

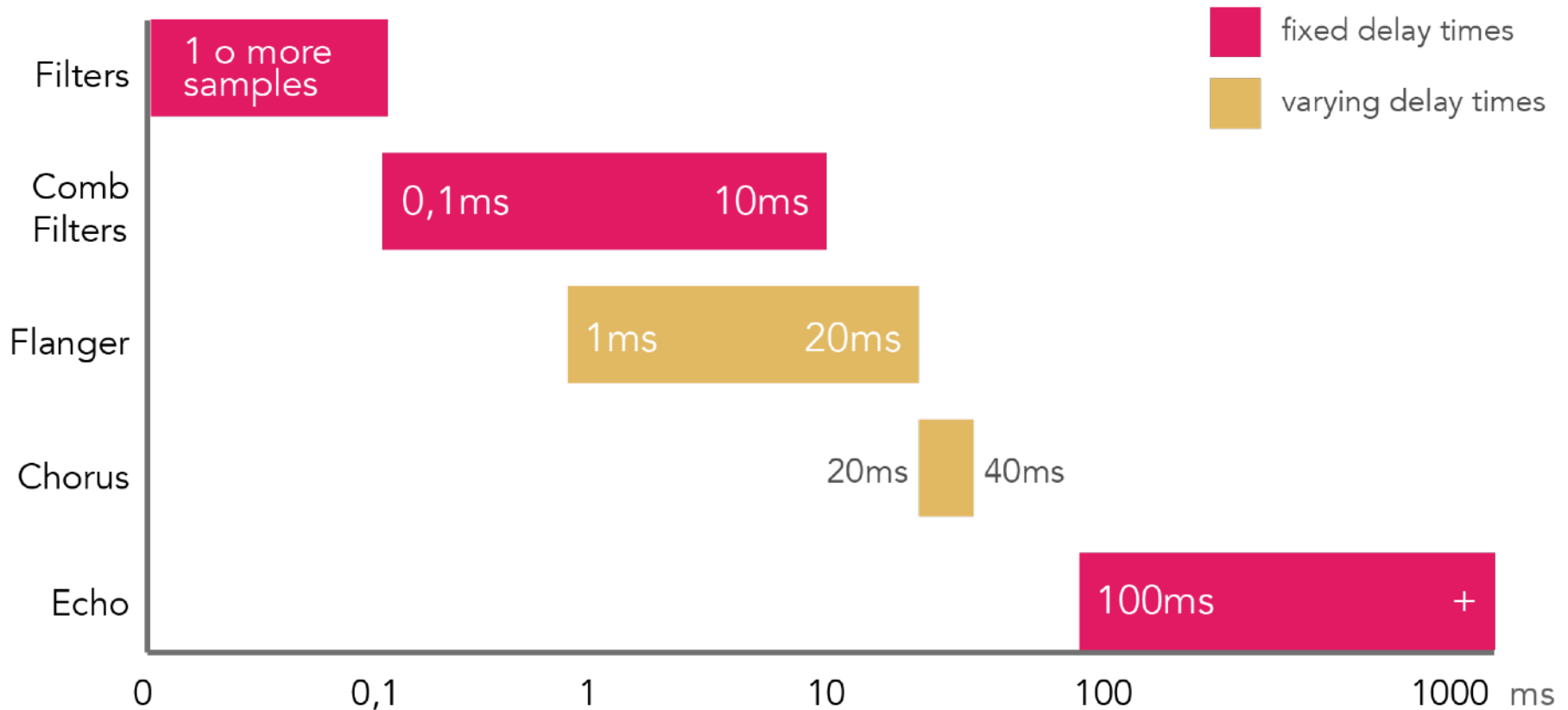
TOMMASO ROSATI  
SOUND ART

# DELAY

ECHO, DELAY, FLANGER,  
CHORUS, COMB FILTER,  
ALLPASS FILTER, PHASER

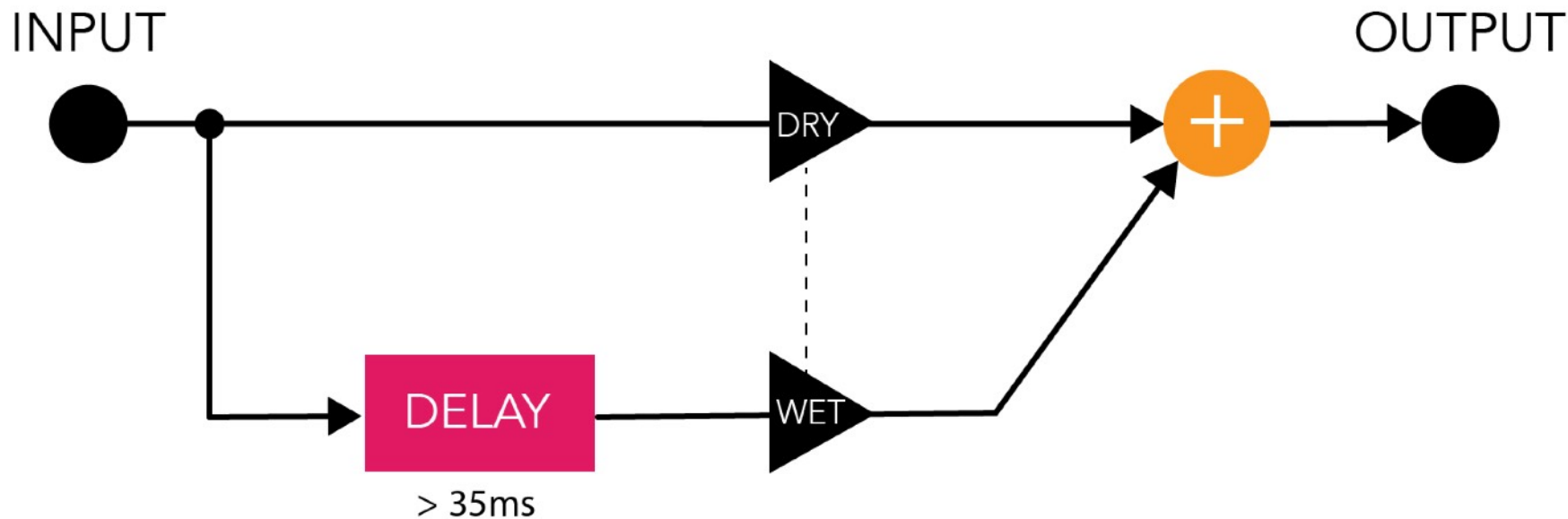
# Delay

A delay is the time lag I apply to an incoming sound.  
Most of the effects we use have a delay at the base of their operation.



# Echo > 100ms

Echoing is the repetition of a sound. We hear an echo when the replication of the sound has a delay that exceeds a specific value, the so-called "Haas zone," which is 20-35 ms.



## Parameters

**Delay time (o Length)** how much delay I apply to the input sound. You can express in **ms** or **musical metric units**

