PULSE ENGINE

MANUAL + USER GUIDE

Pulse Engine
Obligatory Legal Stuff

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Pulse Engine
Change Log

v1.5

- Added a new playback mode called Fill in which new rate variations are triggered by note offs and pulses only play between incoming notes

- Added a new pulse note length decay that can progressively shorten or lengthen the note duration of each subsequent pulse within a cluster

- Added positive and negative values to the pulse velocity decay to both progressively increase or decrease the velocity of each subsequent pulse within a cluster

- Added an optional output display viewer to clearly see generated pulse activity (in orange) contrasted with MIDI note input (turquoise)

- Bug fixes, performance optimizations, and significant GUI improvements
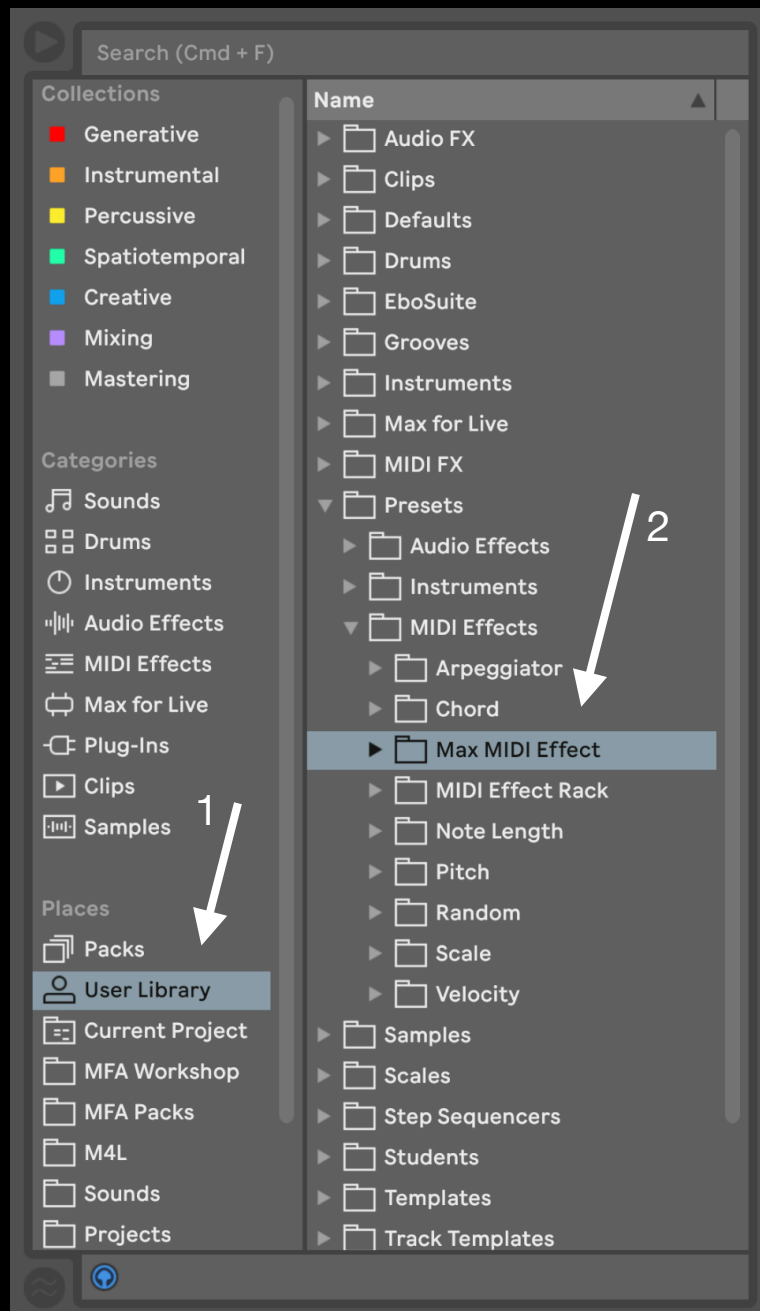
Pulse Engine
Important Info

Pulse Engine is a MIDI effect, which means it *cannot* be used on audio tracks, and *must* be placed *before* instruments.

The device requires Live Suite with Max for Live installed; we strongly recommend Live 10.1.x or higher with Max 8.1.x or higher.

