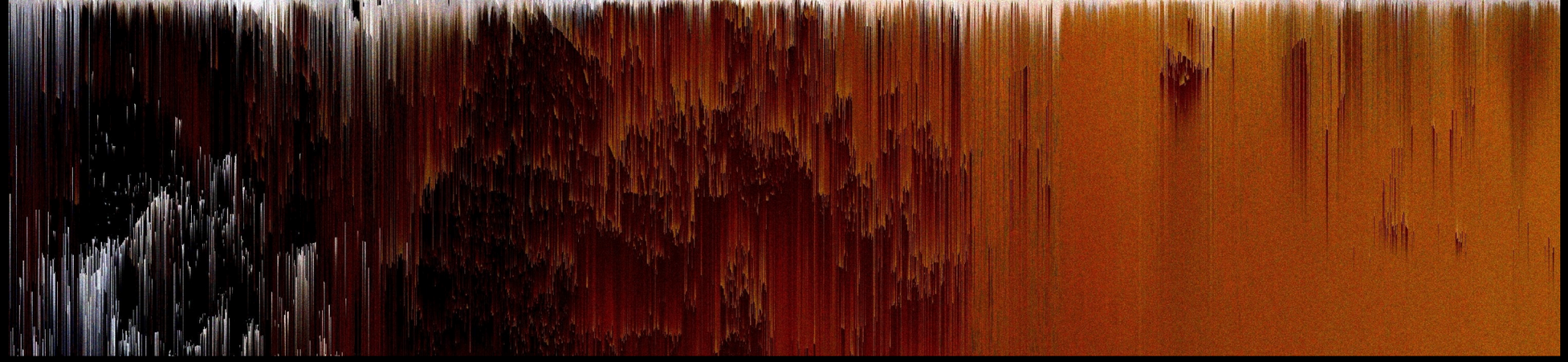

SONIFICATION TOOLS

MANUAL + USER GUIDE

Sonification Tools

Obligatory Legal Stuff

MANIFEST AUDIO

Thank you for purchasing this collection of creative Max for Live devices!

License Agreement:

Sonification Tools

Important Info

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This device requires Live 10 or Live 10 Suite with Max for Live installed; we strongly recommend Live 10.1.x or higher with Max 8.5.x or higher.

Please note Data MIDI and Data Mod are MIDI effects, which means they must be placed prior to instruments on MIDI tracks.

Sonification Tools

Installation Instructions

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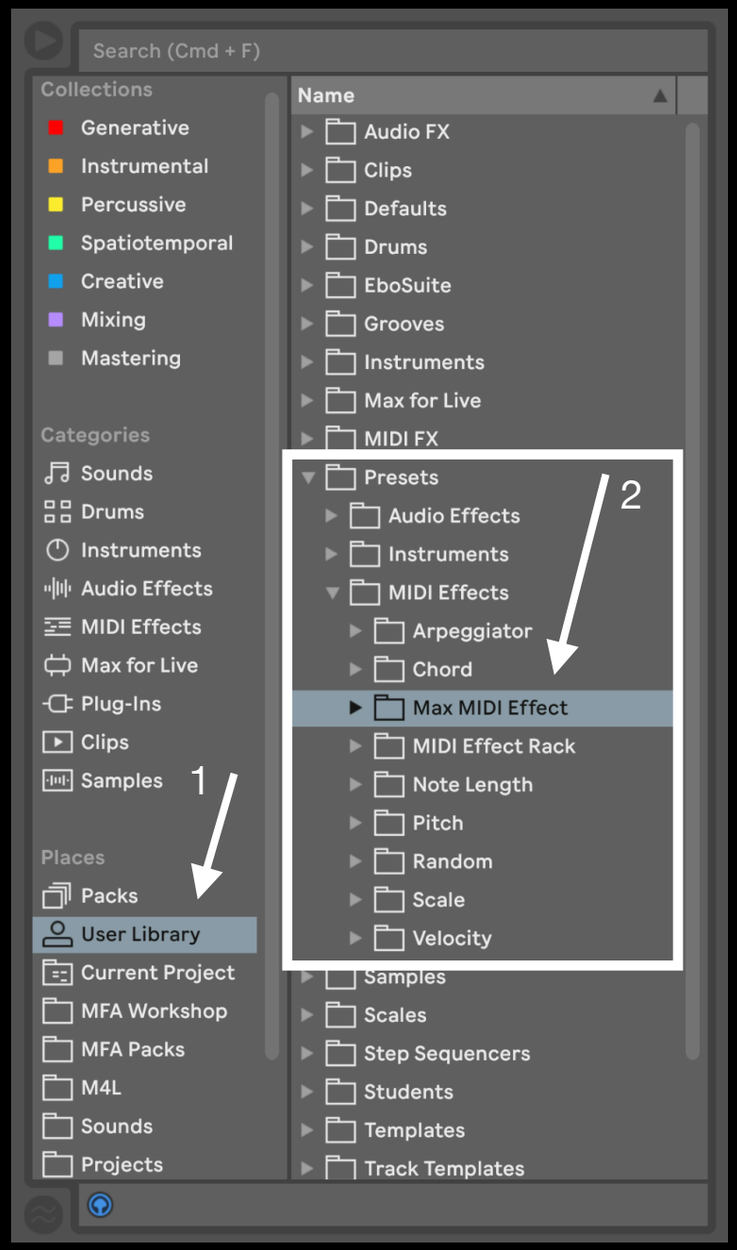


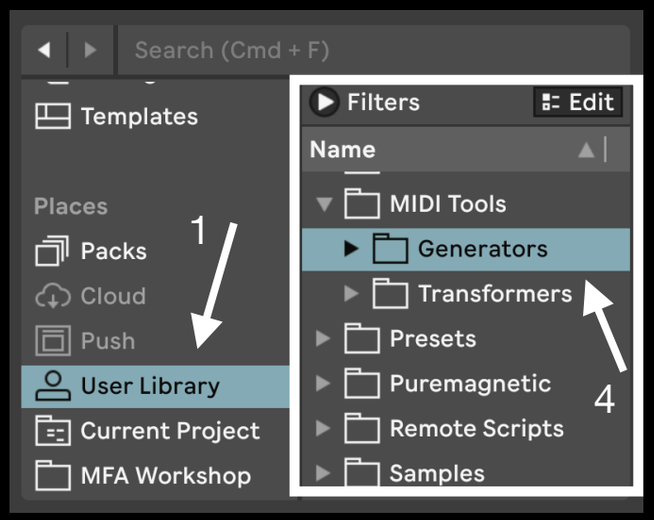
To install Sonification Tools, first double-click to decompress the ZIP archive it arrived in. Presumably you've already done this, because you're reading the manual, also included in said ZIP — good job!