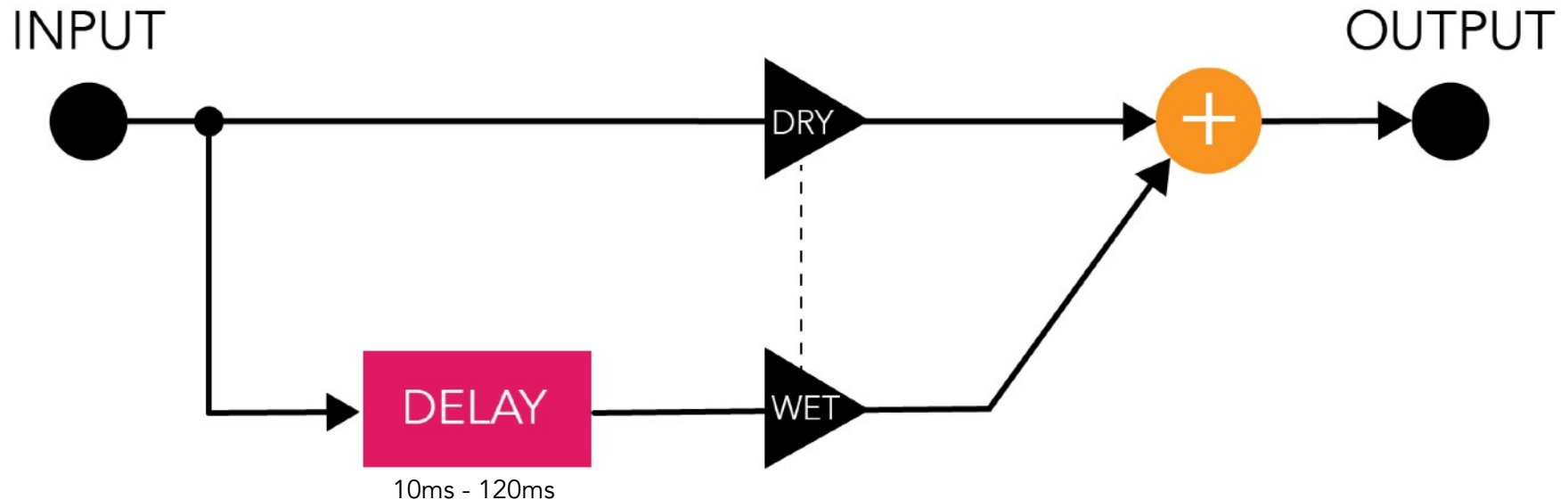
Like 1/4 o 1/8 o 1/16

**Dry/Wet** the volume ratio between the original and processed sound.

# Slapback delay

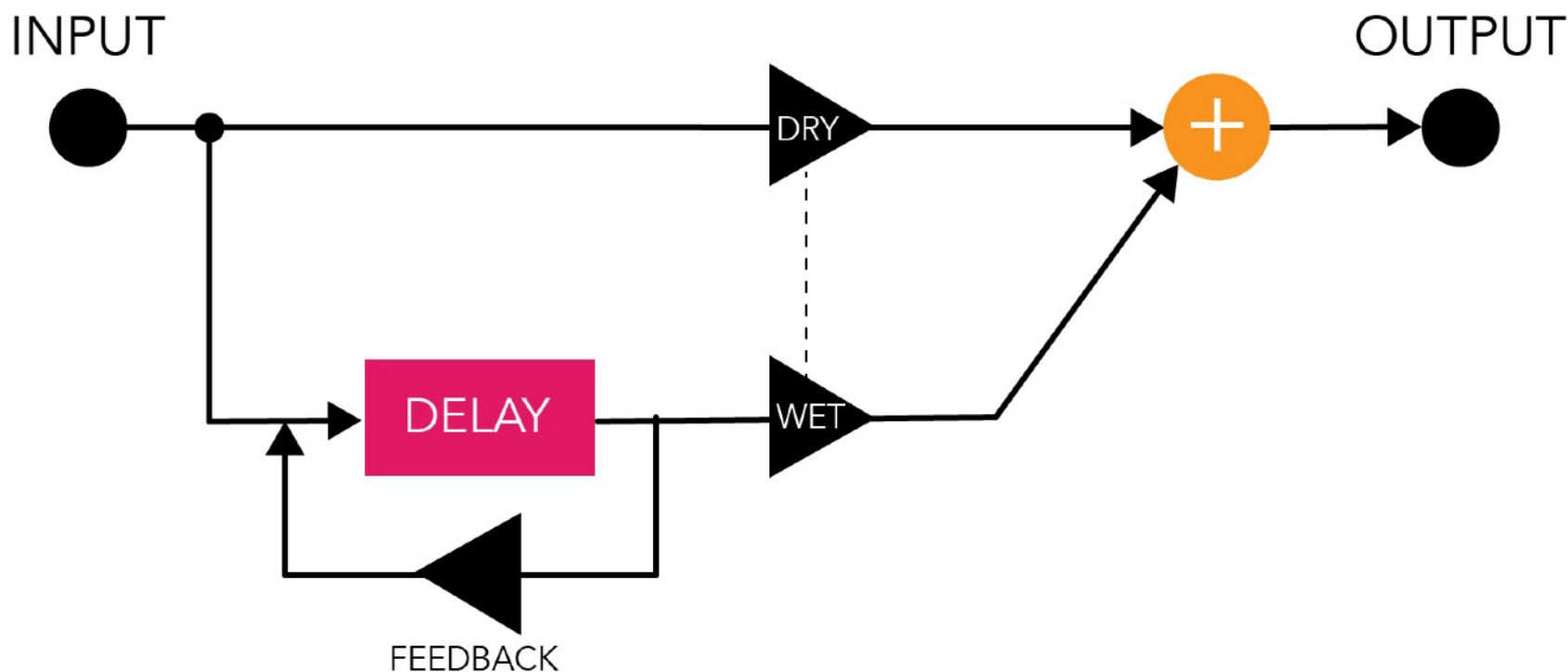
10ms - 120ms

Delay between 10 e 120 ms. The effect is that of sound duplication or sound rebound.



