Linear Crossfade from Dome Music Technologies

Introduction

The Linear Crossfade module from Dome Music Technologies allows you to mix two input signals in a linear manner. That is to say, the attenuation value of Input 1 varies between 0.0 (or 0%) to 1.0 (or 100%), and the two inputs are linked by the rule:

Input 2 attenuation = 1.0 – (Input 1 attenuation)

There are two complementary outputs:

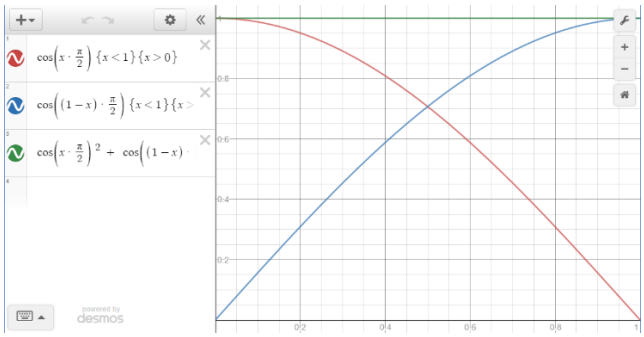
The left-hand output (Main Mix) consists of **100% of Input1** and **0% of Input 2**, when the Balance control is at the 7 o'clock position (**Blue Dot**). It consists of **0% of Input1** and **100% of Input 2**, when the Balance control is at the 5 o'clock position (**Red Dot**).

The right-hand output (Inverted Mix) consists of **0% of Input1** and **100% of Input 2**, when the Balance control is at the 7 o'clock position (**Blue Dot**). It consists of **100% of Input1** and **0% of Input 2**, when the Balance control is at the 5 o'clock position (**Red Dot**).

The mix balance can also be controlled by an external Control Voltage.

Linear vs Constant Power Crossfade

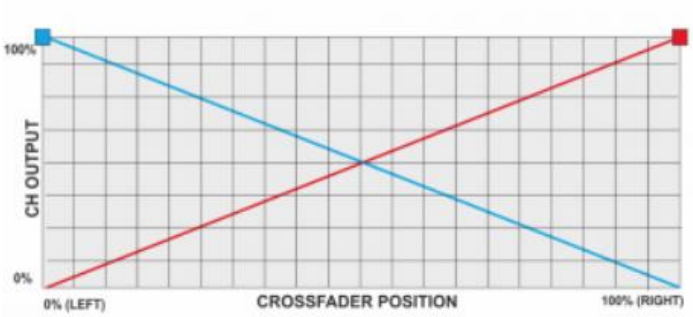
When you are performing transitions between two uncorrelated tracks (for example, a DJ mixing between tracks on two turntables), it is preferential to have a 'constant power' crossfade curve:



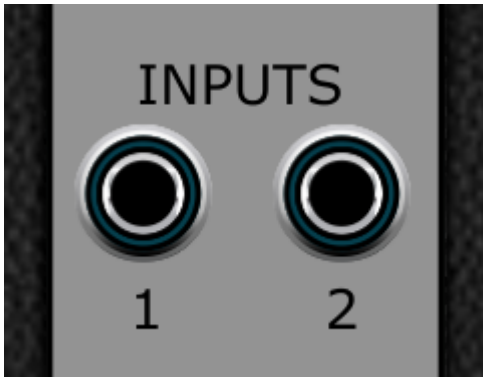
This eliminates a perceived 'dip' in volume at the mid-way point.

However, when you are transitioning between *correlated* signals (for example, the sine wave and triangle wave outputs of a single VCO), using a constant-power curve leads to the generation of a 'bump' in amplitude at the mid-way point, which exceeds the amplitude of both inputs.

It was therefore decided that a pure linear crossfade curve response would be a better fit for modular synth purposes (such as vector synthesis):



Input Sockets



There are two mono signal input channels. These can be audio signals, control voltage signals or even static DC voltages.

