# SUBTRACTION ENGINE

MANUAL + USER GUIDE

# SUBTRACTION ENGINE

MANIFEST AUDIO

## Obligatory Legal Stuff

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## Change Log

**v2.0**

- Increased from 16 to a maximum of 64 Steps
- Polyrhythmic Rate options
- Full-featured Euclidean and Count-based programming modes with discrete Reset in conjunction with Randomization to periodically reset to a Euclidean starting point or Lock Euclidean steps
- Randomization of all Step Chances
- New Lock state toggle controls

**v1.8**

- Added an Interval divisor parameter to allow auto-randomization more frequent than one bar

**v1.7**

- Added an output mode option to either Mute disabled notes by default — or instead now send deactivated MIDI notes anywhere else in your set via the included X-Relay utility

**v1.6**

- Added a new play direction slider that you can click and drag to select between the default forward, reverse, circular, or randomized playback options

**v1.5**

- Added a new toggle that allows you to switch from the default legacy Random behavior, in which the randomization sliders would simply indicate the likelihood of randomization, to a new Weighted behavior in which the randomization sliders correspond instead to a step's likelihood of being randomized to On (at higher values) or Off (at lower values)
- Bug fixes and optimizations

**v1.2**

- Added Cycle Reset option to reset polymetric masking at intervals measured in bars
- Updated GUI for consistency with other Manifest Audio devices
- Bug fixes and optimizations

**v1.1**

- Bug fixes and optimizations

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## Important Info

Subtraction Engine is a MIDI effect, which means it cannot be used on audio tracks, and must be placed before instruments so it can process the MIDI notes being fed into them.

It also does not generate MIDI notes on its own, so be sure to trigger a MIDI Clip on the MIDI track where you've placed it — or add generative MIDI devices prior to it — so it can process MIDI information.

Finally, this device requires Live Suite with Max for Live installed. We strongly recommend Live 12.1.x or higher with Max 9.0.x or higher.

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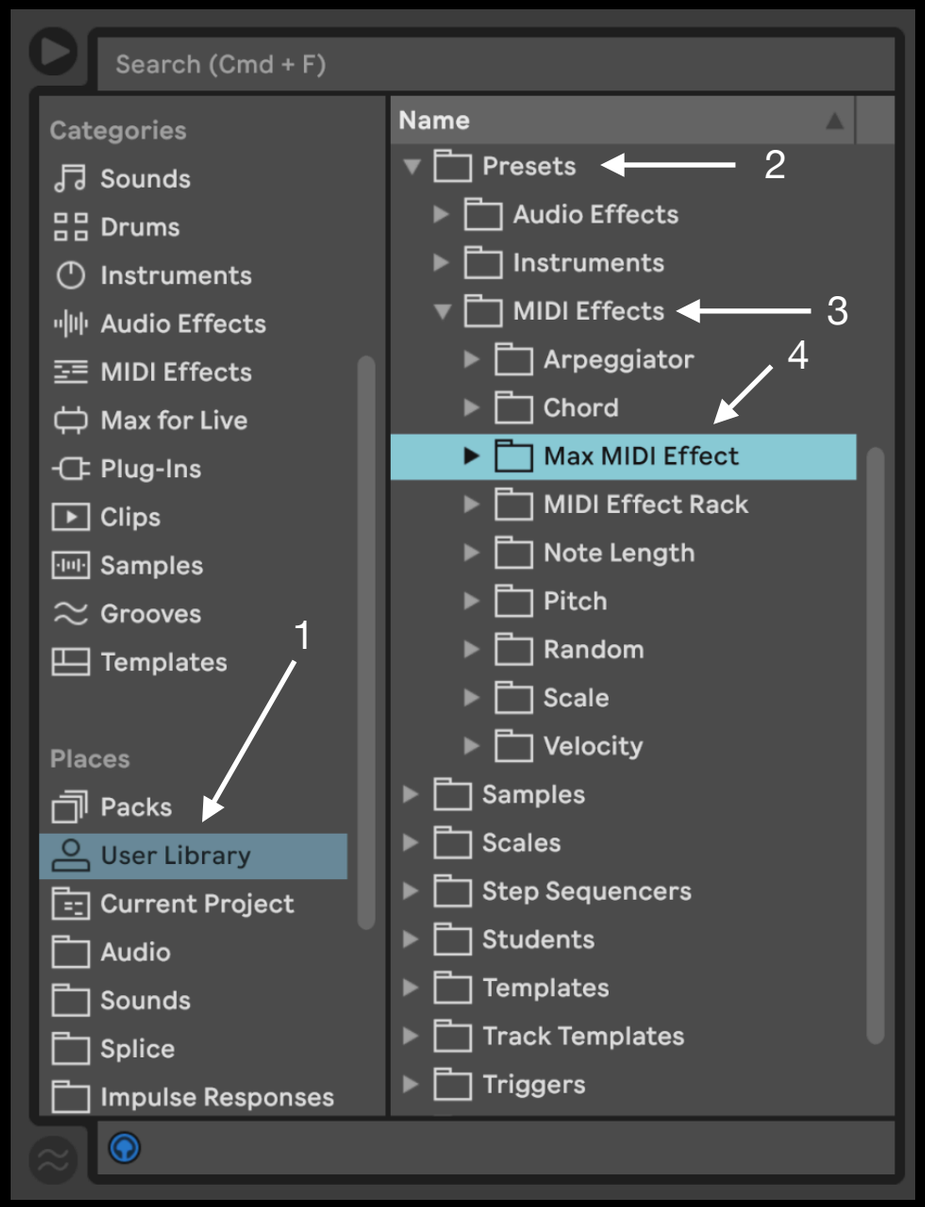
## Installation Instructions




