



# Kaleidoscopes

## User Guide



# Kaleidoscopes

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# Introduction

Thank you for choosing Waves! In order to get the most out of your new Waves plugin, please take a moment to read this user guide.

To install software and manage your licenses, you need to have a free Waves account. Sign up at [www.waves.com](http://www.waves.com). With a Waves account you can keep track of your products, renew your Waves Update Plan, participate in bonus programs, and keep up to date with important information.

We suggest that you become familiar with the Waves Support pages: [www.waves.com/support](http://www.waves.com/support). There are technical articles about installation, troubleshooting, specifications, and more. Plus, you'll find company contact information and Waves Support news.

Nearly every instrument in a mix can use more depth, air, and movement—in short, a deep stage on which to play. Sometimes, particularly in electronic music, you want to push further, employing phasing effects that move with attitude. Engineers can raise depth with reverb and delay, but this can become overwhelming. A little-known trick is to add a range of modulations to the signal, managing their triggers. Together, controlled modulations can add depth, life, and motion to a mix.

**Waves Kaleidoscopes** makes applying and managing such effects simple, efficient, and creative.

The Kaleidoscopes plugin combines two modulation effects engines and two independent triggers in one package. Its dual **Effects** processors, which create phase and amplitude modulations, can be cascaded so that one effect dances with the other—or can be run in parallel, for independent processing. The **Trigger** section decides when an effect begins and ends. You can define a trigger in several ways and even make one trigger master over the other. Triggers can be as simple or complex as you demand.

Kaleidoscopes is more than triggers and modulators. Its sections can create seamless effects, from subtle depth enhancement to in-your-face phase changes. Everything is a meeting of effects, triggers, and your imagination. In Kaleidoscopes, you can discover a new playing partner who does not just follow along, but actually plays with you



# Getting Started

You can learn to use Kaleidoscopes by experimenting with its controls and listening to where that takes you. However, to speed your learning, we made the following tutorial that focuses on plugin issues and controls.

Use the bar at the top of the plugin to save and load presets, compare settings, undo and redo steps, and resize the plugin. To learn more, click the icon at the upper-right corner of the window and open the WaveSystem Guide.

Begin with factory default settings. Open an instance of Kaleidoscopes or choose **Default** from the presets menu on an already opened plugin. For the clearest results, we suggest that you work with sustained sounds, such as on a piano, Rhodes piano, sustained guitar, or vocal.

The next section will list and describe the plugin controls.

## ONE-EFFECT FLANGER

1. Choose a phaser for **Effect 1** and a flanger for **Effect 2**. For now, turn the **On/Off** switch off for Effect 1.
2. Raise Effect 2's **Feedback** control to 65, so the flanger is deeper and more prominent.
3. Go to the **Character** control and toggle between the settings, noting how the tonality changes with each setting.
4. Slowly raise the **Manual Depth** to 33 and listen to how the comb effect of the flanger occurs at ever-lower frequencies.
5. Bring **Depth** to 13 to hear the sweep in the upper frequencies. Slowly increase the Depth to 50, listening to how the sweep tone changes.
6. Increase the **Speed** for a fast effect or lower it to 0.20 for a slow, sweeping flanger.
7. Choose chorus. The settings you just used for a flanger effect will now produce a rich chorus. Return to the flanger to compare.
8. In the **Mixer** section, add some harmonic distortion using the **Drive** control.



## ADD A SECOND EFFECT AND USE PARALLEL PROCESSING

The next step is to activate Effect 1 and process the effects in parallel. That way, rather than linking one processor output to the input of the other, both effects units are sent straight to the output. Effect 1, the phaser, is sent to the left, while Effect 2, the flanger, is sent to the right. Continue working where the previous section ended.

1. Turn on Effect 1.
2. Note that the modulator type is set to **Input** by default, meaning that the audio entering the plugin is the modulator itself.
3. Raise the **Mix** to 50, to better hear the phaser effect.
4. Raise the depth to increase the range of the phaser sweep. The phaser effect should now be evident.
5. Set the **Minimum Frequency** of the phaser range to 1000 Hz, so the sweep ranges from 1000 Hz to the maximum frequency setting.
6. Choose parallel (**PrI**) on the **Serial/Parallel** toggle, noting that the mix controls for each effect have become level controls. This indicates that the effects are not chained, but each routes directly to the output mixer.
7. In the mixer section, slide the **Dry** control fully to the left, so that you hear only the output of the two effects.
8. In the mixer section, rotate Effect 1 fully to the left using **Rotate 1**, then rotate Effect 2 fully to the right with **Rotate 2**.
9. Use the **Level** control for each effect to create the balance you like, with phasing on the left and chorusing on the right.
10. Reintroduce the dry signal to the sound at a setting of -6 dB.



