

Ruismaker

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User Manual
version 2.0

Version history

Version history (this document's state reflects the latest available software version:

2.0 August 21, 2017 Initial publication

Introduction

Ruismaker started out as a hardware drum machine. Its synthesis engine was transplanted carefully inside the first drum audio unit plugin on iOS, but in the way Ruismaker works it still feels and operates like a hardware drum synth.

Instead of designing a synth engine that tries to recreate any drum sound, each Ruismaker sound has its own dedicated component-modelled synthesis circuit. Much like oldschool drum synths (such as the TR-808) where every sound had its own separate little cluster of components on the circuit board.

Many of the drum models inside Ruismaker are actually based on schematics and circuit-designs found in the service manuals of vintage hardware drum machines. But rather than try and clone the original sounds, Ruismaker uses its own tuning signature to capture the essence of the classics. Try to spot them.

Thanks to carefully modelled analog behavior of the Ruismaker engine each drum sound is slightly different from the next - injecting some much-needed life and character in your drum patterns.

Euclidean Sequencer

With the introduction of version 2.0 of Ruismaker and Ruismaker FM, we have added a cool standalone feature to the existing plugin: a Euclidean sequencer. The aim of the sequencer is to help you come up with drum patterns you would normally not come up with. We hope you'll enjoy this playful addition to the app.

1. The Audio Unit / Drum Synth Engine

We'll first dive into the controls of the synth engine (which constitutes the AU plugin part of the app).

1.1 Basic Parameters

The basic parameters can all be set using the on-screen user interface. There are

- channel settings that are specific to each of the 8 available channels,
- and global parameters that apply to the total plugin.



INSTRUMENT SETTINGS ('channel settings')

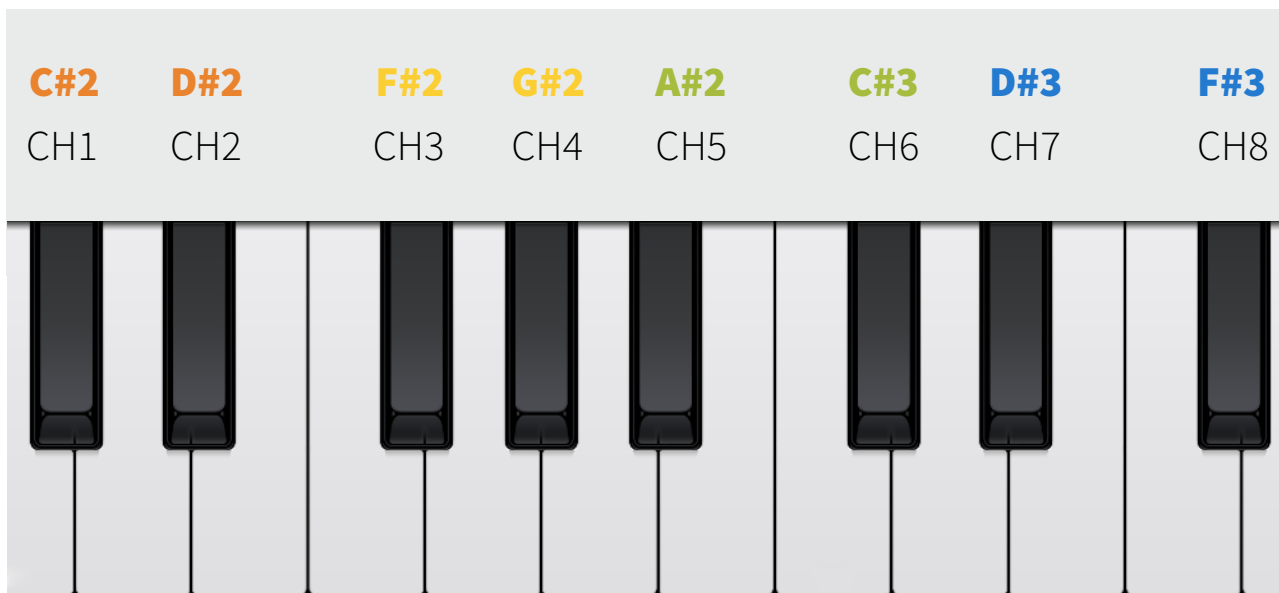
- **Tune** - determines the pitch characteristics of the selected instrument.
- **Decay** - changes the duration of the current instrument. Depending on the selected instrument it typically ranges from a short click to a slowly decaying percussive sound.
- **Personality** - this adjusts characteristic qualities of the selected type of instrument. This differs per sound; e.g. attack, timbre, filter settings, noise intensity, pitch drop curves and often a combination of variables.
- **Drive** - sends the synthesized sound through an overdrive distortion circuit
- **Bitcrush** - applies a digital bit crusher effect to the sound. Value 127 applies a random bit crusher level to each hit.
- **Delay Send** - changes how much sound is sent through the delay effect.
- **Pan** - adjusts the stereo image of the sound; from left to centre to right.
- **Level** - changes the relative output level of the sound.