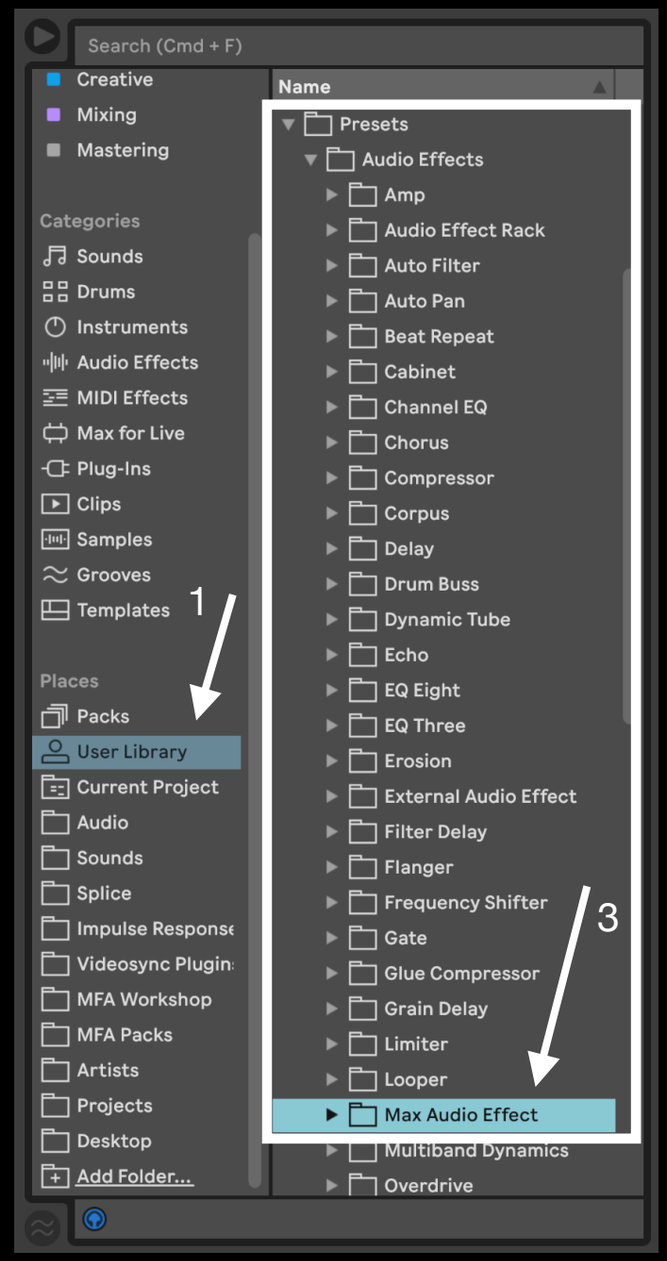
From Finder (macOS) or Explorer (Windows), drag the Data MIDI and Data Mod from the Sonification Tools MIDI Effects folder to the User Library in the Places section of Live's Browser (Arrow 1 pictured left). This will copy the required files to your User Library.

We recommend dragging them into the Max MIDI Effect subfolder of the User Library MIDI Effects folder (Arrow 2 pictured left). You should drag Data FX from the Sonification Tools Audio Effects folder to the Max Audio Effect subfolder of the User Library Audio Effects folder (Arrow 3 pictured right).

The Dataforge MIDI Tool should go in the Generators subfolder of the MIDI Tools folder, located at the top level of the User Library, pictured below (Arrow 4); if these folders don't appear, simply create them yourself.

Once installed, we might humbly suggest adding it to an appropriate Browser Collection, if applicable.





Sonification Tools

MANIFEST AUDIO

Overview

A collection of powerful creative devices, Sonification Tools allow you to access new musical ideas via real-world data.

Just manually type or simply copy and paste raw numeric data into the text entry field of all three devices to generate corresponding MIDI patterns with Data MIDI, modulation sequences with Data Mod, or spectral filtration, wavefolding distortion, impulse convolution or even exported audio waveforms with Data FX.

Data can be copied from any text, CSV, or Excel file to embody data string of numbers as change over time. Integer or floating point number values need only be separated by a single space for the device to ingest them. You can then select and loop the data as you like, with the lowest data value automatically corresponding to your lowest allowed output, and the highest data automatically corresponding to your specified upper output limit.

Data MIDI and Data Mod allow you to trigger data at any multiplied metrical base rate with optional cycle reset for a wide variety of rhythmic patterns, with offset delay and swing further enhancing MIDI output timing. You can also trigger data at a millisecond rate, or via arbitrary MIDI pattern input.

A variety of trigger modes allow you to engage with Data MIDI's output in a variety of ways, all of which can be constrained via 69 scales in any key, set locally, via Live 12, or the included Global Hub utility. Better yet, you can expand or contract the range of data pitch, velocity, or length output in real time to dynamically express the data in highly musical ways.

Adding one last twist, data can also be randomized to easily generate a wide variety of patterns and tones from scratch. Data MIDI and Data Mod can also be Gated to only produce MIDI above or below a certain threshold for more rhythmically complex output. And with Live 12, use the Dataforge MIDI Tool to sonify data directly in a MIDI clip with the bulk of Data MIDI's settings on offer.

Whether you type or copy personally meaningful data or research and source it from any data set available online or elsewhere, Sonification Tools allow you to embed real-world phenomena into your creative process — and express those phenomena as uniquely as you wish, giving them a voice through your music and hopefully inspiring new approaches.

Sonification Tools

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Gathering & Preparing Data

The first step to sonifying real-world data sets is to find good data. There are a wide range of sites available to explore a variety of data sets for free, from **sports** to **finance** to more **incisive academic data of all kinds.**

Websites such as **Our World In Data** allow you to use their data freely under a creative commons license — so long as you attribute the website and authors in your credits. However, different data sets will have different licenses, some of which may be more strict — so be sure to check that you have permission to use the data set you intend to in the way you plan to use it before committing to use data from that source.

Once you have your data set downloaded, data preparation is the next step to ensure a smooth sonification experience. Once you have a good data set downloaded as XLSX or CSV, you'll want to open it in a **spreadsheet editor** so you can copy and paste it into our device in Live. Certain data sets may contain nonsensical values that should be purged before sonification usage.

Make sure only the actual data you wish to use has been pasted in. Be sure also not to include, for example, an index column that simply counts up from 1 alongside the desired data, as this will skew the results rather drastically. Please ensure only numeric characters are pasted into the data field.

Numbers should be separated by a space and/or line break (enter); commas or semicolons may cause problems and should be avoided — but don't worry: data copied from a CSV or other spreadsheet will be entered correctly as space-separated here. Finally, you must ensure float values are denoted correctly with a period (".") symbol — not a comma (",").