Balance Knob

The Balance Knob determines the mix of Inputs 1 & 2 which appears at the outputs. In the **7 o'clock position** (blue dot), the Main Output (left) consists of 100% Input 1, while the Inverted Mix Output (right) consists of 100% Input 2. Similarly, in the **5 o'clock position** (red dot), the Main Output consists of 100% Input 2, while the Inverted Mix Output consists of 100% Input 1.

In the **12 o'clock position** (mid-way), both outputs feature a 50:50 mix of the two input channels. This is in contrast to the Cherry Audio Crossfade module, which outputs a 100% + 100% mix of the two input channels at the 12 o'clock position:

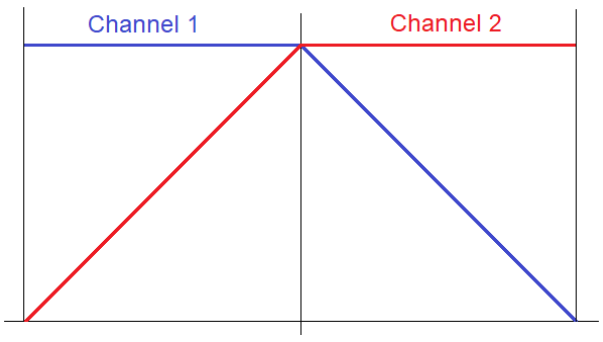


Figure 1 - Cherry Audio Crossfade Curve

CV IN Socket and CV MOD Knob

The balance between Input 1 and Input 2 can also be controlled by an external CV signal. The depth of modulation is controlled by the CV MOD Knob, which is bipolar. If you have the Balance Knob in the 12 o'clock position, a CV IN value of +5V (and CV MOD of +100%) will effectively 'move' the knob to the 5 o'clock position (red dot). Similarly, a CV IN value of -5V (and CV MOD of +100%) will effectively 'move' the knob to the 7 o'clock position (blue dot).

Note that if you want to use an envelope generator to sweep the balance through its entire range, you will require to boost its signal x2, so that it delivers a varying voltage between 0V and +10V. This can be achieved through various methods, but perhaps the easiest is to simply connect two cables from the envelope generator output to the CV IN Socket (pink and blue cables, here):

Output Sockets and Balance Arrows

The Linear Crossfade has two complementary outputs. The left-hand socket is the Main Output and the right-hand socket is the Inverted Mix Output.

The balance arrows show which input channel is selected when the Balance control is set to the 7 o'clock position (blue dot) or 5 o'clock position (red dot). The Main output will fade from 100% Input 1 at the blue dot to 100% Input 2 at the red dot. The Inverted Mix output will fade from 100% Input 2 at the blue dot to 100% Input 1 at the red dot.

Balance Knob Position	Main Mix Channel 1	Main Mix Channel 2	Invert Mix Channel 1	Invert Mix Channel 2
7 o'clock (Blue Dot)	100% (x1.0)	0% (x0.0)	0% (x0.0)	100% (x1.0)
12 o'clock (Mid-Way)	50% (x0.5)	50% (x0.5)	50% (x0.5)	50% (x0.5)
5 o'clock (Red Dot)	0% (x0.0)	100% (x1.0)	100% (x1.0)	0% (x0.0)

Patching Example 1 – Single Oscillator Waveform Blend

Turn Balance to Blue for pure sawtooth, and to Red for pure pulse wave.

Patching Example 2 – Dual Oscillator Balance Control

Turn Balance to Blue for Osc 1 only, and to Red for Osc 2 only. Amplitude will never exceed +/- 5V.

Patching Example 3 – Single Channel Auto Pan

Mini LFO Channel 2 controls panning rate.

Patching Example 4 – Dual Channel Antiphase Auto Pan

As Osc 1 pans to the right, Osc 2 pans left, and vice-versa. They cross over in the stereo centre.

Patching Example 5 – Four Wave Vector Swirl

Using four waveform outputs from a single Oscillator to create a stereo pair of constantly morphing tone colours.