GLOBAL PARAMETERS (apply to all channels)

- **Delay Time** - duration before an echo is heard. Values > 64 are tempo-synced to multiples of 16th notes. Values < 64 are partials of a 16th note.
- **Delay Feedback** - strength of an echo. Determines how long it takes for an echo to fade to complete silence.
- **Randomize** - changes the parameters and instruments assigned to *all channels*.
- **GM Keymap** - toggles between the default Ruismaker keymapping and the old GM keymapping.
- **Reverb** - the amount of plate reverberation that is applied to the end signal. This is a simulation of a lo-fi vintage reverb technique in the 1950s.
- **Volume** - the amplification of the end signal.

1.2 Triggering notes

By default the notes of the 8 channels are mapped to the black keys in octaves 2 and 3 (octave mapping may vary between MIDI sequencers). Compared to the old GM key mapping this ‘black key’ mapping is much more convenient and intuitive for programming drum patterns using MIDI keyboards.



The corresponding MIDI key/note numbers are:

	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8
Default map	49	51	54	56	58	61	63	66
GM keymap	36	38	39	45	48	50	42	46

The standard setup used in all preset kits is:

	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8
Instrument	Kick	Snare	Clap/ Perc	Low Tom/ Perc	Mid Tom/ Perc	Hi Tom/ Perc	Closed Hihat	Open Hihat

You are free to map any instrument to any channel. Each instrument can be assigned to one channel at a time (e.g. you can not have “80s Clap” on two channels at once). So the table above is just a guideline to make it easier to change out drum kits between tracks.

1.3 Controller lists

Every aspect of the Ruismaker plugin that can be accessed via the on-screen user interface can also be controlled and automated using AU parameters and MIDI CC codes. The following controller numbers are for MIDI CC. The respective Audio Unit parameters use their corresponding names.

Channel parameters

Channel parameters are used to control each of the 8 individual channels.

	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8
Tune	30	38	46	54	62	71	79	87
Decay	31	39	47	55	63	72	80	88
Personality	32	40	48	56	65	73	81	89
Level	33	41	49	57	66	74	82	90
Pan	34	42	50	58	67	75	83	91
Bitcrush	35	43	51	59	68	76	84	92
Delay Send	36	44	52	60	69	77	85	93
Drive	37	45	53	61	70	78	86	94

Example: to set the pan of channel 1 to full left, send MIDI CC#34 with value 0

Change instrument sounds

Use these controller codes to select instruments for each channel. Use the instrument numbers from the instrument list below as the value of the MIDI CC message.

	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8
Instrument	22	23	24	25	26	27	28	29

Example: to set the instrument of channel 3 to “80s Clap” send MIDI CC #24 with value 50

‘Active channel’ parameters

These are a special set of MIDI CC codes (not available as AU Parameters) specifically added to make it easy to tweak sounds using external midi controller hardware. They are 8 CC codes, mapped to the channel parameters of the currently active channel.

E.g. if channel 2 is active, they will control the sound of the snaredrum. If channel 8 is active, they will control the sound of the open hihat.