Data MIDI Visual Guide

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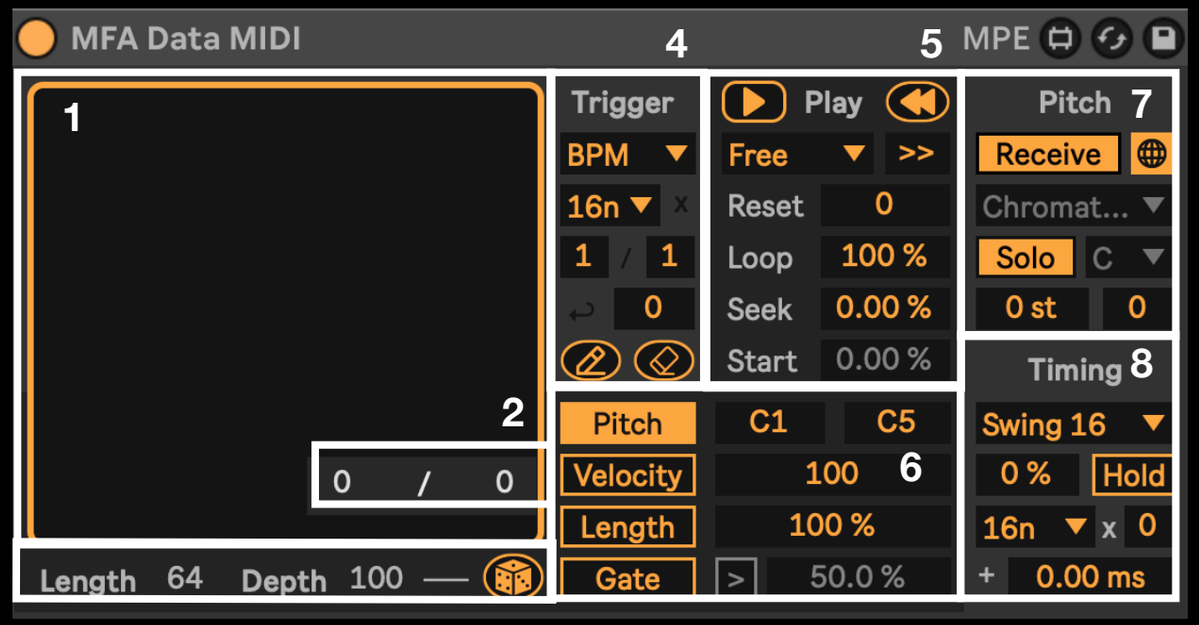


1 · This is the **Data Entry** field where you can click the place the cursor and manually type or paste copied numerical data; be sure to hit the Enter key for the data to be ingested.

2 · The **Data Counter**, shows the total data points in the string at right, and the currently expressed data point on the left.

3 · Here we have the **Randomization** controls: adjust the Length to determine how many data points will be generated up to a maximum of 2048; use the Depth to determine the resolution range of data, up to 1000; the minimum of 2 will generate a binary string of ones and zeroes which can be highly useful to generate rhythmic patterns; simply click the dice to randomize a new string.

4 · This is the **Trigger** section that defines whether data points are advanced at a BPM-synchronized rate with multiplier, divider, and optional bar reset, unsynchronzied millisecond rate, or arbitrary MIDI note on or note off messages; click the pencil to access the raw text data file or click the eraser to clear all stored data.

5 · Here we have the **Play** controls: play or pause the data output or manually reset the data string to the start point with the buttons up top; select the play Mode from Free playback, Gate mode to only play when incoming MIDI notes are held, Side to only play between incoming MIDI notes, Gate Pause to actually pause the data cycle between notes, Side Pause to similarly pause the data string during note, or Arp to manually gate and reset the data string with each new note on. Play direction allows you to advance through the data string Forward, Reverse, Cycle forward then reverse and back again, or trigger Random data points within the string; then, the entire data string can be Reset in bar intervals, the entire Loop length of the string can be shortened, and finally you can Seek for a new start point within the optionally looped string length.

6 · Here we have our data **Expression** settings: with Pitch enabled, we can specify the minimum and maximum pitch values that will be output which can be inverted and altered in real-time; if disabled, a single specified pitch value will be triggered by the data; Velocity and Length, off by default, will then output a single value but when activated can also specify ranges that correspond to the minimum and maximum of output data, invertible and automate-able; when enabled, Gate specifies the point above or below which data will actually trigger note output.

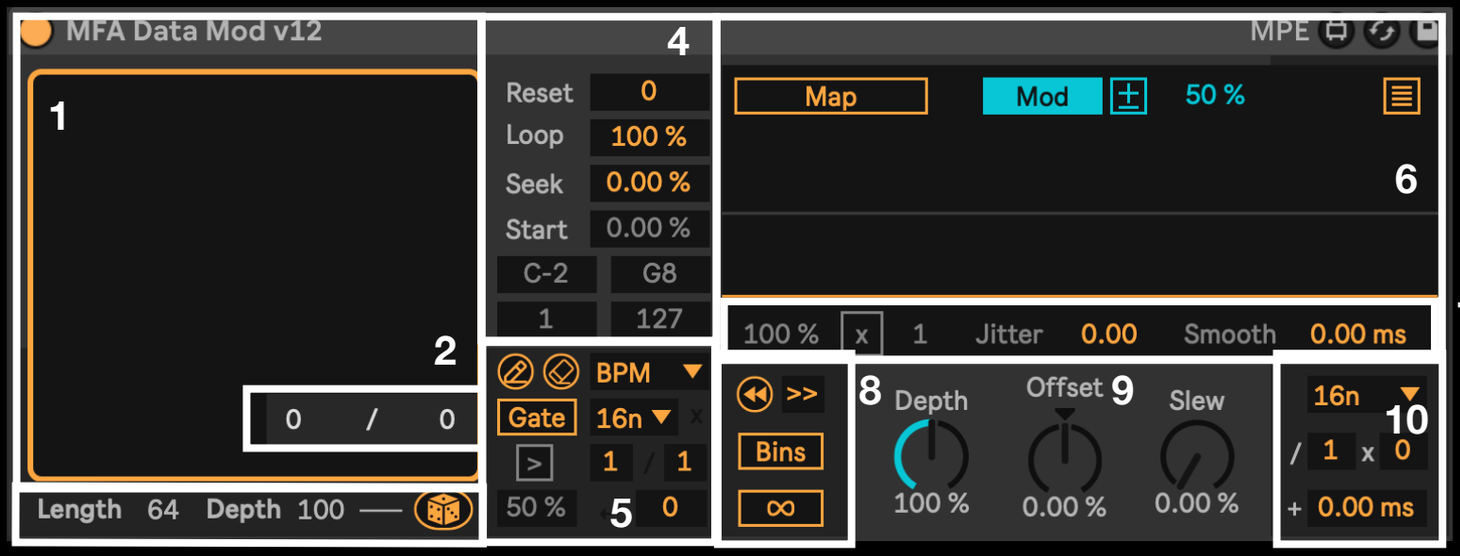
7 · The **Pitch** settings determine the scale and key that will be output and whether those are set by Live 12 or Global Hub, or controlled locally, whether received note input will transpose the output, and whether output will play solo or be merged with incoming notes; you can also transpose the output manually in semitones and octaves.

