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# *Delay Troll Beta User Manual*

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*Control every delay in every way*

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## Controls

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Figure a

## Main view

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List of controls and what they do (figure a)

1. Delay Gear:	The total number of delays	2-64
2. Feedback:	The percentage fed back into the delay line	0-100%
3. Mix:	How wet/dry the output of the effect is	0-100% (wet)
4. Smooth:	How fast the delay taps move (See concepts)	0-100%?
5. Min Time	The delay time of the first delay tap	0-max time ms
6. Gravity	changes the distribution of the delays	0-100%?
7. Max Time	The delay time of the last delay tap	min time – 10 s
8. Eject button	Expands the automation view	on/off
9. Curve type	Selects the type of automation	Bezier/Lfo
10. Preset controls	save, delete, new, select presets	various
11. Curve selector	selects the automation curve for editing	previous/next
12. In/out level	controls overall input output level for plugin	0 - -48dbfs
13. Input meter	displays the input signal level	n.a.
14. Output meter	displays the output signal level	n.a.
15. Tab selector	selects the time, level, eq...etc. tabs	list
16. Control dropdown	selects the method of control for current tab	list
17. Quantization grid	selects how the quantization grid will be divided	list

## Time Tab



Figure b

The Time tab controls the times of each of the delays taps, Delay Troll gives the user a variety of ways to accomplish this task. Figure b 1 is a drop-down menu that allows the user to select how they want to control the times of each of the delay taps. The options are as follows:

- I. Gravity: Using the gravity gear (Figure a-6) to make the delay taps denser towards the first or last delay depending on the direction of the gear.
- II. Manual Control: The user can manually select each delay tap and move it horizontally on the display to the desired time.
- III. Divisions: The user can select a delay and make it a dividing delay and manually drag it horizontally on the display to its desired time. All delay taps between dividing delays will be distributed evenly in time. To remove a dividing delay simply double click the delay.
- IV. BPM Sync: The Min time and Max time (Figure a-5/7) will sync to the DAWs BPM and the distribution of the delay times will be controlled using the gravity gear (Figure a-6). In this mode the Quantization amount drop-down will be selectable (Figure b-2) and will change how the beat is divided.
- V. Quantized Delays: like manual mode but the delay taps will snap to the nearest grid corresponding the selected quantization amount (Figure b-2).

## Level Tab



Figure c

The Level tab controls the playback level of each individual delay tap. Delay Troll Provides a Bezier curve to set a pattern, to learn more about how Bezier curves work in delay troll see concepts. The level of each delay tap can also be controlled individually by selecting manual from the control drop down (figure c-1)

## Eq Tab



Figure d

The EQ tab controls the Hi/Low pass frequency for each of the delay taps as well provides a bypass switch (figure d-2) to save computing resources when not in use. When the control drop down (figure d-1) has Bezier selected the Hi/Low pass frequency can be controlled with 2 Bezier curves. Since two curves share the same display one curve will be brighter than the other to indicate to the user which curve they are currently editing. Another consequence of having 2 curves is that it is possible for you to set a delay tap's highpass frequency that is higher than that same delay tap's lowpass frequency. This will simply result in that delay tap being silent as you might expect. Finally, each delay tap's Hi/Low pass frequency can be set individually by selecting manual from the control drop down.

## Pitch Tab



Figure e

The Pitch Tab controls the transposition amount of each of the delay taps as well as provides a bypass switch (figure e-2) to save computing resources when not in use.

When the control drop down (figure e-1) has Bezier selected the transposition of each delay tap is controlled by a Bezier curve. The transposition of each delay tap can be set manually by clicking on the line representing said delay tap and dragging it vertically. Quantized mode works similarly to manual mod however the transposition amount will snap to the nearest semitone.