# Components

Component	DAW Track	Routing	Notes
Kaleidoscopes mono	Mono	Mono input, mono output	
Kaleidoscopes mono-to-stereo	Mono	Mono input, stereo output	All plugin inserts later in the rack will be stereo. The rack becomes stereo.
Kaleidoscopes stereo	Stereo	Stereo input, stereo output	

# Interface

The interface offers two views, **Expanded** and **Collapsed**. The collapsed view shows the two identical effect processors and the mix section. Click the Expand/Collapse button in the right corner of the WaveSystem toolbar to reveal or hide the two Trigger sections.



Collapsed View



Expanded View



## Collapsed View: Effect Processors and Mix Section



- 1 Input Meter
- 2 Output meter
- 3 Modulation Display, Effect 1
- 4 Modulation Display, Effect 2
- 5 Effect On/Off
- 6 Effect Type Selector Tabs
- 7 Modulation Shape and Character
- 8 Modulator Controls
- 9 Output HP/LF Filters
- 10 All-pass cutoffs
- 11 Modulation Depth Control
- 12 Manual Depth Control
- 13 Plugin Input Gain
- 14 Plugin Output Gain
- 15 SC Listen
- 16 Tempo
- 17 Drive Control and Source Select
- 18 Modulator Shape Menu
- 19 Serial/Parallel Signal Path Select



## Modulation Display

The **Modulation Display** at the top of the plugin illustrates the speed and range of the modulator for each effect.

- The Effect Type (Phaser, Flanger, Chorus, or Tremolo) and Modulator Type (Sine, Triangle, Absolute Sine, Random, Input, Sidechain) dictate the basic shape of the motion.
- The speed of the dots is always based on the Speed/Sensitivity setting.
- The Depth defines the range of movement shown in the display.



### EFFECT TYPES

**Phaser** (L/R motion indicate changes in frequency): The left-most ball indicates the motion's starting point, as defined by the all-pass filter Min, Max, and Q. Depth sets the actual amount of movement.

**Flanger and Chorus** (L/R motion illustrate changes in time): Depth and Manual Depth work interactively to set the range of movement. Each impacts the signal in a markedly different way.

**Tremolo** (up and down motion indicates gain changes): The Depth knob is the only control for setting the range of motion.

On the edges of the display are two full scale meters. The meter on the left shows plugin input level, the meter on the right shows plugin output level. Click on a meter to reset the red clip indicator.



## Expanded View: Trigger

This section controls the triggering mechanism that starts, stops, and changes the signal's movement in relation to the incoming (or sidechain) signal's behavior. Threshold, energy, and frequency are used to trigger an effect. Attack and length for the trigger are also set here.



- 1 Energy/Rhythm Trigger Mode
- 2 Trigger Listen (solo)
- 3 Trigger Type
- 4 Master Trigger (priority)
- 5 Use Sidechain for Trigger
- 6 Threshold for Trigger
- 7 HP/LP filters for Trigger Input
- 8 Trigger Attack
- 9 Trigger Length

### Additional Mix Section Controls

- 10 Stereo Image Rotation
- 11 Dry Signal Level



# Controls

## *Effect 1 and Effect 2*

The two effect sections create complex phase effects through modulation. Effects 1 and 2 are identical and independent, their settings swappable to effectively change places in the signal flow.

### EFFECT TYPE

Each processor has four Effect types.



### Phaser

A phaser takes an input signal, splits it, and applies an all-pass filter to the second signal. Changing the filter cutoff alters the phase at specific frequencies. When the two signals mix, these phase differences create a whistling, phase-like sound. Adjust the phasing by changing the **Min**, **Max**, and **Q** settings of the all-pass filter.

### Flanger

A flanger takes an input signal, splits it, delays the second signal by a tiny amount, and mixes the delayed signal back into the original. This causes certain frequencies to be in or out of phase. The delay is modulated so that the in-phase or out-of-phase frequencies change constantly, creating the characteristic sweeping sound.

### Chorus

A chorus effect mixes an audio signal with one or more delayed copies of itself. The delay is modulated by an LFO, achieving a slow-changing phase difference between the copy and original. A chorus effect can add a slow, silky splash to a signal, usually more subtly than a flanger.