# Multiple echo

When you create more repetition of the sound with feedback.



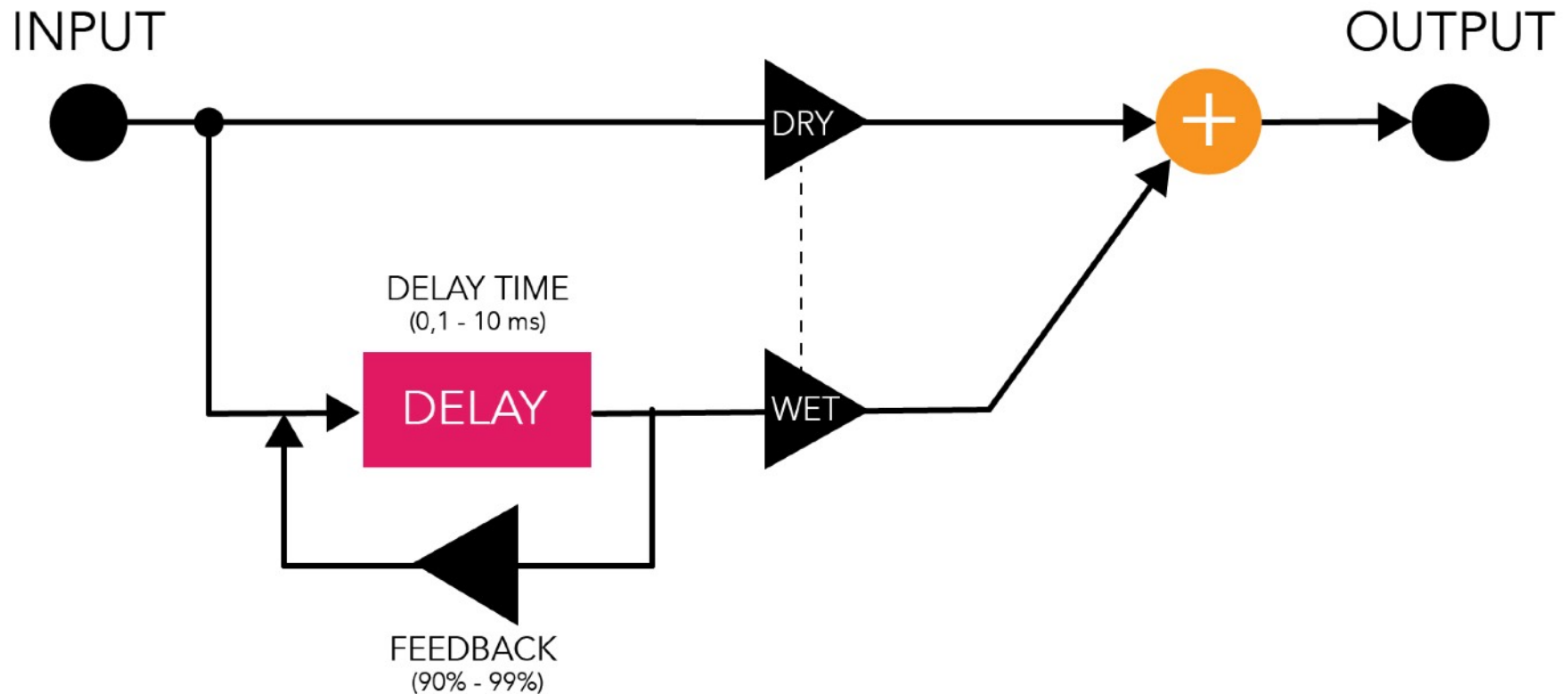
## Parameters

**Feedback** is a value that indicates how much I attenuate the volume of the sound I send back—expressed in dB or percentage.