## Pan Tab

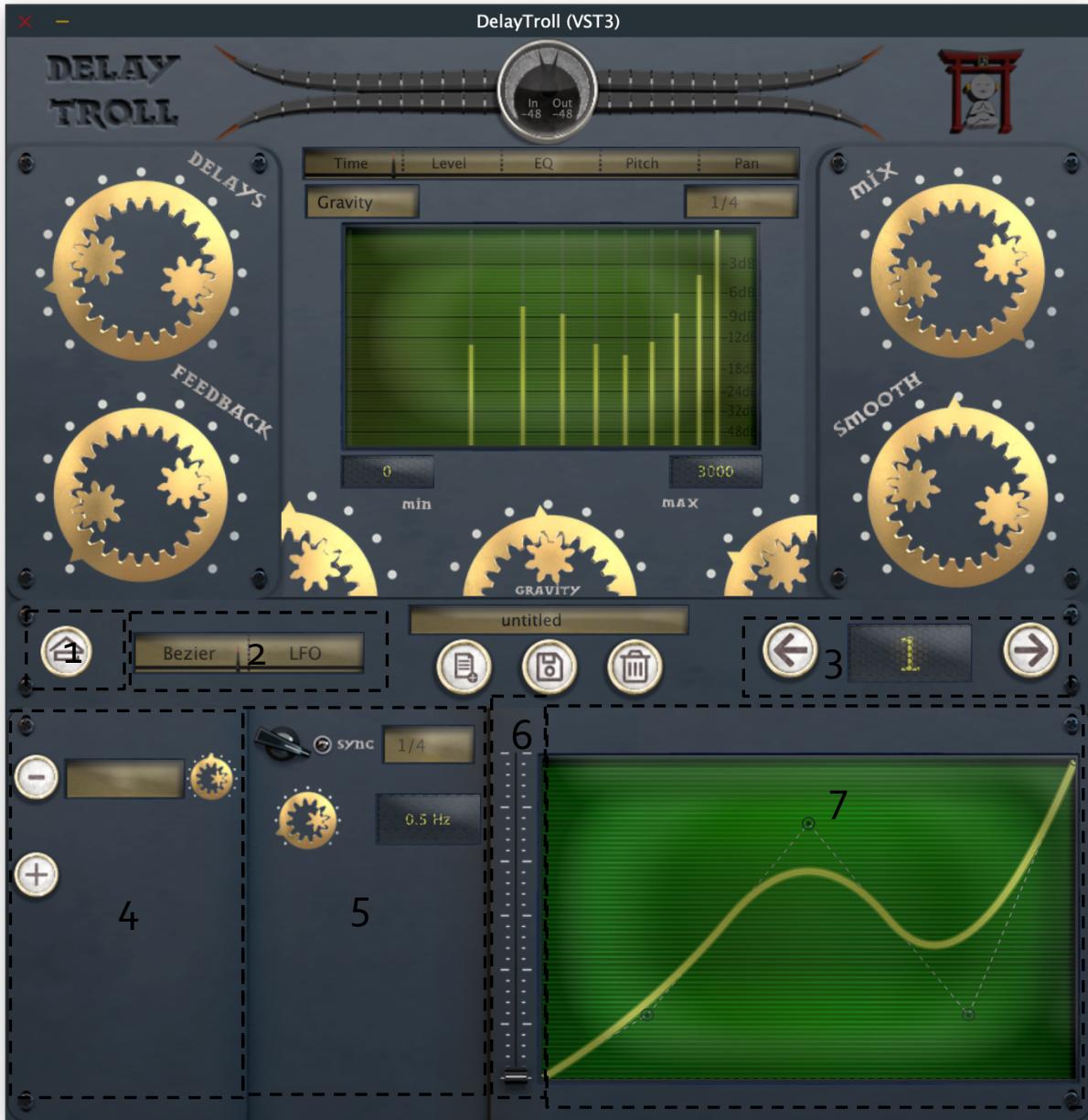


Figure f

The Pan Tab controls the Stereophonics of each of the delay taps. Delay Troll gives the user a variety of ways to accomplish this task. Figure f-1 is a drop-down menu that allows the user to select how they want to control the stereophonics of each of the delay taps. The options are as follows:

- I. Manual: The user can select the individual playback level of each of the delay taps channels Left channel on top and right channel on the bottom. A full line from top to bottom means each of the delay tap's channels will playback without attenuation. Dragging the top half down towards the centre and the bottom half towards the centre will attenuate the left/right channel respectively.
- II. Bezier: 2 Bezier curves are provided to set the playback level of each of the delay taps channels, again left channel on top and right channel on the bottom.
- III. Manual Balance: The user can control the individual balance between the right/left channel of each of the delay taps as a percentage. Left on top and right on bottom so a line from the centre extending up to the 60% mark would have a playback level in the left channel of 100% and 40% ( $100\%-60\%=40\%$ ) in the right channel.
- IV. Bezier Balance: The user can control the balance between the right/left channels of the delay taps with a Bezier curve.

