# BLOOM

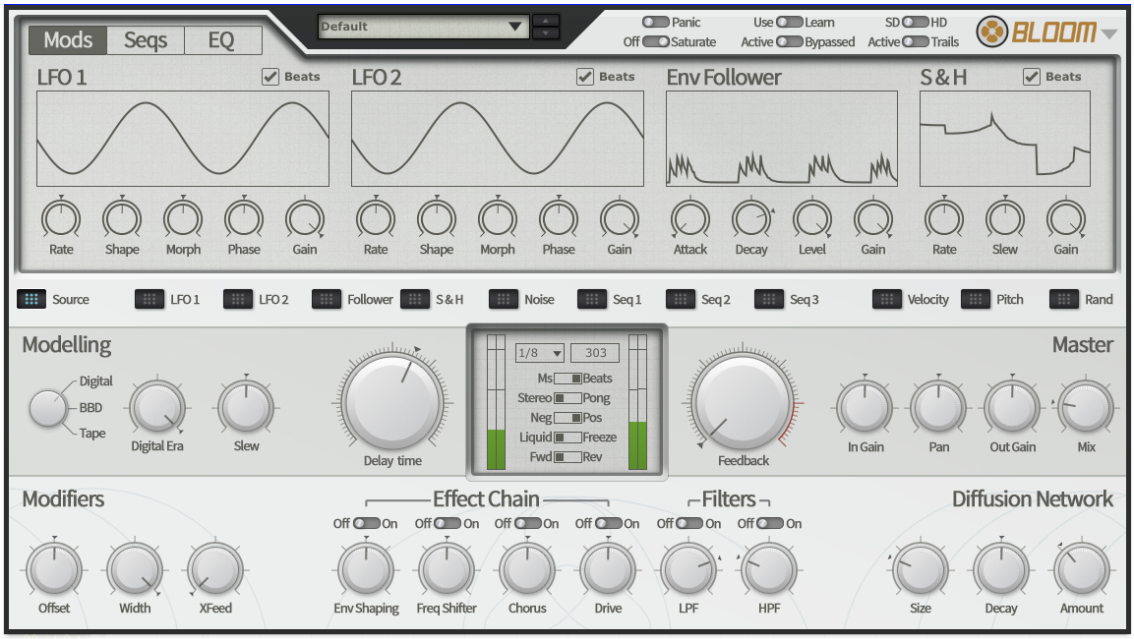
## OPERATION MANUAL

fxpansion

# Table of Contents

# 1 Introduction

Bloom is a creative delay and reverb effect with a wide range of advanced modulation functions.




## Bloom Audio functions

### Stereo delay line

At the heart of Bloom is a single delay line that operates in stereo. 3 delay models are available - Digital (which can be dialled between vintage dirt and modern clarity), analogue BBD (bucket-brigade delay) and Tape models. Bloom's delay models are authentic and realistic, designed to offer huge variety of rhythmic texture to your productions.

### Diffusion network

Bloom's Diffusion Network provides a newly-developed algorithmic reverberation effect. Its simple-to-use controls should be familiar to you if you've ever used a reverb effect before.

It can exist in 3 different positions within the Bloom audio path - see the EQ/Routing page section for details.

### Effect chain

The Effect chain provides a number of audio processing blocks which can be used to shape the sound of Bloom's output and feedback characteristics. The overdrive, filtering, saturation and dynamics functions are very useful for moulding the tone and shape of the feedback, while frequency-shifting and chorus functions are also available for psychedelic effects.

Using the EQ/Routing page the position of the Effect chain can be moved so that that it only affects the entire output of the delay line or only the feedback path.

### EQ stages

Bloom also features 2 EQ blocks - one is placed within the Effect chain where it provides additional tone-shaping control, while the other is located at the final output of the audio path for final shaping of Bloom's output. The EQ controls are located within the EQ/Routing page.

## Bloom modulation functions

Bloom's TransMod modulation system is a powerful and intuitive alternative to the traditional 'mod-matrix'. TransMod allows you to modulate most parameters within the plugin with a variety of sources, setting the amount of modulation visually on the parameter itself rather than using a tedious list of matrix assignments. A variety of modulation sources can be used:

### Internal modulation devices

Bloom contains 2 built-in LFOs, an envelope follower and sample & hold, all of whose parameters can themselves be modulated via the TransMod system.

### Additional modulation sources

The Pitch, Velocity and Random sources are generated from incoming MIDI note messages, while there is also a dedicated Noise modulation source for a continuous stream of random values.

### Sequencers

Bloom also contains 3 step-sequencer devices which can either be routed directly to the Delay time, Freeze and Reverse functions, or routed to any other parameters within Bloom using the Transod modulation system. Each sequencer can run at a different division of the tempo and provides a fun way to achieve even more variation and movement over time for Bloom's audio effects.

## MIDI control and host automation

Bloom features a variety of MIDI control options which are described in the MIDI functions section.

Using MIDI CCs, it is possible to:

- Adjust the initial values of Bloom's parameters
- Adjust the modulation depths of individual parameters and TransMod modulation sources

You can additionally use MIDI notes for a variety of different functions.

In addition to MIDI control, it is possible to automate Bloom's parameters with your host's built-in automation features.

# 1.1 Launching and controlling Bloom

### Using Bloom as an audio insert effect

In most cases, Bloom should be launched as an insert effect. Even though it may not be possible to route MIDI notes and/or MIDI CCs to an insert plugin in some DAWs/hosts, it is still possible to use your host's built-in automation features to remotely control Bloom: all parameters are exposed to the host automation system.

### Using Bloom with MIDI control

Bloom has extensive MIDI control features for interacting with its parameters in real time.

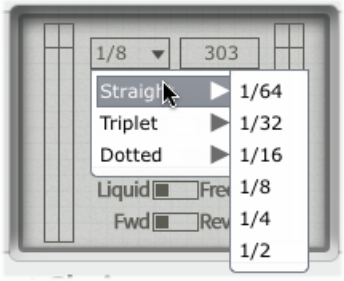
MIDI control with Bloom is *host-dependent*. Some hosts make it very easy to route MIDI notes and/or continuous controllers to an effect plugin, but in some it may be necessary to run Bloom as an instrument or MIDI-controlled effect on a separate channel and route the desired audio to the input. Please consult your host's documentation for full details of its MIDI implementation for audio effect plugins.

### Adjusting parameters

**Rotary controls**


**Click and drag up/down the main part of the rotary control.**

**Drop-down menus**



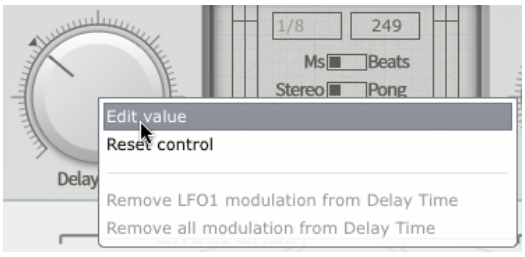

**Drop-down menus are indicated by a downwards triangular arrow icon. Click the drop-down box in order to display the menu.**

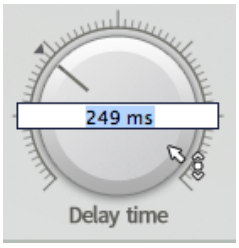
Bloom's rotary controls are also used for setting modulation depths in the TransMod system.

### Context menus

Context menus exist in several areas on the Bloom interface. They are invoked by right-clicking (you can also CTRL-click on Mac).

