

Plant a sequence, and watch it grow.

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This manual covers Bloom v2 firmware v1.1.0

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# Foreword

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I have a confession to make - I hate programming sequencers. It has always been my least favorite part of modular synthesis, and electronic music in general. Why can't the sequencer program itself? That is the question that led to the original Bloom, and even more so, to the new and improved Bloom v2.

One of the most fun, and certainly the most unique aspects of modular synthesis is the "ghost in the machine" phenomenon; The feeling that you're collaborating with an instrument, rather than telling it what to do. Bloom is certainly not the first sequencer to incorporate this idea, but it did take the concept to new heights. And with the new reseed, ornament, and mod functionality on Bloom v2, sometimes it feels like Casper himself may jump out of the module and start jamming alongside you.

With all that being said, I hope you dig this module as much as we did while making it.

p.s. You also get real ratchets now :)

Andrew Ikenberry  
October 2024  
San Clemente, California



*Andrew and his wife, Catalina (she oversees building and shipping all your Qu-Bit modules) catching a breather at the Anza Borrego Superbloom event in 2017.*

## Description

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Inspire new growth in your musical garden with Bloom, a fractal sequencer capable of generating infinitely evolving melodies.

In its latest iteration, Bloom is a powerful 3-channel, 64-step CV and gate sequencer with a plethora of additional features and configurability compared to its predecessor. Apply clock-synced ratchets per step, dial in the Mutation range for random note variation, and even save and recall your Branches with your saved sequence!

Each channel now has a new output: Mod! The Mod output is a third, modulation-focused output that stays in sync with your melodic CV and rhythmic Gate outputs. Patch up dubstep-style filter madness, build sequenced amplitude or panning variations into your signal, or send a no-frills LFO that syncs perfectly with your patch!

Bloom's roots are grounded in algorithmic variation and probability. Sequences can be dynamically resized and rotated, while notes can receive ornamental musical trills or arpeggios. There are also new probabilistic controls beyond Mutate, including random step muting, ratcheting, and slewing!

Bloom's front panel now features a Reseed button, which dice-rolls a whole new sequence for you, as well as a MIDI output that sends all sequence data through a 3.5mm TRS MIDI jack!

Beyond the front panel controls, the USB drive and Narwhal brings even greater flexibility to Bloom. Set custom settings, export and import sequences to and from your Bloom, and so much more.

Plant the seeds of your next patch with Bloom.

- 3-channel, 64-step-per-channel fractal sequencer
- Mod output for sequenced, non-melodic CV modulation
- Per-step modifiers including ratchets, mutes, slew, trills, and more
- MIDI out jack to sequence any MIDI-equipped device
- Based on the Daisy platform

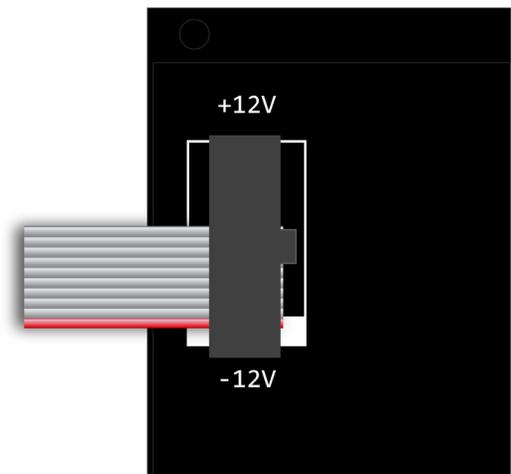
## Module Installation

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To install, locate 18HP of space in your Eurorack case and confirm the positive 12 volts and negative 12 volts sides of the power distribution lines.

Plug the connector into your case's power supply unit, keeping in mind that the red band corresponds to negative 12 volts. In most systems, the negative 12 volt supply line is at the bottom.

The power cable should be connected to the module with the red band facing the bottom of the module.



# Technical Specifications

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## General

- Width: 18HP
- Depth: 22mm
- Power Consumption: +12V=137mA, -12V=1mA, +5V=0mA

## CV Outputs

- Range: 0V to +5V
- Tracking: 1V/oct

## Gate Outputs

- Amplitude: +5V

## Controls

- Knobs
  - Resolution: 16-Bit (65,536 distinct values)
- CV Inputs
  - Resolution: 16-Bit (65,536 distinct values)

## USB Port

- Type: A
- External Power Draw: up to 500mA (for powering external devices via USB). Please note that additional power drawn from the USB must be considered within your PSU's total current consumption.

## Stored Settings

Without USB inserted:

- Tune Mode Page
- Knob Mode Page
- Knob Mode States
- Channel
- Page
- LED Brightness
- Scale
- Root
- Order

With USB inserted:

- Channel Sequences (w/ Autosave ON)
- Patterns
- Narwhal Settings

## Recommended Listening

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Wolfgang Amadeus Mozart - Musikalisches Würfelspiel

[YouTube](#)

Steve Reich - Variations For Winds, Strings, and Keyboards

[YouTube](#)

Brian Eno - 1/1

[YouTube](#)

Milton Babbitt - Composition For Synthesizer

[YouTube](#)

## Recommended Reading

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**Fractal**

[Wikipedia](#)

**Benoit Mandelbrot** - Fractals: Form, Chance, and Dimension

[Goodreads](#)

**Gerhard Nierhaus** - Algorithmic Composition: Paradigms of Automated Music Generation

[Goodreads](#)

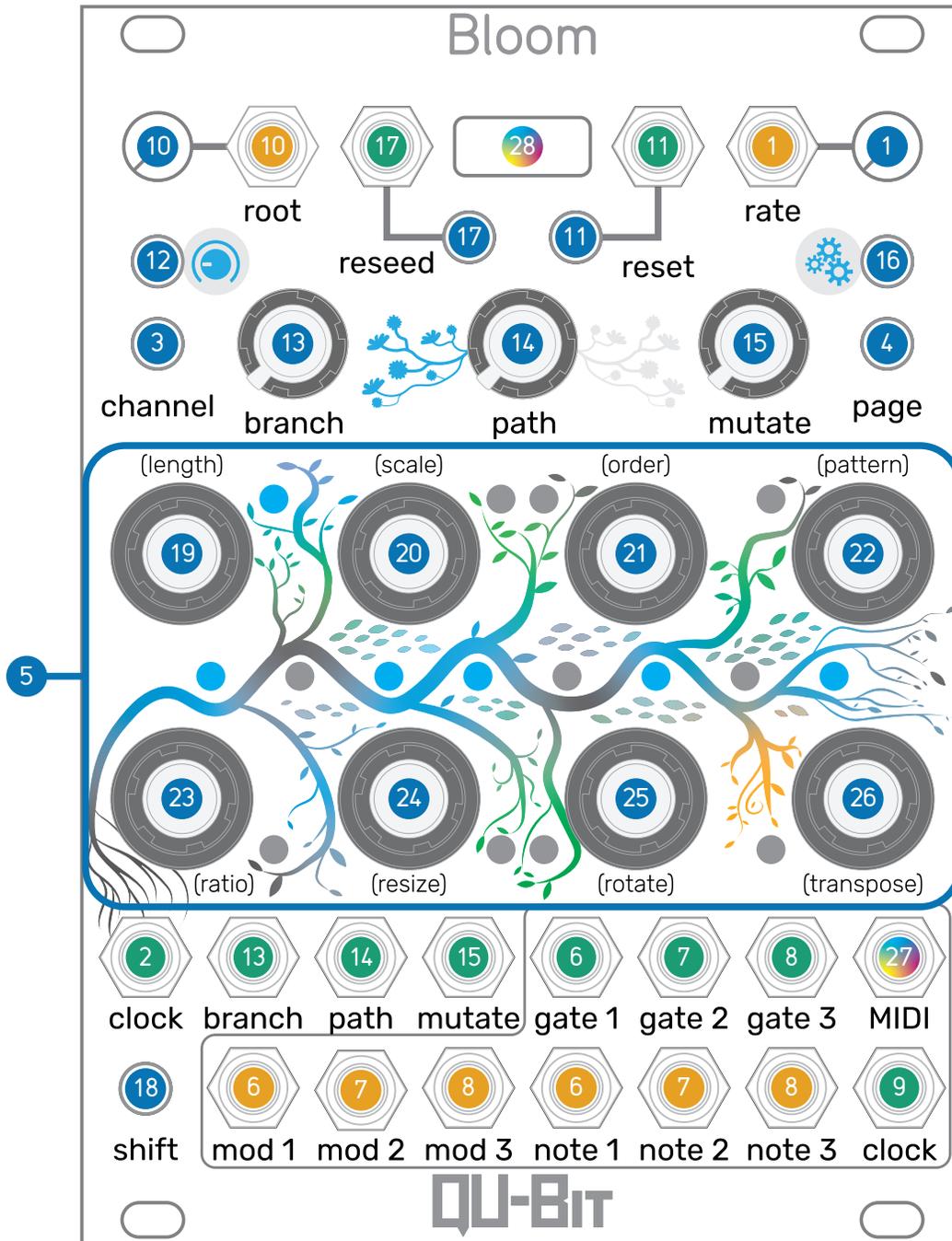
**John Maurer** - A Brief History of Algorithmic Composition