### Tremolo

Tremolo is modulation based on amplitude changes. It can add a feeling of motion and enliven a static sound.



## Controls Available According to Effect Type

Each effect type has its own control panel. Most controls are common to all effect types.

### PHASER



### MODULATOR

- **Modulation Shape** is a drop-down menu offering a choice of modulation shapes.
- **Modulation Rate**
  - **Speed:** When a **Sine**, **Triangle**, or **Absolute** modulator shape is chosen, speed sets the pace of the modulator's oscillation. With **Sync** on, the speed appears as musical notation. With sync off, the speed appears in Hz.
  - **Sensitivity:** When random, input, or sidechain modulator shape is selected, sensitivity controls how much the input signal affects modulation. A very high setting can yield significant modulator changes with each alteration to the envelope or the input or sidechain signals.



- **Depth** controls the range of oscillation. If, for example, Speed is set to 1.0 Hz and intensity is set to 60%, then the modulator will move only 60% of its potential range, while its speed remains 1.0 Hz.
- **Resonance** sets the phase of the effect. Negative values use all-pass filters to create negative phaser sounds. Positive values use notch filters that boost gain to create positive notch sweeps, a bit like a *wahwah*.
- **Width** controls the stereo image width. This function is only available in the mono-to-stereo and stereo components.
- **Character** provides five tonality-shaping filter options.
- **Sync** allows the processor to follow the session tempo and time signature and to quantize the speed control to the tempo measurement values. With sync on, the modulation of simple shapes—such as sine, triangle, and absolute sine—will reoccur at exactly the same time. With sync off, the modulation cycle is not reproduceable. Sync is not available for the random, input, and sidechain shapes.

#### ALL-PASS FILTER

**Q**, **Range Min**, and **Range Max** set the parameters of the all-pass filter, which determines the frequencies sent to the effect processor. Frequencies outside this range are unaffected.

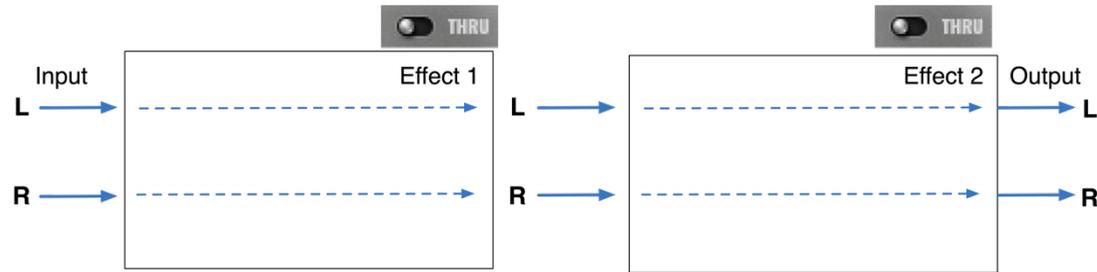
- Range Min sets the minimum frequency of the phaser sweep.
- Range Max sets the maximum frequency of the phaser sweep.
- Q sets the Q value of the all-pass filter, as defined by the range min and range max settings.