8 · Finally, the **Timing** section defines the type and amount of swing, whether notes are held for sustain, and whether output is delayed by a metrical value multiplied by a rate with optional milliseconds in addition; with a multiplier of zero and a milliseconds at zero there will be no output delay.

Data Mod

Visual Guide

MANIFEST AUDIO



1 · This is the **Data Entry** field where you can click the place the cursor and manually type or paste copied numerical data; be sure to hit the Enter key for the data to be ingested.

2 · The **Data Counter**, shows the total data points in the string at right, and the currently expressed data point on the left.

3 · Here we have the **Randomization** controls: adjust the Length to determine how many data points will be generated up to a maximum of 2048; use the Depth to determine the resolution range of data, up to 1000; the minimum of 2 will generate a binary string of ones and zeroes which can be highly useful to generate rhythmic patterns; simply click the dice to randomize a new string.

4 · Here we have the **Play** controls: manually reset the data string to the start point with the buttons up top; select the play Direction to advance through the data string Forward, Reverse, Cycle forward then reverse and so on, or trigger Random data points within the string; then, the entire data string can be Reset in bar intervals, the entire Loop length of the string can be shortened, and finally you can Seek for a new start point within the optionally looped string length; below these you can select the range of MIDI note pitches and velocities that will trigger new data values in MIDI trigger mode as detailed below.

5 · This is the **Trigger** section that defines whether data points are advanced at a BPM-synchronized rate with multiplier, divider and optional bar reset, unsynchronzied millisecond rate, or arbitrary MIDI note on or note off messages; click the pencil to access the raw text data file or click the eraser to clear all stored data; finally, when enabled, Gate specifies the point either above or below which data will actually trigger note output.

6 · Here we have our data modulation **Mapper and View Scope**: click Map then click the parameter you wish to control anywhere throughout your set, then constrain and even invert the mapping range with the percent sliders at right; click the hamburger menu to access seven additional mapping assignments.

7 · The **Refinement** settings determine the chance modulation will be triggered, the data interval at which data will be triggered; at 81% x 2, 81% of data points will be output and counted, every second of which will trigger modulation — or the inverse with count mode switched to avoid; Jitter adds random motion to the modulation signal, while Smooth softens the modulation.

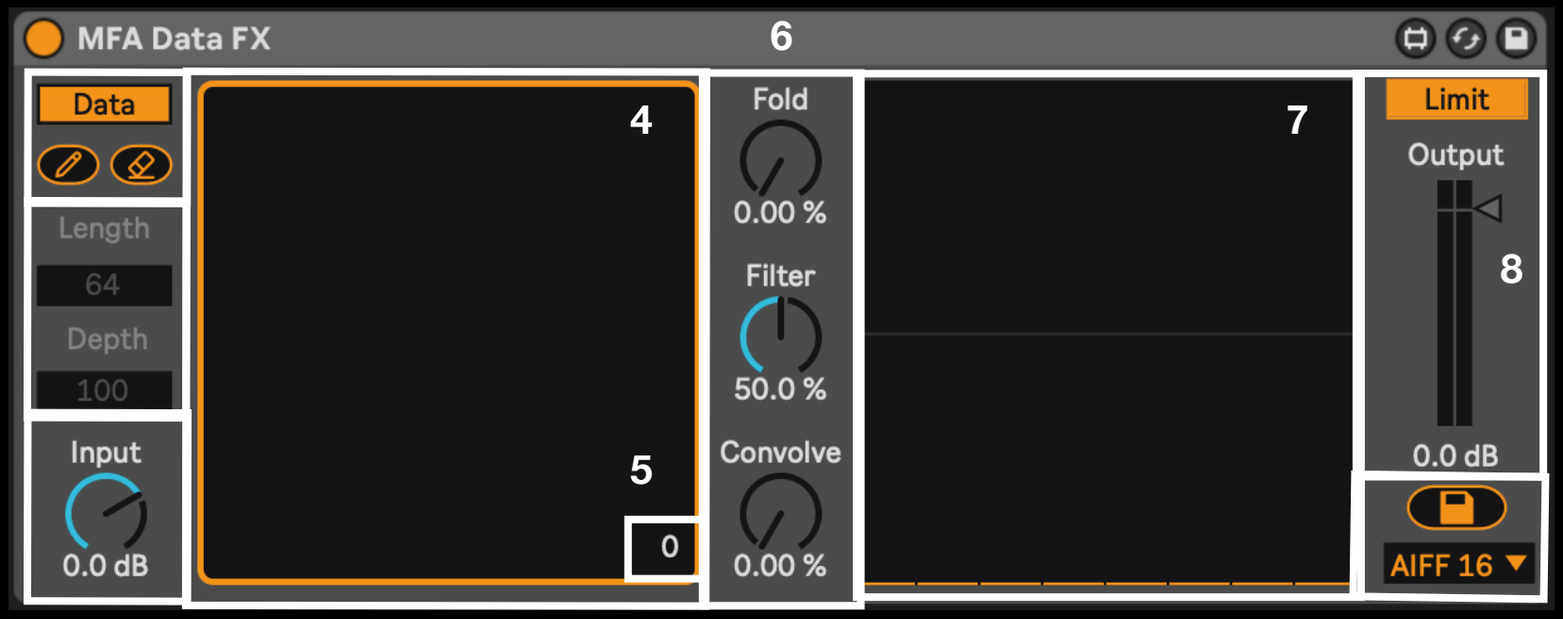
8 · **Modulation** settings govern the Slew amount for smooth linear slopes between data values, the overall Depth of modulation, and whether the resulting modulation is offset to higher or lower values.

9 · Here we have the final **Advanced** settings: enable Bins to quantize modulation output to minimum and maximum output values or hit freeze to pause modulation output at the current value; finally, modulation output can be delayed by a metrical value multiplied by a rate with optional milliseconds in addition; with a multiplier of zero and a milliseconds at zero there will be no output delay.

Data FX

Visual Guide

MANIFEST AUDIO



1 · This is the **Edit Mode** field: in Data mode you can enter your own data or toggle to Random mode to randomize fresh data points; click the pencil to access the raw text data file or click the eraser to clear all stored data.