**Editing a value manually using the control context menu**




**Right-click on any parameter to display the control context menu, which contains the Edit value function for entering values via the keyboard.**

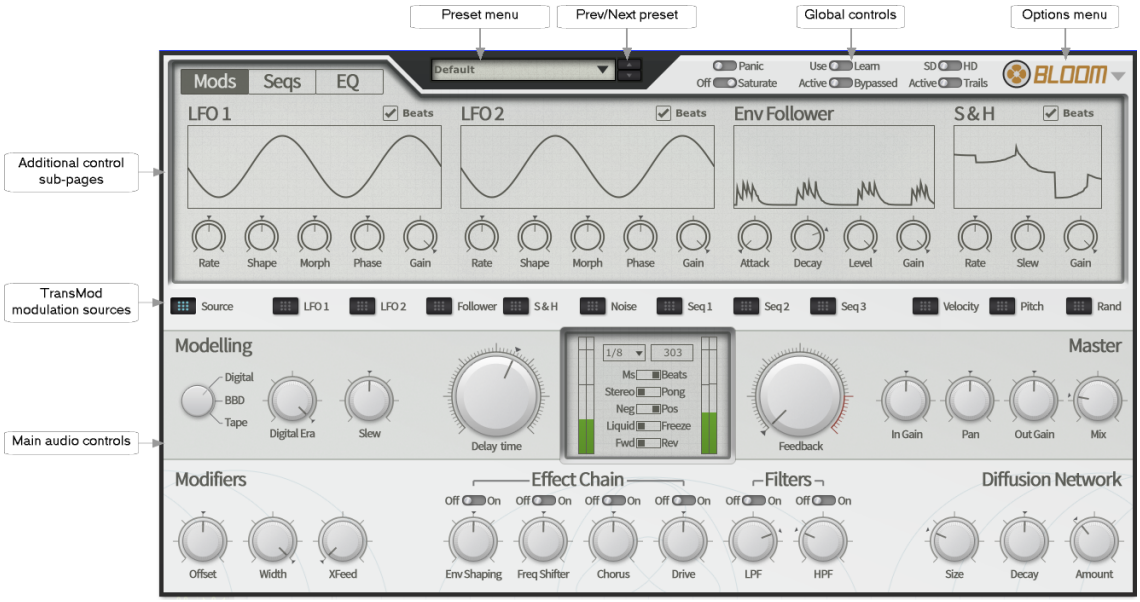
This menu also contains the **Reset control** function to reset a parameter to its default value and additional functions related to the TransMod modulation system.

### Resetting a control to its default value

Double-click a control to reset it to its default value. This is also possible using the control context menu with the **Reset control** function.

# 2 Using Bloom

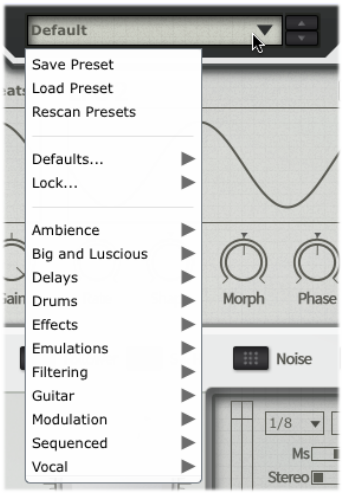
## Bloom user interface overview




## Preset controls

### Preset menu

This drop-down menu displays all available presets of the relevant type, arranged in category sub-menus, as well as the **Save preset**, **Load preset**, and **Rescan presets** functions.




### Save preset

This function prompts you for a filename in order to save the current settings to disk. It is recommended that you save presets to the default folder that is shown so that they can easily be reloaded using the preset picker menu.

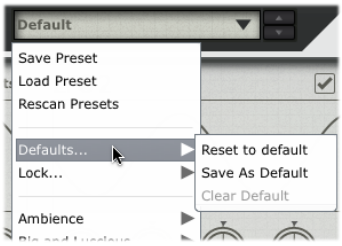
### Load preset

This function allows you to browse to and load a preset from any location.

### Rescan presets

The **Rescan presets** function scans the preset location for new presets you may have copied there since you launched Bloom.

### Defaults... sub-menu




### Reset to default

This function resets the state of Bloom to its default settings.

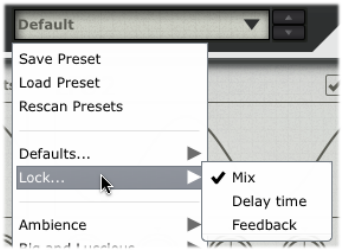
### Save As default

This function allows you to set the current state of Bloom as the default settings, meaning that they are recalled when Bloom is launched as a plugin and when using the **Reset to default** funtion.

### Clear default

This function clears the current user-defined default if it exists, meaning that the factory default settings are used as the defaults.

### Lock... sub-menu




This sub-menu allows you to lock certain Bloom parameters so that they are not affected by loading a new preset.

#### Mix

Activating this setting locks the **Mix** control.

#### Delay time

Activating this setting locks the **Delay time** control.

#### Clear default

Activating this setting locks the **Feedback** control.

### Prev/Next preset

These buttons sequentially step backward/forward through the current preset category.

## Main audio controls

The main audio controls are always visible and relate to Bloom's stereo delay line, reverb (diffusion network), effect chain and master level controls.

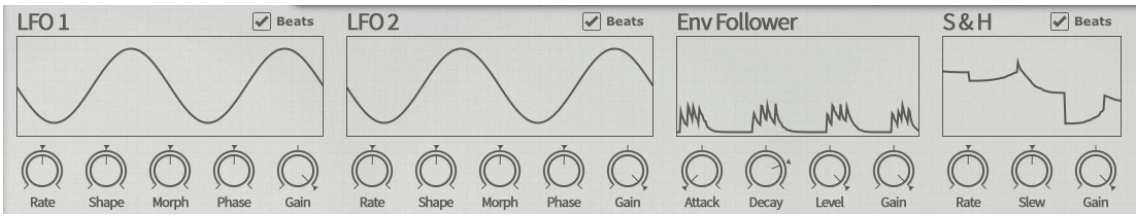
## TransMod modulation sources

These buttons are involved with using the TransMod modulation system, used for complex animation of parameters within Bloom.

## Additional control sub-pages

3 additional sub-pages of controls are provided: the Modulators, Sequencers and EQ/Routing pages.

### Modulation



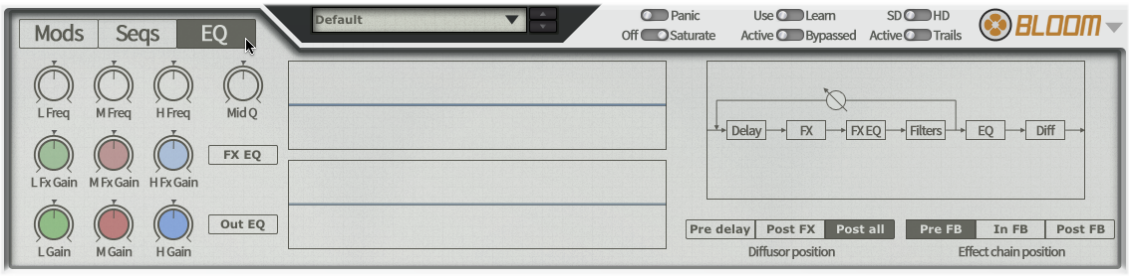

The Modulators page shows the controls for Bloom's 4 internal modulation devices: 2 LFOs, an envelope follower and a sample & hold. The main parameters for these devices can themselves be modulated via the TransMod modulation system.

Each modulation device features an individual Visualizer screen. The nature of each screen varies according to the function of the module.

### Sequencers

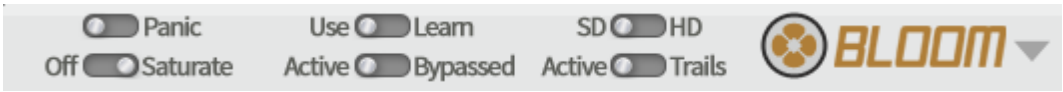

The Sequencers page shows the controls for Bloom's 4 internal sequencing devices. Each of these can modulate the Delay Time, Freeze or Reverse functions or, alternatively, can modulate any number of parameters via the TransMod modulation system.