Pulse Engine
Installation Instructions

To install Pulse Engine, 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 (Mac) or Explorer (Windows), drag the Pulse Engine folder, including the Presets folder, which contains the Max MIDI Effect folder and all .adv preset files, 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 it to the Max MIDI Effect subfolder of the User Library MIDI Effects folder (Arrow 2 pictured left).

*For the Pulse Engine Presets to load correctly, the included "MFA Pulse Engine.amxd" file must be copied to **both** of the following folders:*

· User Library → Presets → MIDI Effects → Max MIDI Effects
· User Library → Presets → MIDI Effects → Max MIDI Effects → Imported

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

Pulse Engine
Device Overview

A unique generative MIDI device, Pulse Engine is designed to easily produce melodic ornamentation or rhythmic augmentation of existing material — or complex musical expressions all its own.

At its most basic, you can think of it as not unlike Live's Beat Repeat device, but for MIDI. Incoming notes can probabilistically be triggered to repeat at randomized intervals within a variety of constraints. Triggered groups of note repetitions are referred to as Pulse clusters.

The pitch of these notes can be transposed manually or via incoming MIDI and optionally randomized to produce diatonic ornamental flourishes, with all notes filtered through the specified outgoing scale and key. Additive per-repeat transposition offers cascading note runs. The base generated MIDI note pitch can also be guided along a contour by the built-in LFO.

That same LFO can be used to control outgoing velocity, with an adjustable Phase to desynchronize it from note pitch LFO control. Velocity can also be randomized, within constraints, while an optional decay fades repetitions out until a new repetition is triggered.

A variety of playback modes allow Pulse Engine to be used in parallel with incoming MIDI, in conjunction with external MIDI, or simply on its own as powerful MIDI production tool.

Pulse Engine

Visual Guide

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1

Pulse Engine ▶

Blend | Free ▼

Viewer | Swing 16 ▼

2

Chance | 4n ▼

Pulse | 50 %

Variance | 50 %

Timing

Full Range ▼

16n ▼ ↔ 64n ▼

Rate | 32n ▼

🔒 x | 1 / 1

Ramp | 0 %

Swing | 0 %

Length | Rate ▼

Factor | 1.00

Decay | 0 %

Pitch

C3

Internal | G ▼

🌐 Minor B... ▼

Chaos | 0 %

Max | 24

Min | -24

Decay | 0

LFO | 0

Phase | 0

LFO | R

Free | ◀◀

Sine ▼

Frequency

0.10 Hz

Jitter

0 %

Smooth

0 %

Velocity

100

Hold | 0 %

Chaos | 0 %

Max | 127

Min | 1

Decay | 0 %

LFO | 0

Phase | 0

Note Input | C4 | 100 | Grid Off

Pulse Output | C3 | 100 | 40.7 ms

1 · These are the **Global Play** controls.

At top right is a simple Play/Pause toggle. The Throughput mode toggle allows Pulse output to be combined with incoming MIDI signal in the default Blend mode, or switched to play only triggered Pulse Engine output in Solo mode, muting incoming MIDI as a result.

The play mode chooser includes four options. In Free mode, Pulses are triggered strictly according to internal settings. In Gate mode, Pulses will only play so long as an incoming MIDI note is triggered; in Side mode, Pulses only play between incoming notes and are muted by new incoming notes. Similar to Gate mode, Note mode also only triggers Pulses with incoming note on messages — but also takes the length of incoming notes to define the Span, described below, and triggers a new possible Pulse rate variation with each note on as well. Finally, Fill mode is trigged by Note Offs, filling the gaps between notes with possible ornamentation.

At bottom are the pulse swing interval rate chooser, and the optional Viewer display toggle. Click the logo up top to flush stuck notes.

2 · Here we have our **Chance** settings. The Pulse chance determines the probability that pulse clusters will be triggered, while Variance determines the likelihood pulse clusters will be assigned new rhythmic rates.

3 · Here we find our **Timing** settings. The top chooser defines the quantization range, with options to exclude or include nearly any combination of Straight, Dotted, or Triplet rhythmic values; selecting Manual here disables variance and gives full automation control over the Rate chooser. Below this we have multiplier and division ranges, which can be locked to a specific value instead of ranging. Ramp allows gradual acceleration or deceleration within a pulse cluster.

