Expert Sleepers

User Manual

Revision 1.0

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Introduction

Congratulations on your purchase of an Expert Sleepers “Otterley”. Please read this user manual before operating your new module.

Otterley is a multi-LFO module, designed to offer extensive modulation possibilities, with a good amount of control and flexibility, while remaining nicely compact.

Four of the outputs are switchable between sine and square LFOs. Their frequencies are jointly set by the Speed and Spread knobs, which control the base speed and the speed difference between the outputs, respectively. Both controls also have CV inputs. These four outputs can also be switched between bipolar (±5V) and unipolar (10V positive or negative), and can be reset to the start of their cycle via the Reset input.

A fifth output offers another, independent, sine LFO with its own speed knob.

The module is 100% analogue.

Installation

House the module in a Eurorack case of your choosing. The power connector is 16-pin Doepfer standard[1]. If using the power cable supplied with the module, the red edge of the cable is closest to the bottom edge of the PCB, and carries -12V. ("-12V" is marked on the PCB itself next to this end of the connector.) Be sure to connect the other end of the power cable correctly, again so -12V corresponds to the red stripe on the cable.

1 http://www.doepfer.de/a100_man/a100t_e.htm

Power requirements

Otterley draws up to 82mA on the +12V rail, and 80mA on the -12V rail.

It does not use the 5V rail.

Inputs and outputs

Otterley's input and output jack sockets are illuminated, lighting red for positive voltage and blue for negative voltage. (Audio-rate signals appear purple, since you see a rapid alternation of positive and negative.)

From top to bottom, Otterley's sockets are:

- Speed CV input
- Spread CV input
- Reset (gate) input
- LFO outputs 1 to 5

For the Speed CV input, with its attenuator fully clockwise, a voltage range of 10V corresponds to the full range of the knob. For the Spread CV input, a voltage range of 5V corresponds to the full range of the knob. In both cases, the knob and CV are simply added, and negative CVs are accepted (a negative CV having the same effect as turning the knob counter-clockwise).

The LFO outputs are factory calibrated to a 10V range (±5V) but there is a lot of scope to customise this – see "Calibration" below.

Controls

There are four knobs, which are (from top to bottom):

- Speed
- Attenuator for the Speed CV input
- Spread
- Speed (for the fifth LFO)

There are also two switches, both of which have three positions.

The lower switch chooses the LFO shape for outputs 1-4, Square when positioned to the right, and Sine when positioned to the left. In the centre position, there is no output.

The upper switch applies an offset voltage to LFOs 1-4, +5V when positioned to the right, and -5V when positioned to the left. In the centre position, no offset is applied.

This switch is particularly useful when using the square LFO shape, since applying a +5V offset turns the output into a 0/10V square – a typical gate/trigger shape.

Speed and Spread

The Speed and Spread knobs (and their corresponding CVs) jointly control the speeds of LFOs 1-4. Speed is easy to understand – it simply makes all four LFOs faster or slower. Spread controls the difference in speed between the four LFOs. With the knob fully counter-clockwise, and the CV at 0V (or unconnected), all four LFOs run at the same speed[2]. As the Spread is increased, LFO 1 remains unchanged, but LFO 2 will run faster, LFO 3 will run faster still, and LFO 4 even faster.

