

# Hampshire Electronics

Dual LFO in Eurorack Format

Instructions and Details



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## Overview

The Hampshire Electronics Dual LFO is a 100% analogue modulation source in the popular Eurorack format.

The LFO features two completely independent low frequency oscillator channels, with each channel outputting three independent waveforms, saw/triangle, square and sine.

The duty of all three waves is controllable, enabling many waveshapes to be created. As an example, all waves from downward ramp, through triangle and to upwards ramp can easily be dialled in by using the shape knob for each LFO.

The key details of the LFOs are:

- 10HP Wide Eurorack module with thin profile (20mm deep from faceplate)
- Controls designed and laid-out with performance in mind
- 100% analogue circuitry
- 0.2Hz (5 seconds per cycle) to 9Hz low speed mode per LFO
- 9Hz to 700Hz high speed mode per LFO
- Saw / triangle, square and sine wave outputs
- Wave shaping enables a huge range of waveforms to be generated
- Diode protected power input
- 32ma @ +12v
- 30ma @ -12v

# Installation

## Power Availability

The Dual LFO module draws the following current from your power supply:

32ma @ +12v

30ma @ -12v

You should first ensure that your power system has enough power capacity to drive the module before considering installation. If you are in doubt, please consult with your power supply manufacturer.

## Connecting the Power

Refer to the writing on the back of the module next to the 16-pin power connector to ensure that you connect the power supply correctly. The +12v, -12v and ground (GND) pins will be clearly marked.

The power inputs are diode protected but damage may occur if the unit is connected incorrectly.

## Fitment

Use the screws provided to firmly fit the module into your case. You should make sure that the module does not move when you insert and remove patch cables.

## Using the Dual LFO Module

The Dual LFO module provides a basic building block modulation source, two completely independent low frequency oscillators capable of producing modulation source waves of frequencies from 0.1Hz to 700Hz in a wide range of wave shapes.

All three outputs of each LFO can be used simultaneously.

### Frequency

The **SPEED** knob and **slow / fast** switch are used to set the frequency of the wave output. The frequency is completely independent between the two LFOs, numbered **1** and **2**.

When the **fast / slow** switch is in the **slow** position, the available frequencies range from 0.1Hz to 9Hz. In **fast** position the range is from 9Hz to 700Hz.

Turning the **SPEED** knob to the left reduces the frequency, turning to the right increases the frequency.

### Output Waveforms

The Dual LFO module outputs three waveform types simultaneously and at the same pitch:

- Triangle / Sawtooth
- Square
- Sine

The waveform outputs all have the voltage levels of -5v to +5v.

### Shaping the Waveforms

The **SHAPE** knob can be used to shape the waveforms output from the Dual LFO module. Turning the **SHAPE** knob will affect all three outputs for the relevant LFO (either **1** or **2**).

Turning the **SHAPE** knob to the left will move the centre of the generated wave to the left. Turning the **SHAPE** knob to the right will move the centre of the generated wave to the right.

Using the **SHAPE** knob will cause the sine wave to have an increasingly flattened left or right-hand side to the wave, depending on which way the knob is turned.

The **SHAPE** knob will affect the pulse width of the square wave output, changing the amount of time the wave remains in the high or low position.

For the saw/triangle output, the **SHAPE** knob will change the shape from a down-slope ramp wave (knob fully left), through a triangle (knob centred) to an up-slope ramp wave (knob fully right). Any variation of these shapes can be achieved by turning the knob appropriately.

## Trimming the Dual LFO Module

The Dual LFO module has a trim pot on the back, which serve to adjust the sine wave shaping circuit.

Care must be taken when adjusting the trims pots and it is highly recommended that a good quality oscilloscope is used when making any adjustments.

### Sine Shaping

The sine shaping circuit can be trimmed using the *sine level* and *sine shape* trim pots for each LFO. The *sine level* pot adjusts the squashing of the wave into a sine shape. The *sine shape* trim pot adjusts the balance of the waveform.

The trim pots have been factory set to produce a clear sine wave but they can be adjusted if required.