Oakley Sound Systems

5U Oakley Modular Series

Deep Equinoxe
Voltage Controlled Phaser

User Manual

V1.1

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The 1U wide panel design for the standard Deep Equinoxe for MOTM format systems.

Introduction

This is the User Manual for the Deep Equinoxe 5U module from Oakley Sound. This document contains an overview of the operation of the unit and all the calibration procedures.

For the Builder's Guide which contains information on how to construct the module from our PCB and parts kits please visit the main project webpage at:

http://www.oakleysound.com/deep.htm

For general information regarding where to get parts and suggested part numbers please see our useful Parts Guide at the project webpage or http://www.oakleysound.com/parts.pdf.

For general information on how to build our modules, including circuit board population, mounting front panel components and making up board interconnects please see our generic Construction Guide at the project webpage or http://www.oakleysound.com/construct.pdf.

The prototype Oakley Deep Equinoxe module behind a natural finish Schaeffer panel. The Deep Equinoxe board is the smaller one mounted above the standard Equinoxe PCB.

The Oakley Deep Equinoxe Voltage Controller Phaser

The Oakley Deep Equinoxe is a classic four, six and eight stage OTA based phaser and designed to be similar in sound to the phaser used by Jean Michel Jarre on the Oxygene and Equinoxe albums.

When in normal mode the Oakley Deep Equinoxe produces two deep notches in the frequency response of the unit. These notches can be considered as band stop filters whereby a very narrow portion of the sound's spectrum is filtered out. These two notches are produced by four voltage controlled phase shift circuits. In Deep mode the number of phase shift circuits can be increased to six, producing three notches, and eight, producing four notches.

The Deep Equinoxe allows the frequency of all eight phase shifting circuits to be controlled by an external control voltage (CV). This allows envelope generators to be used to sweep the phaser to create filter type effects. It also contains an inbuilt low frequency oscillator that is connected internally to the phase shifter when a CV is not being applied.

The module has four pots:

Frequency: This controls the frequency of the two notches created by the phase shift network.

Emphasis: This accentuates the feedback signal within the phaser to create a deeper effect.

Modulation depth: A simple attenuator to adjust the level of the internal LFO or incoming CV. With no jack plug inserted into the CV IN socket the internal LFO is controlled by this pot. When a jack plug is inserted into CV IN then the LFO is automatically disconnected and the CV input takes over.

LFO rate: Adjusts the speed of the LFO. A dual colour LED indicates the output status.

The module also has two toggle switches:

Norm/Deep: This two way toggle switch selects between the classic four stage Oakley Equinoxe mode and the Deep modes.

Six/Eight: This two way toggle switch selects between six stage or eight stage phasing when in Deep mode. It has no effect when the Norm/Deep switch is in the up position.