### EQ/Routing




The EQ/Routing page contains controls for Bloom's 2 EQ processing blocks and for changing the position in the signal path of the Diffusion Network and the Effect Chain.

### Global controls




#### Panic

Clicking the **Panic** button clears the current contents of the delay line buffer. This can be useful when delay feedback oscillation gets too intense.

#### Off/Saturate switch

Activating the **Saturate** button enables the saturation function, located within the effect chain. Note that the routing functions on the EQ/Routing page affect how the saturation sounds, as it allows the position of the entire Effect chain to be switched between 3 possibilities.

The saturation behaviour is dependent on the level of the input signal. Note that this function is not a peak clipper - the signal can still exceed 0dB depending on peaks in the input signal and further gain introduced by other parts of the signal path.

#### Active/Trails switch

This button is a creative alternative to the **Bypass** function. When in the **Active** position, Bloom functions as normal. When it is switched to **Trails**, Bloom's processing is bypassed so that no new audio is allowed to enter the delay but the current contents of the delay line are allowed to decay naturally.

#### Active/Bypassed switch

Set this button to the **Bypassed** position to bypass Bloom, so that the input signal is passed to the output unaffected.

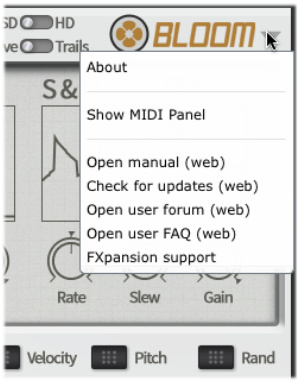
### SD / HD switch (Standard / High definition)

Moving this switch to the **HD** position results in processing audio internally at a higher sample-rate, minimising aliasing artifacts. The sound quality is improved with the trade-off of higher CPU usage.

### Use/Learn

Setting this button to the **Learn** position activates MIDI Learn mode, which allows you to map MIDI CCs (continuous controllers) to Bloom's parameters.

## Options Menu




### About

The **About** box displays Bloom's version number and credits listing.

### Show MIDI Panel

The MIDI panel allows you to set the MIDI channels used for MIDI note input in Bloom.

### Open manual

The Bloom online manual is opened in your OS's default web browser.

### Check for updates

Bloom checks the FXpansion website for any available software updates.

### Open User forum, Open User FAQ, FXpansion support

These functions open the Bloom forum, FAQ and FXpansion support page in your default browser.

# 2.1 Main audio controls

### Modelling and delay controls


#### Model selector

At the heart of Bloom are 3 distinct models of different delay technologies.

**Digital**

The Digital model is capable of producing a variety of digital delay timbres, from early lo-fi devices to modern delays with higher sample-rates and better AD/DA converters. The Digital Era control allows you to dial between a vintage and modern sound.

**BBD**

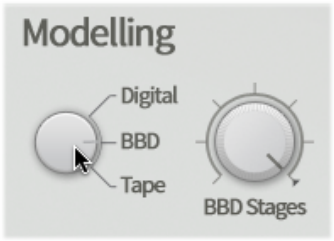
BBD delays are a classic form of analogue delay, in which the audio signal is carried through an array of capacitors by charging and discharging them according to the delay time clock. The process is reminiscent of water (the audio signal) being transferred between a series of buckets (capacitors), which is the origin of the term BBD ('bucket-brigade device). BBD delay types generally feature quite a dark sound with a lack of high frequency response.

**Tape**

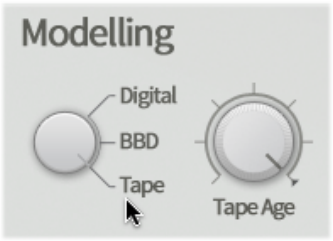
Tape delays operate by guiding a tape loop past record and playback heads, with the delay time changed by either changing the tape speed or the distance between the heads. Tape delays are known for their classic psychedelic, warm character and wobbly effects due to wow and flutter.

#### Model secondary control

The function of this control depends on the current setting of the **Model selector** control.




**BBD Stages: secondary control for BBD Model**




**Tape age: secondary control for Tape model**

#### Digital Era (Digital model)

The **Digital era** control adjusts the behaviour of the Digital delay model between vintage (fully anti-clockwise) and modern (fully clockwise).

Towards the vintage setting, the Digital delay model introduces the low-fidelity characteristics of early-era digital delays such as low sample rates and bit depths.

#### BBD stages (BBD model)

This control changes the number of stages - the term given to the number of capacitors used - in the BBD model between 256 (fully anti-clockwise) and 4096 (fully clockwise).

Lower numbers of stages result in a lo-fi sound with more aliasing artifacts. Even though BBD delays are 'analogue', they still involve a form of sampling - even though the method of sample 'storage' is analogue, any process that involves sampling audio signals at finite intervals is susceptible to aliasing.

### Tape age (Tape model)

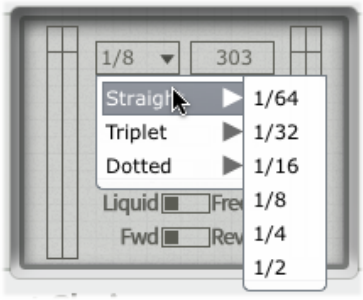
The Tape age control changes the character of the tape in the Tape delay model. Towards lower settings, more hiss and wow/flutter artifacts are introduced, along with less high-frequency response.

### Slew

The Slew control introduces smoothing when changing the delay time (either manually or via modulation). Effectively, the change between values is spread out in time, resulting in a slightly slower, but smoother, transition.

### Delay Time

Bloom's **Delay time** can be set in milliseconds or in tempo-based divisions, depending on the state of the **Ms/Beats** switch. Adjustments can be made to the large rotary **Delay time** control or manually to the numeric values shown in the LCD-style display in the centre of Bloom's interface. Note that TransMod modulation can only be set using the rotary control.




**Setting the delay time manually for Beats mode.**


**Setting the delay time manually for Ms mode.**

**Note that the drop-down menu for BPM-synced times is not available in this mode.**

The possible delay times are between 5 milliseconds to 2500 milliseconds in **Ms** mode, or 1/64 to 1/2 beat divisions in **Beats** mode (with dotted and triplet versions).

### Feedback

The **Feedback** control adjusts the level of the delayed signal that is fed back into the delay's input.

Low Feedback settings result in minimal repetitions of the input, while high settings create more repetitions. Very high settings result in self-oscillation of the delay circuit.

### Ms/Beats

This switch toggles between milliseconds and tempo-based beat divisions for setting the delay time.

### Stereo/Pong (Ping-pong)

This switch toggles between normal stereo and ping-pong delay modes.

In **Stereo** mode, the stereo image of the original input signal is preserved within the delay line.

In **Pong** mode, the input signal is summed to mono before entering the delay line. The left side of the delay is routed to the left output and to the right side of the delay, whose output is fed to the right output and back to the input of the left side.

### Neg/Pos (Negative/Positive feedback)

This switch toggles between positive and negative feedback types. In **Negative** feedback mode, the phase of the feedback is inverted in relation to the input signal.

### Liquid/Freeze

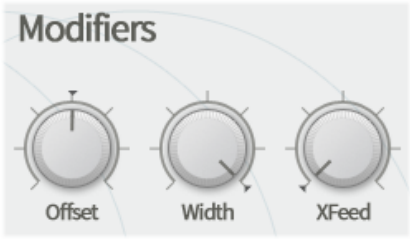
Setting this switch to **Freeze** mode results in infinitely repeating the the current content of the delay line - no new input (or feedback from the output) is allowed to enter the delay line and it repeats indefinitely until the switch is set back to **Liquid** mode.

### Fwd/Rev (Forward/Reverse)

Changing the setting of this switch to Reverse from the default setting of Fwd (forward) results in reversed delays.