## Automation View



**Figure g**

### List of Controls:

- |                    |   |               |
|--------------------|---|---------------|
| 1. Eject Button    | Expands/Hides the automation panels                 | on/off        |
| 2. Type Selector   | Selects the type of curve being edited              | Bezier/LFO    |
| 3. Curve Selectors | Selects the automation curve for current editing    | previous/next |
| 4. Assign Panel    | Assigns the currently selected curve to a parameter | multiple      |
| 5. Control Panel   | Controls parameters specific to the selected curve  | multiple      |
| 6. Polarity        | Controls the polarity of the selected curve         | 0-100         |
| 7. Curve Displays  | Displays the curve selected                         | n.a.          |

## Curve and Type Selectors

Using the Curve selector tab (figure g-2) the user can customize and assign 2 types of automation curves: Bezier Curves and LFO's. Bezier Curves in this context are Delay Trolls answer to Massive X's Performer automation and its use is covered in the concepts section of the manual. LFO's are additive in delay troll meaning that multiple wave types can be added to each LFO providing near infinite variety.

Each Curve type has 10 different curves that can be assigned to various parameters resulting in 20 total automation curves. The curve identification number is displayed in the middle of the curve selectors section (figure g-3). The user can navigate between the automation curves by clicking the previous/next arrow buttons to the left/right of the curve identification number display.

## Assign Panel



The Assign Panel (figure g-4) is where the automation curves get assigned to parameters.

To start select a parameter from the parameter drop down (figure h-2). Then set the desired depth with the depth gear (figure h-3). If you want to add an additional parameter to be controlled by the selected curve, then simply hit the plus button (figure h-4) and repeat the previous 2 steps. Finally, if you want to remove a parameter simply hit the minus button next to the parameter you want to remove (figure h-1). Once assigned a semi-transparent ring will appear around the parameter being modulated with a radial distance equivalent to the depth assigned to it.

Figure h

## Control Panel



Figure i

The Control Panel is where the user sets parameters particular to the selected automation curve.

When editing a Bezier Curve the user can choose whether to sync the curve with the DAW's BPM with the sync switch (figure i-1). If in sync mode the user can select how they want the beat divided by selecting the desired fraction from the drop down menu (figure i-2). Finally the user can set the speed of the automation using the gear (figure i-3).



Figure j

When Editing an LFO The user has all the controls as a Bezier Curve with a few additional controls for the LFO wave/waves. First the user can select the wave type from the drop-down menu (figure j-2). Then the user can control the period amplitude and phase of the wave with their corresponding gears (figure j-3). The Amplitude gear goes from -1 to 1 so the wave can be inverted. If the user wants add complexity multiple waves can be added to form one automation curve by hitting the plus button (figure j-4). The user can add as many waves as they like to the curve for near infinite variety. New waves will be added with an amplitude of 0 this must be adjusted to affect the wave. The cumulative amplitudes of all the waves are balanced out with each other to keep the LFO's total amplitude from becoming too big. Finally, if the user wants to remove a wave from the LFO they must simply press the minus button (figure j-1).