To install Subtraction Engine, first open Live. Then navigate to the Subtraction Engine folder accompanying this PDF from the ZIP archive it arrived in.

Open Live's browser and drag the entire Subtraction Engine folder onto any appropriate location within Live's User Library. Feel free to select any location you want, but User Library (1) > Presets (2) > MIDI Effects (3) > Max MIDI Effect (4) would be ideal for Live's native folder structure.

You could alternatively move it anywhere on your hard drive, but placing it within Live's User Library ensures the Max for Live file is ingested to Live's Max for Live browser Category for easy future access.

After navigating to the Subtraction Engine folder within Live's browser, open Presets, then MIDI Effects to access the 16 .adv presets that come with the device, or open the Max MIDI Effect folder contained within Presets to access the default MFA Subtraction Engine.amxd Max for Live MIDI Effect device.

You may wish to add these to an appropriate Collection in Live's browser, or add the containing folder to your Live browser's Places. Experiment with the .adv presets, or drag the .amxd in to start fresh.

If you've placed the folder in Live's User Library, you should also find the MFA Subtraction Engine default Max for Live Device in the Max MIDI Effect folder of Live's Max for Live browser category.

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## Device Overview

Less is more: addition by subtraction is the name of the game.

Subtraction Engine is designed to mute steps of incoming MIDI drums, melodies, and harmonies in real-time to create variations, build tension, or experiment with different expressions of pre-programmed rhythmic and musical phrases.

The large Dice button randomizes up to 64 eligible Step states to instantly produce new variations on a MIDI sequence. The Global Probability Amount slider governs the chance of Step states flipping for all Steps simultaneously — but Step Probabilities can also be set individually. By reducing a Step's Probability to 0% you can Lock it, excluding it from randomization for highly programmable control.

Clicking the Manual toggle to switch into Auto Dice mode allows you to create infinitely evolving permutations of any MIDI fed into Subtraction Engine, randomizing all unlocked steps at the specified Interval, set in bars. This could be used to generate new melodic riffs at, for example, Intervals of 2 or 4, or for creating continuous variations on percussion patterns — with Locked Steps perpetually exempt.

Explore Euclidean and Count options to easily generate compelling starting points from which to periodically randomize as desired with the ability to reset to them as a home base. Then explore the lock and probability randomization controls and weighting, and route muted steps anywhere in your set. Experiment, have fun, and capture your results to new MIDI or Audio Clips by recording them to other tracks in Live.