The Rate chooser defines the current rate of generated pulses, subject to randomization unless in Manual mode. Max and Min control the fastest and slowest rates that can be randomized to. Span determines the interval at which Pulse clusters are triggered, as per the Pulse percentage slider, and at which new rates are randomized, as per the Vary slider below that. Span is disabled in Note play and Fill mode, with randomizations instead triggered by Note On or Note Off messages, respectively.

Time determines how generated note lengths are calculated. In default Rate mode, notes are the length of the current Pulse rate, multiplied by the slider value below. Fix mode allows rates to be set at a separate metrical length value than the current Rate. Chaos randomizes note lengths per cluster.

Finally, pulse Decay determines whether new pulses within a cluster will increase in note length at positive values, or progressively shorten at lower values.

4 · These are the **Pitch** controls. Up top we have a pitch dial which sets the base note for generated pulses in Internal mode. Switching to Receive mode, note pitch is transposed according to incoming MIDI, switching to a semitone dial to add or subtract from incoming note pitch accordingly.

Along with the scale and key choosers, we also have the Global toggle. In default Global mode, Live 12 or an instance of Global Hub elsewhere in the set will control Pulse Engine's Key and Scale, but if you want it to ignore Live 12 and Global Hub or save with a device preset, toggle it to pin scale and key settings locally.

Chaos determines the degree to which note pitch values will be randomized, within the range constrained by the Max and Min pitch ranges below. Decay transposes subsequent Pulse repeats up (or down, at negative values) for cascading note runs, retriggered per cluster.

Bipolar LFO amount controls the degree and direction, in semitones, that note pitches will follow the internal LFO. Phase allows you to offset the note LFO from the Velocity LFO if you want to decouple them for more dynamic use of the same LFO curve.

Pulse Engine

Visual Guide

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Pulse Engine ▶

| Blend | Free ▼ |
| Viewer | Swing 16 ▼ |

Chance	4n ▼
Pulse	50 %
Variance	50 %

3 Timing
Full Range ▼
16n ▼ ↔ 64n ▼
Rate 32n ▼
🔒 x 1 / 1
Ramp 0 %
Swing 0 %
Length Rate ▼
Factor 1.00
Decay 0 %

4 Pitch
C3
Internal G ▼
🌐 Minor B... ▼

Chaos	0 %
Max	24
Min	-24
Decay	0
LFO	0
Phase	0

5
LFO R
Free ⏪
Sine ▼
Frequency
0.10 Hz
Jitter
0 %
Smooth
0 %

6 Velocity
100
Hold 0 %

Chaos	0 %
Max	127
Min	1
Decay	0 %
LFO	0
Phase	0

7
Note Input C4 100 Grid Off

Pulse Output C3 100 40.7 ms

5 · Here we have the **LFO** settings. It can be toggled off or on to temporarily pause any assigned contours. R enables LFO re-triggering with each note on message — or use the rewind button to re-trigger the LFO manually.

The default Free mode can be toggled to BPM to switch from default Hertz rates to musical rates synchronized to Live's clock via the rate dial below. Use the shape chooser to select from seven LFO shapes; increase Jitter to add randomization to any shape, and increase smooth to ease sharp corners.

6 · These are the **Velocity** settings. Base determines the default output velocity of triggered pulses.

Chaos introduces randomness, within the Max and Min ranges above. Increase Decay amount to ramp repetitions down to lower velocities at negative values or up to higher velocities at positive values until a new Pulse cluster is triggered.

Hold allows randomization of whether notes will be held and forced legato until a new note on message is received.

LFO controls the amount of LFO motion applied to velocity values; Phase allows you to offset the Velocity LFO from the Pitch LFO if you want to decouple them for more dynamic use of the same contour.

7 · This the optional note **Display**, toggled with the Viewer button in the global settings at far left.

Note input is displayed with a cyan line and corresponding MIDI note and velocity values along the bottom, with velocity corresponding to brightness: when no note play, no line will display.

Generated pulse output is shown with an orange display line, with corresponding MIDI note, velocity, and length along the top; be advised extremely short pulses may not appear detectably.

At bottom right, you have the option to toggle an approximate octave grid off or on.