[Stanford](#)

**Manfred F. Bukofzer** - Music In The Baroque Era - From Monteverdi To Bach

[Goodreads](#)

# Front Panel



 Tactile Controls

 CV I/O

 Gate I/O

 MIDI/USB

# Functions: Primary Controls

## 1. Rate

- The **Rate knob** controls how fast **Bloom's internal clock rate** runs. This clock drives the 3 channel sequences. The clock signal is off when the Rate knob is fully to the left, and the maximum clock rate at x1 speed is 60Hz when the Rate knob is fully to the right.

**Rate CV Input** range: -5V to +5V

- *Did You Know?* When the Rate knob is fully to the left, Bloom can accept an external clock signal for driving its sequences!

## 2. Clock

- The **Clock Input** uses an **external clock source** to drive Bloom's sequences. In order to use an external clock, the Rate knob must be fully to the left or at 0V. The clock rate is indicated by the right bouquet LED:



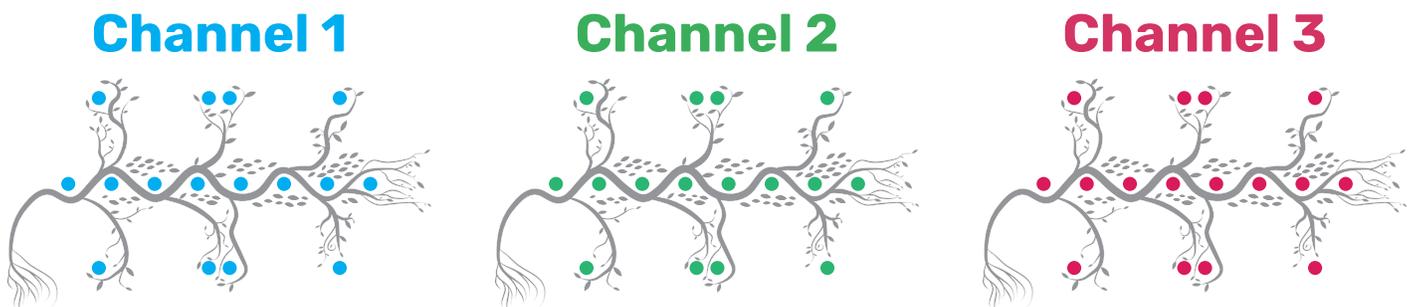
The default PPQN for the clock input is 1. The PPQN can be adjusted for a tighter sync on clock-multiplied sequences using Narwhal!

Input PPQN Values: 1, 4, 8, 24

- **Clock Gate Input** threshold: +0.4V

## 3. Channel

- The **Channel button** cycles through **which of the 3 sequence channels can be edited** by the front panel controls. The currently selected channel is the "focused" channel, and is indicated by the Trunk Sequence and Page LED colors, seen below:



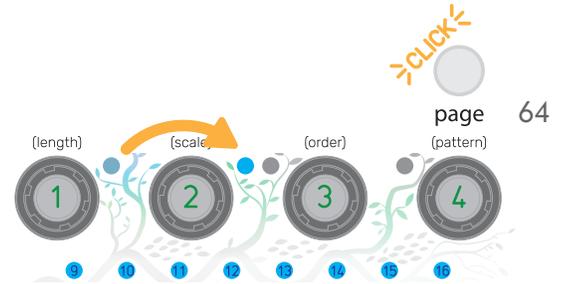
**Global Editing:** Hold the Channel button down when performing any knob turn or button press to apply the change to all three channels!

# Functions: Primary Controls

## 4. Page

- The Page button advances which 8-step section of the step sequence the step encoders edit.

Pressing the button will advance to the next page in the sequence, indicated by one of the 8 page LEDs.

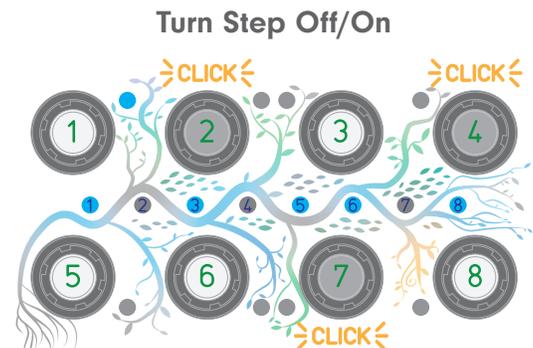


**Page Increment:** By default, Page will only cycle the active pages set by the sequence length. Bloom can cycle all Pages regardless of length via Narwhal.

## 5. Step Encoders

- The **step encoders** are the main editing interface **for programming sequences on Bloom**.

The steps run horizontally, with the Step 1 encoder at the top left, and the Step 8 encoder on the bottom right. For example, in the default Tune Mode, turning the encoders will adjust the pitch for its step, while clicking an encoder down will toggle whether or not its note and gate signal are active.



*Did You Know?* More complex sequence editing can be achieved using the Knob and Tune Modes. Check out each section to learn how to incorporate generative sequence branches, ratcheting and slew per step, ornamentation, and more!

## 6. Channel 1 Outputs

- Outputs the sequence data generated from channel 1.
- **Note 1:** Outputs the note frequency set by Channel 1. The voltage from Note 1 tracks 1V/oct across 5 octaves and is programmed by the Note and Slew Tune Modes. See the Tune Mode section to learn more!
- **Gate 1:** Outputs the gate signal set by Channel 1. The gate signal defaults to 50% duty cycle and outputs a 5V signal, and is programmed by the Gate Length and Ratchet Tune Modes.
- **Mod 1:** Outputs the modulation signal set by Channel 1. The output tracks 1V/Oct and is configurable using the Mod Output Tune Mode. See the section to learn more about utilizing this versatile CV output!

# Functions: Primary Controls

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## 7. Channel 2 Outputs

- Outputs the sequence data generated from channel 2.
- **Note 1:** Outputs the note frequency set by Channel 2. The voltage from Note 1 tracks 1V/oct across 5 octaves and is programmed by the Note and Slew Tune Modes. See the Tune Mode section to learn more!
- **Gate 1:** Outputs the gate signal set by Channel 2. The gate signal defaults to 50% duty cycle and outputs a 5V signal, and is programmed by the Gate Length and Ratchet Tune Modes.
- **Mod 1:** Outputs the modulation signal set by Channel 2. The output tracks 1V/Oct and is configurable using the Mod Output Tune Mode. See the section to learn more about utilizing this versatile CV output!

## 8. Channel 3 Outputs

- Outputs the sequence data generated from channel 3.
- **Note 1:** Outputs the note frequency set by Channel 3. The voltage from Note 1 tracks 1V/oct across 5 octaves and is programmed by the Note and Slew Tune Modes. See the Tune Mode section to learn more!
- **Gate 1:** Outputs the gate signal set by Channel 3. The gate signal defaults to 50% duty cycle and outputs a 5V signal, and is programmed by the Gate Length and Ratchet Tune Modes.
- **Mod 1:** Outputs the modulation signal set by Channel 3. The output tracks 1V/Oct and is configurable using the Mod Output Tune Mode. See the section to learn more about utilizing this versatile CV output!