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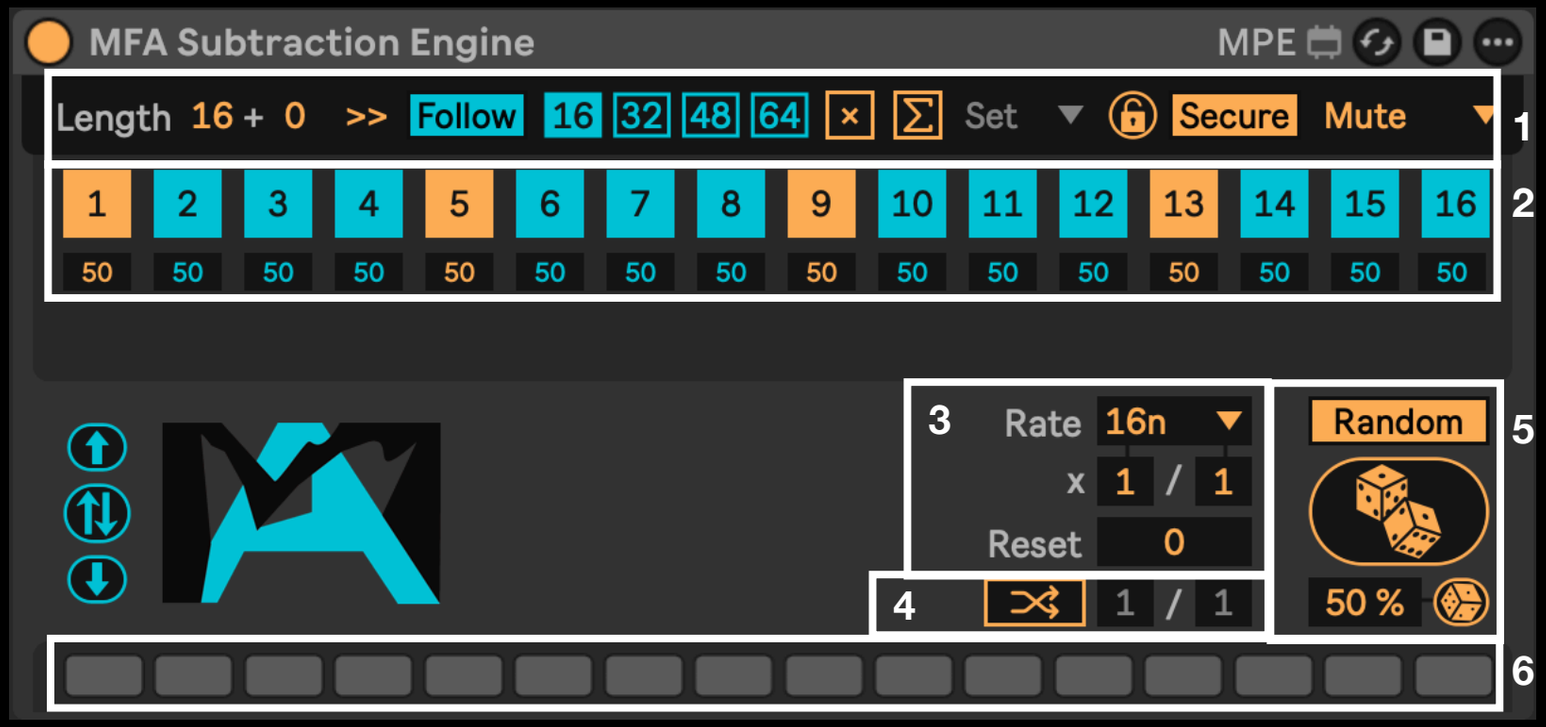
## Visual Guide




**1 ·** Along the top are global settings including pattern length in steps, with offset and direction. You can then follow the current view of 16 steps when the cycle exceeds this length, or toggle to edit to focus just on one area. Next are the count and Euclidean editing modes, which get a lock mode chooser with Veto to clear current locks with their programming, Obey to adhere to current lock settings regardless of programming, or Set to create locks. In default Secure mode, Global Randomization does not affect Locked Steps; toggled into Force mode, the Global Randomization Amount will override step locks. Unlock toggles current Locks off; in the event all steps are locked, the Unlock toggle at left goes orange to invite unlocking. Finally, you can specify whether to simply mute steps that are off or send them to one of 64 destinations with the bundled X-Relay utility.