#### EFFECT PROCESSOR OUTPUT

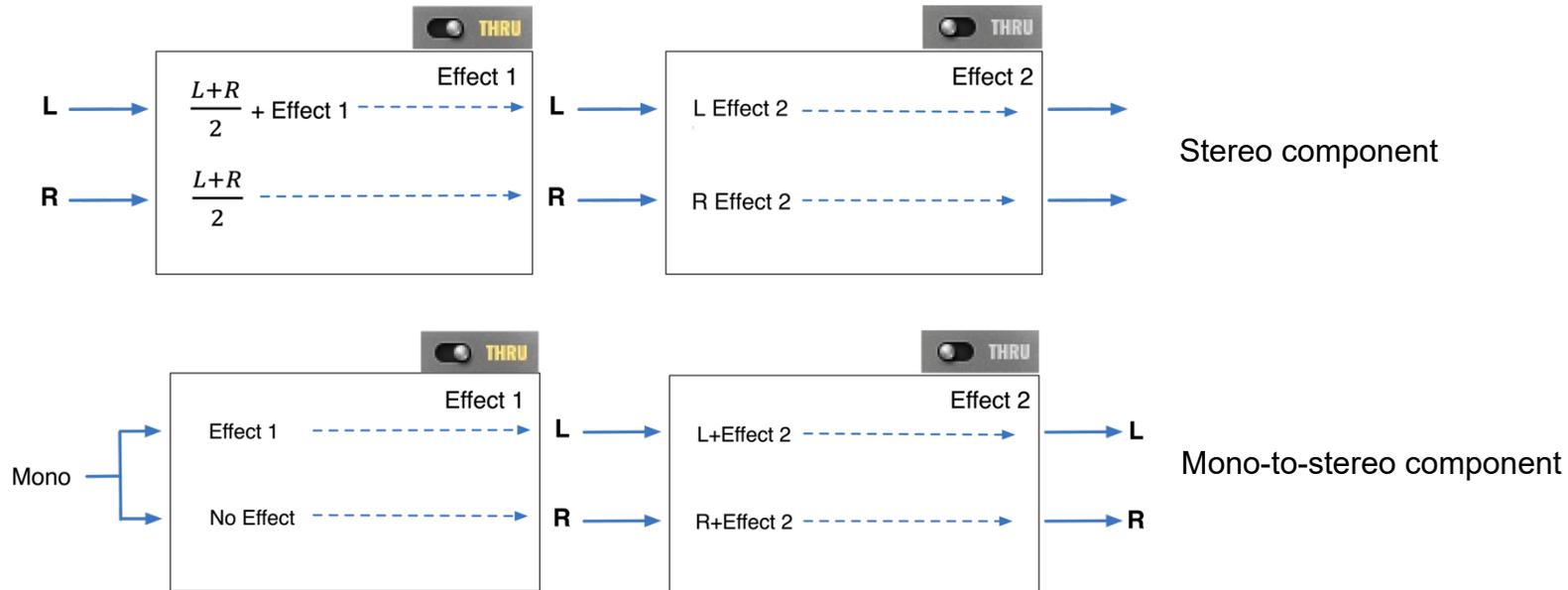
- **Mix/Level** controls the output level and wet/dry mix of the processor. It is not available when thru is selected.
  - When the mixer is set to serial, the mix knob controls the mix of the processor output with the dry signal. This mix is the input of the second processor.
  - When the mixer is set to parallel, the control becomes the level knob, setting the processor output level sent to the mixer.
- The **Low-pass filter** removes unwanted high frequencies from the output of the effects section.
- The **High-pass filter** removes unwanted low frequencies from the output of the effects section.



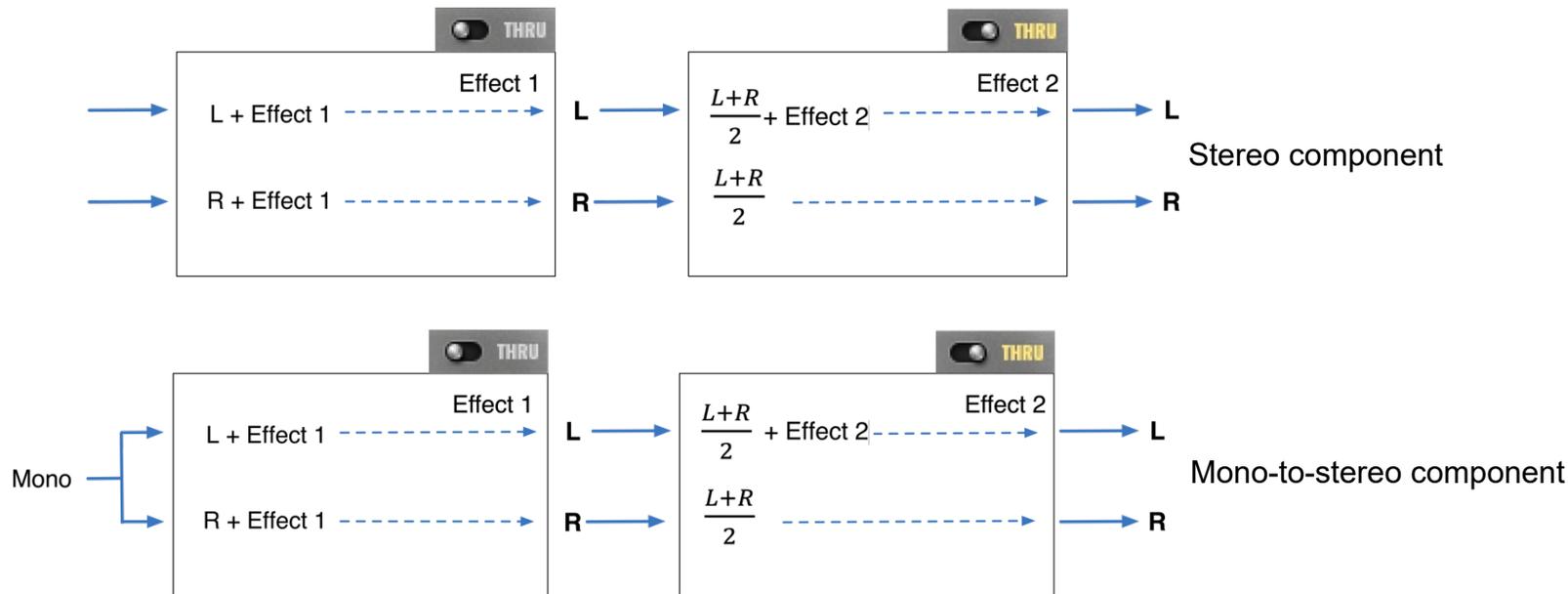
- The **Thru** mode helps you create a wide and unique stereo sound by altering the signal flow within an effect. When Thru is Off on both effects, stereo is unchanged between effects input and effects output, as shown here.