2 · Here we have the **Randomization** controls: adjust the Length to determine how many data points will be generated up to a maximum of 2048; use the Depth to determine the resolution range of data, up to 1000; the minimum of 2 will generate a binary string of ones and zeroes which can be highly useful to generate rhythmic patterns; simply click the dice to randomize a new string.

3 · Here we have the input **Gain** dial to reduce or boost input signal.

4 · Here we have the **Data Entry** area where in Data mode you can click to place the cursor and manually type or paste copied numerical data — just be sure to hit the Enter key for the data to be ingested; in Random mode these values are greyed out and must be edited in the visual editing area.

5 · This is the **Data Count** section that displays the length of the data string, up to a maximum of 512.

6 · Here we have our data **Effects** dials where you can use the current data table to apply corresponding wavefolding distortion, spectral filtration, and/or finite impulse response convolution via the three dials here.

7 · This is the graphical editing area where the current data points are displayed as a graph that can easily be altered by clicking and dragging your mouse to draw new shapes.

8 · **Output** settings allow you to toggle optional output limiting and adjust the output gain as needed.

9 · Here we have the **Waveform Export** settings: select your preferred format (AIFF or WAV) and 16- or 24-bit depth, then click the disk button to save a waveform corresponding to the current data set that can then be used as a looping oscillator in any sampling instrument, or even as a wavetable.

Sonification Tools

Examples

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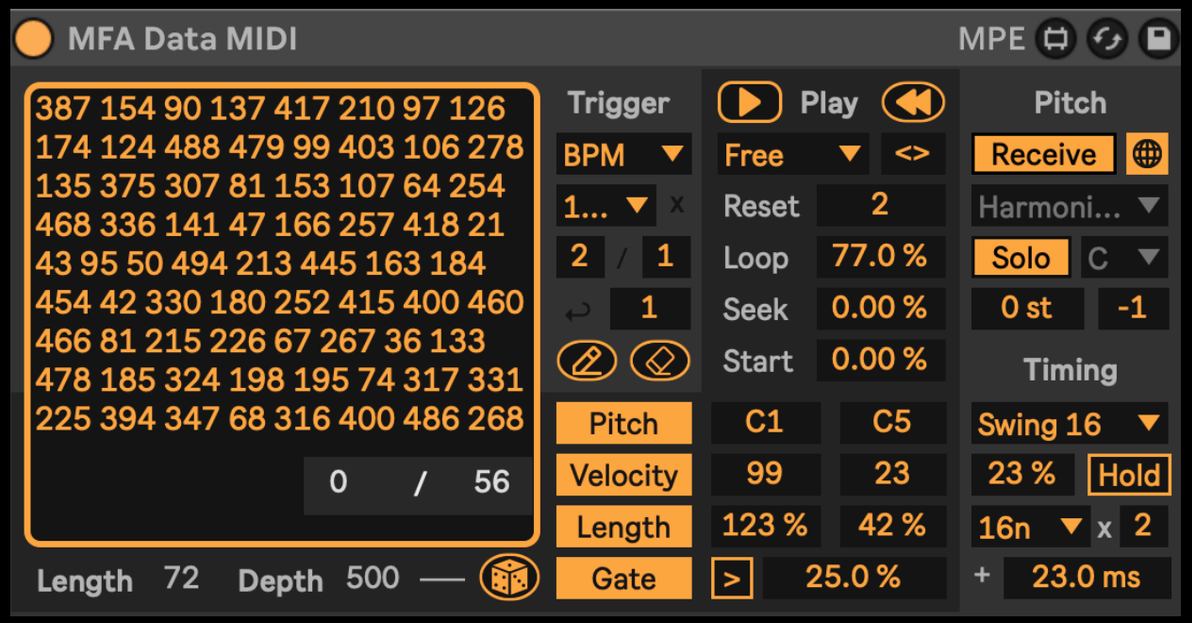
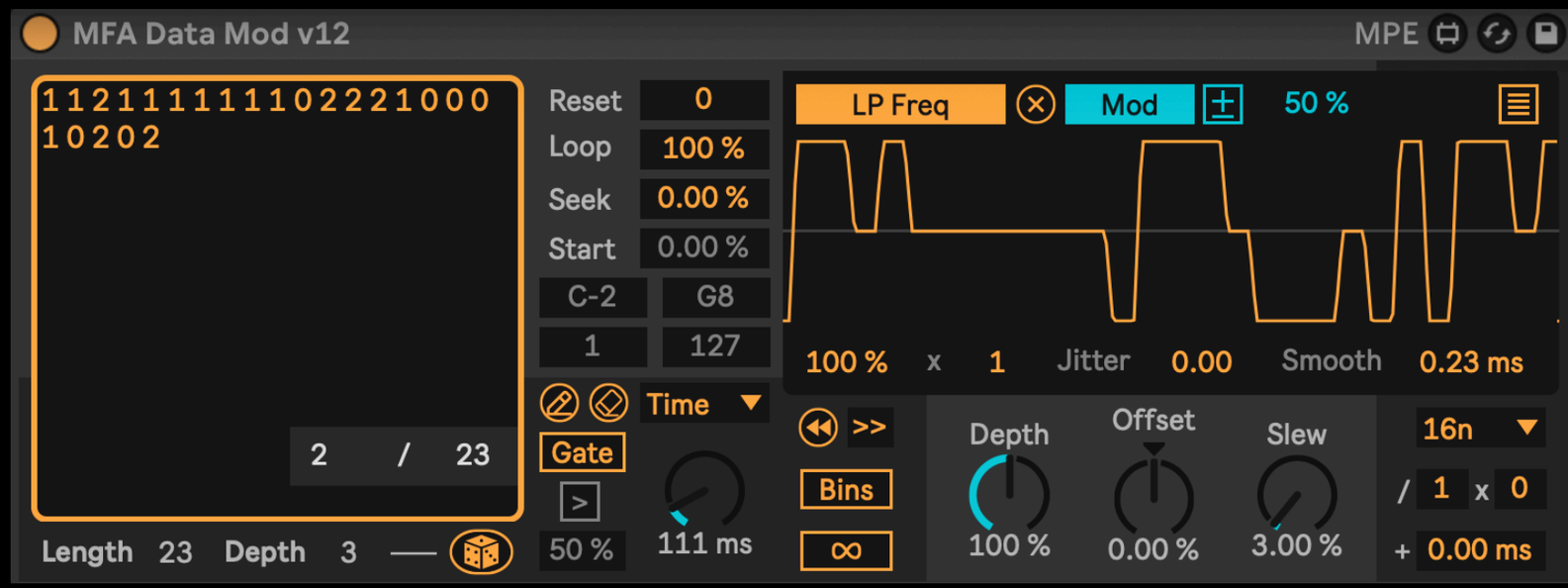


← EXAMPLE 1

A 72-step data string has been generated with a depth of 500, triggered rhythmically every second 16th note triplets, with the rhythmic pattern reset every bar. The data values will be played across four octaves with the lowest at C1 and highest at C5, in solo mode but receiving transposition input, transposed an octave down within a Harmonic Minor scale in the key of C from Live 12 or Global Hub. Output will be delayed by two 16th notes and 23 milliseconds with 23% 16 Swing applied. Velocity is mapped to data with the lowest data values outputting 99 and the highest a velocity of 23; Length is also mapped with the lowest values outputting slightly longer and the highest values considerably shorter. With Gate active at 25% on a data depth of 500, only data values above 125 will trigger output. A loop length of 77% of the data string, corresponding to the counter total tally of 56, will Cycle forward and back, with the data string resetting every two bars.