Note: you should typically never record these CC changes in your sequencer, because the results may be unpredictable (they will still apply to whatever channel is active, which may not be the same channel that was active when you recorded the session).

So only use these if you’re tweaking and fine-tuning sounds using a MIDI controller. This way you can control your sounds using only 8 knobs, instead of 64.

	Tune	Decay	Person.	Drive	Bitcrush	Delay S.	Pan	Level
CC#	14	15	16	21	19	20	18	17

Example: in the image below channel 7 is active. So sending MIDI CC #14 with value 127 will change the tuning parameter of the closed hihat assigned to channel 7 to its highest tuning setting.



It is also possible to use a MIDI controller for selecting the active channel. Use the controller value to select channels 0-7 (which represent instruments 1-8).

	Select channel	
CC#	110	

Global parameters

These controllers set parameters that apply to the entire plugin, e.g. the overall volume level.

Delay Time	102	Reverb	105
Delay Feedback	106	Main Volume	103
Randomize	109		

Example: to fully disable the reverb of this plugin instance, send MIDI CC #105 with value 0

These commands are only available as a CC parameter and can not be set as an Audio Unit Parameter.

1.4 Instrument list

Each instrument in Ruismaker has its own synthesis model emulating an analog or FM hardware circuit, as you would find them in vintage drum machines.

- An instrument can be assigned to any channel in the plugin
- Each instrument can be assigned to only one channel (per plugin instance - if you're running multiple instances of the plugin then each instance has its own set of instruments)
- Assigning an instrument to a channel will steal it away from any other channel already using it.
- If multiple instruments in the list are grouped they will choke each other (e.g. hihats, toms, ...)

Instrument Name	Description	Personality Parameter	#
Hard 90s Kick	A typical dance kick with a punchy envelope. Uses a slightly triangular oscillator sound	Changes the attack and punch characteristics	11
Deep 80s Kick	Classic kick, reminiscent of the TR-808 bass drum sound. High decay levels offer extra long decay times	Changes the attack characteristic	10
FM Kick 1	A soft kick sound using two FM sine operators	Adjusts high overtones and punchiness	13
FM Kick 2	An FM synthesised kick mimicking an acoustic bass drum sound	Controls the dampening of the sound (like filling a bass drum with cushions)	12
Drop Kick	A dramatic techno kick with a heavy punch and a long deep tail	Determines the starting pitch of the bass drop	14
Mellow 70s Kick	A subtle but deep kick drum, inspired by the CR-78 schematics	Adjusts the presence of the attack transients	16
Curve Kick	Synth kick with a very pronounced drop curve and audible overtones	Controls exaggeration of the envelope curve	17
Subbass	Deep and long sub bass hit that requires headphones or a subwoofer to be fully appreciated	Adjusts curve and pitch characteristics	15

Instrument Name	Description	Personality Parameter	#
90s Snare	Snare drum sound loosely based on TR-909 schematics. Lots of pop	Controls the snappiness of the sound (balance between noise and tone)	31
80s Snare	Snare sound reminiscent of the TR-808 and TR-606, with an aggressive attack	Controls the snappiness of the sound (balance between noise and tone)	30
Noise Snare	Analog snare sound with a long and prominent noise component	Tonal character and pop of the noise generator	32
FM Snare	FM synthesised snare drum using three operators for complex relation between envelope, noise and tone	Changes the behavior of the carrier wave to create sounds ranging from acoustic to very artificial	33
S&H Snare	Snare using a sample&hold circuit emulating the flawed sound of an unmodded Volca Beats snaredrum	Adjusts the parameters of the bandpass filter and the S&H circuit	34
70s Snare	Subtle analog snare sound inspired by the rhythm section of the Monotribe	Controls the snappiness of the sound (balance between noise and tone)	35
Electro Snare	Synthetic snare that gets better with a bit of overdrive	Duration of the noise tail (independent of the decay duration)	36
80s Clap	Analog clap sound, hollow character	Changes the characteristics of the filter responsible for the 'hollow' clap sound	50
Clap Attack	Analog clap sound, bright character	Adjusts the timing of the multiple attack transients	51
80s Toms (L/M/H)	Subtle, bass-rich percussive tom sound	Controls pitch drop and overtones	70,71,72
90s Toms (L/M/H)	Deep, hollow tom sound	Changes the balance between sine and square oscillators	79,80,81
Hexatom (L/M/H)	Tom with a long pitch decay	Controls the initial tune of the pitch decay	73,74,75
Bongotom (L/M/H)	FM toms with a tropical flavor	Adjusts complexity of the overtones	76,77,78
Industrial Tom (L/M/H)	FM toms with a steep pitch drop - useful for dirtying up with effects	Tunes the steepness of the pitch drop	85,86,87
Bass Tom (L/M/H)	Deep percussive FM bass sound	Changes the amount of overtones in the tom	88,89,90
Snare Tom (L/M/H)	Tuned snaredrums with loosened snares	Adjusts balance between the tone and the snare/noise	91,92,93
Conga (L/M/H)	Analog conga sound as found in old 80s drum machines	Adjusts the cleanness of the oscillator	82,83,84
80s Cowbell	The 80s analog cowbell we all know and love	Timbre and resonance of the sound	100