## Concepts

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### Bezier Curves

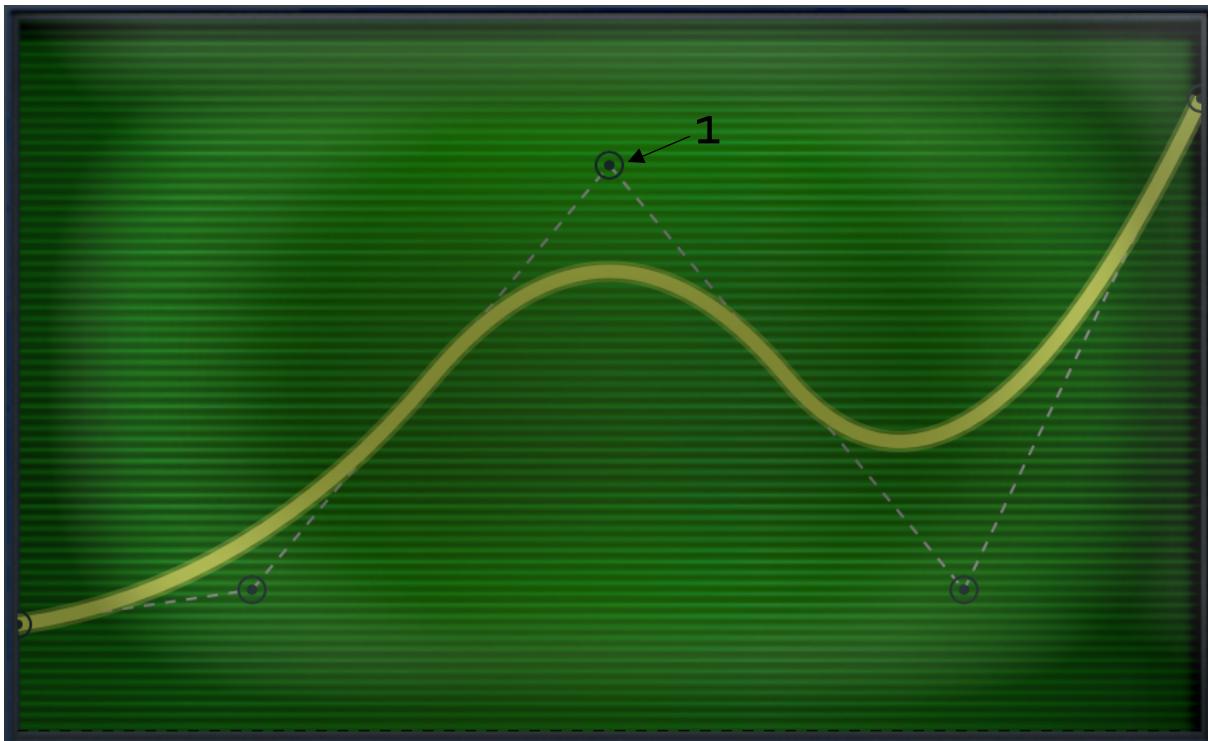
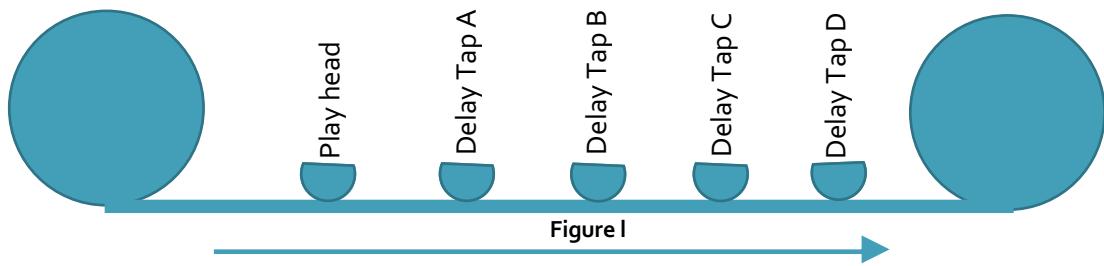


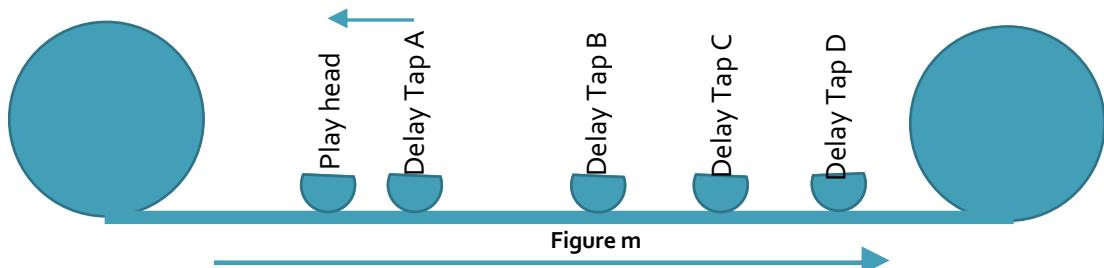
Figure k

Pierre Étienne Bézier was a French engineer and one of the founders of the fields of solid, geometric and physical modelling as well as in the field of representing curves. We stan our boy Pierre for providing the mathematical basis for the easy-to-use curve editor used throughout Delay Troll. The shape of these curves is defined by several control nodes, represented graphically by a circle with a dot in the middle (figure k-1). Notice the dotted line drawn between the nodes, apart from the first and last node the curve will always intersect with the middle of the line. To change the shape of the curve the user can simply select any node by clicking within the circle and dragging it to a new position. The user can also add a new node by clicking any ware outside of an existing node or conversely remove a node by double clicking on it. The first and last nodes cannot be deleted, and their must always be at least 4 nodes.