## 9. Clock Output

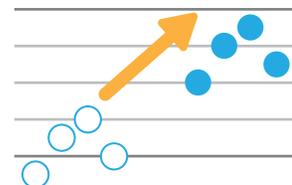
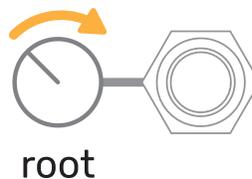
- Outputs a 50% duty cycle gate signal set to the clock rate. If Bloom is using an external clock, the Clock Output will match the rate of the external clock.

The default PPQN for the clock output is 1. The PPQN can be adjusted for a tighter sync on clock-multiplied sequences using Narwhal! Output PPQN Values: 1, 4, 8, 24

**Clock Output** threshold: +5V

## 10. Root

- The Root knob diatonically transposes the active sequence within its scale. This means that the sequence will always stay in key when using Root.



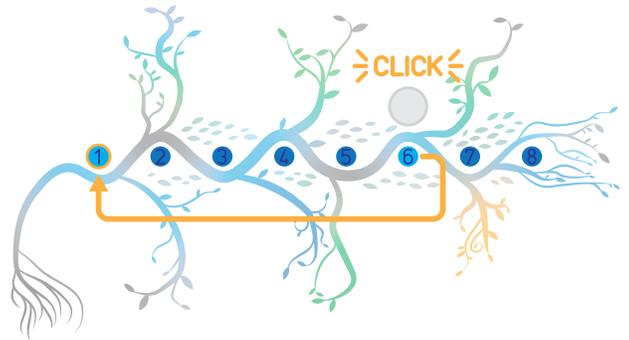
**Root CV Input** range: 0V to +5V

# Functions: Primary Controls

## 11. Reset

- The **Reset button** and gate input, when activated, will **set all sequences back to the first step**.

When using the internal clock, the reset happens instantly. When using an external clock, the reset happens on the next clock pulse received at the Clock Input.



**Reset Tune Modes:** Reset can also be used to reset Tune Mode data! Hold the Tune Mode button down and press Reset to set the Tune Mode to its default values. To reset all Tune Modes at once, while keeping the macro sequencer settings, we can hold the Shift button and the Reset button for a few seconds!

**Reset Gate Input** threshold: 0.4V

## 12. Knob Mode

- The Knob Mode button cycles through the different available controls on the Branch, Path, and Mutate knobs. There are 3 modes in total, Default (**blue**), Micro Mutate (**green**), and Performance (**rose**), each with both different and similar features to the original three knob functions.

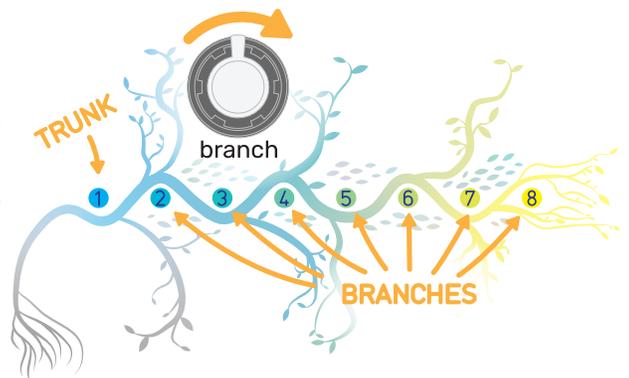


### Default Mode

## 13. Branch

- The **Branch knob** in default mode **sets the amount of generative branches that will play after the trunk sequence**. Each branch will match the length of the trunk, and will perform one of the following transformations on the previous branch:

- Reverse (reverse playback of the previous branch)
- Inverse (inverts the previous branch)
- Transpose (transposes the previous branch up to one octave up)
- Mutate (mutates step data in relation to the previous branch)
- Randomize (100% random sequence)



Bloom can generate up to 7 branches after the sequence. That means with a full 64-step sequence Bloom can use branches to create a 512-step generative sequence!

- **Branch CV Input** range: -5V to +5V

**Regenerate Branches Filter:** Branches are regenerated each time the trunk sequence receives an edit. Using Narwhal, we can filter out which edits do not regenerate the branches!

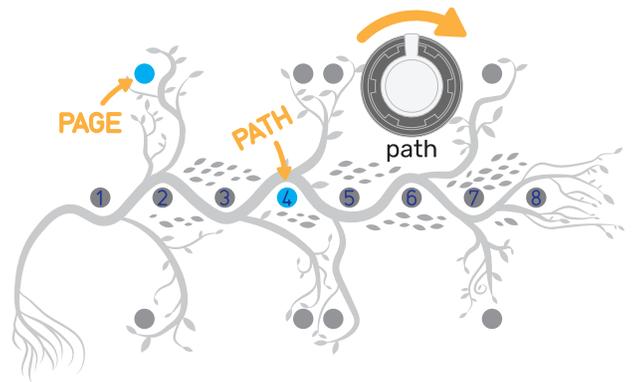
# Functions: Primary Controls

## 14. Path

- The **Path knob** in the default mode **chooses the order in which the generative branches are navigated**.

The amount of paths available is relative to the number of active branches. At max branches, there are 128 different paths you can take!

- **Path CV Input** range: -5V to +5V



## 15. Mutate

- The **Mutate knob** in the default mode **sets the probability of changing the note or gate state of the active sequence step**. No mutations occur when the knob is fully to the left.

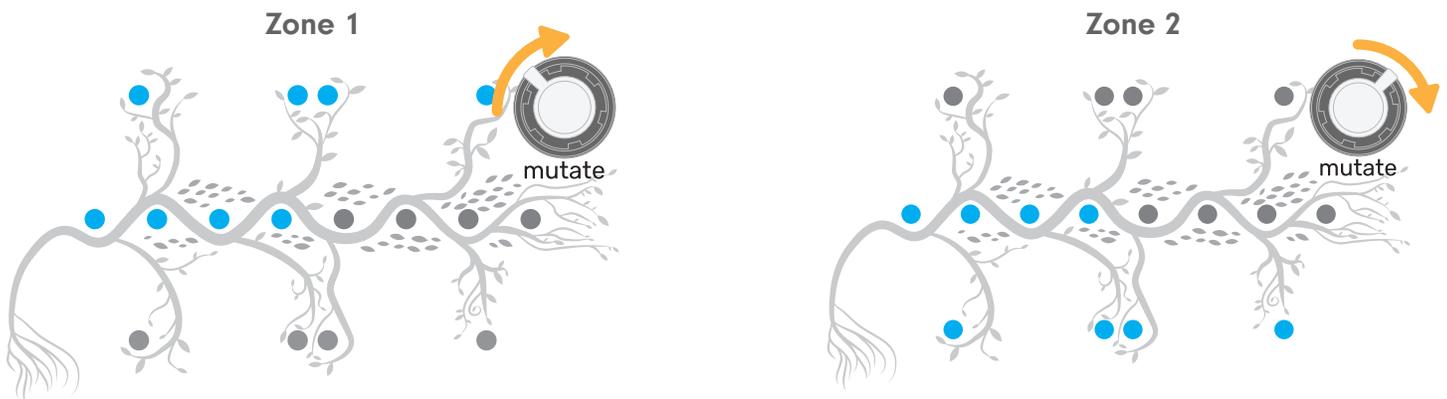
The knob has two zones that include different conditions.

Zone 1 (the left half of the knob) only adds the probability of note mutation. 100% note mutation occurs at the end of this zone.

Zone 2 (the right half of the knob) introduces the probability of gate state and length changes.

The probability of a pitch mutation drops back to a fixed 75% at the beginning of Zone 2. The gate state and length mutations range from 0% to 100% across this zone.

When a gate mutation is triggered, there is always a 70% chance the gate length will be modified, and 30% chance that the step will be enabled or disabled.