Pulse Engine
Examples
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← **EXAMPLE 1** This instance is in solo mode, so only generated Pulses will be output — but since it is in Receive mode, the pitch of Pulses will be 24 semitones below any incoming MIDI notes received. In No Straight mode, it will only produce triplet or dotted Pulse rates, varying by 77% at each note off message received, due to being in Fill mode, with note lengths 0.75 times the current rate and shortening by 23% with each new note. Note pitches will be quantized to D Phrygian, with 64% chance of randomization between 12 and -24 semitones, while adding 1 semitone to each repetition within a cluster. A 4-bar sine wave LFO is retriggered with each incoming note, with slight Jitter and a bit of smoothing to compensate. The LFO is applied to note pitch by 7 semitones with a phase offset. Velocity will randomize slightly from a base of 127 between 123 and 33 with a bit of downward decay slope applied. The LFO also alters the velocity by 42, with no phase offset.

→ **EXAMPLE 2** Here we have an instance that will ornament incoming MIDI that is also passed to the output with Blend enabled. Since it's in Side mode, Pulses will only be generated between incoming MIDI notes, producing an innate "call-and-response" with notes played. Pulses, however, are only triggered 64% of the time at a half-note span, with 81% variance between 32n and 2nt — but only producing standard note intervals (not triplet or dotted). Pulse note lengths will be randomized by 72% in Chaos mode, with a 23% chance notes will be held. Output notes — including those Blended — will be in an F Insen scale, pinned locally to the device. An 8-bar ramp up LFO applied to note pitch by 24 semitones will push the notes up from F5 with a 23% chance of randomization between -12 and 24 semitones, while an Add value of -2 subtracts two semitones with each repetition, falling downward while the LFO contour pushes up. A central velocity of 90 is slightly randomized between 111 and 11 with a positive decay gradually increasing velocities within each cluster.

← **EXAMPLE 3** Finally we have an instance set to Manual mode, meaning the Rate doesn't vary randomly, and can also be controlled via MIDI or Macro assignment, as well as modulated or automated. The Max and Min constrain these ranges to between 128n and 8n, while the note lengths are fixed to 128n. Pulses will always occur, with a 33% chance of being held for sustain, with -23% length decay shortening notes within each cluster. Pitch is controlled internally and set to A1, with 13% chance of randomization between 12 and -12 semitones within an A Aeolian (Minor) scale. The LFO is disabled. Velocity is set to a default of 100 with a 13% chance of randomization and velocities decaying downward by 9% per cluster. With a configuration like this, you might try assigning the Pitch dial and the Manual Rate selector to the same Macro knob or MIDI controller dial for highly expressive, dynamic musical gestures that would be rather difficult to produce otherwise.

Pulse Engine   FAQ

Output keeps transposing when I play MIDI notes — how can I stop this?

Disarm record input for the MIDI track containing Pulse Engine, and toggle from Receive to Internal mode.

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

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

MIDI output is ever so slightly delayed Live's transport — how do I align it?

Due to internal clock settings, in some cases Pulse Engine output can be delayed by a tiny fraction, typically less than a 512th note. If this is the case, simply record the MIDI output to another MIDI track and quantize it as desired, or adjust Live's Track Delay to align it in real-time.

The rate control is unavailable for automation and Macro or MIDI mapping — why?

When a parameter is auto-randomized, as Pulse Engine's rate control is in all timing modes except for Manual, it cannot be seen by Live's automation system. To allow rate control automation, switch the quantization selector to Manual.

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

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

The device is barely audible and seems to be playing super low notes — how do I remedy this?

In some situations, when in Receive pitch mode, Pulse Engine needs to be sent a MIDI note to play correctly, so you can simply trigger any MIDI note on that track via clip or MIDI input to get it playing back correctly.

Pulse Engine looks small — how do I make it bigger?

In the Look/Feel tab of Live's Preferences pane, simply increase the Zoom Display percentage slider to 125% or 150%. I'm getting glitches and drop-outs in Live — how can I avoid this?

In the Audio tab of Live's Preferences pane, increase the Buffer Size to at least 256 samples; we recommend 512.

I'm getting errors attempting to load the included .adv presets — how can I fix this?

For the Presets to work, you must copy the included "MFA Pulse Engine.amxd" file to both locations: 1. *User Library → Presets → MIDI Effects → Max MIDI Effects*; and 2. *User Library → Presets → MIDI Effects → Max MIDI Effects → Imported*

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