## Smoothing



Imagine a reel-to-reel tape machine with a play head representing the dry signal and 4 delay taps A-D. Now let's say we wanted to decrease the delay time of Tap A while it was running effectively moving it closer to the play head.



What would we hear if we isolated the sound from Delay Tap A as it moved to its new position? Well, that would depend on how long it took for Tap A to reach its new position. If for example Tap A teleported instantly to the new position, we would hear a click from the waveform coming out of it as it would be discontinuous. A relatively fast-moving Tap would sound sped up as it is moving against the direction of the tape, but a slow enough moving Tap would probably be hard to notice this sped up effect. Smoothing in Delay Troll controls how fast a delay tap will readjust to a new time if a new time is given. This effect is most noticeable if the min/max time or gravity has been modulated in some way. (and yes I know most old school tape delays didn't physically change the location of the read heads but changed the speed of the tape but I think this explanation is more intuitive)

## DAW Automation

Delay Troll is different, it's not like the other multi tap delays. The motto of Delay Troll is to control every delay in every way and that includes control from DAW Automation. You may notice you can do some things in DAW Automation that you can't using the Delay Trolls GUI, for example you can set a min time that is higher than the max time or vice versa. Unfortunately, there is no way for a plugin to restrict the behavior of an automation curve so if we are to allow the user to automate the delay times (seems like something a delay plugin should allow) then we will just have to accept the possibility of contradictions like this occurring. Be careful kids it's a mad world.

## Presets

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Figure n

Presets in delay troll are saved with the extension .dtf (delay troll file) in:

Mac:

users/USERNAME/Library/Audio/Presets/Temples Of Silence Studios/Delay Troll

PC:

C:\Users\USERNAME\AppData\Roaming\DelayTroll

Previously saved presets can be selected from the drop-down menu (figure n-1). If you would like to save the current settings as a preset simply select the save as button (figure n-3). To delete the currently selected preset click the delete button (figure n-4). And to start a new preset hit the new button (figure n-2).

## Index

PRESET NAME	CATEGORY	DESCRIPTION
<b>ZIPPER</b>	Zippers	standard 900 ms zipper
<b>SHORT WABBLY ZIPPER</b>	Zippers	short zipper with the max time modulated subtly, kind of like a tape machine with bad playback speed constancy
<b>SHORT ZIPPER</b>	Zippers	short 300 ms zipper
<b>GROWLER</b>	Scramblers	fast decaying stutter with the max time modulated to create textures
<b>DRUNK ROBOT</b>	Scramblers	very fast zipper with even level, the max time modulated giving it a wobbly drunk feeling
<b>EXPANDING ZIPPER</b>	Zippers	extremely fast zipper that modulates out then snaps back
<b>PLAY IT BACK DJ</b>	other	special effect similar to a dj scratching a record then replaying it
<b>1 SEC STUTTER</b>	Stutters	basic 1 second stutter
<b>WABBLY ZIPPER</b>	Zippers	900 ms zipper with the max time modulated subtly to create problems in your relationships
<b>SWEEP DOWN</b>	Sweeps	750 ms evenly spaced delays with a low pass eq sweeping down from fully open to about 600 Hz
<b>EQ PYRAMID SWEEP</b>	Sweeps	sweeping up and back down in a lowpass eq, mostly evenly spaced
<b>SHORT DECAY</b>	Bubblers	evil sounding bubbler, good for voice
<b>CREEPING FILTER</b>	Bubblers	Pitch starts up then goes down in this evenly spaced delay
<b>DANCING ROBOTS</b>	Resonators	creates a metallic resonating kind of sound
<b>MAKE IT BIG</b>	Verbers	big reverb sound
<b>SWEEP UP</b>	Sweeps	Sweeping Up a lowpass eq
<b>SNARE SKIP</b>	other	Special Effect for snares that adds some space and energy to them
<b>UNDERWATER TAIL</b>	Sweeps	coupled delays sweeping up a lowpass eq
<b>2 BAR RACHET</b>	Bubblers	musical bubbler
<b>ACID WARP</b>	Sweeps	sweep but with pitch from low to high