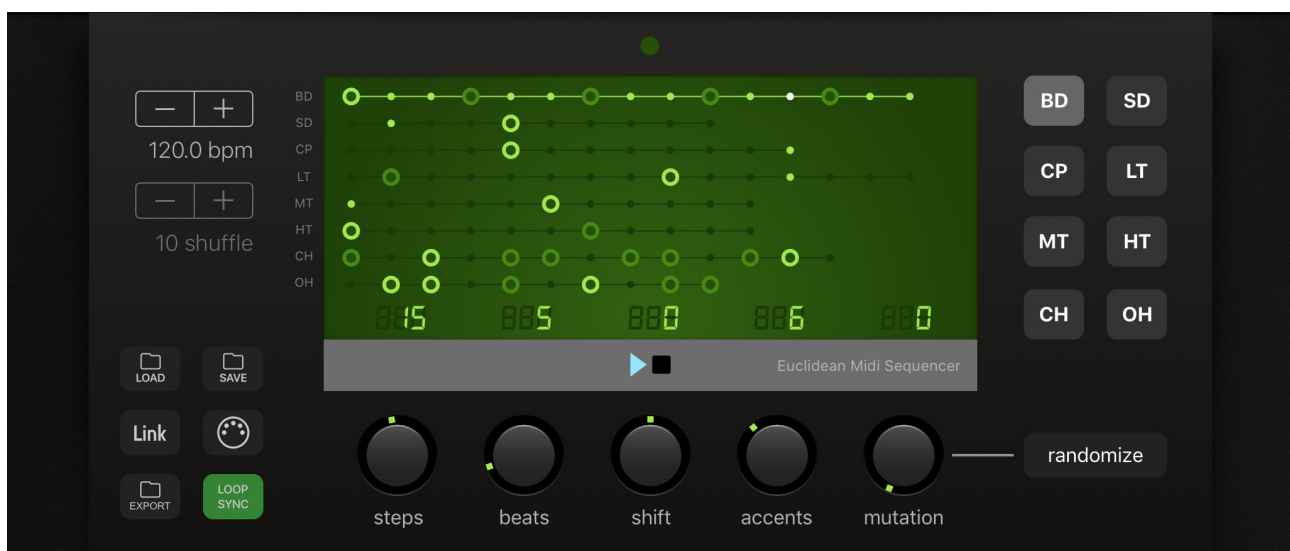
Instrument Name	Description	Personality Parameter	#
Hihat (C/O)	Old school analog hihats with a complex metallic bouquet	Controls the amount of metallics in the sound	60,61
Noise Hihat (C/O)	Analog hihats made using filtered noise	Adjusts the width of the bandpass filter band	62,63
FM Hihat (C/O)	Metallic hihats with sizzling FM overtones	Metallic timbre	66, 67
Analog Crash	Crash Cymbal inspired by old analog boxes like the TR606	Metallic timbre	64
FM Ride	Ride Bell, analog style	Metallic timbre	65
Woodblock	FM synthesised woodblock hit	Changes the amount of overtones in the sound	101
Rimshot	Percussive hit reminiscent of the iconic TR-909 rimshot sound	Controls the timbre of the tuned elements in the sound	102
Blip (L/M/H)	Percussive FM sounds in different pitch heights	Changes the FM pitch curve, from gradual to aggressive	103,104,105
FM FX	FM accent sound that can be changed from metallic to glassy	Adjusts the carrier sound: metallic to glass-like	106
Noise Thwack	Percussive noise sound, like sand in a tin	Adjusts the resonance of the bandpass filter	107
Chip	Sine chirp	Controls the curve of the chirp, from gradual to aggressive	108
Sine Hit	Analog percussion, like a light claves sound	Adjusts the overtones in the sound	109
Claves	Sound reminiscent of the TR-808 claves	Controls the resonance of the wood	110
Finger Snap	Synthesised finger snap-like sound	Resonance of the filtered noise part of the sound	111
Maracas	Subtle analog maracas sound	Balance of noise component	112