EXAMPLE 2 →

A 23-step data string has been generated with a depth of 3 and mapped to the Filter 1 Frequency of a Wavetable. Slew of 3% and Smoothing of 0.23 milliseconds have been applied to smooth the modulation output. The modulation will loop at 100% at a rate of 111 milliseconds. No gating, depth, Loop or Reset is applied.



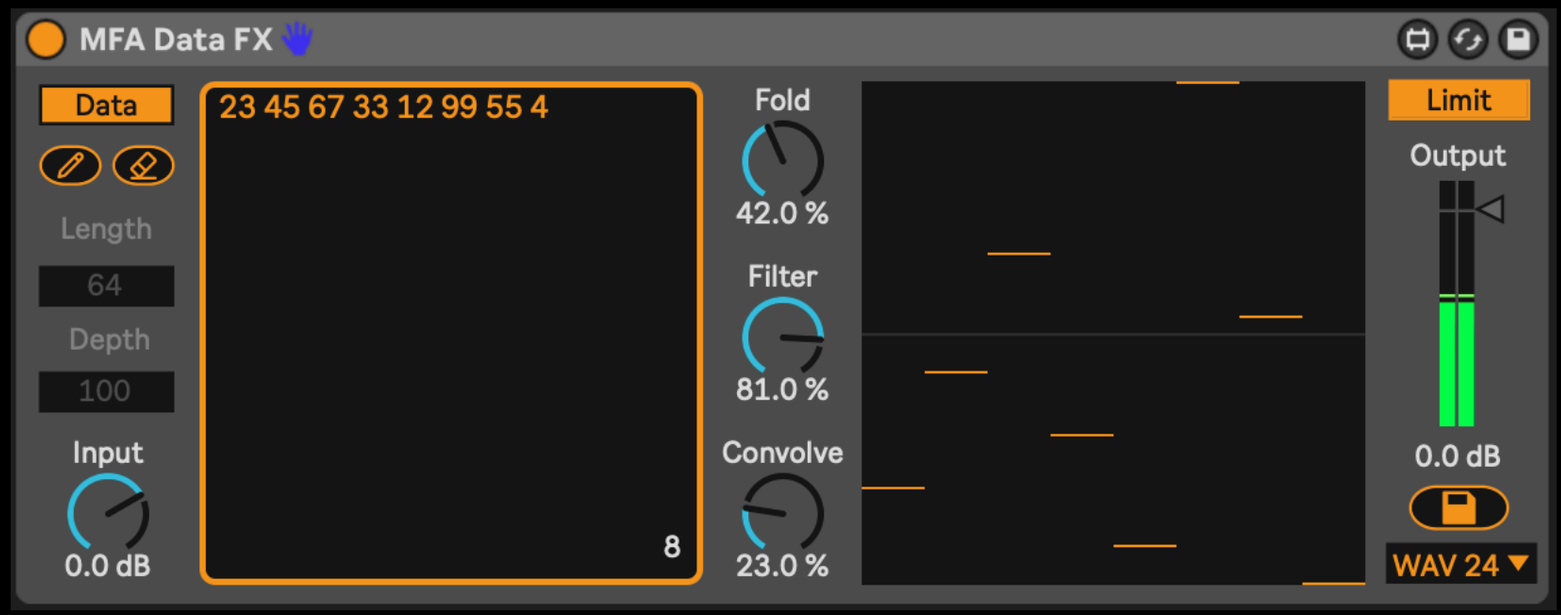
Sonification Tools

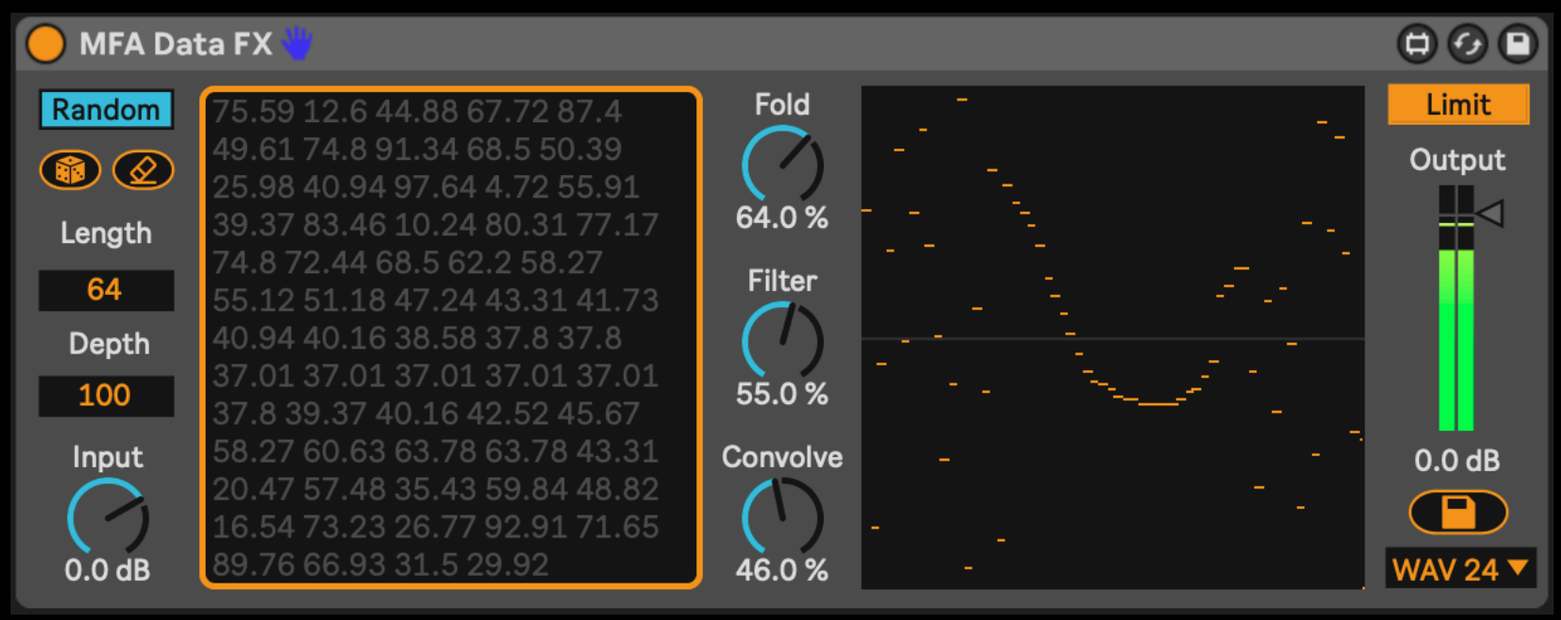
Examples

MANIFEST AUDIO

EXAMPLE 3 →

Eight data points have been entered to create a unique effect array. The effect array has been applied to the Fold distortion by 42%, to the spectral Filter by 81%, and finally to the Convolution reverb by 23%. Limiting is applied and the resulting audio will be exported in 24-bit WAV format.





← EXAMPLE 4