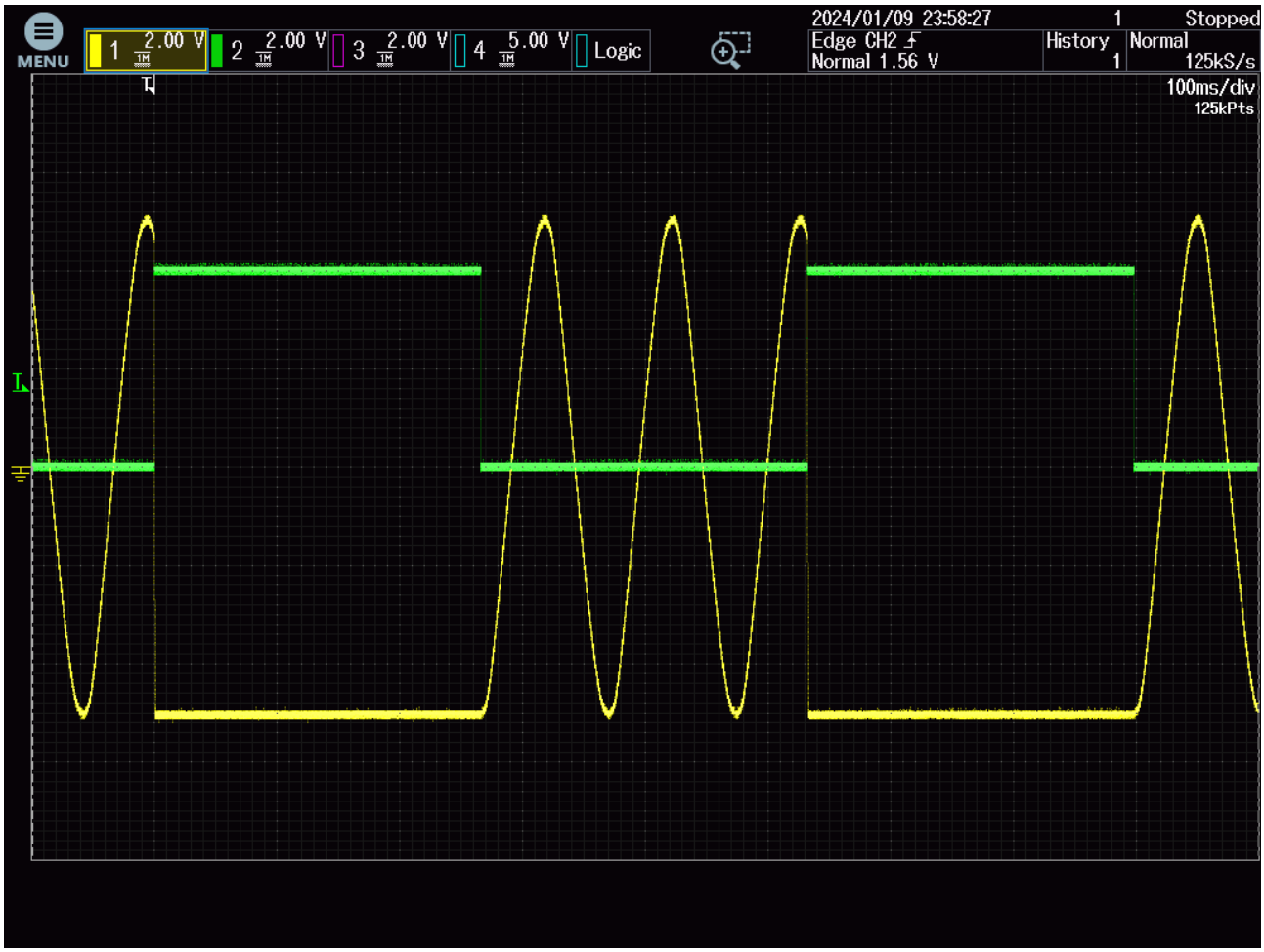
Note that while the knob only applies positive Spread, the CV input is bipolar – supplying a negative CV will make LFOs 2, 3, & 4 run slower than LFO 1.

Reset

The Reset input takes a gate (on/off) signal. While the gate is high, LFOs 1-4 are halted, and their outputs take a fixed level. When the gate goes low, oscillation restarts from a fixed phase.

A very short gate (trigger) signal can therefore be used to restart the LFOs; or a longer signal can be used to hold them in a reset state for as long as desired.

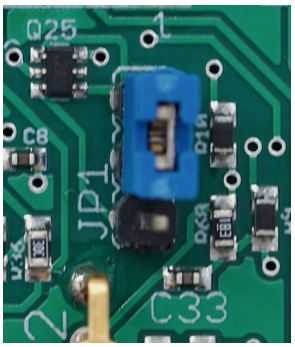
The image below shows the effect of the Reset input (green trace) on the Sine LFO shape (yellow trace). Note that the LFO always starts from its lowest point when the Reset goes low.