**2 ·** Step Toggles determine whether or not MIDI notes that fall on these steps will be triggered. Yellow toggles simply indicate downbeats for easier orientation at a glance. Step Probability sliders determine the chance that a Step Toggle's state will be flipped at the next randomization trigger; setting a Step Probability to 0% will Lock it, meaning it will never randomize and instead remain in its manually programmed state, whether On or Off.

**3 ·** Grid Resolution determines the metrical resolution of the grid with polyrhythmic modulators below. Finally, Reset polyrhythmic patterns in intervals measured in bars; 0 never resets.

**4 ·** The Interval sliders determine the interval, in bars and divisions thereof, at which randomizations will be triggered in Auto Dice mode; click the shuffle arrows to toggle in or out of Auto Dice mode.

**5 ·** In default Random mode, percentage determines the likelihood of randomization; in Weighted mode, probabilities determine the likelihood of steps randomizing to On at higher values, or Off at lower values. The Global Randomization Amount slider controls the probabilities of all Steps simultaneously; the Dice button triggers randomization of all eligible, unlocked (greater than 0%) steps. In Auto Dice mode, randomizations automatically occur at each bar Interval set by the slider at left, easily creating automatic permutations. Click the Dice to randomize at any time. The Steps On (arrow up) button toggles all Steps On at once; Steps Off (arrow down) does the opposite. In between, Invert (two arrows) flips all unlocked steps to their opposite state.

**6 ·** The playhead indicator shows where Live's Transport playhead corresponds to the 64-step cycle.

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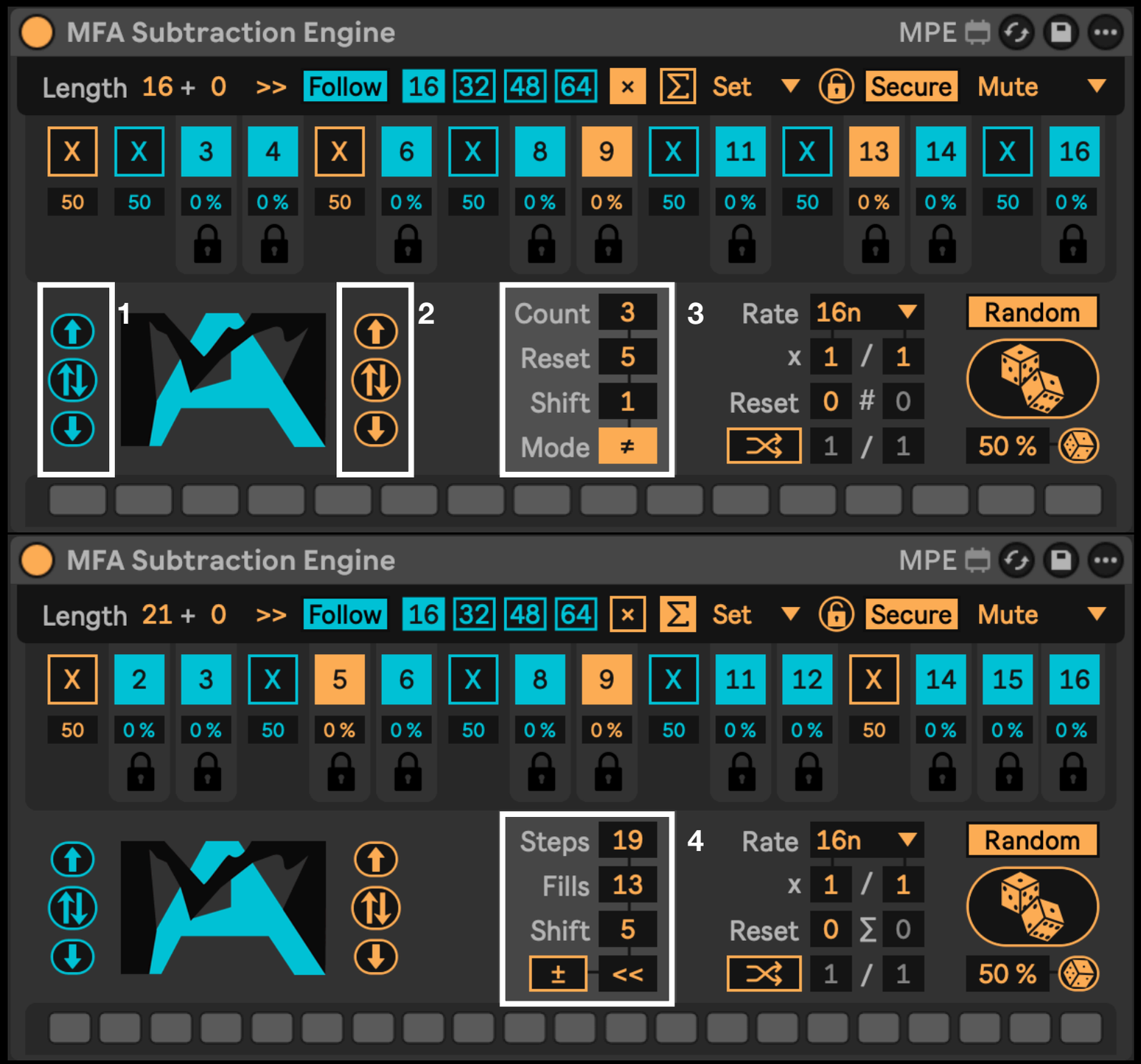