## Modifiers section

### Offset




The **Offset** control introduces a time offset between the Left and Right sides of the stereo delay line in order to add a further sense of space and stereo width to the sound of the delay. At the centre position, the delay time of the left and right channels is the same. Turning the control clockwise from the centre position results in adding up to 25ms to the left channel's delay time while also reducing the right channel's delay time by the same amount. Turning the Offset control anti-clockwise from the centre position inverts this behaviour.

### Width

Th **Width** control adjusts the stereo width of the 2 channels in Bloom's stereo delay line, from mono at the minimum setting (fully anti-clockwise) to stereo at the maximum setting (fully clockwise).

### XFeed

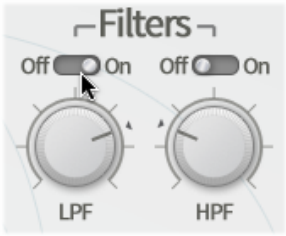
The **XFeed** control adjusts the amount of cross-feedback between the 2 channels of Bloom's stereo delay line: the feedback from the left side of the stereo delay line is fed into the right side's delay input, and vice versa. As a result, the feedback effectively becomes monophonic.

## Effect chain section

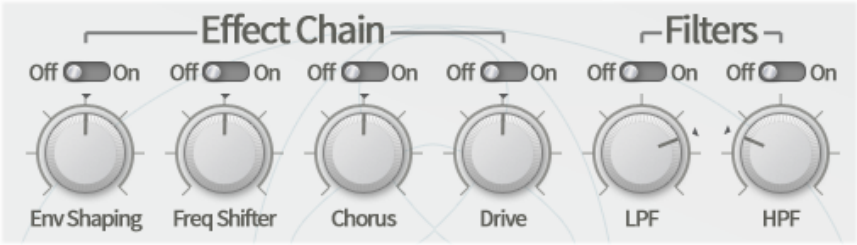
The Effect chain provides a number of audio processing blocks which can be used to shape the sound of Bloom's output and feedback characteristics.

By default, the Effect chain is placed before the feedback loop, meaning that it affects the main signal and feedback. Using the **Effect chain position** switch in the EQ/Routing page, the position of the Effect chain can be moved after the feedback loop (**Post FB**), meaning that it only affects the entire output of the delay line, or within the feedback loop, meaning that it affects only the feedback signal (**In FB**).

Note that all the following processing blocks feature a **Off/On** switch to bypass or enable them.




**Enabling the LPF function with its Off/On switch**




Also note that the **Saturate** function, located in the Global controls section, actually exists within the Effect chain, between the **Pitch** and **EQ** functions.

### Env Shaping

The **Env Shaping** control offers a simple but powerful transient-shaping control. Towards the 'Bite' setting, attack transients are emphasized while decay portions are de-emphasized. Towards the 'Body' setting, the opposite occurs: the attack is de-emphasized while the decay is emphasized.

At the centre setting of 50%, the Dynamics function has no effect.

### Freq Shifter

The **Freq Shifter** control changes the pitch of the input signal without preserving the harmonic information, resulting in very alien and abstract timbres. The control can increase/decrease the pitch by up to 12 semitones.

### Chorus

The **Chorus** control sets the amount of the chorus function in the Effect chain between 0% at the minimum position (fully anti-clockwise) and 100% (fully clockwise).

### Drive

The **Drive** control introduces an overdrive/distortion function, useful for adding growl and extra harmonics to the signal. This control can be set from 0% at the minimum position (fully anti-clockwise) to 100% at the maximum position (fully clockwise).

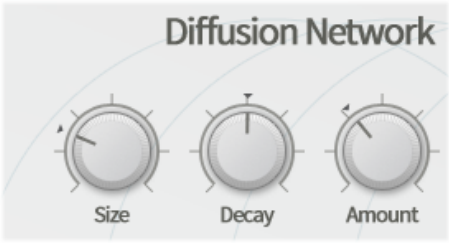
### LPF

The **LPF** function provides a 12dB/octave low-pass filter. With the LPF control at its maximum position (fully clockwise), the filter cutoff is set at 20kHz, allowing most of the signal to pass through (some gentle filtering of high frequencies will occur due to the 12dB/octave slope from the cutoff frequency). Setting the LPF control to the minimum position (fully anti-clockwise) sets the cutoff at 20Hz meaning that the signal is filtered out entirely.

### HPF

The **HPF** function provides a 12dB/octave high-pass filter. With the HPF control at its minimum position (fully anti-clockwise), the filter cutoff is set at 20Hz, allowing most of the signal to pass through (some gentle filtering of low frequencies will occur due to the 12dB/octave slope from the cutoff frequency). Setting the HPF control to the maximum position (fully clockwise) sets the cutoff at 20kHz meaning that the signal is filtered out entirely.

## Diffusion Network section




The Diffusion Network section allows control over Bloom's internal reverberation algorithm. Reverb algorithms introduce a sense of space - higher settings for the following controls create the impression of larger spaces.

### Size

This control adjusts the size of the space emulated by the reverb algorithm.

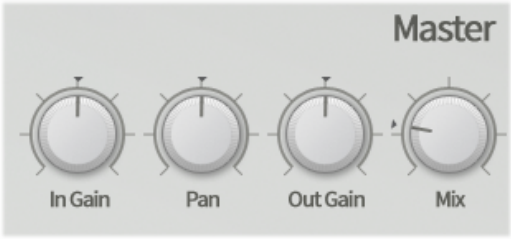
### Decay

This control adjusts the decay time of the reverb algorithm.

### Amount

This control adjusts the amount of reverb added to the signal.

## Master section




### In Gain

The **In Gain** control adjusts the level of the signal entering Bloom. The level can be adjusted between -inf dB and +18dB.

### Pan

The **Pan** control adjusts the stereo balance of the processed signal.

### Out Gain

The **Out Gain** control adjusts the level of the output of Bloom. The level can be adjusted between -inf dB and +18dB.

### Mix

The **Mix** control sets the balance between the original input signal (anti-clockwise from the centre position) and the processed signal (clockwise from the centre), with an equal mix of the two at the centre position.

## 2.2 EQ/Routing page

Click the **EQ** tab to show the EQ/Routing page if the Modulators or Sequencers page is currently displayed. The EQ/Routing page allows control over Bloom's 2 internal EQs and the routing configuration of all processing blocks within the plugin.

### Output EQ and FX EQ

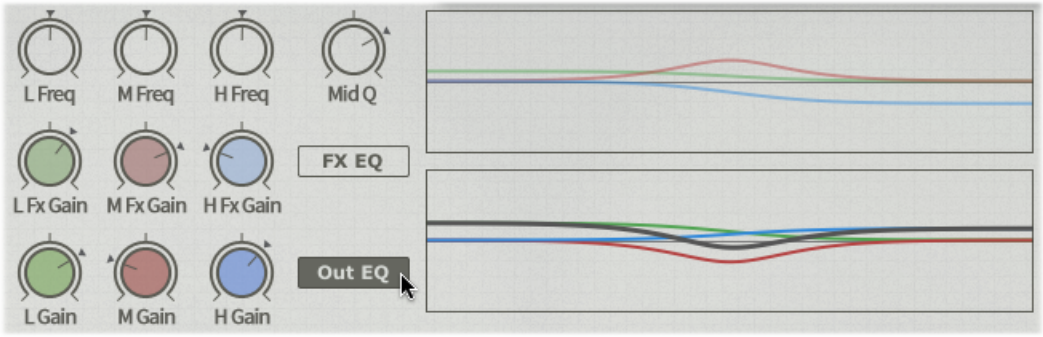
The EQ controls actually operate upon 2 separate EQ stages within Bloom. The **Freq** and **Q** controls for both EQs are always linked. However, each EQ features individual control over the **Gain** of each of the 3 frequency bands.

#### Output EQ

The Output EQ is located after the delay line. It can exist before or after the Diffusion Network depending on the **Diffusor position** setting.