# Comb Filter

0,1 - 10 ms

It's a Multiple echo with minimal delay time values and high feedback.

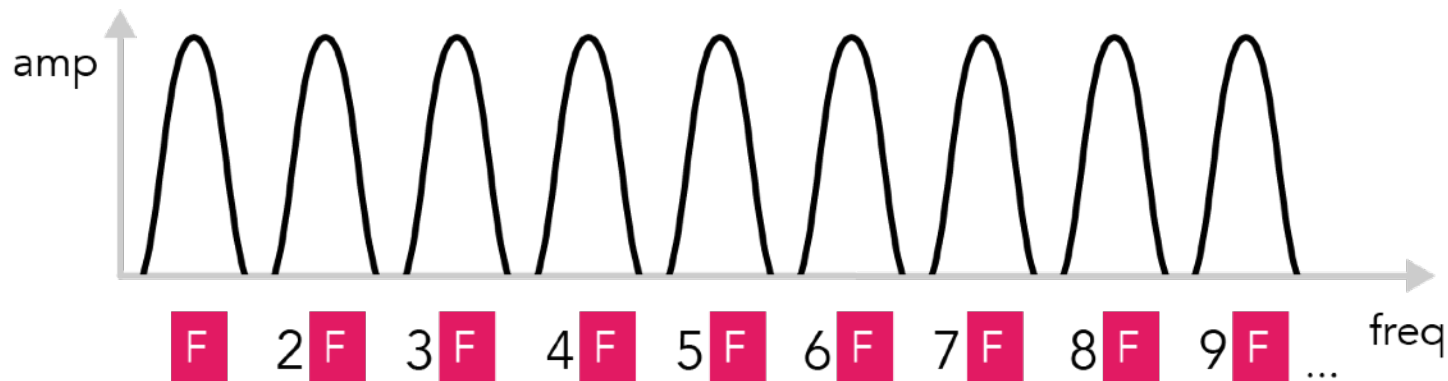


# Comb Filter

The Comb Filter can tune a sound that would not be in tune because it brings out several bands in the spectrum at an integer multiple distances of a fundamental frequency.

$$\text{fundamental Frequency} = \frac{1 \text{ second}}{\text{delay time}}$$

$$\text{delay time} = \frac{1 \text{ second}}{\text{fundamental Frequency}}$$



## Parameters

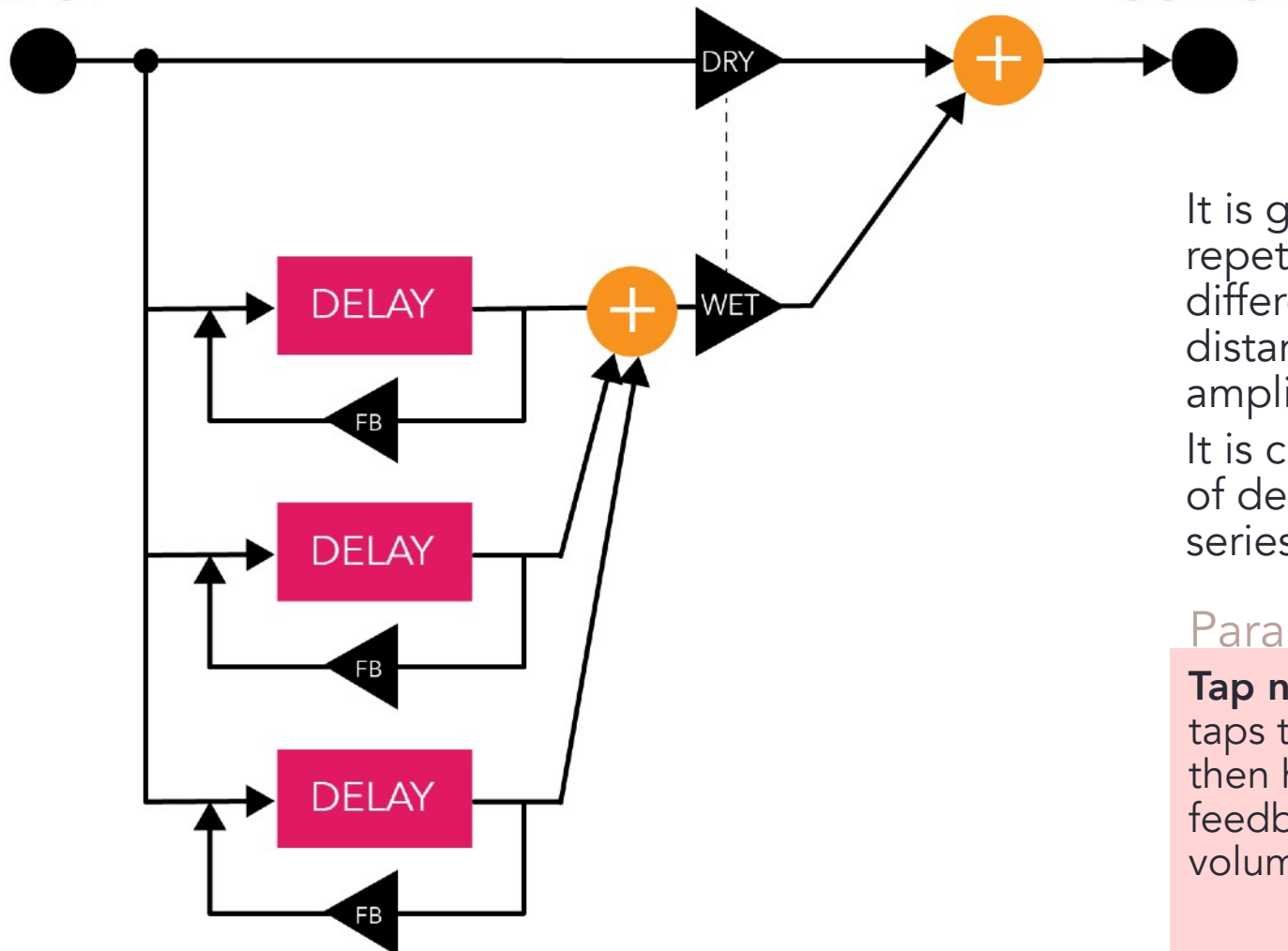
**Feedback** This is still how much I attenuate the volume of the sound I send back, but in a Comb filter, it indicates the decay of the effect.