<b>SPEED SWEEP</b>	Sweeps	Sweep up in pitch quickly then stay there
<b>TENSE BAKKA</b>	Bubblers	Technically a bubbler but really I use this to add tension to pads
<b>64 VERBER</b>	Verbers	big verber
<b>PAD GHOSTER</b>	Bubblers	delay intensity initially sweeps down but then comes back up creating a kind of ghost effect
<b>DRAIN PATTERN</b>	other	has a narrow bandpass that sweeps up then down in a very particular quantize pattern
<b>DOUBLE TAPE DELAY</b>	other	creates a warbley tape effect
<b>STEP UP</b>	Sweeps	sweep up in pitch
<b>REVEAL ZIPPER</b>	Zippers	has a unique eq pattern that kind of hides the delay before bringing it back,
<b>DOUBLE TROUBLE</b>	Sweeps	sweeps down a low pass filter with a quantized coupling pattern
<b>FAST SWEEP</b>	Sweeps	quantized but with a bit of a stutter vibe has a narrow bandpass that sweeps up and down
<b>BANDED TAPS</b>	other	has a narrow bandpass that scatters all over the place
<b>FILTER UP 1 BAR</b>	Sweeps	primarily sweeps a high pass filter up
<b>FALLING DOUBLE</b>	Sweeps	verry quick pitch sweep with only 4 taps
<b>QUICK SQUEEZE</b>	Sweeps	sharp increase in pitch then stays there
<b>TAP COLAPSE</b>	Bubblers	bubbler with a kind of collapsing sound

## Troubleshooting

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Try changing your buffer size to 1024 and bouncing in real time

## The Beta Tester Package

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### Changelog

#### Sep 20

- Fixed bug where the GUI wouldn't switch out of division mode properly leaving behind a GUI element
- Fixed bug where the main display after closing and reopening the GUI would load Bezier curves even if the control mode was set to manual
- Added a bubble pop up to show the values of some gears when you turn them and the time of the delays when adjusted manually
- LOTS OF NEW PRESETS and a table in the manual to explain them
- Added a tutorial Video for beta testers

#### Sep 1

- Added a bypass switch for the soft clipper (not in this manual's images yet because I may just scrap the soft clipper entirely)

#### Aug 12:

- Replaced timer that handled modulation with a higher fidelity one
- Fixed bug so when bouncing offline modulated parameters will update correctly
- Fixed bug so the modulations phase will now be consistent when bouncing
- Cleaned up the Bezier nodes and changed the level default ones

### Known Bugs

listed here are just a few bugs I plan to get around to fixing in future updates, most of them have reasonable workarounds for the time being.

#### ~Gravity Error

- **Problem:** Some times moving the Gravity Gear causes some sort of error in the times of the delay taps but I can't repeat the problem so I'm not quite sure of the nature of this, if you get this problem let me know so I can recreate and debug it
- **Workaround:** Just move the Max or Min Gear and they will readjust to the proper time

#### LFO Phase only changes half the phase:

- **Problem:** The Phase knob some of the LFO waves only goes half as far as it should
- **Workaround:** you can invert the amplitude of the wave so in effect you can access that second half of the waves phase by doing that.

#### Dotted line at the bottom of some of the displays

- **Problem:** some of the Bezier displays have a dotted line that appears at the bottom.
- **Workaround:** just ignore it.

### ~Audio Driver Crash

- **Problem:** In a couple of my testing sessions, I managed to crash the audio driver by attempting to pitch shift all 64 delays. I haven't managed to repeat the problem since and have made some changes that I think would address this so probably it's a non-issue but let me know if you experience this. This happens because there is not enough time to process all the pitch shifts before the next buffer of sound is passed to the plugin.
- **Workaround:** First, change your buffer size to 1024 if you want to pitch a lot of delays but if you do manage to crash the audio driver I found changing the output from speakers to headphones and then back again seemed to reset the driver.

### Planned Future Features

What follows is a list of features I plan to add to Delay Troll although not all of them will be implemented before it's release, I'm sure this list will grow with feedback:

- Add a reset button to some of the Bezier curves
- Manual BPM Entry (not all DAW's will report BPM reliably)
- Spread gear to give left/right channels slightly different delay times
- Light to indicate the user has set the buffer size too low
- Drop downs should light up a bit when the mouse hovers over them so the user knows they are clickable