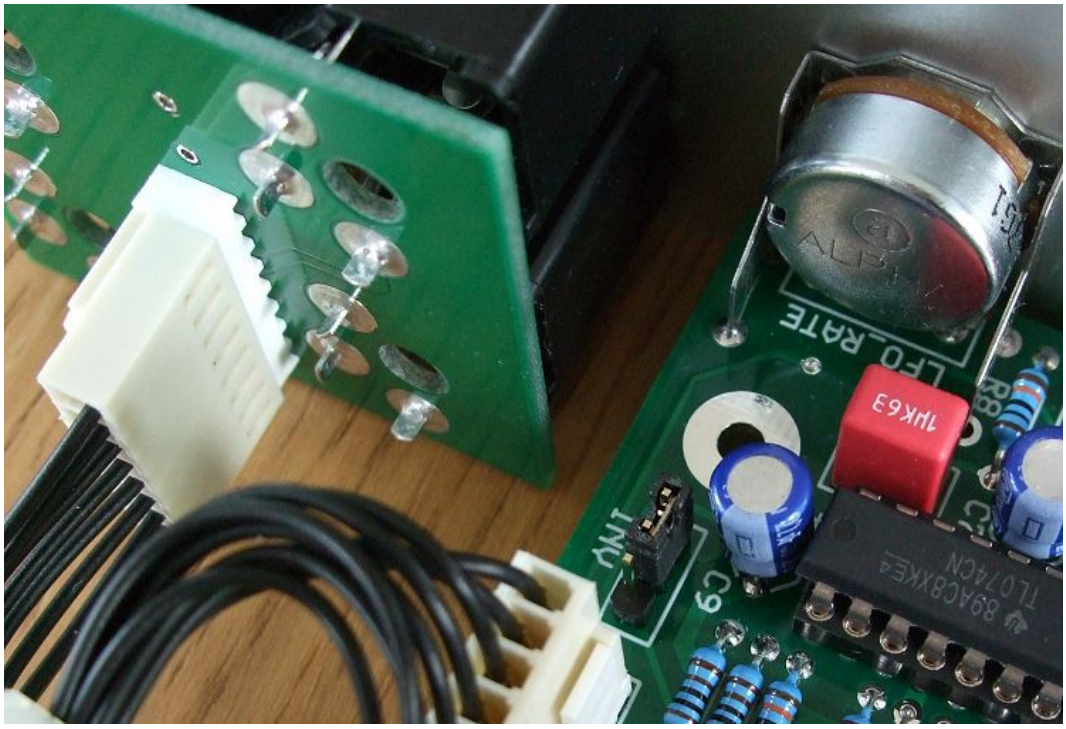
The internal LFO produces a triangle wave output which is also available from a front panel socket. This allows you to use the internal LFO for other modulation purposes. As stated above the LFO signal is automatically routed to the modulation depth pot when no jack is inserted in the CV input.

The LFO output can be configured as normal or inverted. In normal mode the LFO output is simply a copy of the signal being sent to the phaser circuitry. That is the voltage output from the LFO OUT socket rises as the phaser frequency moves upwards. In inverted mode the LFO output is an inverted signal. Thus when the phaser is being swept upwards, the LFO OUT signal is going downwards. The mode is selected by the position of a movable jumper found at the lower edge of the circuit board. It is not expected that you will be changing the mode on the fly. The LFO mode does not affect the polarity of any CV IN signal.

By having two Equinoxe modules you can use one to modulate the other. Simply connect the LFO OUT of one (the master) to the CV IN of the other (the slave). You can now modulate both phasers with the master's LFO. If the LFO mode is set to non inverting this will allow for true stereo phasing, whereby both channels are treated equally. With mode set to invert then you will create a form of stereo phase panning, where each phaser moves in an opposite direction to give a wide stereo effect.

The unit is designed to work with standard MOTM/Oakley signal levels, although it is possible to modify your unit to be run straight from a guitar.

Power (+/-15V) is provided to the board either by our standard Oakley 4-way header or Synthesizers.com header. Current draw is around 50mA maximum. This unit will also run from a +/-12V supply with a slight reduction in dynamic range.



Here we can see the three pin header and two way jumper that selects the LFO mode. In the position shown in the photograph the LFO OUT will produce an inverted signal - the jumper is aligned with the letters INV on the circuit board.

Calibration

There is only one trimmer to set up and it is easy to calibrate. Set the 'frequency' and 'emphasis' pots to their maximum value and the 'mod depth' and 'LFO rate' to the minimum values. Now turn the trimmer to its fully anti-clockwise position. Power the unit up and input a sawtooth waveform into the input. The specific note is not important, but a low to medium note like an A at 220Hz works well. Listen to the output through your normal listening set up.

Now slowly turn the trimmer in a clockwise direction. The moment the sound alters in texture stop turning. You may have to go back a little bit and do it again until you get it right. It'll probably end up being somewhere around its half way point. What you are doing is setting the module's top operating frequency for the frequency control. It's not terribly important that you set this accurately, so don't worry about it if you don't get it absolutely right.

Final Comments

I hope you enjoy using the Oakley Deep Equinoxe phaser module.

If you have any problems with the module, an excellent source of support is the Oakley Sound Forum at Muffwiggler.com. Paul Darlow and I are on this group, as well as many other users and builders of Oakley modules.

If you have a comment about this user manual, or have a found a mistake in it, then please do let me know.

Last but not least, can I say a big thank you to all of you who helped and inspired me. Thanks especially to all those nice people on the SDIY and Analogue Heaven mailing lists and those at Muffwiggler.com.

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