#### FX EQ

The FX EQ is located within the Effects Chain, between the Saturation and LPF stages. While it is always between these 2 blocks, the position of the entire Effects Chain can be altered using the **Effect chain position** routing switch.




**In this example, the FX EQ is inactive while the Output EQ is active. The green, red and blue curves indicate the shape of each EQ band. The black curve appears when the EQ is activated and indicates the overall EQ curve generated by the 3 bands.**

### EQ bands

Both the Output EQ and FX EQ feature 3 bands - L (Low), M (Mid) and H (High). The Low and High bands are shelf bands, while the Mid band is parametric with adjustable Q.

### EQ controls

#### L Freq, M Freq, H Freq

These controls adjust the frequencies of the Low, Medium and High bands in both the Output EQ and the FX EQ.

#### Q

This control adjusts the Q of the Mid band in both the output EQ and the FX EQ. It is adjustable between 2.5 (minimum position) and 0.5 (maximum) octaves.

#### L Gain, M Gain, H Gain

These controls adjust the amount of gain for each band in the output EQ. The amount of gain available for each band is +/- 30 dB.

#### L Fx Gain, M Fx Gain, H Fx Gain

These controls adjust the amount of gain for each band in the FX EQ. The amount of gain available for each band is +/- 30 dB.

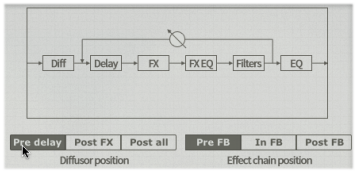
## Diffusor and Effect chain position switches

This pair of routing switches allow you to change the position of the Diffusor and the Effect chain within the audio path.

### Diffusor position: Pre delay / Post FX / Post all

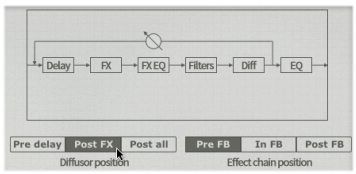
#### Pre delay

The Diffusor is positioned before the input of the delay line.



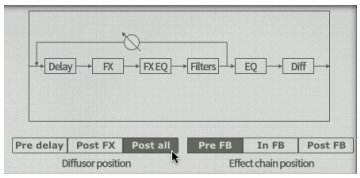

#### Post FX

The Diffusor is positioned immediately after the Effect chain. The actual position of the Diffusor depends on the **Effect chain position** setting.




#### Post all

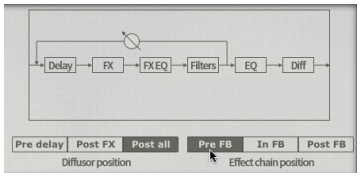
The Diffusor is positioned after all other processing blocks, immediately before the plugin output.




### Effect chain position: PreFB / In FB / Post FB

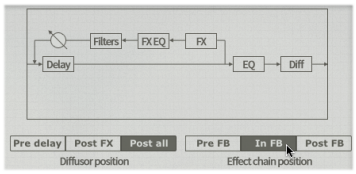
#### Pre FB

The Effect chain is positioned before the feedback path - it affects the overall output of the delay line and also affects the signal fed back to the delay input when feedback is used.



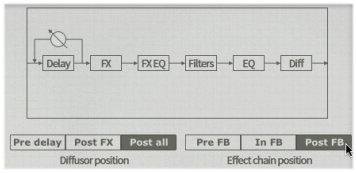

#### In FB

The Effect chain is positioned within the feedback path - it affects the signal in the feedback loop only and not the overall output of the delay line.




#### Post FB

The Effect chain is positioned after the delay and feedback path - it affects the entire output of the delay line but does not affect the signal that is fed back to the delay input when feedback is used.



# 3 Using TransMod modulation in Bloom

## Using TransMod modulation

The TransMod modulation system allows you to route a single modulation source to multiple synthesis and effect parameters, each with its own definable depth.

Modulation depths are represented visually on the parameter itself, rather than in an abstract list of assignments.

TransMod modulation occurs at control rates, in 32-sample blocks.


There are 2 types of 'views' of the parameters:

### Initial Source view (Source)

To activate this view, click the **Source** button (this button is activated by default).

In this view, no modulation depths can be viewed or created. You simply set the initial value of any parameters before any modulation occurs.

### TransMod modulation source views

To the right of the Source button are a number of buttons which represent the various TransMod modulation sources that are available.

Clicking any of these buttons means that you can view and create modulation depths from the TransMod source to Bloom's parameters. Modulation depths can be seen and set visually on parameters, with indicators showing the current state of the control.

A parameter's specified modulation depth represents the maximum amount of modulation possible. The changing intensity of the TransMod modulation source, and the combined effect of any other TransMod sources which have been routed to the parameter, dictate the actual modulation or the parameter that occurs at any one time.

Only one TransMod source 'view' is visible at any one time.

In the following example, **LFO1** is modulating the **Feedback** parameter for Bloom's delay line, something that can be useful for periodically varying the amount of feedback - for example if you want periods of intense feedback without things getting out of hand due to the Feedback control being turned up continuously.

The extent of the modulation depth shown represents the maximum amount of possible modulation away from the Source value - in this example, when the LFO has reached its maximum amplitude.


**With the Source button selected, no modulation is shown. Note the real-time indicator showing the current value of the Feedback control.**


**With the LFO1 TransMod source selected, the destination modulation amount is shown around the Feedback control.**

### Adjusting modulation depths

To adjust the modulation depth of a control:


**First select the desired TransMod source.**


**Mouse over the outer ring of the control - notice the mouse cursor has changed.**


**Click and drag up/down on the outer edge of the control to set the modulation amount.**

### Controls that cannot be modulated

Most of Bloom's parameters can be modulated, although there are some exceptions:

- **Phase** control in LFOs
- All buttons and switches

### Real-time modulation indicators

Any modulation that occurs causes a control's actual value after modulation to be shown on controls in real time.

# 3.1 Further TransMod operations

## Setting a TransMod source to uni-polar or bi-polar operation

By default, all TransMod modulation sources act as uni-polar sources. In other words, the modulation occurs only in one direction - from the initial Source value towards the maximum modulation value. The modulation depth can be positive (increases the parameter's value) or negative (decreases the value), but not both.

You can also set each source to act in a bi-polar way, so that the modulation occurs in both directions from the initial Source value.

In the following example, LFO1 is shown first as a uni-polar source, modulating the **Delay time** control.

After right-clicking on the LFO1 TransMod button, it is then set to bi-polar mode by clicking on **Bi-polar modulator** in the TransMod source context menu that appears. The modulation subsequently occurs in both directions, as shown by the indicator that moves to show the current value of the parameter after being modulated.


**Right-click on the TransMod button and click on 'Bi-polar modulator'**


**Note the real-time indicator showing the current value as a result of switching to bi-polar mode**

To return a modulation source to uni-polar operation, use the **Uni-polar modulator** function on the TransMod source context menu.

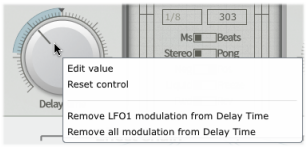
## Managing TransMod modulation

### Displaying which TransMod sources are modulating a parameter

To see which TransMod sources are modulating a Bloom parameter, move the mouse over the control. Any TransMod sources which contain destination modulation depths on the parameter flash on the interface.

### Control context menu

Right-click on a Bloom parameter to display its context menu, which contains several functions relating to managing TransMod modulation.




#### Remove modulation from control

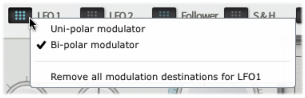
Click this function to remove the modulation depth on this control for the currently selected TransMod source.

#### Remove all modulation from control

Click this function to remove the modulation depths on this control for all TransMod sources that contain modulation depths on it.