2. The sequencer section

When using Ruismaker as a standalone app, it lets you drive the Ruismaker drum synth using a playful little Euclidean sequencer. Under the surface the sequencer is actually a normal MIDI sequencer sending bog-standard midi commands to the synth module.

Once you have designed (or randomly generated) a nice pattern, you can export your pattern as a standard MID file and send it directly into your DAW of choice to build a full track out of it (taking advantage of the Audio Unit Plugin format of Ruismaker).

Note: exported MIDI files do not contain swing or shuffle and all notes are quantized to a straight grid. It is assumed that the sequencer/DAW will apply its own swing algorithm to make the MIDI pattern sit better in the receiving track.



2.1 Euclidean Patterns

There's lots of interesting reading material about the theory behind Euclidean rhythms on the interwebs, so we'll just give you the executive summary here.

Euclid was a Greek mathematician from 300 B.C. who came up with an algorithm to calculate the Greatest Common Divisor (GCD) for any set of two numbers.

So far, it has nothing to do with music nor drums. But some time ago, it was discovered that many seemingly complex traditional/ethnic drum patterns follow Euclidean logic in their composition.



Recommended reading: "The *Euclidean* Algorithm Generates Traditional Musical Rhythms" by Godfried Toussaint is a remarkably clever - and highly influential - paper on Euclidean Rhythms. <http://cgm.cs.mcgill.ca/~godfried/publications/banff.pdf>

When we apply Euclid's algorithm to rhythmic patterns, it lets us take a pattern of a given number of (16th) steps and distribute a number of beats (drum hits) onto it, as evenly as mathematically possible.

For example, when we take a pattern of 16 steps and 4 beats and apply Euclid's algo, the distribution will look like this:

Steps: 16 Beats: 4 Shift: 0



Now if we apply 5 beats instead, note how the distribution changes (and how the 'excess' step introduces an interesting irregularity in the pattern):

Steps: 16 Beats: 5 Shift: 0



If we want a simple snare drum/hand clap on the second and fourth beat, we take 16 steps and 2 beats, and then shift (or rotate) the entire pattern 4 steps to the right:

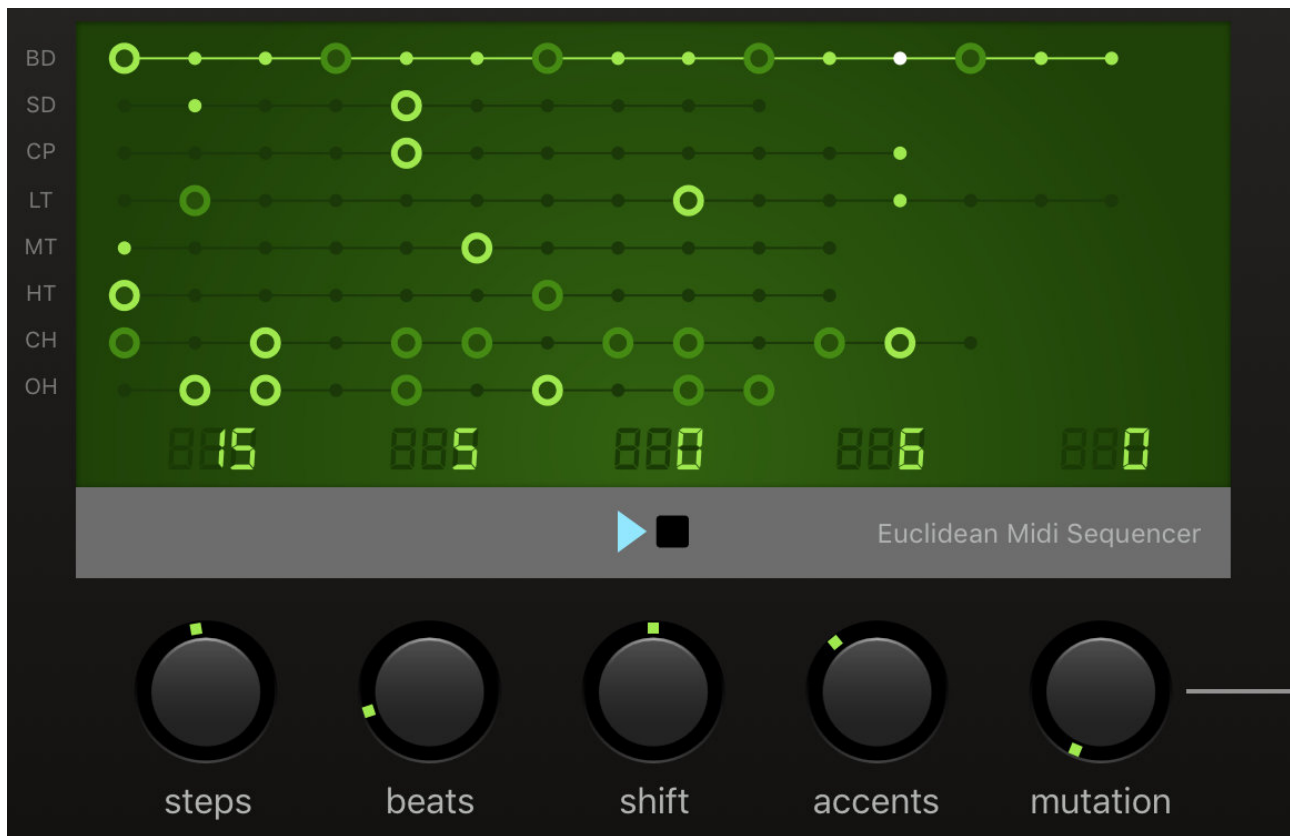
Steps: 16 Beats: 2 Shift: 4



By playing with the number of steps and beats we can create anything from standard 4-to-the-floor patterns to authentic latin and highly complex african rhythms - not to mention lots of interesting experimental patterns.

Especially when different channels with different patterns and lengths are combined, we can create polyrhythms of massive complexity using just these few simple variables.

2.2 Ruismaker's Euclidean Sequencer



Ruismaker's implementation of the algorithm works as follows: each channel has its own pattern. When the playhead of a pattern reaches the end of a cycle, it will loop and start at the beginning.

Each channel pattern is controlled using 5 variables:

Steps - the total length of this channel's pattern

Beats - the number of drum hits distributed over this pattern

Shift - the rotation to the right (positive) or left (negative) of the beats in this pattern

Accents - the accent distribution: 0 = off, 1 = every step accented, 2 = every 2nd step accented, etc.

Mutation - the probability (0-100%) that a step will do the opposite of what it's programmed to do

The 5 knobs for changing the pattern can be controlled using MIDI CC:

	Steps	Beats	Shift	Accents	Mutation			
CC#	112	113	114	115	116			

Loop Sync

Loop Synchronization mode is a switch that lets you select how polyrhythms are handled. If Loop Sync is enabled, then the entire sequence will restart once the longest pattern has reached its end. This makes for nicely predictable drum loops.

If Loop Sync is disabled then every channel will run freely, making the sequence a complex free-running polyrhythm. This lets you mix different time signatures or create intricate rarely-repeating patterns.