- **Mutate CV Input** range: -5V to +5V



## Micro Mutate Mode

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The Micro Mutate knob mode changes the Branch, Path, and Mutate knobs to set the probability of changing different aspects of the sequence. The controls in this knob mode are *destructive*, meaning that the mutations permanently change the step data.

### 13. Ratchet Mutation

- The **Branch knob** in the micro mutate mode **sets the probability of changing the ratchet amount for the active step.**

No ratchet mutations happen when the knob is fully to the left, and each step will receive a new ratchet amount when the knob is fully to the right.

### 14. Slew Mutation

- The **Path knob** in the micro mutate mode **sets the probability of changing the slew amount for the active step.**

No slew mutations happen when the knob is fully to the left, and each step will receive a new slew amount when the knob is fully to the right.

### 15. Mod Mutation

- The **Mutate knob** in the micro mutate mode **sets the probability of changing the Mod Output value for the active step.**

No changes happen when the knob is fully to the left, and each step will receive a new Mod Output value when the knob is fully to the right. See the Mod Output section for more information on the different signals it can output!

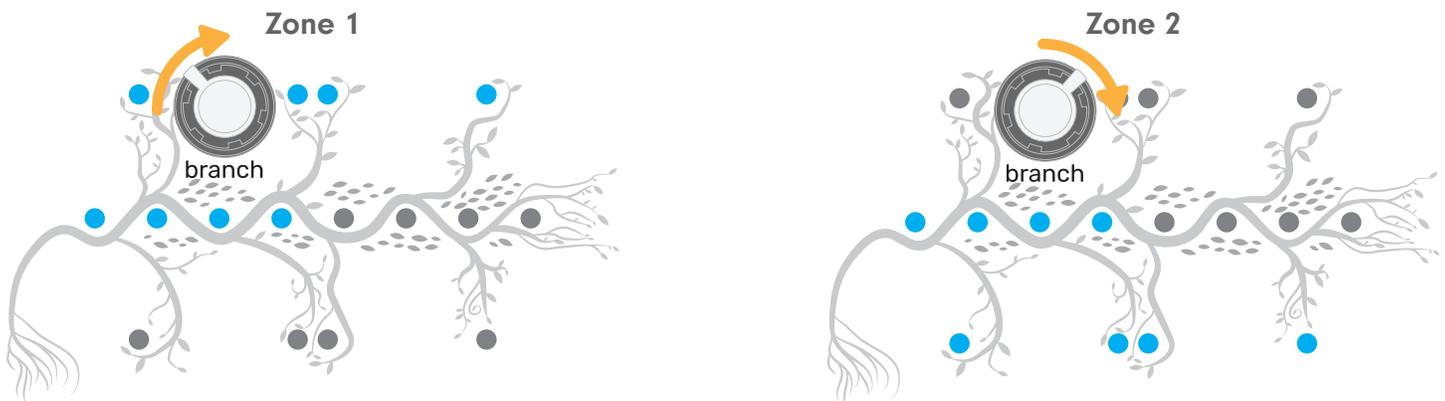
# Functions: Primary Controls

## Performance Mode

The Performance knob mode changes the Branch, Path, and Mutate knobs to set the probability of changing different aspects of the sequence as temporary effects.

The controls in this knob mode are *non-destructive*, meaning that the mutations change the step data only for that one instance. Turning a control off will return that aspect of the sequence back to original values.

Each knob has 2 zones of effect, with the first zone being a probabilistic range and the second zone being a fixed amount of the effect per step.



### 13. Ratchet Effect

- The **Branch knob** in the performance mode **sets the probability and multiple of a ratchet effect for the active step.**

Zone 1 (the first half of the knob) is a probabilistic range of random ratchet amounts per step. The max possible ratchet amount in this zone is x6 (16th note triplets).

Zone 2 (the second half of the knob) sets a fixed amount of ratchets for all steps. The ratchet amount is indicated by the trunk LEDs.

### 14. Slew Effect

- The **Path knob** in the performance mode **sets the probability and amount of a slew effect for the active step.**

Zone 1 (the first half of the knob) is a probabilistic range of random slew amounts per step.

Zone 2 (the second half of the knob) sets a fixed amount of slew for all steps.

# Functions: Primary Controls

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## **15. Mutation Effect / Ornamentation**

- The **Mutate knob** in the performance mode **sets the probability for a step note or gate state and length effect to occur.**

Zone 1 (the first half of the knob) is a probabilistic range of random pitch, gate state and length changes per-step.

Zone 2 (the second half of the knob), introduces ornamentation, arpeggiation, and rhythmic effects to the sequence.

**Ornamentation:** The ornamentation effect on Mutate applies varying classical flourishes and embellishments to the sequence.

**Ornamentation/Mutation Ratio:** These sequence effects are applied on the probabilistic scale across the ornamentation range, from 50% to 100%. If an ornamentation doesn't happen, then there is an equal percentage chance that a note mutation (non-destructive) will happen!

**Two-Step Ornamentations:** From 50%-67% of the knob range (first three LEDs on the Ornamentation Trunk LED UI), Bloom has a chance to apply any of the two step flourishes below:

- Anticipation - Plays the next step one eighth note early
- Suspension - Play the previous step for one eighth note before playing the current step's value.
- Syncopation - Rest for one eighth note, and then play the current step's note
- Octave Up - Plays the octave above the current note one eighth note later than the current step
- Fifth Up - Plays the fifth above the current note one eighth note later than the current step
- Half Turn Toward - An eighth note that goes one scale degree beyond the next note in the direction of the next note
- Half Turn Away - An eighth note that goes one scale degree away from the current note based on the direction of the next note.

**Four-Step Ornamentations:** From 68%- 84% of the knob range (second set of three LEDs), Bloom will add more complex four step ornamentations to the possible mutations.

- Run Toward - generates four notes in the direction of the next step.
- Run Away - generates four notes in the direction away from the next step.
- Turn - plays the current note, then one note up, one note down, then the current note again.
- Arp Toward - generates a four note arpeggio from the current step towards the next step.
- Arp Away - generates a four note arpeggio from the current step away from the next step.
- Mordent Up - quickly alternates between the current note and the note above.
- Mordent Down - quickly alternates between the current note and the note below.

**Max Ornamentation:** The last portion of the knob range (last two LEDs) applies all possible ornamentations, and includes 8 step Trills!

# Functions: Primary Controls

## 16. Tune Mode

- The **Tune Mode** button **cycles through the different available step editors for the trunk sequence**. There are 5 modes:

- Note (**blue**)
- Gate Length (**green**)
- Slew (**gold**)
- Ratchet (**purple**)
- Mod (**white**)

The active Tune Mode is indicated by both the Tune Mode LED and Tree LED colors, and cycling to a new Tune Mode will play a brief LED animation to indicate what the mode does to the sequence!

### Note

- The default Tune Mode is **Note**, which **edits the 1V/oct pitch data for a given step**. Turning a step encoder to the right will increase the pitch value, while turning the step encoder to the left will decrease the pitch value.



The pitch ranges 5 octaves of notes, and the chosen step will act as the reference point for generative aspects of Bloom, including branches, mutations, and sequence effects.

When changing the pitch of a step with an encoder, the Trunk and Page LEDs will indicate which step and octave the pitch is set to relative to the root, and in the selected scale.

### Gate Length

- The **Gate Length** Tune Mode **adjusts the gate signal width per-step**. Turning a step encoder to the right will increase the gate length, while turning a step encoder to the left will decrease the gate length. The Trunk LED will indicate the gate width with the 8 main LEDs.

The maximum gate length value is 100%, and will tie the gate signal to the next step. The next step will not re-trigger with a tie, but will update its note pitch. The minimum gate signal is set to 5% of the clock rate.

*Did You Know?* Gate lengths will auto-adjust with clock rate changes, ratchets, and other sequence effects!



# Functions: Primary Controls

## Slew

- The **Slew** Tune Mode sets the amount of portamento on a step from the previous step's Note value.

Turning an encoder to the right will increase the slew time, while Turning the encoder to the left will decrease the slew time. Slew is off when the Trunk LEDs are off.