**Delay time** How much delay do I apply to my input sound? It indicates the keynote that the Filter Comb goes to create.

# Multitap delay

In parallel

INPUT



OUTPUT

It is given by several repetitions of a sound at different temporal distances and amplitudes.

It is created with a series of delays in parallel or in series.

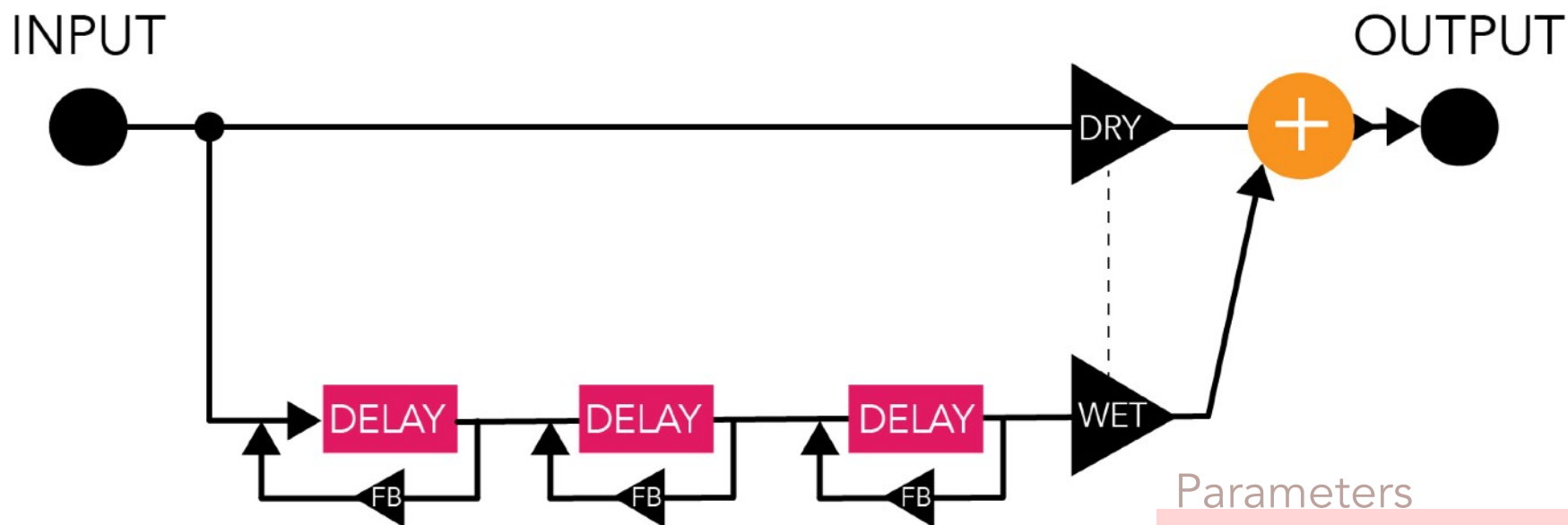
## Parameters

**Tap number:** how many taps there are. Each tap then has its own delay time, feedback, and output volume parameters



# Multitap delay

In series

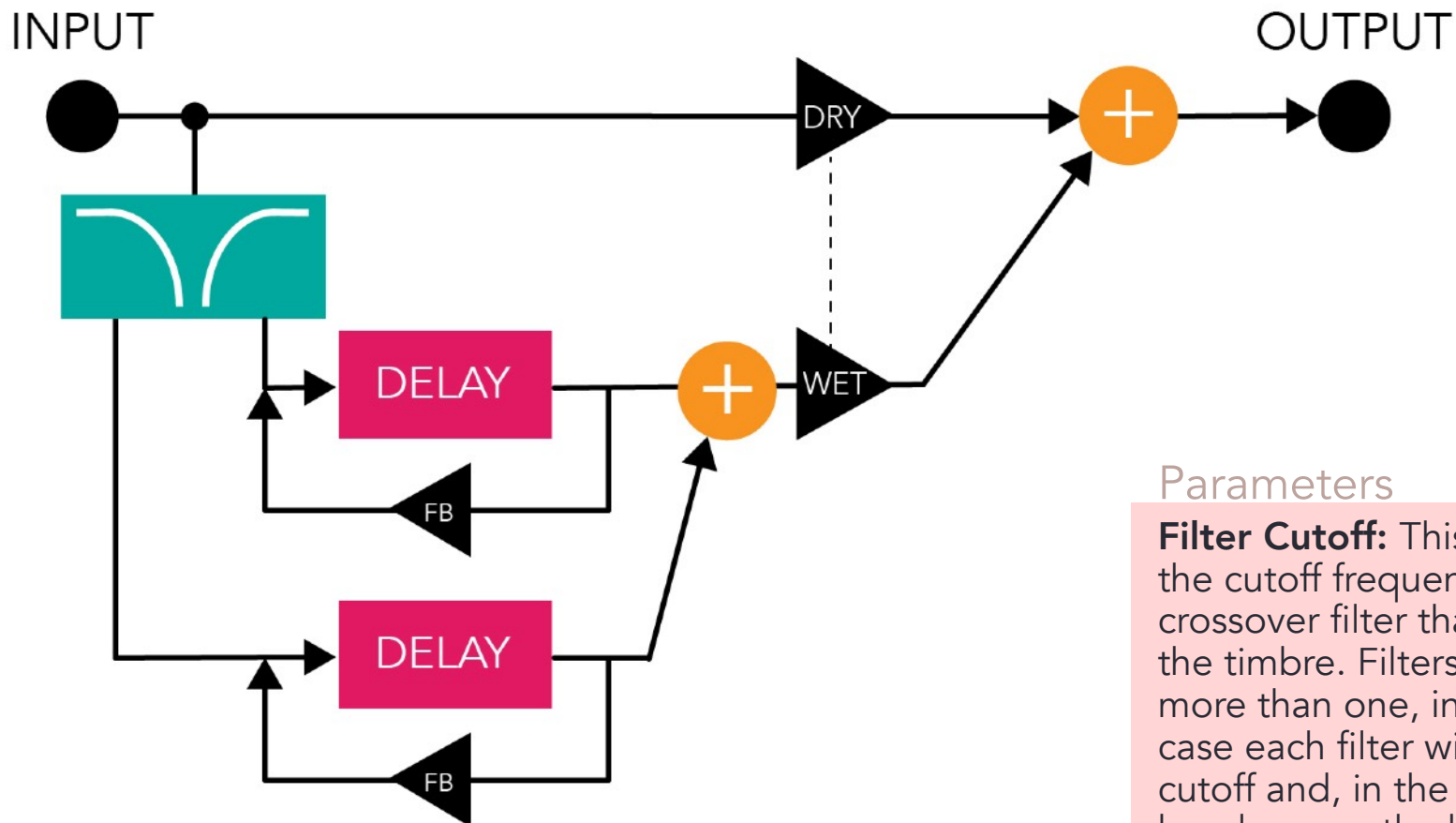


## Parameters

**Tap number:** how many taps there are. Each tap then has its own delay time, feedback, and output volume parameters

# Multitap-Multiband delay

It is a multitap delay in which specific frequency bands feed the various delay lines. They are created with one or more crossover filters that split the signal and send it to a series of delays.

