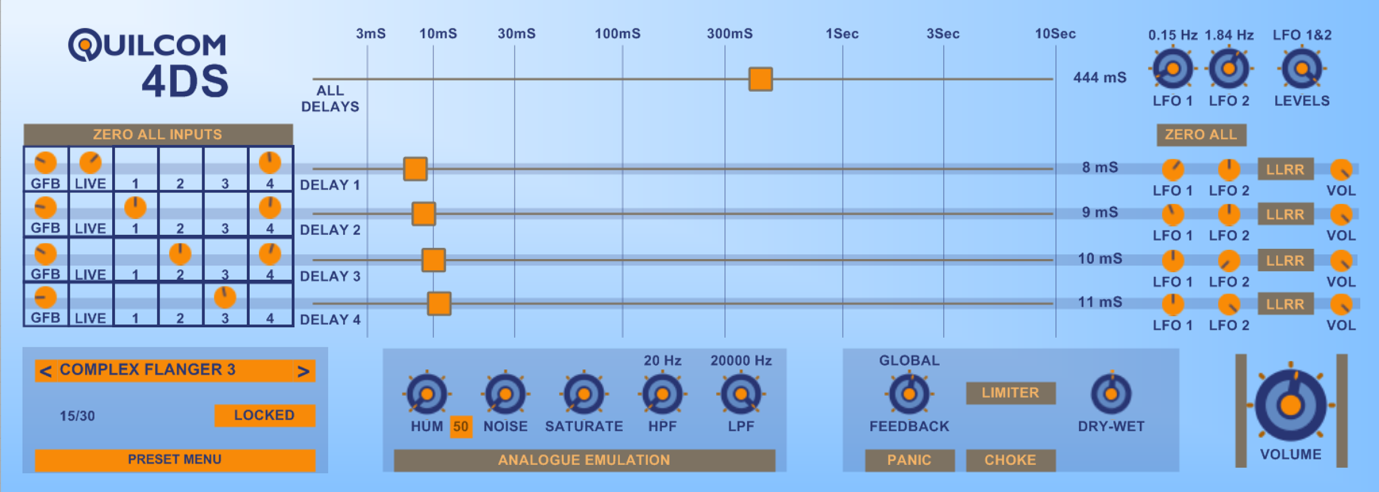
**Quilcom 4DS**



**Design**

The Quilcom 4DS is an effect plugin featuring a 4 Delay System. The 4 delays are independent, and the flexible input routing and level control matrix means you can interconnect the 4 delays in many different configurations to give a wide variety of regular and unusual delay-based sounds.

In addition there is an Analogue Emulation panel which is available for modifying the sound to simulate older tape-based echo units.

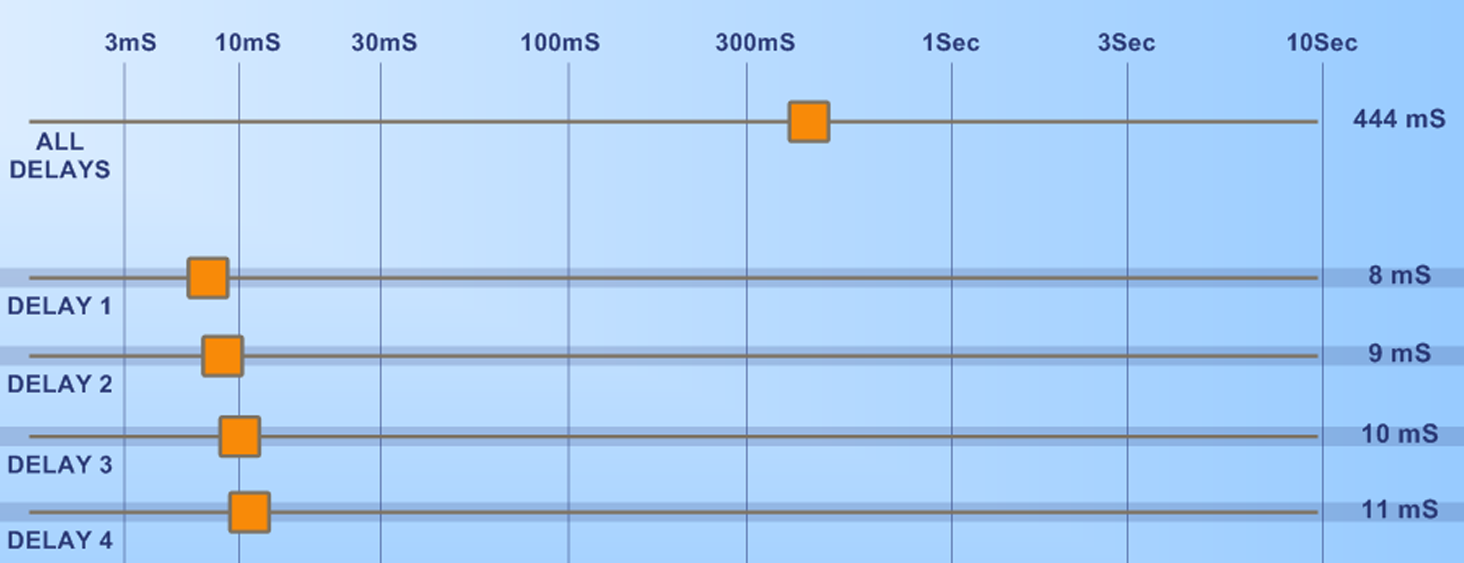
The plugin handles a stereo signal throughout, and each delay can be switched to swap left and right signals. This means that if you apply a mono signal to just one input you can create a wide field with the classic Ping-Pong panning effect.