The portamento effect begins at the start of the step, and slides into the new note over the set slew time.



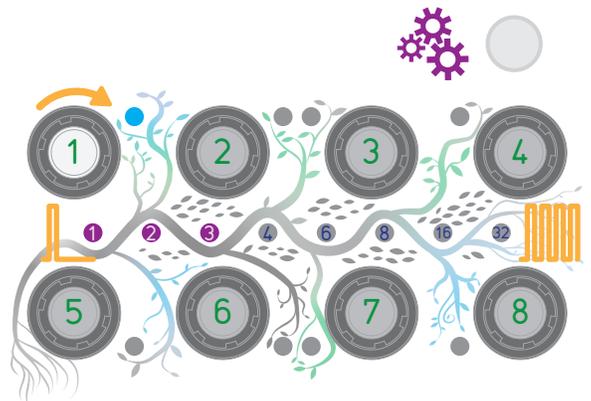
## Ratchets

- The **Ratchets** Tune Mode sets the step encoders to adjust the amount of repeated gate outputs evenly placed through the step's duration. *Oh thank god real ratchets finally.*

Turning a step encoder to the right will increase the amount of gate ratchets, while turning a step encoder to the left will decrease the ratchet amount.

**Ratchet Amounts (via the trunk LEDs):**

● | ● | ● | ● | ● | ● | ● | ●  
x1 | x2 | x3 | x4 | x6 | x8 | x16 | x32



## Mod

- The **Mod** Tune Mode sets the per-step CV Modulation that is sent to the Mod Output jack.

Turning a step encoder will change the CV value for that step. The values are also dependent on which Mod Mode is active for the channel. See the next page for a run down of the different Mod Modes.

**Mod CV Output Range:** 0V to 5V

# Functions: Primary Controls

## Mod Output Modes

- The Mod Output has 4 available output modes, each with a different take on utility CV signals.

The different outputs can be cycled through for each channel by holding the Shift button and pressing the Knob Mode button. The Knob Mode LED while holding Shift shows which Mod Output mode is active for the focused channel.



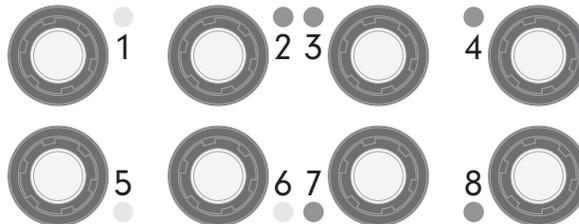
## Shapes

- Shapes** Mod mode is a **sequenced modulation builder**, allowing for complex, ratchet-able LFO shapes per-step that are in-sync with the channel sequence.

Select one of the 8 available shapes with a step encoder. If a step is off, Mod will output 0V.



The Shapes table below is a reference for the LED UI when navigating the possible shape subdivisions. The Page LEDs are used to indicate which subdivision is active, with the 8 trunk LEDs still acting as shape selectors.



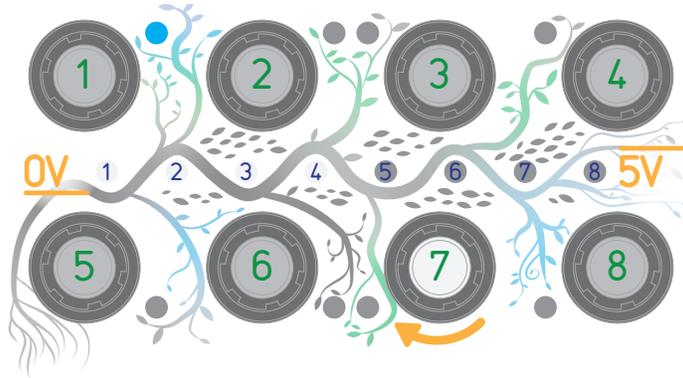
Page LEDs Indicator	Mod Rate (relative to step)	Iteration
No LEDs	X1	Oneshot
1	X2	Oneshot
1, 2	X2	Ratchet
1, 2, 3	X3	Oneshot
5	X3	Ratchet
1, 5	X4	Oneshot
1, 2, 5	X4	Ratchet
1, 2, 3, 5	X8	Ratchet
5, 6	/2	First half of shape
1, 5, 6	/2	Second half of shape
1, 2, 5, 6	/4	First quarter of shape
1, 2, 3, 5, 6	/4	Second quarter of shape
5, 6, 7	/4	Third quarter of shape
1, 5, 6, 7	/4	Fourth quarter of shape
1, 2, 5, 6, 7	X1	Fixed voltage 0V to 2.5V
1, 2, 3, 5, 6, 7	X1	Fixed voltage 2.5V to 5V

# Functions: Primary Controls

## Velocity

- **Velocity Mod mode** sets a fixed CV value between 0V and 5V and outputs it on the assigned step.

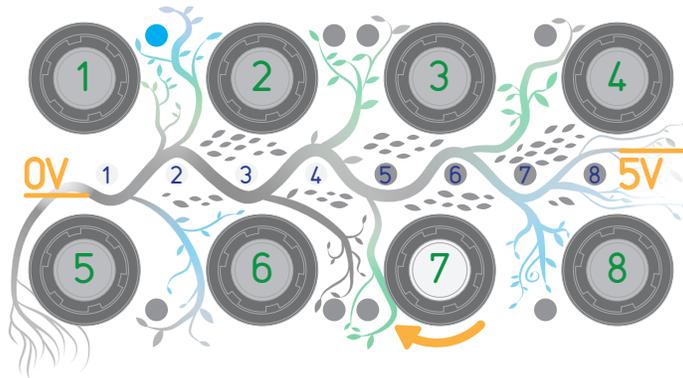
Turning a step encoder to the right will increase the voltage value for that step, while turning the encoder to the left will decrease the value. If a step is off, Mod will output 0V.



## Smooth

- **Smooth Mod mode** sets a CV value between 0V and 5V and smoothly transitions between the values.

Turning a step encoder to the right will increase the voltage value for that step, while turning the encoder to the left will decrease the value. If a step is off, Mod will smoothly transition to 0V.



## Envelope

- **Envelope Mod mode** controls a simple **Attack/Decay envelope** with peak offset control per-step.

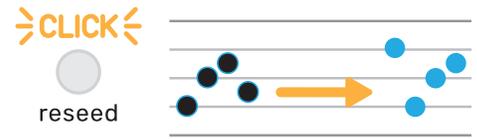
Turning the step encoder will run through the morphing attack and decay stages of the envelope, with a sharp plucky envelope on the far left, to an equal parts attack and decay in the middle, to a reverse plucky envelope on the far right. If a step is off, Mod will output 0V.



# Functions: Primary Controls

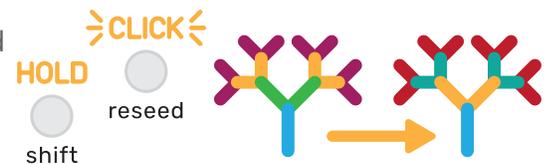
## 17. Reseed

- The **Reseed** button and gate input are a **dice roll switch for randomizing all tune modes for the focused channel!** This is a great feature for getting an interesting starting point for a sequence quickly.



- **Reseed Gate Input** threshold: 0.4V. The gate input will only reseed the focused channel.

**Reseeding branches:** Sometimes Bloom doesn't quite generate the branches you are looking for. Luckily, Reseed can help us regenerate new ones!



To regenerate branches, hold the Shift button and press the Reseed button.

**Reseeding individual tune modes:** If you are looking to change only one Tune Mode at a time with reseed, you can!

To reseed individual tune modes, first select the tune mode you want to dice roll, then hold the Tune Mode button and press Reseed.

This will reseed the Tune Mode data for the 8 steps currently selected by the Page button. To reseed the Tune Mode for all 64 steps, hold both Shift and Tune Mode down, then press Reseed!

**Global Reseed:** Yes, you can reseed all 3 channels at once! Just hold the Channel button down, then press Reseed. All 3 channels will dice-roll their Tune Mode values!