When an effect is in the Thru mode, its signal flow, and hence the stereo image, is altered. In the diagram below, Effect 1 is in Thru mode. The Effect 1 input signal is summed and combined with the output of the effect. This becomes the left output of the effect. The effect's right output is the sum of the input channels, without any added effect.



The effect that is not in the Thru mode (in this example, Effect 1) does not alter the stereo image of the signal as it passes through it. Use its Mix control to adjust the balance between the two effects. This changes the nature of stereo perception. Swap Thru between the two effects and you will likely hear strong differences.



**Thru** is available only in the stereo and mono-to-stereo components and only in the serial mode.



## FLANGER AND CHORUS



The controls for the flanger and chorus effects processors are identical.

### MODULATOR

- **Modulation** is a drop-down menu with a choice of modulation shapes.
- **Modulation Rate**
  - **Speed:** When sine, triangle, or absolute modulator is selected, the speed control sets the speed of the modulator oscillation. With sync on, the speed appears as musical notation. With sync off, the speed appears in Hz.
  - **Sensitivity:** When random, input, or sidechain modulator shape is selected, sensitivity controls how much the input signal affects modulation. A very high setting can yield significant modulator changes with each alteration to the envelope or the input or sidechain signals.
- **Feedback** controls the amount of signal returned to the modulator.
- **Width** controls the width of the stereo image. This is available only in the mono-to-stereo and stereo components, and not in serial mode when thru is selected.



- **Character** provides five tonality-shaping filter options.
- **Depth** controls the range of oscillation. If, for example, Speed is set to 1.0 Hz and intensity is set to 60%, then the modulator will move only 60% of its potential range, while its speed remains 1.0 Hz.
- **Manual Depth** sets the amount of pure delay added to the copied signal, changing the tonality at the point where the sweep is active. The flanger's comb effect occurs at lower frequencies as the manual depth increases. The depth and manual depth affect each other strongly.

## EFFECT PROCESSOR OUTPUT

- **Mix/Level** controls the output level and wet/dry mix of the processor. Not available when *Thru* is on.
  - With the mixer set to serial, the mix knob controls the mix of the processor output with the dry signal. This mix is the input of the second processor.
  - With the mixer set to parallel, the control becomes the level knob, setting the processor output level sent to the mixer. The **Lowpass Filter** is used to remove unwanted high frequencies from the output of the effects section.
- The **Low-pass filter** removes unwanted high frequencies from the effects section output.
- The **High-pass filter** removes unwanted low frequencies from the effects section output.



## TREMOLO



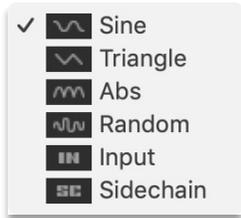
### MODULATOR

- **Modulation Shape** is a drop-down menu used to select between modulation shapes.
- **Modulation Rate**
  - **Speed:** Choosing a sine, triangle, or absolute modulator sets the speed of the modulator oscillation. With sync on, the speed appears as musical notation. When off, the speed appears in Hz.
  - **Sensitivity:** When random, input, or sidechain modulator shape is selected, sensitivity controls how much the input signal affects modulation. A very high setting can yield significant modulator changes with each alteration to the envelope or the input or sidechain signals.
- **Depth** controls the range of oscillation. If, for example, Speed is set to 1.0 Hz and intensity is set to 60%, then the modulator will move only 60% of its potential range, while its speed remains 1.0 Hz.
- **Character** provides five tonality-shaping filter options.
- The **Low-pass filter** removes unwanted high frequencies from the section output.
- The **High-pass filter** removes unwanted low frequencies from the section output.