### TransMod source context menu

Right-click on any TransMod modulation source button to display its context menu. The **Uni-polar modulator** and **Bi-polar modulator** functions have been previously discussed.




#### Remove all modulation destinations

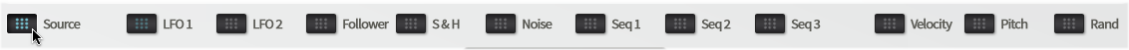
Click this function to remove destination modulation depths for all parameters modulated by this TransMod source.

## Adjusting modulation depths with MIDI CCs or host automation

Bloom's MIDI Learn system makes it possible to assign controls and controls' TransMod modulation depths to MIDI continuous controllers. This is useful for changing the amount of modulation over time for a specific parameter.

**Note**: it is also possible to modulate the **Gain** controls for each internal modulation device to vary the intensity of each of these TransMod sources over time - this varies the intensity of the entire modulation source, which affects all destination parameters being modulated by the source.

## 3.2 TransMod modulation sources




### Internal modulators

#### LFO1, LFO2

These sources provide the output from LFO1 and LFO2.

#### Env Follower

The Env Follower source provides the output from the Envelope Follower module.

#### S&H

The S&H source provides the output from the Sample & Hold module.

#### Noise

The Noise source provides a white noise source, quantized to control rate. It provides an continually changing random source.

### Internal sequencers

#### SEQ1, SEQ2, SEQ3

These sources provide the output from Bloom's 3 built-in step-sequencers.

### MIDI-generated sources

Because the following sources are generated from incoming MIDI note-on messages, it is only possible to generate the following sources when sending MIDI notes to Bloom.

#### Velocity

The Velocity source provides a source generated at every MIDI note-on derived from the note's MIDI velocity.

#### Pitch

The Pitch source provides a keyboard tracking modulation source generated from MIDI notes received on channels 2-16 of Bloom's MIDI input.

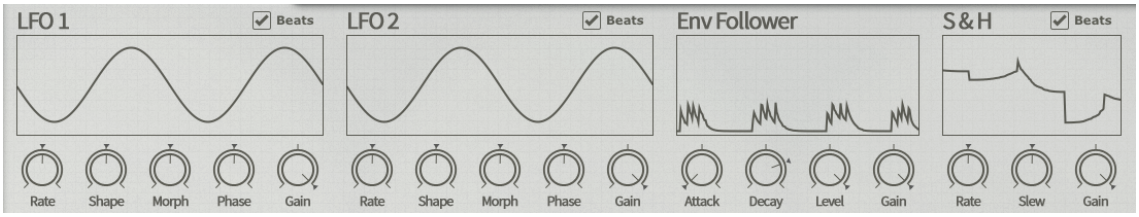
An interesting use for this source would be to route some MIDI notes to a synth and into Bloom, using the Pitch TransMod source to modulate the Delay time parameter. This results in changing the Delay time depending on pitch of each MIDI note received.

#### Rand

The Rand source provides a random value generator that changes value every MIDI note is received at Bloom's MIDI input on any MIDI channel.

Try the same example as described above for the Pitch source, using the Rand source instead - a random Delay time is produced for each note.

## 3.3 Bloom internal modulators



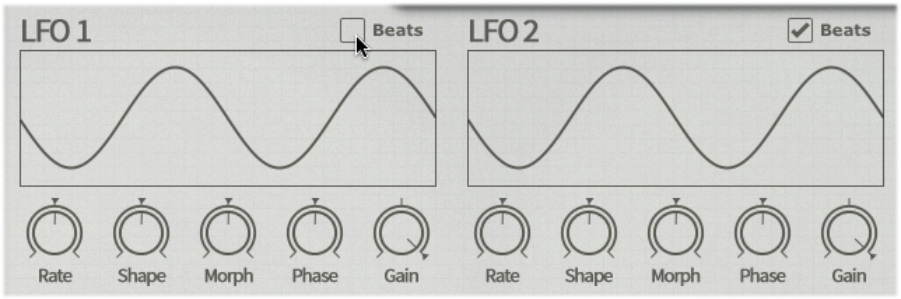

Bloom features several internal modulator devices which can be used to modulate parameters within Bloom. The controls of each modulator can themselves be modulated, resulting in potentially very complex and interesting sonic results.

If the Sequencers or EQ/Routing page is currently displayed, click on the **Mods** tab in order to switch to the Modulators page.

Bloom contains 2 LFOs, an Envelope Follower which responds to the amplitude of the incoming signal and a Sample and Hold that can be used to generate 'random LFOs'.

Modulators are assigned to destination parameters using the TransMod modulation system.

## 3.3.1 LFO1 and LFO2




Bloom's 2 LFOs can operate at speeds of up to 1024 Hz.

The LFO modules' Visualizers represent the current LFO shape.

### Sync button

With the **Sync** button enabled, the **Rate** control is set in BPM values derived from the tempo of the host within which Bloom is running.

With the **Sync** button disabled, the **Rate** control is set in Hz.

### Rate

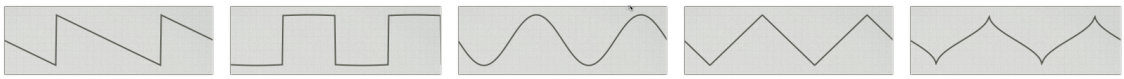
The **Rate** control dictates the speed of the LFO's oscillation.

Bloom also responds to certain MIDI notes to switch between sync'd LFO rates on the fly, even with the **Sync** button disabled.

### Shape

The **Shape** control morphs the shape of the LFO continuously through various waveform shapes.

At the default setting of 50%, the LFO shape is a sine wave.



LFO Shape 0% LFO Shape 25% LFO Shape 50% LFO Shape 75% LFO Shape 100%

### Morph

The **Morph** control shifts the centre point of the waveform without altering the wavelength. It is similar to a pulse width control in that it varies the duty cycle of the waveform.

### Phase

The **Phase** control allows you to adjust the phase of the LFO within 360 degrees.

**Note**: This control cannot be modulated with the TransMod system.

### Gain

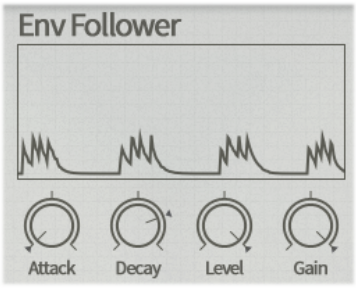
The **Gain** control offers a final attenuation control for the output of the module before it enters the TransMod modulation system. At 100%, no attenuation is applied to the output modulation signal.

This control is intended to be modulated by other TransMod sources, in a similar way to using a VCA to scale one modulation source with another in an analogue modular system.

### MIDI note functions

Bloom's LFOs respond to incoming MIDI notes for resetting to the start phase and for setting various sync'd delay times. See the Advanced MIDI functions section for details.

## 3.3.2 Envelope Follower




An envelope follower produces a modulation signal by reacting to the amplitude of an audio input signal.

The Envelope Follower module's Visualizer represents the real-time output of the module.

### Attack

This control sets the **Attack** time of the envelope generated in response to a new detected transient.

### Decay

This control sets the **Decay** time of the generated envelope.

### Level

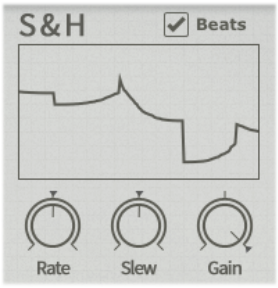
The **Level** control allows you to attenuate the level of the signal entering the envelope follower transient detection circuit. At 100%, no attenuation is applied on the signal.

### Gain

The **Gain** control offers a final attenuation control for the output of the module before it enters the TransMod modulation system. At 100%, no attenuation is applied to the output modulation signal.

This control is intended to be modulated by other TransMod sources, in a similar way to using a VCA to scale one modulation source with another in an analogue modular system.