*Did You Know?* You can use Narwhal to set which Tune Modes Reseed will affect! Head to the Narwhal section to find out more!

## 18. Shift

- The Shift button provides access to a host of secondary functions and conditional settings found on Bloom. When the Shift button is pressed, the Tree LEDs will turn **red**, indicating that the secondary functions are active on the front panel.

We've seen Shift mentioned a handful of times up until this point in the manual, but it really comes into play for the next controls we will be covering.

# Functions: Primary Controls

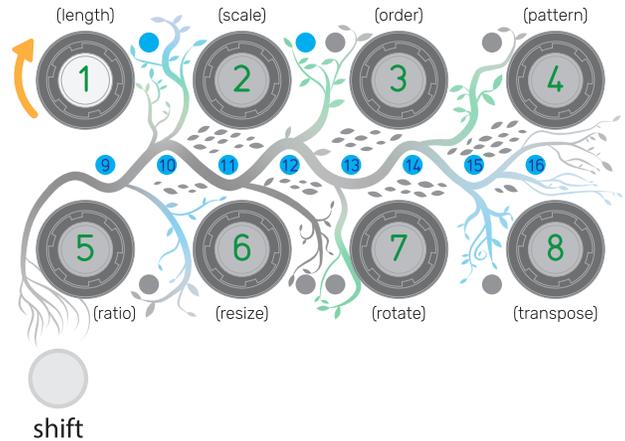
## 19. Length

- The **Length** step encoder **adjusts how many steps are in the trunk sequence**, from 1 step to 64 steps.

Holding the Shift button and turning the Length encoder to the right will increase the amount of steps in the sequence, while turning the encoder to the left will decrease the amount of steps.

**Length and Pages:** Once the sequence length is beyond 8 steps, you may notice that the sequence page does not advance with the sequence. Pressing the Page button will advance the encoders to the next set of 8 steps for editing.

The Page button will cycle through the active pages (number of pages available, set by Length) for editing, but you can decouple Page from Length using Narwhal!



## 20. Scale

- The Scale step encoder selects the quantized scale for the focused channel sequence and Root knob.

Holding the Shift button and turning the Scale encoder will select between 8 quantizations. The currently available quantizations from left to right on the trunk sequence LEDs are:

- Chromatic
- Major
- Minor
- Major Pentatonic
- Minor Pentatonic
- Harmonic Minor
- Whole Tone
- Unquantized

The unquantized selection increments 25 cents each encoder step.

# Functions: Primary Controls

## 21. Order

- The **Order** step encoder **selects the playback order of the trunk sequence and branch sequences**. Holding the Shift button and turning the Order encoder will select between 8 different playback options.

**Forward:** Plays the sequence in an incrementing direction.



**Reverse:** Plays the sequence in a decrementing direction.



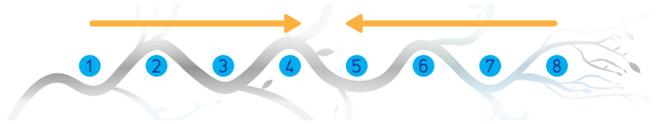
**Pendulum:** Plays the sequence alternating between forward and reverse.



**Random:** Shuffles the sequence in a random order, then plays it back. Each pass regenerates a new random order.



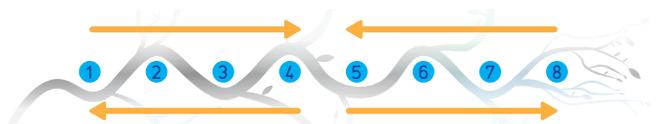
**Converge:** Plays the sequence from the outer most notes to the inner most, jumping back and forth relative to the center point.



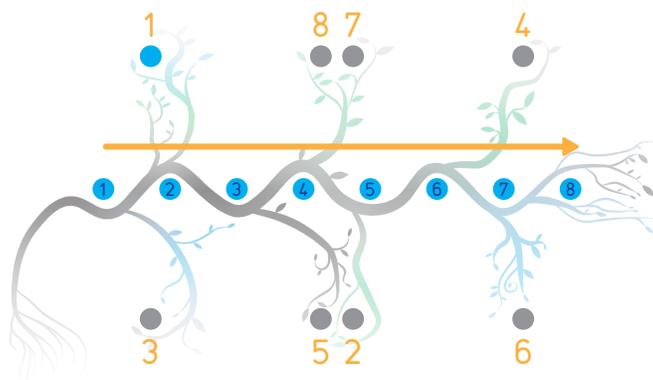
**Diverge:** Plays the sequence from the inner most steps to the outer most, jumping back and forth relative to the center point.



**Converge & Diverge:** plays the sequence alternating between converging and diverging orders.



**Page Jump:** Randomly jumps to the start of a new sequence page when the sequence length is complete.



# Functions: Primary Controls

## 22. Pattern

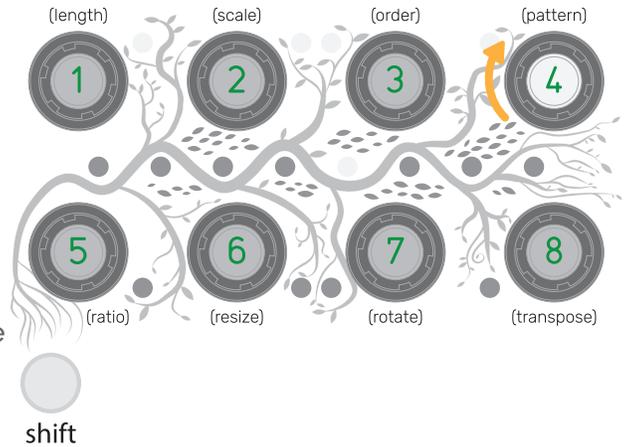
- The Pattern step encoder navigates the pattern bank on Bloom. Each slot can be a fully saved sequence, including any branches/paths, and per-step editors that may be included.

**Selecting a Pattern:** To select a pattern, hold the Shift button and then turn the Pattern encoder. There is a global pattern bank with 16 slots to select by turning the Pattern encoder.

**Saving a Pattern:** To save the focused channel sequence to a pattern slot, select the slot you'd like to save to, then hold the Pattern encoder down for 3 seconds. An LED animation will play, indicating that the sequence is saved to the slot!

**Loading a Pattern:** To load a pattern from a slot into the focused channel, select the slot you'd like to load from, then click the Pattern encoder. A brief LED animation will play, indicating that the sequence loaded!

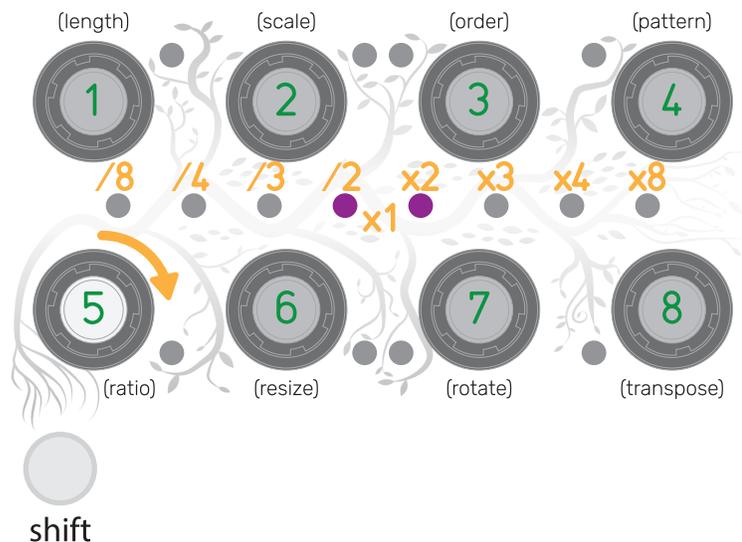
*Did You Know?* Patterns are saved as files to the USB drive. Store them externally, or share them with other Bloom v2 users!



## 23. Ratio

- The Ratio step encoder selects the rate multiplier for the focused channel, relative to either the internal or external clock source.

Holding the Shift button and turning the Ratio encoder to the right will increase the multiplier, while turning the encoder to the left will decrease the multiplier into fractional ratios.