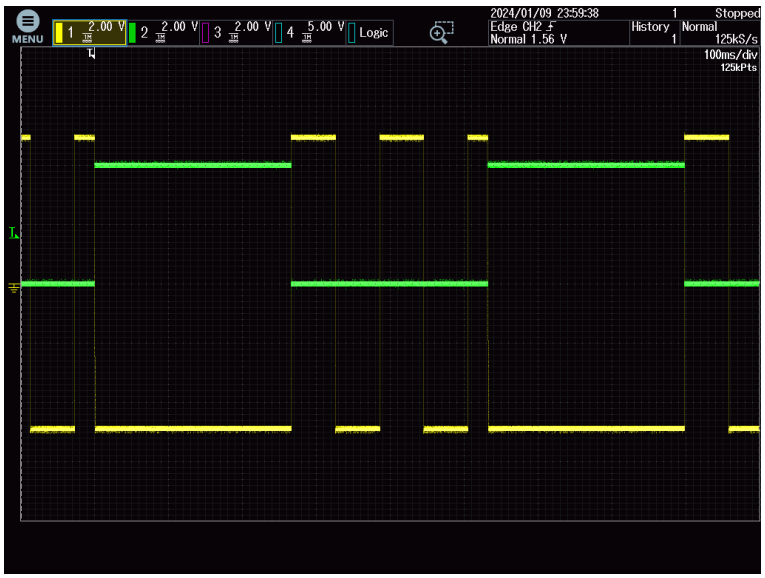
2 More or less – bear in mind that this is an analogue module!

Jumper

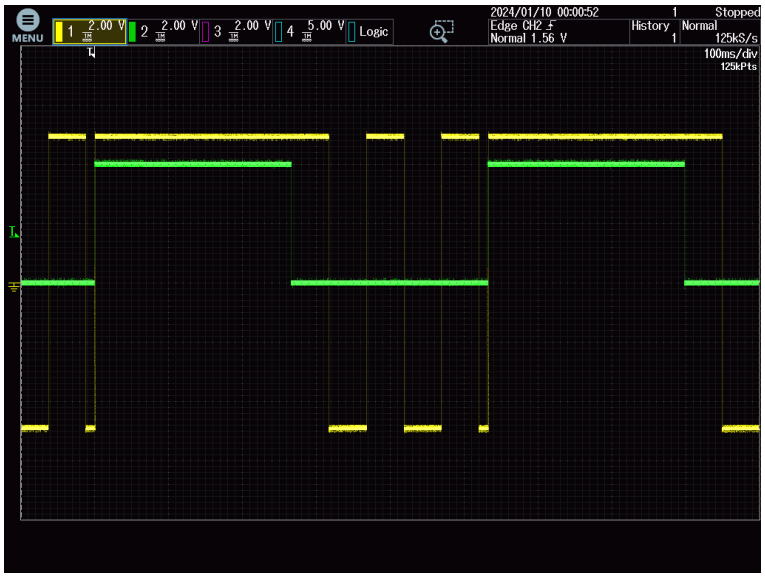
There is one jumper on the upper PCB, labelled JP1. This controls the exact behaviour of the Square LFO shape when the Reset input is used.



If the jumper is in the position as pictured above (which is the position as fitted in the factory), the Square output is held low while the Reset is high:



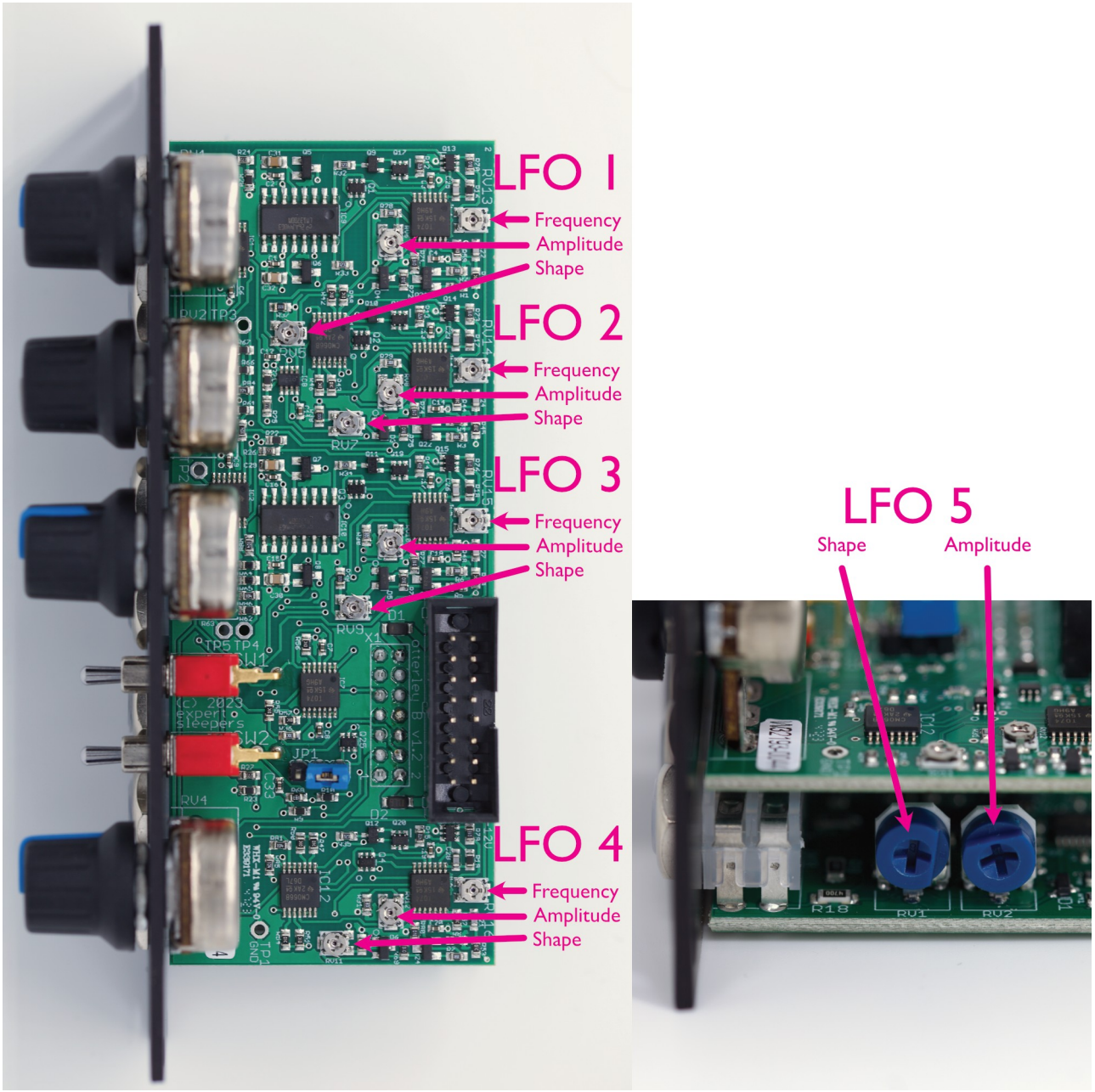
With the jumper on the other pair of pins, the Square output is held high while the Reset is high, and goes low one half cycle after the Reset goes low:



Calibration

Each LFO has trim pots to adjust the shape and amplitude of its sine output[3]. These are factory-adjusted to give a "nice" sine shape, and a ±5V amplitude, but there is enough range in the trim pots to deliver amplitudes from about 3V (±1.5V) to 20V (±10V). The shape trimmers can also be set to deliver an almost-triangle shape, if you prefer that over a sine. Or indeed you could have different outputs with different shapes/amplitudes.

LFOs 1-4 also have trim pots to fine tune their frequencies. These are not factory-adjusted, but are provided in case you wish to attempt to get all four LFOs to run at exactly the same rate when the Spread is zero.



3 The LFO core generates a triangle, which is waveshaped into a "sine".

Where to get help

Email, forum, and social media links can be found at the bottom of every page on our website[4].

Acknowledgments

Black and white photography by Israel Denadai[5].

4 https://www.expert-sleepers.co.uk
5 http://israeldenadai.com.br/bw