### 3.3.3 Sample and Hold (S&H)




A Sample and Hold (S&H) is designed to output a stream of varied modulation values - typically random values derived from a dedicated noise signal to produce a 'random LFO'.

The S&H module's Visualizer represents the real-time output of the module.

#### Sync button

With the **Sync** button enabled, the **Rate** control is set in BPM values derived from the tempo of the host within which Bloom is running.

With the **Sync** button disabled, the **Rate** control is set in Hz.

#### Rate

The S&H module is driven internally by a series of pulses called a clock, the speed of which is dictated by the **Rate** control. When a clock pulse occurs, the dedicated internal noise signal is 'sampled' - its current value is 'snapshotted' - and held constant at the sampled value until the next clock pulse, when the process repeats.

#### Slew

This control introduces slew, or 'lag', between each sampled and held value, resulting in a smoother transition between values instead of abrupt changes with the control at the minimum setting (fully anti-clockwise).

#### Gain

The **Gain** control offers a final attenuation control for the output of the module before it enters the TransMod modulation system. At 100%, no attenuation is applied to the output modulation signal.

This control is intended to be modulated by other TransMod sources, in a similar way to using a VCA to scale one modulation source with another in an analogue modular system.

## 3.4 Bloom internal sequencers

Bloom features 3 step-sequencer devices which are used to modulate parameters within Bloom. They are useful for adding subtle to extreme variation of Bloom's behaviour over time. To view and edit these step-sequencers, click the **Seqs** tab if the Modulators or EQ/Routing page is currently displayed.


With the exception of the Alternative Delay/Freeze/Reverse modes, the modulation values generated by the sequencers are routed to parameters using the TransMod modulation system's Seq1, Seq2 and Seq3 sources.

### Sequencer modes

Each of the 3 sequencers can be used in either of 2 modes.

#### Default mode

By default, each sequencer simply operates as a generic CV-style step-sequencer which outputs its values to the TransMod modulation system in order to be assigned to and modulate any parameters within Bloom.

#### Delay/Freeze/Reverse mode

Each sequencer can be switched to an alternative mode which overrides the usual 'CV-style' approach to the sequencers' values.

These modes operate outside the TransMod system and modulate the relevant controls directly. In fact, the Freeze and Reverse modes allow you to modulate parameters that cannot otherwise be modulated using the TransMod system.

The output of each sequencer is still available using the Seq1, Seq2 and Seq3 TransMod modulation sources, although they are quantized according to each function.

**Note:** When one of these modes is active, its corresponding parameter on the Bloom interface is disabled - it is unable to be directly manipulated and other TransMod modulation signals that are routed to it are ignored.

#### Seq1: Delay mode

This mode allows a different BPM-synchronized **Delay time** on each step: each step can be set to any of 18 different BPM-based values. This mode can be used regardless of the state of the **Msec/Beats** switch.

The Seq1 TransMod source is also quantized to 18 equally-distributed values between 0 and 1 (or -1 and 1 in bipolar mode).

#### Seq2: Freeze mode

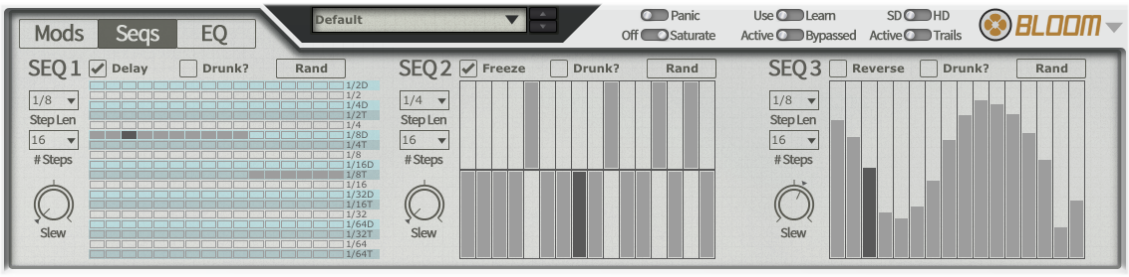
This mode offers an on/off setting on each step for the delay's **Freeze** function.

The Seq2 TransMod source is also quantized to 2 values.

#### Seq3: Reverse mode

This mode offers an on/off setting on each step for the delay's **Reverse** function.

The Seq3 TransMod source is also quantized to 2 values.




**In this example, Seq1 has been set to Delay mode, meaning that each step sets a BPM-based delay time. The first 10 steps are set to 1/8 dotted notes, with the remaining steps set to 1/8 triplets.**
**Seq2 is set to Freeze mode, with its steps representing Freeze on/off states.**
**Seq3 is running in the default variable CV-style mode for modulating parameters via the TransMod system.**

**Seq1 and Seq3 are running at 1/8 note steps, while Seq2 is running at 1/4 note steps.**

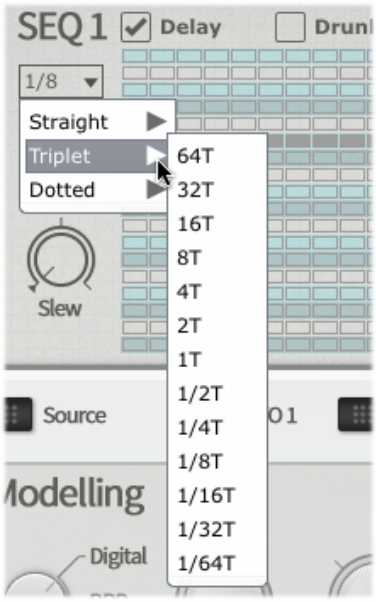
## Common sequencer controls

### Step Len (Step Length)

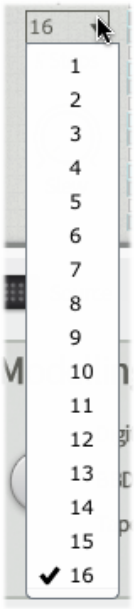
This parameter sets the length of each sequencer step in terms of a division of the host's tempo, from 1/64 notes to 64 bars in straight, triplet and dotted versions.

### # Steps (Number of steps)

This control specifies the number of steps in the sequence, between 1 and 16.




**Setting the Step length**




**Setting the number of Steps**

### Slew

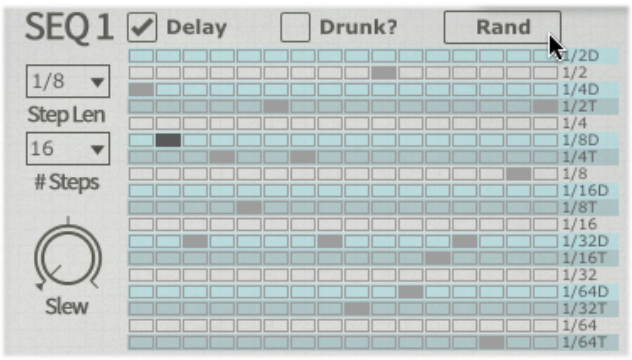
This control introduces slew, or 'lag', between values on each step of the sequencer, meaning that transitions between them are smoothed rather than abrupt.

### Rand

The **Rand** control is a momentary button - when clicked, it randomizes the entire series of values within the sequencer.

### Drunk?

This control allows you to choose between regular forward progression between steps (when deactivated) and an alternative mode which introduces jitter and random changes of direction (when activated).




**Clicking the Rand button to introduce a random delay time for each step in Seq1 running in Delay mode.**

# 4 MIDI functions

Bloom features extensive MIDI control features for interacting with its parameters in real time.

MIDI control of Bloom is *host-dependent*. Some hosts make it very easy to route MIDI notes and/or continuous controllers to an effect plugin, but in some it may be necessary to run Bloom as an instrument or MIDI-controlled effect on a separate channel and route the desired audio to its input(s).

Please consult your host's documentation for full details of its MIDI implementation for audio effect plugins.