# Functions: Primary Controls

## 24. Resize

- The **Resize** step encoder **algorithmically expands or shrinks the trunk sequence within the 64 steps.**

Holding the Shift button and turning the Resize encoder to the right will expand the sequence, while turning the encoder to the left will shrink the sequence.

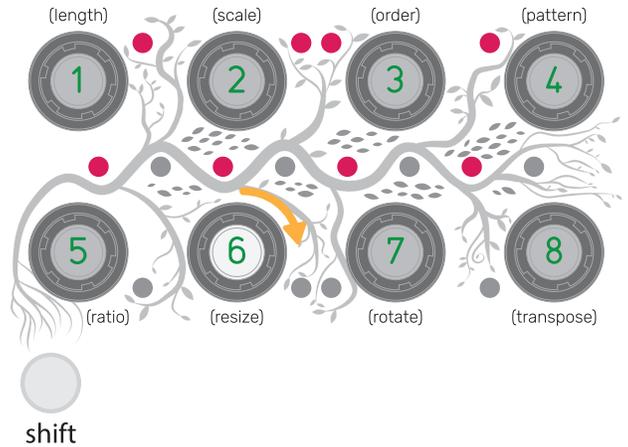
For example, an 8 step sequence can be stretched to 16, 32, or 64 steps, while it can be shrunk to 4, 2, or 1 step.

There are 3 different Resize expand behaviors that are accessible via Narwhal.

**Spread (Default):** resizing a sequence will leave empty steps between the stretched steps.

**Stretch:** resizing a sequence will fill the new steps in-between with repeats of the original steps.

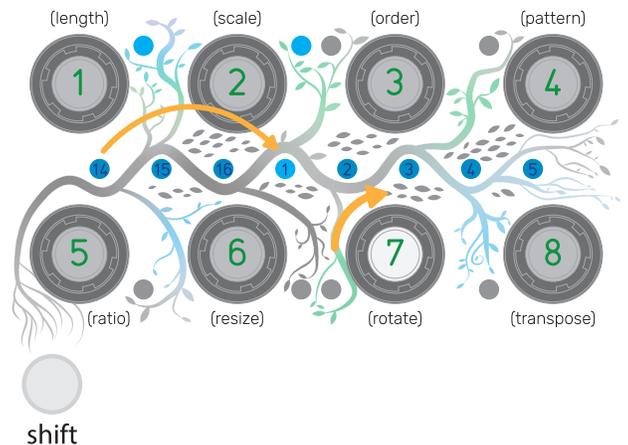
**Clone:** resizing a sequence will repeat the whole original sequence across the resize.



## 25. Rotate

- The **Rotate** step encoder **shifts the start point of the sequence from the current position.**

Holding the Shift button and turning the Rotate encoder to the right will move the start point incrementally in the sequence, while turning the encoder to the left will decrement the start point within the sequence.

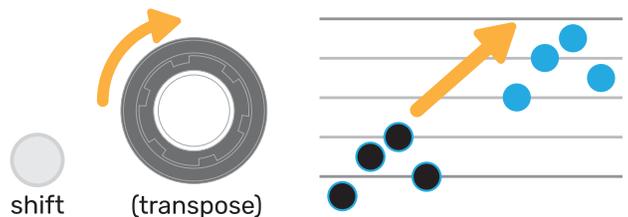


## 26. Transpose

- The **Transpose** step encoder **diatonically and destructively transposes the trunk sequence.**

Holding the Shift button and turning the Transpose encoder to the right will transpose the sequence up, while turning the encoder to the left will transpose the sequence down.

The sequence steps will clamp at the far ends of the 5 octave range.



## 27. MIDI Out

-  The TRS MIDI Out jack outputs the sequence data for all 3 channels on Bloom to be used with external MIDI equipped devices.

The MIDI Channel and CC Numbers used by this output can be configured via Narwhal!

MIDI Message	Description
0xF8	24PPQN Clock Output*

MIDI Channel (Default Value)	Description
1	Channel 1 Note Data
2	Channel 2 Note Data
3	Channel 3 Note Data

MIDI CC (Default Value)	Description
1	Mod Output**
84	Slew Amount

**MIDI Root Note Offset:** Bloom can adjust where the root notes sits within the CC range using Narwhal. **The default offset is 48 (C-1).**

\*Clock will output when the Narwhal setting is set to "True."

\*\*When Velocity Mod Mode is selected, the note data will also use the mod data as velocity. Otherwise, all notes have a velocity of 100.

### 27-A. USB Drive

-  The USB Drive provides multiple utility features for Bloom, firmware updates, custom settings, and sequence file access.

Bloom v2 comes with an included USB drive, but Bloom v2 is compatible with any USB-A drive as long as it is formatted to FAT32.

**Firmware Update:** To update or reflash firmware onto Bloom v2, place the appropriate .bin file onto the USB drive. Make sure that it is the only .bin file on the drive to ensure that the proper firmware will load.

Insert the USB drive into Bloom v2. Then, hold the Shift button, the Reseed button, and the Reset button for 3 seconds. Bloom will reboot and update the firmware to the file on the drive, then return to normal operation.

# Functions: MIDI / USB

**Sequence and Pattern Files:** Saved channel and pattern files are available to export, store, and share from the USB drive.

If any sequences or patterns are saved to the USB drive, they will appear as either "BloomCh[channel number].json" or "BloomPatt[pattern slot number].json." Files must adhere to this naming structure to properly import into Bloom v2. For example BloomCh1.json will load into Channel 1 at boot up, and BloomPatt12.json will load into Pattern slot 12!

**Options.json:** The options.json file holds all the custom settings available through Narwhal. Each time the USB drive is inserted, Bloom v2 will read and update the Narwhal settings without rebooting the module. See the table below for a list of possible configurations.

Setting	Default	Description
Sequence 1 MIDI Channel	1	MIDI output channel used for channel 1
Sequence 2 MIDI Channel	2	MIDI output channel used for channel 2
Sequence 3 MIDI Channel	3	MIDI output channel used for channel 3
MIDI Root Note Offset	48	MIDI note offset for lowest value output by Bloom
MIDI Mod CC Number	1	MIDI CC value for the Mod output for each MIDI Channel
MIDI Slew CC Number	84	MIDI CC value for the Slew amount for each MIDI Channel
Input PPQN	1	Sets the PPQN setting for the external clock mode
Output PPQN	1	Sets the PPQN setting for the clock out jack
Reseed Gate Channel	Focus	Sets the channel/s that are targeted by the Reseed gate input
Branch CV Channel	Focus	Sets the channel/s that are targeted by the Branch CV input
Path CV Channel	Focus	Sets the channel/s that are targeted by the Path CV input
Mutate CV Channel	Focus	Sets the channel/s that are targeted by the Mutate CV input
Root CV Channel	Focus	Sets the channel/s that are targeted by the Root CV input
Branch CV Mode	Focus	Sets the Knob Mode/s that are targeted by the Branch CV input
Path CV Mode	Focus	Sets the Knob Mode/s that are targeted by the Path CV input
Mutate CV Mode	Focus	Sets the Knob Mode/s that are targeted by the Mutate CV input
Reseed Filter	All	Selects which Tune Modes are affected by Reseed
Page Increment	Only Active Pages	Controls which pages are included when pressing the Page button
Ratchet Options	Normal	Sets whether or not triplets are included in reseeded or mutated ratchets
Ratchets Fixed Pulse Width	True	Determined if ratchets are a 50% pulse width (true) or a percentage based on gate length (false)
Reseed Gate Function	Reseed Tree	Selects what is reseeded when using the Reseed Gate input
Resize Algorithm	Spread	Controls the method by which Resize expands the sequence
Generate MIDI Clock	False	When true, Bloom will output a 24PPQN clock signal via MIDI
Enable Autosave	True	When true, Bloom will periodically save channel sequences to USB
Gate Micro Delay	None	Sets a small delay to gate outputs to allow destination inputs to settle
Regenerate Branches Filter	Note, GateLength, Slew, Ratchets, StepEnabled, Length, Resize, Rotate, Transpose	Sets which trunk sequence edits regenerate the branches when made. If an edit is unchecked, then making this edit will not regenerate branches when made.

