track from their last saved state in a project (`TRACK|CLK` or `PATTERN` + `RETURN`).
- ACDGEN: Added new Base Velocity and Accent parameter new Lead and Legato algorithms.
- POLYFORM: Added new Inversion, Inversion Range, Chord Quality and Trigger parameters.
- THRU: Added new Delay parameter.
- CHORDS: Added 1 more interval (4 in total now) and a new Probability parameter.
- SHAPER: new Mode parameter (Clip / Scale / Drop).
- STRUM: Added a new Probability parameter.
- SCALE: 2 new scales (Phrygian and Chromatic) and new global Octave parameter.
- TRACK: New Clock-rate options: 4, 2, 1, 1/2, 1/4, 1/6, 1/8, 1/12, 1/16, 1/24, 1/32.
- TRACK: New modal menu for managing tracks (save / copy / paste / delete).
- PATTERN: New modal menu for managing patterns (save / copy / paste / delete).
- PATTERN: Quickly queue a Pattern by holding down the `PATTERN` button and turning the the `MENU ENCODER` .
- PERFORM: Use the 4 NGEN buttons (`TRACK|CLK` , `PATTERN` , `FUNCTION` , and `GENERATE`) to mute / unmute the first 4 tracks while in the Perform sub-menu.
- SETTINGS: New Global Variation Amount ( ) parameter.
- SETTINGS: New settings for Screensaver time ( ), Idle Mode time ( ), and Factory Reset.

IMPROVEMENTS

- Updated user interface design: The entire NGEN UI has been update with new designs for pages(Pattern Selector), notifications, modals (Pattern / Track edit), animations, list view, and more.
- Parameter course control: Parameters can now be adjusted in larger increments by holding down the `MENU ENCODER` or `FUNCTION` while turning it (coarse step determined by the parameter type).
- Re-designed settings page: NGEN's settings are now organized into separate pages for easier navigation.
- MIDIPLAYER: Updated MIDI SMF file parsing and parameters.
- PATTERN: The Pattern Selector view now shows the active Generator and MIDI FX for the first 3 active tracks of the selected pattern.
- MIDI CLOCK: Swing now works with both 1/16 and 1/8 clock-rates.
- FREE CLOCK now outputs MIDI Clock.

- Active project in memory: The active project now remains entirely in memory to improve performance and to allow users to modify the project's settings while playing without affecting the save file.
- Multi-core Project management: NGEN now saves and loads projects using it's second-core to improve performance and avoid glitches while playing (pcb v1.1 and newer).
- When saving projects, NGEN will now check if there's enough space available.
- When loading projects, NGEN will now check if the project version is compatible with the current firmware version.
- New Project file format with support for dynamic file size.
- Updated MIDI CC assignments for Free Clock, Bounce Clock, Arper, MIDI Player, Chord
- Improved potentiometer readings (better accuracy and less jitter).
- Updated screensaver design.

FIXES

- Major improvements to Project's saving and loading.
- Various minor bug fixes across the entire firmware.
- MIDI Player's Direction parameter now displays the correct values.

Version 1.01

ADDED

- POLYFORM: Polyform now adjusts the length of generated notes based on the length of incoming MIDI notes.
- SAMBA: New Note Length parameter.
- SHUFFLER: New Offset parameter.
- New "MIDI CC Rx" setting for enabling / disabling MIDI CC input.

IMPROVEMENTS

- The `MENU ENCODER` should now be more responsive and less prone to skips.
- Beta features will now show a "BETA" warning in the bottom-right corner.
- The MIDI Monitor will now promptly display the monitor view when selected.
- Improvements to the SAMBA generator.
- Improvements to the menu system.
- Minor UI design improvements.

FIXES

- Selecting the currently active Generator / MIDI FX in Track's settings will no longer reset the active Generator / MIDI FX.
- The display's header now gets properly re-drawn when exiting the selected Idle Mode and screensaver.
- Screensaver now properly activates after 5 minutes of no hardware interaction.
- Idle Mode (Animation / Param List) now activates after 5 seconds of no hardware interaction while in the Generator and Clock sub-menus.

Version 1.0

- Initial Version

2024-10-11