## Modulators

### MODULATOR SHAPES



The moderator drop-down menu sets the modulator shape.

## Swap Effect Presets



Use the double-arrow swap settings in effects 1 and 2 to effectively change the order of the signal flow. This toggle is not available when the serial/parallel processing control is set to parallel.

## Expand View Button



Click on the Expand/Collapse button in the upper-right corner of the display to open the Trigger section at the bottom of the plugin.



## Trigger Section

The Trigger section sets how the input signal will activate the effects processors. The trigger section can also determine how the output of one processor triggers the other.



### TRIGGER MODE

**Energy** acts like a straightforward gate: any sample that passes above the threshold will trigger the effect.

**Rhythm** uses detected transients to trigger the signal. The level of the signal has no effect on triggering: only the transients set the condition for the trigger.

### TRIGGER TYPE

Use the drop-down menu to set trigger behavior.



**Off:** Effects processing is not initiated through the trigger.

**Simple:** The plugin waits for the signal to exceed the threshold. Once the signal passes the threshold, movement begins until the user stops it.

**Re-Trigger:** Movement begins when the input signal passes the threshold. When the signal falls below the threshold, movement ends. The result is a rhythm that correlates with the cycle.

**One Shot:** The plugin waits for the signal to pass the set threshold, at which point it completes the defined path, then stops. One shot is unavailable with Random, Input, and SC modulators.

Note: If the signal is still above the threshold when the settings cause movement to stop, movement will continue for additional round, stopping only when the signal is below the threshold at the end of the path.



**Master** assigns priority to a trigger when both triggers are activated.

Example: Trigger 1 is set to re-trigger, and Trigger 2 to one shot. Trigger 2 is set to master. If both triggers pass their set conditions, Trigger 2 will override Trigger 1 until it finishes its cycle. Trigger 1 will then begin its motion and continue until Trigger 2 is reactivated. The activity of the kaleidoscopes reflects this handing off from one trigger to the other.

**Listen** solos the detected signal for the trigger section. This enables you to listen to the detection in order to adjust the settings for the trigger.

**SC** uses the sidechain signal as the source for triggering.

## TRIGGER CONTROLS

**Threshold:** When the trigger mode is set to energy, the threshold sets the input level above which the trigger will activate and effects processing begins. The kaleidoscope image shows when the trigger has activated the effect processor.

**Sensitivity:** When the trigger mode is set to rhythm, sensitivity controls how much the input signal affects modulation. A very high setting can mean significant modulator changes with each alteration to the envelope or the input or sidechain signals.

**HP** removes low-frequency information from the input signal or sidechain signal feeding the trigger mechanism. This can help you focus on specific frequencies sent to the trigger, to better control how the trigger operates. It is useful when judging how a specific instrument will activate the trigger.

**LP** removes high-frequency information from the input signal or sidechain signal feeding the trigger mechanism.

**Attack** defines the speed at which the trigger opens once the threshold is exceeded. In rhythm mode, attack will define the character of the transient. A lower setting detects faster transients, while longer settings allow longer events to be detected as transients.

**Length** sets the amount of time the trigger will remain open from when it first opened. With sync off, the length duration appears as time in milliseconds. With sync on, the length appears as tempo measurements.



## Mixer Section



The Mixer section controls drive, input and output levels, and effects rotation.

**Input** controls the plugin input level.

**Output** controls the plugin output level.

**Rotation 1** rotates the Effect 1 signal left or right in parallel mode, in the mono-to-stereo and stereo or components.

**Rotation 2** rotates the Effect 2 signal left or right in parallel mode, in the mono-to-stereo and stereo or components.

When **BPM** is on, Kaleidoscopes will sync to tempo selected in the value box. When BPM is off, Kaleidoscope will not sync to the selected tempo, but rather it will grab the session tempo or use a default of 120 BPM.

**SC** lets you listen only to the sidechain signal only.

**Drive** increases the input to the dynamic processor, reducing the output correspondingly. The drive control can achieve more processing without changing the signal loudness. Choose the drive source via a three-position switch below the drive control.

- Off      No drive processing
- Pre      Drive is applied to the input signal.
- Post     Drive is applied to the output signal.