There are two sinewave LFOs which can modulate the delays to provide wow and flutter effects, or chorus and flanging sounds. The amount and phase of each LFO signal can be adjusted on each delay to give a very dense chorus or flanging effect.

Since the delays are independent, each can be set to produce different delay-based effects, and their order in the signal path can be set with the delay input matrix.

There are many free and pro delays available in the wide world, many with features that may not get used in a real situation. For this reason I wanted to make a simple plugin which was versatile, but not too tough to grab and use.

What follows is a more detailed explanation of the operation of the 4DS.



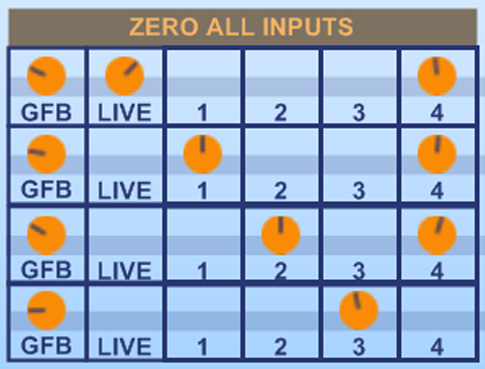
This section is where you set the delay times for each or ALL delays.

The sliders have an approximately logarithmic law, and this allows a slider to cover a range between 1mS and 10 seconds. There is a basic guide grid with values at the top to give a quick reference for a desired delay. The exact delay time is shown in the readouts to the right. If you want to set an exact time, hold the shift key down while dragging a slider. This gives a finer control.

At the top is a “dumb” slider which will control **ALL DELAYS** at the same time. The slider knob turns red when the mouse is hovered over it, to warn you!

Tip:

The delay times are relevant to the type of effect you want. Flanging will typically be between 1 and 20 mS. Chorus will be typically between 20 and 50 mS and above that time you move into repeat echo territory. For Flanging and Chorus, other settings like LFOs and Feedback will need to be adjusted (described later). However, if the delay times are close, but not identical, these type of effects can be heard due to phase cancellation effects on harmonics. In this way you can create a repeat echo with audible chorusing or flanging.



This is the Input Matrix. The inputs from left to right are **GFB**: Global feedback, **LIVE**: the dry input signal, then the outputs from delay lines **1**, **2**, **3** and **4**.

To help visualise the active routing, the level knobs are only seen when the level is set above zero, so is active. If you turn a knob down to zero it will disappear. Or, you can double-click on a knob to set zero and make it vanish. When you want to enable an input, just click and drag up on the empty area above the input name and the knob will appear.

For starting a new configuration, clicking on the **ZERO ALL INPUTS** clears *every* routing and level knob.

Tip:

You will note that each delay input can be fed from its *own* output. This means you can set feedback on a per-delay basis rather than using the **GFB** signal (**G**lobal **F**eed **B**ack). Global feedback provides a signal from what you hear, which is a mix of all 4 delays (see later).

Tip:

The included presets show a few examples of how this Matrix can be used. For example you can create a delay of up to 40 seconds by configuring the delays in series and just providing a **LIVE** input on the first delay, and listening to the output of just the last delay in the chain.



This section has several functions.

There are 2 sinewave LFOs available; **LFO 1** and **LFO 2**. The frequency is set with the **LFO 1** and **LFO 2** knobs.