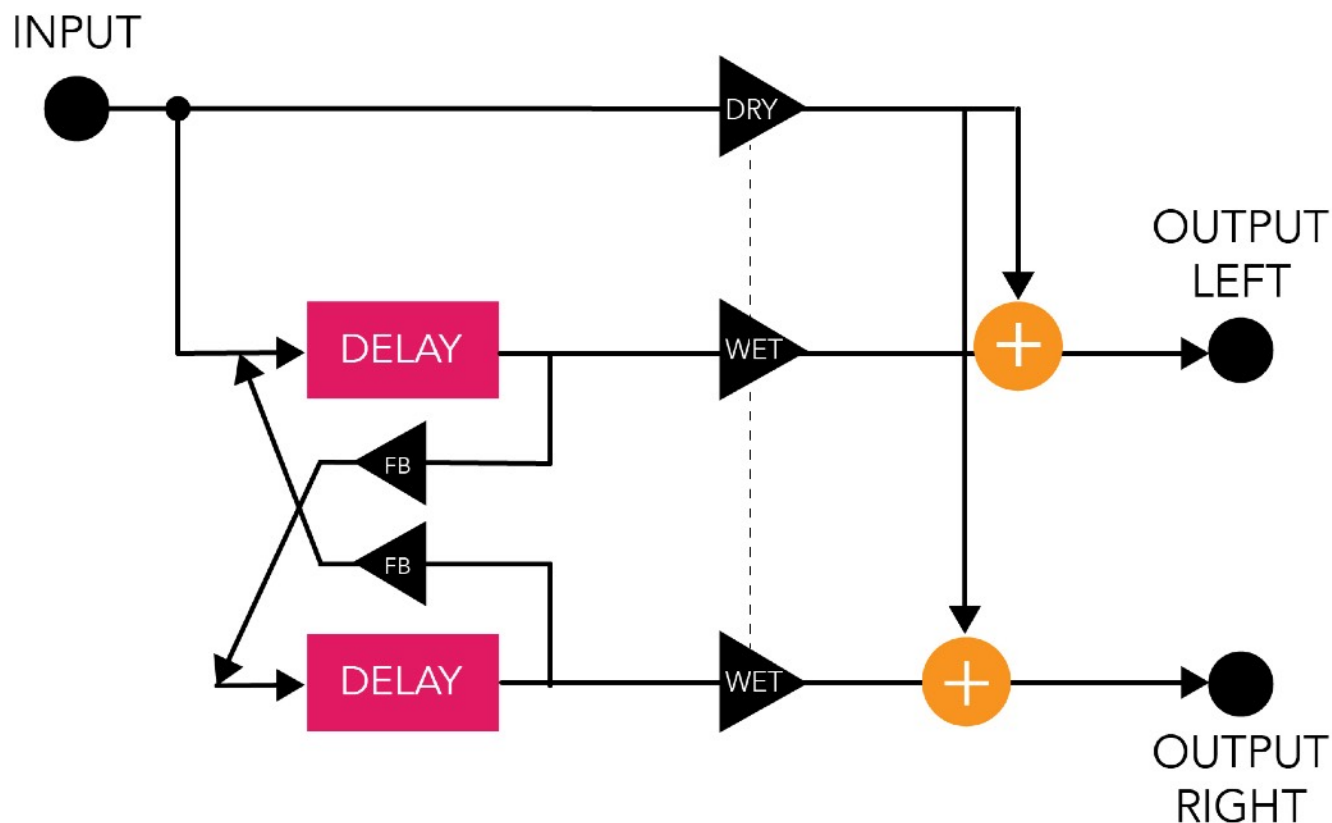


## Parameters

**Filter Cutoff:** This indicates the cutoff frequency of the crossover filter that divides the timbre. Filters can be more than one, in which case each filter will have its cutoff and, in the case of bandpasses, the bandwidth.

# Ping-pong delay

It is a delay in which the repeats alternate between one stereo channel and the other.  
It is created with two concatenated delays that come out separately in the stereo channels.