## 27-B. USB MIDI Host

-  The USB Port also doubles as a MIDI Host port, allowing Bloom to expand its controls with MIDI controllers!

**Powering MIDI controllers via the USB Port:** The USB Port on Bloom v2 can support up to 500mA of power draw for MIDI controllers. Note that this is additional power draw from the PSU, so make sure that there is enough available power to support the MIDI controller.

MIDI Channel (Default Value)	Target
1	Channel 1 Root offset
2	Channel 2 Root offset
3	Channel 3 Root offset
15	Focused Channel Root offset
16	All Channels Root offset

Parameter	CC	Range*
Mutate	3	0-127
Rate	9	0-127
Branch	14	0-127
Path	15	0-127
Ratchet Micro Mutate	16	0-127
Slew Micro Mutate	17	0-127
Mod Micro Mutate	18	0-127
Performance Ratchet	19	0-127
Performance Slew	20	0-127
Performance Mutate/Ornaments	21	0-127
Length	22	1-64
Scale	23	1-8
Playback Order	24	1-8
Ratio	25	1-9
Reseed	26	0 to Nonzero
Reseed Notes	27	0 to Nonzero
Reseed Gate Length	28	0 to Nonzero
Reseed Slew	29	0 to Nonzero
Reseed Ratchets	30	0 to Nonzero
Reseed Mod	31	0 to Nonzero

\* MIDI values are added to the knob & CV values, and clamp at the parameter's min/max range.

\*\* Disconnecting a MIDI controller will not clear previous MIDI inputs. Perform a factory reset to set Bloom's state back to the default values.

## Functions: MIDI / USB

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**Triggering Patterns with MIDI:** Bloom can read Program Changes to store and recall patterns!

**Load Pattern PC Value:** making a program change between values 1 and 16 will load in the corresponding pattern slot into the focused channel. Changing the value to 0 will clear the focused channel to the default empty sequence.

**Save to Pattern PC Value:** The focused channel sequence can be saved to a pattern slot using program changes. See the table below for the corresponding program change value.

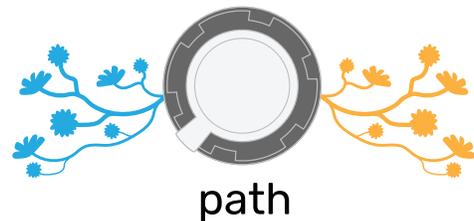
Pattern Slot	Load Pattern PC value	Save to Pattern PC value
Reset Sequence to default	0	
Pattern 1	1	17
Pattern 2	2	18
Pattern 3	3	19
Pattern 4	4	20
Pattern 5	5	21
Pattern 6	6	22
Pattern 7	7	23
Pattern 8	8	24
Pattern 9	9	25
Pattern 10	10	26
Pattern 11	11	27
Pattern 12	12	28
Pattern 13	13	29
Pattern 14	14	30
Pattern 15	15	31
Pattern 16	16	32

## 28. Saving Channel Sequences

- **Channel Sequences are automatically saved by default to the USB drive.** Bloom will change the Clock LED to gold when it is saving sequences to the USB.

All actions below are available when Autosave is off.

**Manual Save:** To manually save a sequence, select the focused channel you want to save. Then, **hold the Shift button and the Page button for 3 seconds.**



The sequence is saved to the USB drive when a gold and white LED animation plays on the Clock LED.

**Global Sequence Save:** To save all three sequences on Bloom v2, **hold the Shift button, the Channel button, and the Page button for 3 seconds.** All three sequences will save to the USB drive when a gold and white LED animation plays on the Clock LED.

**Load a Sequence:** Bloom v2 can hold 3 Sequence files on the USB drive. To load a sequence file into its appropriate channel, first select the channel you want to import with the Channel button.

Then hold the Shift button and tap the Page button. A gold and white Page LED animation will indicate that the sequence has loaded into the channel.

**Global Sequence Load:** To load all 3 sequences into their channels, hold the Shift button and the Channel button, then tap the Page button. A gold and white Page LED animation will indicate that all 3 sequences have loaded into Bloom v2.

**Shift Menu Indicators:** While holding the shift button, the Channel gate LED indicates if the channel sequences are backed up to the USB (green) or not (gold).

## 29. Unmute Sequences

- Bloom v2 has an undo option tailored for rolling back sequence mutations. To unmute a sequence to its last manually edited state, hold the Shift button and press the Reset button.

Making a new manual edit to the sequence will set a new "unmute" point. See below for mutations that can be undone:

- Default Mutate
- Micro Mutate Mode Branch
- Micro Mutate Mode Path
- Micro Mutate Mode Mutate
- Resize
- Rotate
- Transpose
- Reseed

# Functions: Secondary Controls

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## 30. Factory Reset

- To factory reset a sequence to its default state, hold the Reset and Reseed buttons for 3 seconds. A brief LED flash will take over Bloom indicating that the factory reset is complete. The following state is applied to the sequence:
  - Ratio: X1
  - Length: 8 steps
  - Note: Root
  - Scale: Major
  - Gate State: On
  - Gate Length: 50%
  - Slew Amount: 0
  - Ratchet Amount: X1
  - Mod Output Value: 0
  - Mod Mode: Shapes
  - Knob Mode: Default
  - Branch, Path, Mutate Values: 0
  - Tune Mode: Default
  - Order: Forward

## 31. Tuning Reference Modes

- Bloom has 3 available Tuning Reference Modes. These modes change how Bloom v2 plays the sequence for step-editing purposes.

To change the Tuning Reference Mode, hold the Shift button, then tap the Tune Mode button.

- **Playback Mode (Default):** Bloom will play the sequence fully, and the step encoders will edit whichever page of the sequence is selected.
- **Page Mode:** Bloom loops a single page of a sequence, allowing the user to hear the 8 steps of the page while editing them. To advance to the next page of a sequence in this mode, press the Page button.
- **Step Mode:** Bloom loops a single step while editing. Bloom will update its output to whatever step is being edited, and will play the step at the Clock and Ratio rate of the sequence.

## 31. LED Dimmer

- The LEDs on Bloom can be dimmed or brightened for whichever patching environment you find yourself in!

To adjust the LED brightness, hold the Shift button and turn the Rate knob. Turning the knob to the right will brighten the LEDs up to 100%, while turning it to the left will dim the LEDs down to 5%. This setting will save between power cycles!

## More Than Sound

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Every idea starts as a seed, waiting to be watered. With Bloom, we set out to create a sequencer that grows with you, branching in unexpected directions and flowering with musical possibilities.

To honor the natural world that inspired this module, a portion of every Bloom sold will be donated to the California State Parks Foundation; an organization dedicated to protecting and preserving the wild spaces that nurture reflection, creativity, and connection.

Here's to growth, exploration, and planting your own seeds of sound.



## Lifetime Repair Warranty

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No matter how long you've owned your module, or how many people have owned it before you, our doors are open to any and all Qu-Bit modules needing repair. Regardless of circumstances, we will continue to provide physical support for our modules, with all repairs being completely free of charge.\*

[Learn more about the lifetime repair warranty.](#)

\*Issues that are excluded from the warranty, but do not void it includes scratches, dents, and any other user-created cosmetic damage. Qu-Bit Electronix holds the right to void warranty at their own discretion and at any time. Module warranty may be voided if any user damage is present on the module. This includes, but is not limited to, heat damage, liquid damage, smoke damage, and any other user-created critical damage on the module.

## Changelog

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<b>Version</b>	<b>Date</b>	<b>Description</b>
v1.0.2	Jun 17, 2025	<ul style="list-style-type: none"><li>• release firmware</li></ul>
v1.1.0	Jul 2, 2025	<ul style="list-style-type: none"><li>• fixed issue with Page Increment Narwhal setting where the options and their functions were opposite.</li><li>• added Regenerate Branches Filter to Narwhal</li><li>• various UX/UI polishes</li></ul>