**1** · These are the unlocked step toggles: turn all unlocked steps on up top, off at bottom, or invert their current states in between.

2 · These are the locked step toggles, which only appear when one or more steps have been locked: turn all locked steps on up top, off at bottom, or invert their current states in between.

**3** · With count mode enabled, set a Count of steps to enable, Reset that count at a separate interval, Shift the count forward or backward, or invert the step states of the count with the Mode toggle.

**4** · When Euclidean mode is enabled, you can set the number of Steps in the Euclidean pattern (limited by the length of the overall pattern), the number of Euclidean steps to be Filled (limited by the number of Euclidean Steps), a Shift control to offset the count start, an inversion to flip the pattern states, and a direction control to reverse or reflect the Euclidean pattern.

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## FAQ

**Subtraction Engine isn't doing anything — what's wrong?**

This device does not generate MIDI, it only processes MIDI, so be sure MIDI is being fed into it from a Clip or a generative MIDI effect. Make sure the device is on. Then, by default, all Steps will be on as well; try turning some Steps Off to hear it take effect — or just click the Dice button to randomly generate a mute pattern.

**What if I don't want certain steps randomized?**

Simply reduce a Step's Probability slider value to 0% to exempt it from randomization, whether it be manual Dice randomization, or Auto Dice Interval randomization.

**All Steps are Locked — how do I unlock them?**

In Secure mode, the Unlock button goes orange — just click it to revert to normal behavior with all Step Probabilities set to 1% or the value of the Global Randomization slider, if you change it before clicking Unlock. Alternatively, you can also unlock steps by increasing their individual Probability sliders one by one. In Override mode, simply bring the Global Randomization Amount slider up to a non-zero value (1% or higher) and Steps will automatically unlock, as Override mode is designed to ignore step Lock functions.

**Why is the Global Randomization Probability slider unlocking all my steps?**

This is the designated behaviour in Override mode, in which Step Locks are meant to be overridden by the Global Randomization Amount slider. To adjust the Global Randomization Amount slider without overriding Step Locks, toggle the Override button back to Secure mode.

**Steps are greyed out and the loop seems off — why?**

If the Cycle value is below 16, only steps up to the maximum Cycle value will play before looping; steps outside the Cycle appear greyed out but remain available for editing. This allows for polyrhythmic step exposure to create dynamic patterns from simple ones.

**Steps aren't randomizing at the Interval I specified.**

To automatically generate new Step toggle states at specific Intervals, make sure you enable Auto Dice mode by toggling the button that says Manual.

**When I click the Steps On or Steps Off buttons, why do certain Steps remain in their previous state?**

In Secure mode, Locked Steps set to 0% will ignore the Steps On and Steps Off buttons so as to retain certain patterns while changing the state of unlocked Steps for dynamic playability. To deactivate Step Locks with these buttons, click the Secure toggle and switch to Override mode to force Locked Steps Off or On along with the unlocked Steps.

**Step Mute patterns aren't saving with my Live Set — why?**

In Auto Dice mode, unlocked Step states are hidden from Live to avoid a known conflict between Live and Max. Simply disable Auto Dice mode to enable specific patterns to be stored with your Live Set.

**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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