A data string of 64 steps with a depth of 100 has been randomized and then graphically edited to create a unique effect array. The effect array has been applied to the Fold distortion by 64%, to the spectral Filter by 55%, and finally to the Convolution reverb by 42%. Limiting is applied and the resulting audio will be exported in 24-bit WAV format.

Sonification Tools

Examples

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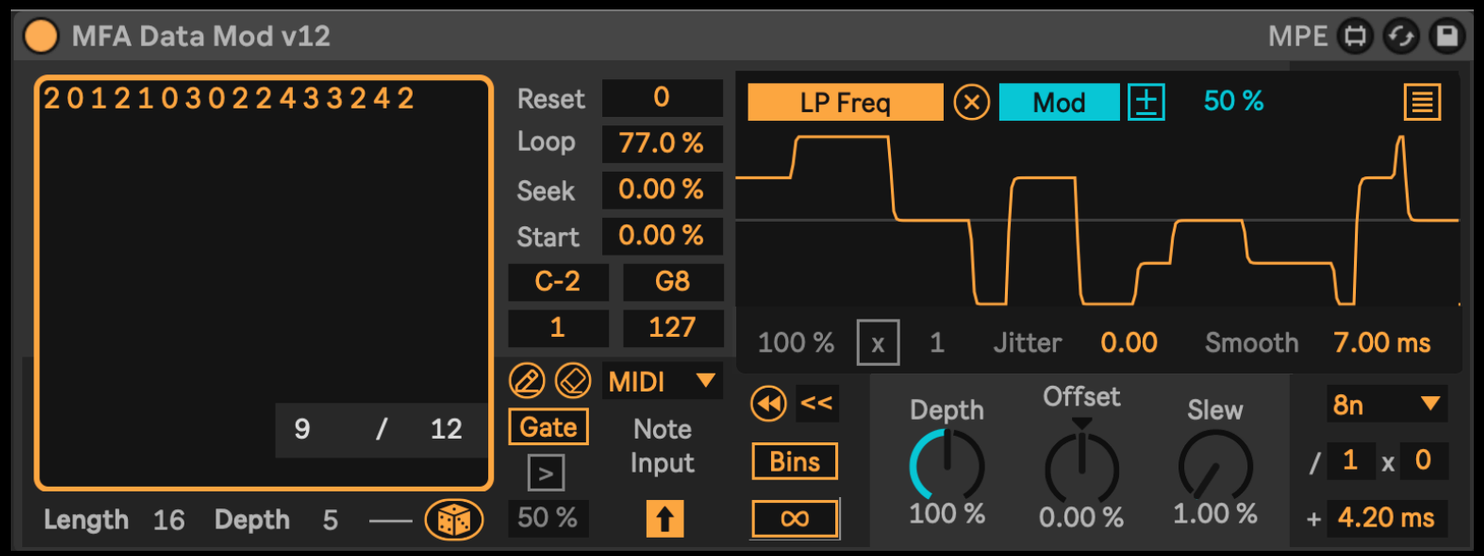
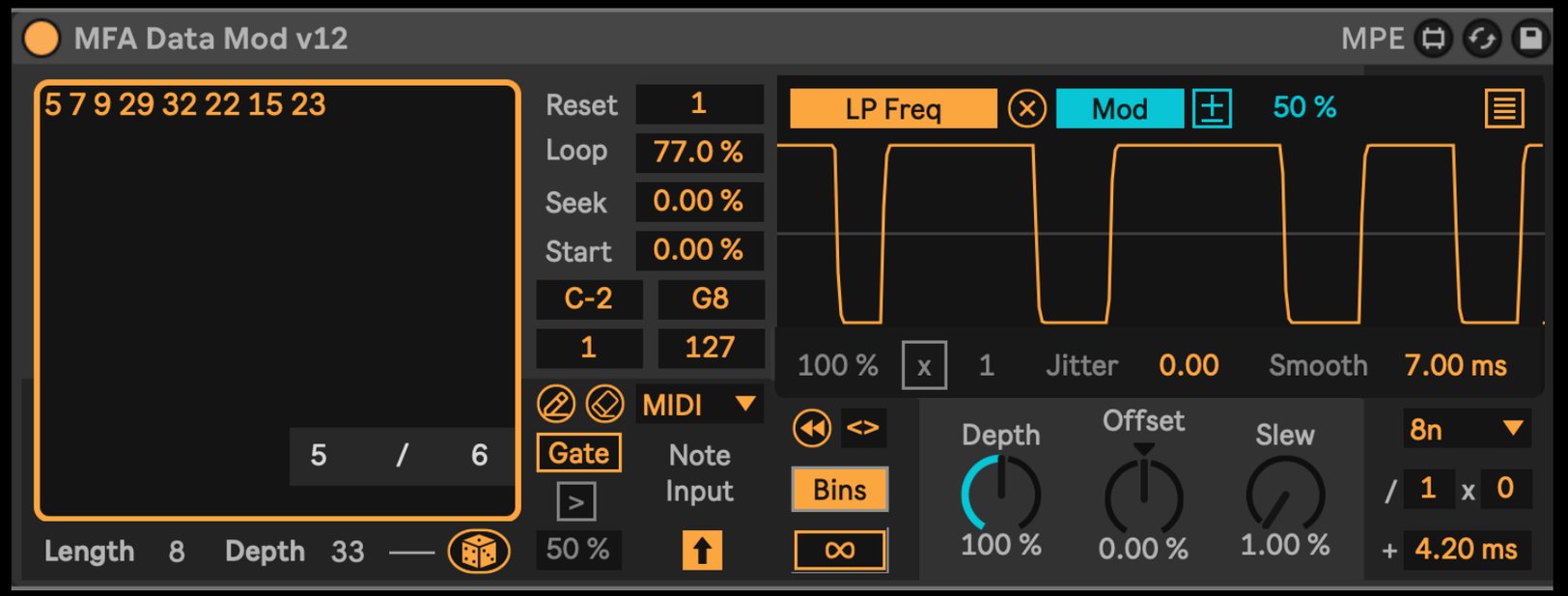


← EXAMPLE 5

A string of 16 data points with a depth of 5 has been randomized to create a unique modulation pattern. Triggered by MIDI note off messages within all note ranges and velocities, only 77% of the data string will loop, and will do so in reverse. Modulation values have been smoothed by 7 milliseconds with 1% Slew applied. All modulation data output will be delayed by 1 8th note and 4.20 milliseconds.