The output **LEVELS** of *both* LFOs are set with the other larger knob.

Each delay strip has a small orange knob for setting the amount of each LFO’s modulation of the delay time. These knobs are bipolar so in the centre position there is no delay time modulation. Double click a knob for the default zero, or click on **ZERO ALL** to remove modulation on *all* the delays (easier than trying to manually set zero!). If you advance these knobs you can select a level from opposing phases of the LFO signal. This means you could have one delay going positive while another goes negative.

The delay time modulation is time-based rather than percentage-based, so the modulation is constant across the whole delay time span. Note that if the delay is set at maximum or minimum time, the LFO excursion will be limited in one direction.

Tip:

If you want to simulate wow and flutter of a mechanical tape echo, you should reduce the setting of the LEVELS knob. Since real wow and flutter are normally quite subtle you can then control the amount more accurately with the little orange knobs.

The LLRR switches, if turned on, will show **SWAP** and left and right stereo channels will be crossed over. This allows for richer effects on a stereo signal, or Ping-Pong with a mono input on one channel.

Each delay has a small orange knob for setting the output level or **VOL**. These make up an output mixer. Please note that if you’re using Global Feedback, the amount of feedback is affected by the output mixer levels.



The **GLOBAL FEEDBACK** knob returns a portion of the output mix signal (what you hear) to any delay input which has the **GFB** input knob showing.

The *range* of this knob will be dependent on many settings, including the output mixer settings and the number and level of knobs set in the input matrix.

Tip:

It’s a good idea to get the basic delay right first, and then increase the feedback as appropriate. Also remember that a delay line can have its own feedback level when its own output is set in the input matrix.

Tip:

The amount of feedback will affect the depth of flanging.

The **PANIC** button will instantly kill all the delayed audio and reset the FEEDBACK knob to zero.

If you click and *hold* the **CHOKE** knob it will make a *soft* turn-off (so no click) of the audio inputs to all delay lines. This allows the audio currently running through the delays to complete. Upon releasing the button it will kill the audio stream but it won’t reset the **FEEDBACK** to zero.

When you turn on the **LIMITER** the amplitude from the delays is limited to a defined level. It starts limiting at -6dB. So if feedback is slowly building towards oscillation it won’t go into internal clipping. As the output mix continues to rise it will became more distorted. This is intended more as a creative tool, since it allows you to “play” the feedback in real time.

The **DRY-WET** knob sets the balance between the delay output mix and the live input. Its setting does not affect the feedback.



You have the option to simulate older analogue tape echo units. It’s enabled when you turn on **ANALOGUE EMULATION**. **HUM** can be 50 Hz (Europe) or 60 Hz (USA). **NOISE** introduces pink noise into all the delay lines (for tape hiss) and a portion of the level directly to the output (for preamp hiss).

The **SATURATE** knob is intended to simulate the non-linear characteristics of a typical tape system. At minimum the effect is very subtle, but as you increase the level you can move to more extreme saturation or overdrive which will increase distortion.

Typically, tape systems can’t cover the whole audio bandwidth, so two filters, **HPF** and **LPF** are provided to simulate this. Start with the knobs as shown and make adjustments until you get the sound you want. Increase the High Pass Filter until you get the bass cut right, then reduce the Low Pass Filter until you get the “damping” right. These two knobs also have creative application, so the delayed sound gets progressively more filtered with each repeat.



Several presets are provided with the 4DS. These are to demo some configurations and feature various delay sound types. They are intended to be used as starting points and would be adapted to suit the source material. The INIT presets start with a basic repeat echo using just one delay line.

You can directly select a preset by clicking on the name, or page through them with the left and right arrow buttons.

The **PRESET MENU** selector gives you the options to save and load single presets or whole banks, and to copy and paste individual presets.

When the **LOCKED** button is on, you can make changes to any settings and the DAW won’t store the changes. When **UNLOCKED** is selected you get another button to **RENAME** the current preset. Also when **UNLOCKED** is selected the DAW will remember the settings you made within a song. The purpose of this button is to allow you to experiment, but get back to the original preset by re-selecting it.



The plugin’s VOLUME control sets the output level. Either side there are bar graph meters which indicate the average peak levels, left and right. If a clipping peak is detected (which may not be easily visible on the meters), the central ring on the knob turns red for 1 second.

The meters are for indication only and aren’t calibrated, other than to say at maximum the clipping level is reached.