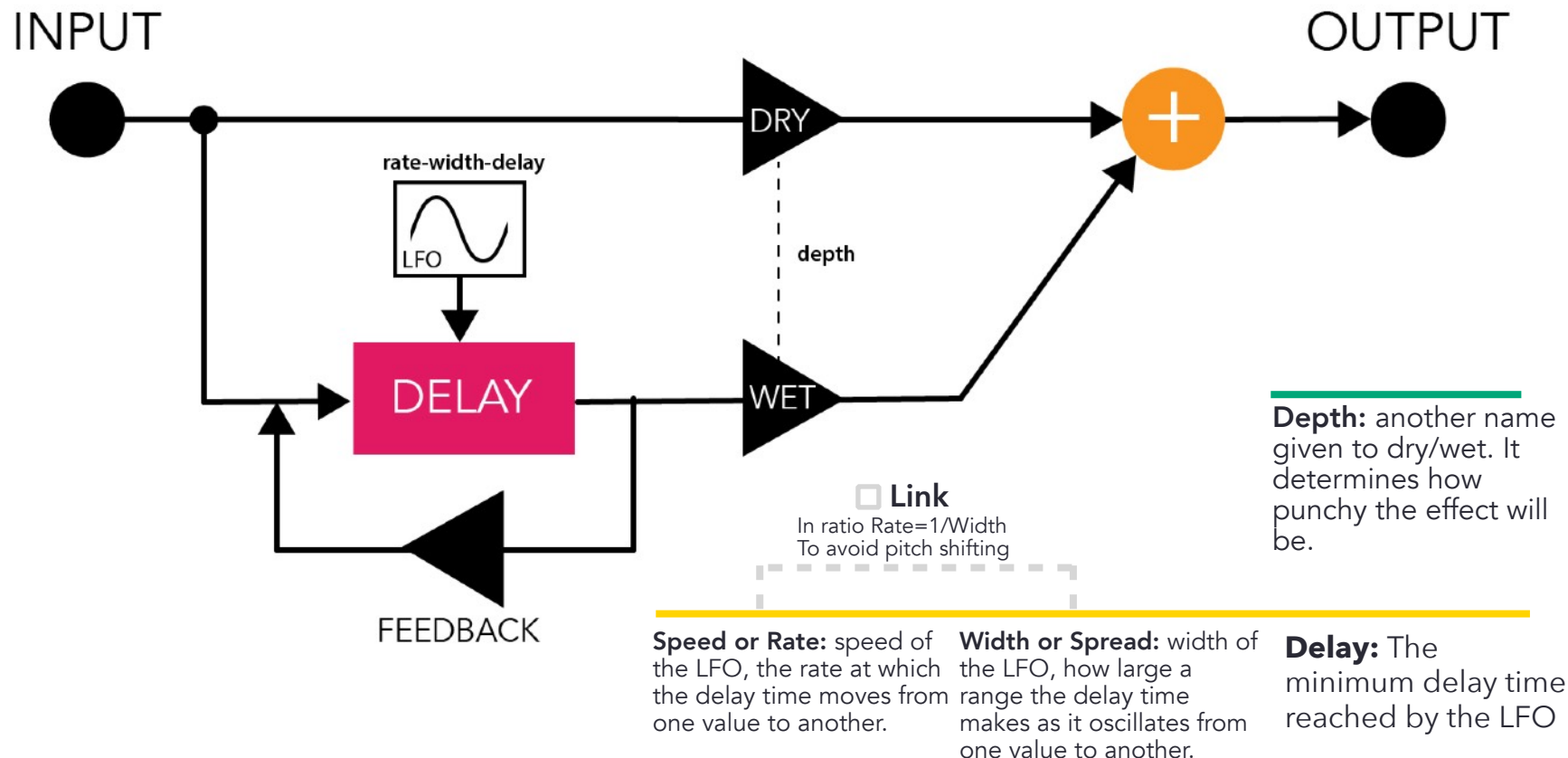
Parametri

**Delay time:** can be synchronised between the two channels or independent.

# Flanger 1-20 ms Variable

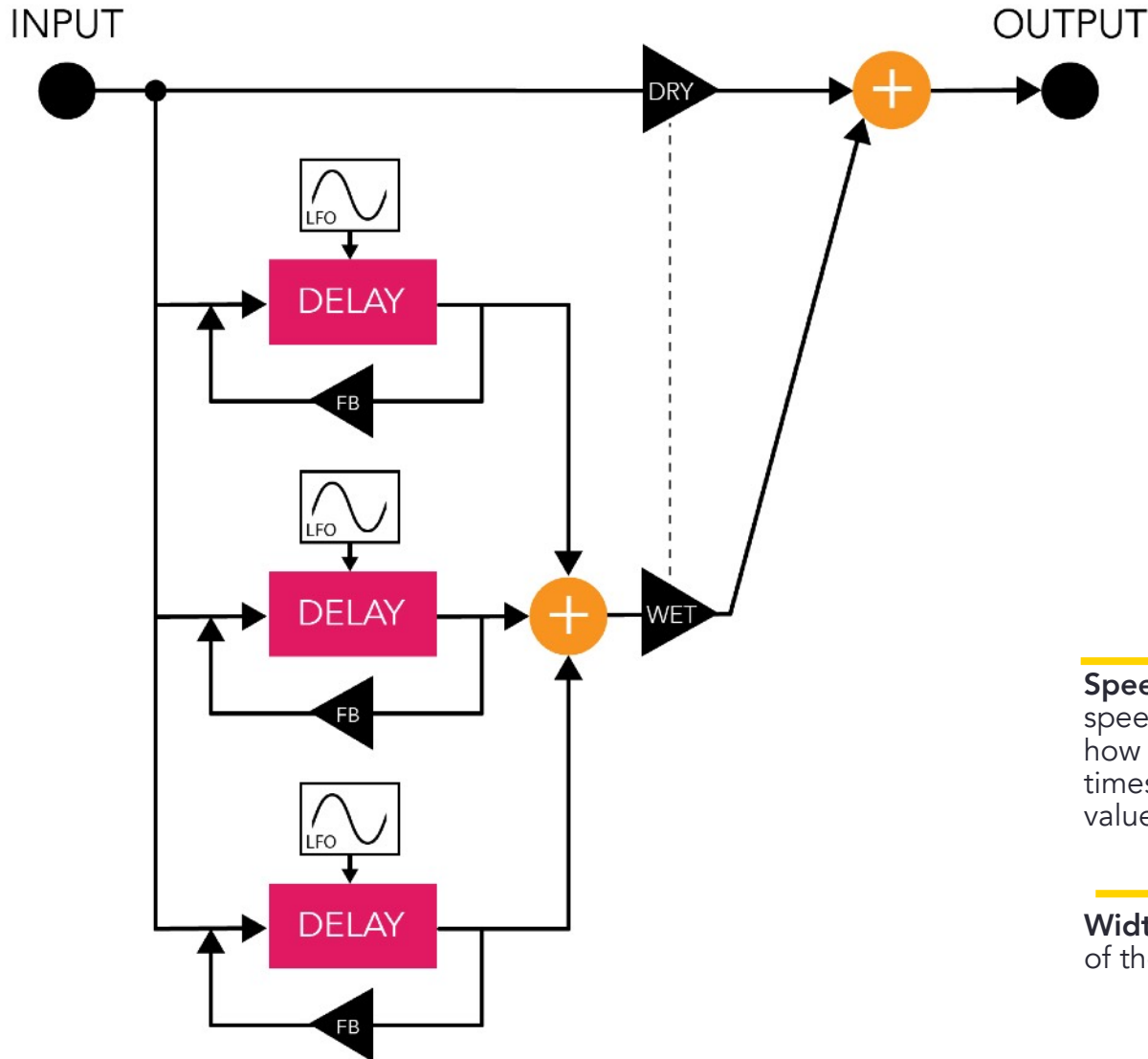
It is given by the sum of a sound and its copy with a moving delay between 1 and 20 ms. The result is variable filtering.

It is achieved with an LFO that continuously changes the delay.



# Chorus

20-30 ms Variable



It's a Multitap delay in which LFOs move the delay times of the various taps.

**Speed or Rate:** The speed of the LFOs, how fast the delay times move from one value to another.

**Wave form:** shape of the LFOs

**Width:** The amplitude of the LFOs

**Delay:** The minimum delay time reached by the LFOs



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