Random

This button randomly generates a pattern for you. Mutations will be reset to 0 on all channels.

Play/Stop

This button starts and stops the playback of the pattern. If Ableton Link is enabled there may be a brief count-in before the pattern starts playing to ensure your pattern will be in sync with the other Ableton Link enabled apps on the network.

Link

This lets you control the Ableton Link feature. You can use this to sync the app with other Ableton Link compatible apps and devices which are on the same device or on the same network as Ruismaker. Changing the tempo will then change the tempo in all linked apps and conversely Ruismaker will also respond to tempo changes initiated by other apps.

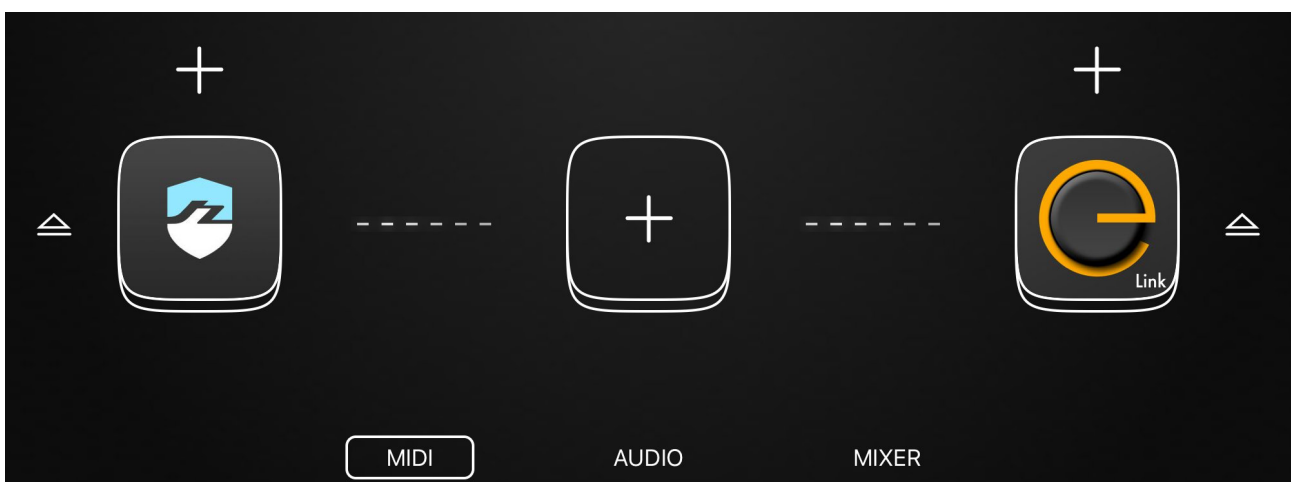
Note: when a Link session is active, Ruismaker will respect its tempo rules. Opening a pattern with a different tempo will not change the active Link session's tempo.

MIDI settings & Audiobus 3 MIDI

This lets you change basic settings for midi input (channel) and select Bluetooth MIDI devices. Ruismaker is fully compatible with CoreMIDI, Virtual MIDI and BTLE MIDI on iOS and will respond to midi input while running in background mode.

Note: Audiobus 3 MIDI IN/OUT is also supported. No settings need to be made for it; they are enabled automatically when Ruismaker is loaded into an AB3 MIDI slot.

When using Ruismaker in an Audiobus 3 MIDI slot you can use the built-in sequencer to drive other Audiobus 3 compatible apps and Audio Unit Instruments. In this case Ruismaker's internal synth engine is disabled and only MIDI notes are transmitted - not audio.



Note: the Ruismaker sequencer always uses the 'black keys' key mapping for output. The receiving app must be configured to respond correctly to these MIDI notes.