EXAMPLE 6 →

A string of 8 data points has been randomized with a depth of 33. Once again triggered by MIDI note off messages within all note ranges and velocities, 77% of these 8 data points will be looped forward then backward but the data string will be reset every bar. Modulation values have again been smoothed by 7 milliseconds with 1% Slew applied, and all modulation data output will be delayed by 1 8th note and 4.20 milliseconds. However, with Bins mode enabled, all data points above 50% are quantized up to the maximum value, while data points below a 50% value will be quantized down to the miminium possible value.



Sonification Tools

Examples

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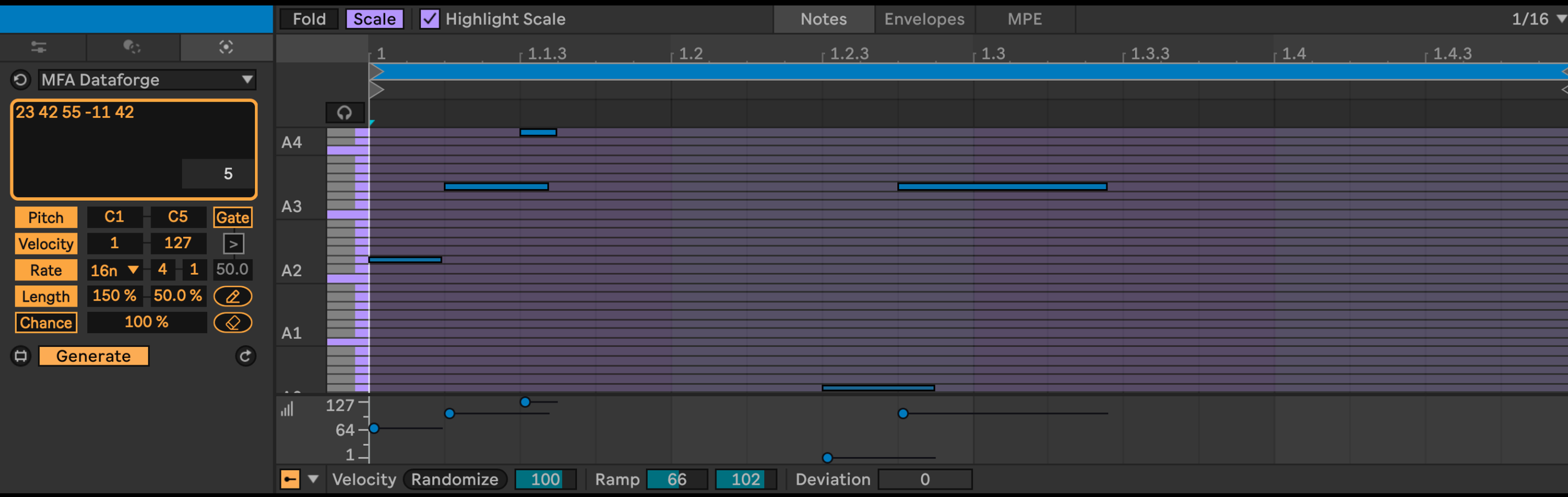
EXAMPLE 7

A basic sequence of five MIDI notes expressed by the Dataforge MIDI Tool; it offers the same settings available as in Data MIDI, with the addition of Chance, which allows you to control the probability of notes depending on their original data value — while Gate mutes notes rather than removing them.



Sonification Tools FAQ

MANIFEST AUDIO

The data I entered doesn't play — why?

After data points are entered into a device by manually typing or pasting in, you must then press the Enter key for the data to be ingested and processed for output.

How can I sonify multiple a full table of data strings?

Simply use as many instances of our Sonification Tools as necessary to give voice to all the concurrent strings of data required for your project; a good way to think about each instance is that it can handle one row or column of data — therefore, simply add another Sonification Tool for each column or row of data in a table you wish to give voice to.

What is the maximum length of data I can enter into a Sonification Tool?

Due to limitations with Max list processing, the maximum data string length for Data MIDI, Dataforge, and Data Mod is currently 2048. It's debatable whether longer strings would produce musical results anyway. Meanwhile, due to MSP buffer size limitations, the maximum data string length for Data FX is 512.

My data isn't playing back as expected, what should I do?

Make sure only the actual data you wish to use has been pasted in. Be sure not to include, for example, an index column that simply counts up from 1 alongside the desired data, as this will skew the results rather drastically. Please ensure only numeric characters are pasted into the data field. Numbers should be separated by a space and/or line break (enter); commas or semicolons may cause problems and should be avoided — but don't worry: data copied from a CSV will be entered correctly as space-separated here. Finally, you must ensure float values are denoted correctly with a period (".") symbol — not a comma (","). Finally, certain data sets may contain nonsensical values that should be purged before sonification usage.

Sonification Tools's scale and key are not stored with my Live Set or saved presets — why?

By default, Sonification Tools is in Global scale and key mode, so it will inherit the scale and key from Live 12 or any instance of the included Global Hub, which will be stored with your Live Set. To ignore Global Hub settings or to ensure scale and key are saved independently with your pre-Live 12 Sets or any presets, simply toggle from Global scale mode to pin these settings locally.

I don't want Sonification Tools to conform to Live 12 or Global Hub's scale and key — is this possible?

Any device that can be impacted by Global Hub has a Global toggle; click this to pin the scale and key to Local Sonification Tools settings. Toggling from Local back to Global mode will automatically and instantly force the device to inherit Live 12 or Global Hub settings.

Sonification Tools looks small — how do I make it bigger?

In the Display tab of Live's Preferences pane, increase the Display Zoom percentage slider to 125% or 150%.

Thank you for supporting us by purchasing this device — we hope it inspires your creativity!

For more information, video tutorials, and other devices, please visit us online at: **manifest.audio**

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