Bloom features 2 kinds of MIDI control:

### MIDI CC input

Bloom allows the ability to assign MIDI CC (continuous controller) messages to the following:

- its parameters
- parameter modulation amounts from individual TransMod modulation sources.

See the MIDI Learn section for full details on Bloom's MIDI mapping functions.

### MIDI note input

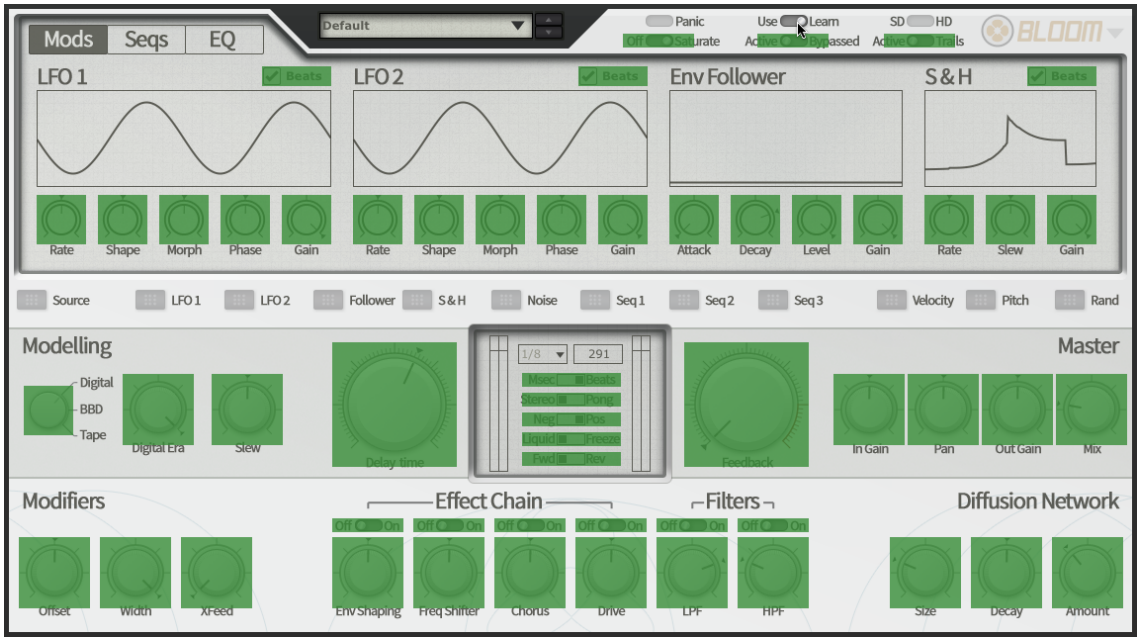
Bloom responds to MIDI note input for retriggering and setting LFO rates as well as for generating several TransMod modulation sources. See the Advanced MIDI section for more details.

## 4.1 MIDI Learn mode

Bloom's MIDI Learn mode allows you to map MIDI CCs (continuous controllers) to Bloom parameters, and to parameter modulation depths from TransMod sources. Being able to send MIDI to Bloom or any other audio effect is *host-dependent*.

MIDI Learn CC setups are saved with the host project containing Bloom. They are not saved within individual Bloom presets (saved using Bloom's Preset picker).

### Mapping a MIDI CC to a control




**1. Click the MIDI Learn button to enter Learn mode. Parameters in Bloom which can be mapped to MIDI CCs are highlighted in green. Note that no TransMod modulation source is currently selected.**


**2. Click the parameter you want to map on the Bloom interface.**

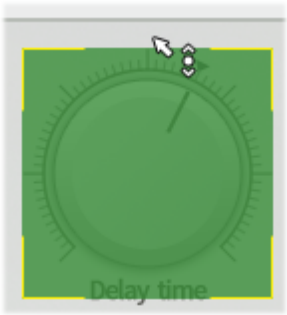
**3. Move the physical MIDI CC knob, slider or other controller you want to use.**


4. The parameter is now mapped. The MIDI channel and CC number are overlaid on the control.


5. Click the MIDI Learn button again to exit Learn mode.

### Removing a MIDI Learn assignment


1. While in MIDI Learn mode, click the 'X' button above each assigned control.



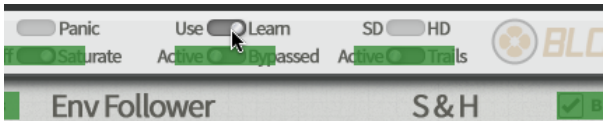

2. The assignment is now removed.

### Mapping a MIDI CC to a control's modulation depth for a TransMod source

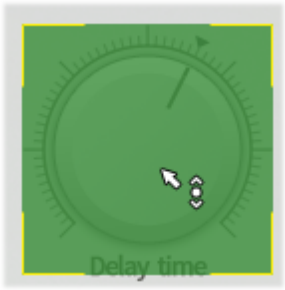
It is possible to assign individual controls' TransMod modulation depths to MIDI CCs.

This is useful for changing the amount of modulation over time for a specific parameter, and is usually only possible for filter FM from the LFOs using the **FM** controls in Filter1/Filter2.


1. Click the desired TransMod modulation source button.




2. Click the MIDI Learn button to enter MIDI Learn mode.




3. Click the parameter you want to map on the Bloom interface.

4. Move the physical MIDI CC knob, slider or other controller you want to use.


5. The parameter's modulation depth for the current TransMod source is now mapped. The MIDI channel and CC number are overlaid on the control.


6. Click the MIDI Learn button to exit MIDI Learn mode.

## 4.2 Advanced MIDI functions

Bloom responds to MIDI note input in a variety of performance-oriented ways. You can define a separate MIDI channel for each of these types of MIDI input control using the MIDI panel located in the Options menu.

Sending MIDI to Bloom is *host-dependent*.

### LFO control

Both LFOs respond to MIDI note input for retriggering their phase and for setting their rate to BPM-based values.

The following MIDI note octave numbers assume that C-2 is the lowest MIDI note (MIDI note 0).

| Note | Note no. | Function |
|---|---|---|
| D-2 | 2 | Retrigger LFO1 module |
| D#-2 | 3 | Retrigger LFO2 module |
| | | |
| F-2 to G1 | 5-43 | LFO1 Rate: 64 bars (dotted) to 1/64th note (triplet) [also retriggers LFO1 phase] |
| | | |
| G#1 to A#4 | 44-82 | LFO2 Rate: 64 bars (dotted) to 1/64th note (triplet) [also retriggers LFO2 phase] |

### Generation of Pitch, Velocity and Random TransMod sources from MIDI notes

MIDI note input is used for generating several modulation sources within the TransMod system.

#### Velocity

MIDI note velocity is converted to the Velocity source at every note-on.

#### Pitch

MIDI note pitch is converted to the Pitch keyboard tracking source at every note-on.

#### Random

A random number is generated when every MIDI note-on is received.

### MIDI panel

The MIDI panel is evoked using the Options menu. It allows you to choose which MIDI channels to use for various MIDI functionality.


The following settings allow you to specify MIDI channel 1-16 or Omni for all channels.

**LFO MIDI Channel**

This allows you to set the MIDI channel for MIDI notes for retriggering and setting LFO rates.

**Pitch MIDI Channel**

This allows you to set the MIDI channel for MIDI notes to generate the Pitch TransMod source.

**Velocity MIDI Channel**

This allows you to set the MIDI channel for MIDI notes to generate the Velocity TransMod source.

**Rand Retrigger MIDI Channel**

This allows you to set the MIDI channel for MIDI notes to generate values for the Random TransMod source.

**Apply**

Click this button to apply the new settings and exit the MIDI panel.

**Store as default**

Click this button to store the current settings as the defaults used when launching an instance of the Bloom plugin.

**Restore default**

Click this button to restore the settings currently saved as the defaults.

**Cancel**

Click this button to cancel any changes to the previous settings and exit the MIDI panel.