2.3. Saving and Exporting

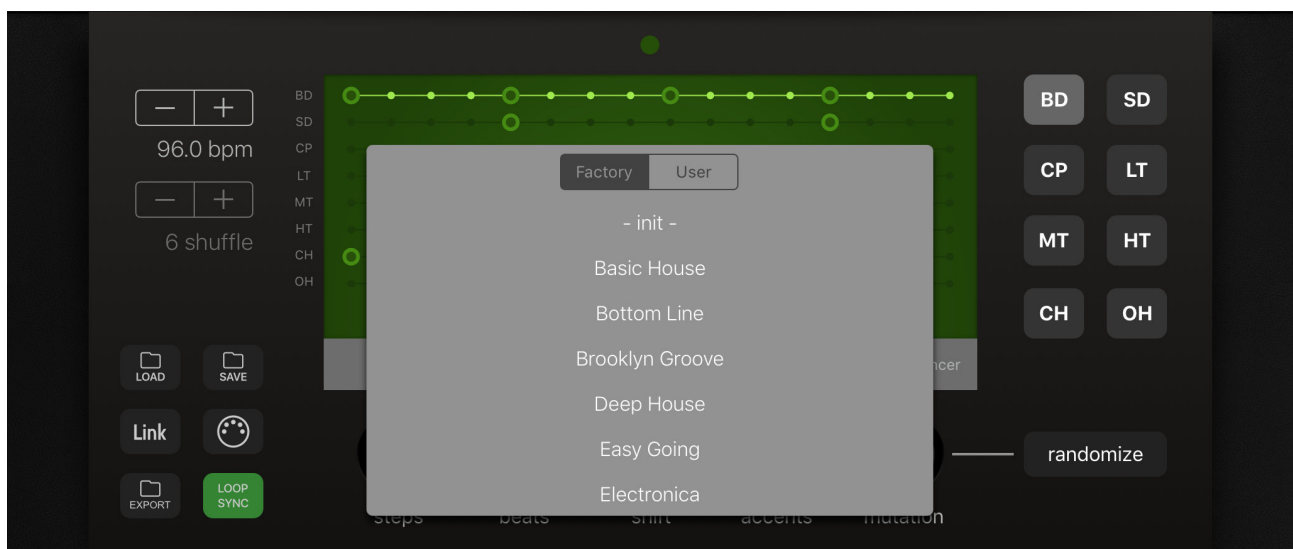
AU Presets

Synth settings can be saved and loaded from inside the Audio Unit plugin. This ensures that all your favorite presets and homemade patches are always available, across different AU hosts and the standalone mode of Ruismaker. To access the AU Presets, tap the SAVE and LOAD buttons in the top-right corner of the plugin.



Patterns

A Ruismaker pattern contains the sequencer note data, the current synth settings, the tempo and shuffle settings. Patterns can be saved and loaded from the standalone sequencer version of Ruismaker. They can be accessed from the SAVE and LOAD buttons in the left hand margin of the sequencer.



Note: you can delete user presets and patterns from the list by swiping-to-the-left and then confirming you want to delete them. Factory patterns/presets can't be deleted.

Exporting

Several things can be exported (and imported) from the standalone version of Ruismaker. Tap the EXPORT button to bring up the export options window...

Pattern as WAV - Exports the 4 bars of the current sequencer pattern & synth settings as a WAVE file

Pattern as MID - Exports a standard MIDI file with the current sequencer pattern for use in your DAW

All Patterns ZIP - Packs all your user patterns into a Zip file and sends it to wherever you like

AU Presets ZIP - Packs all your homemade AU Presets and exports them to your preferred destination

Importing

Patterns and AU presets can be reimported as Zip files. To make sure they are valid and end up in the right place there is a special rule for how to name your Zip files:

Pattern Zip file: [yourname]_patterns.zip e.g. *ruismaker_patterns.zip*

AU Preset Zip file: [yourname]_presets.zip e.g. *ruismaker_presets.zip*

Other filenames are ignored.

2.4. Using Ruismaker in plugin mode

When using Ruismaker as plugin inside third party hosts and DAWs it will behave as any regular MIDI instrument. You can run as many simultaneous instances as your device can handle.

The Delay section will automatically synchronize with the AU host's tempo settings.

GM Keymap settings are local: they only apply to this particular instance of the AU plugin and must be set accordingly for each instance.



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