Oakley Sound Systems

5U Oakley Modular Series

Noise Generator and Dual Filter

PCB Issues 4 & 4.1

User Manual

V4.1

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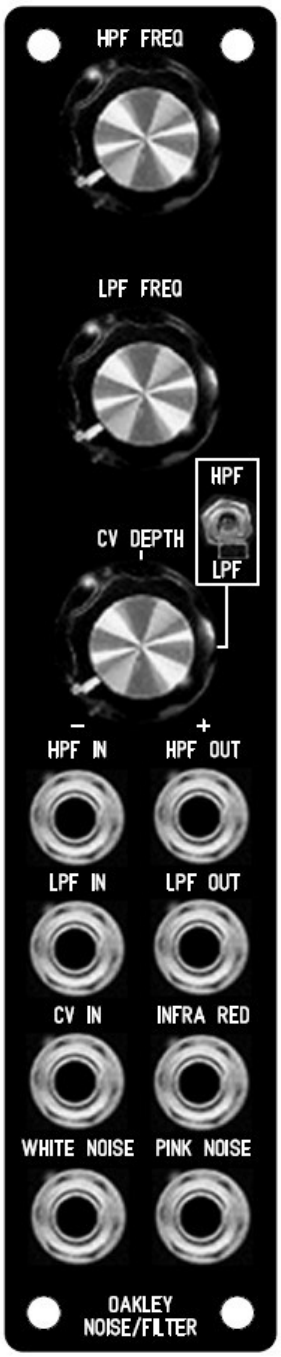


The MOTM format front panel of the issue 4 Oakley Noise/Filter module.

Introduction

This is the User Manual for issue 4 of the Noise/Filter 5U module from Oakley Sound.

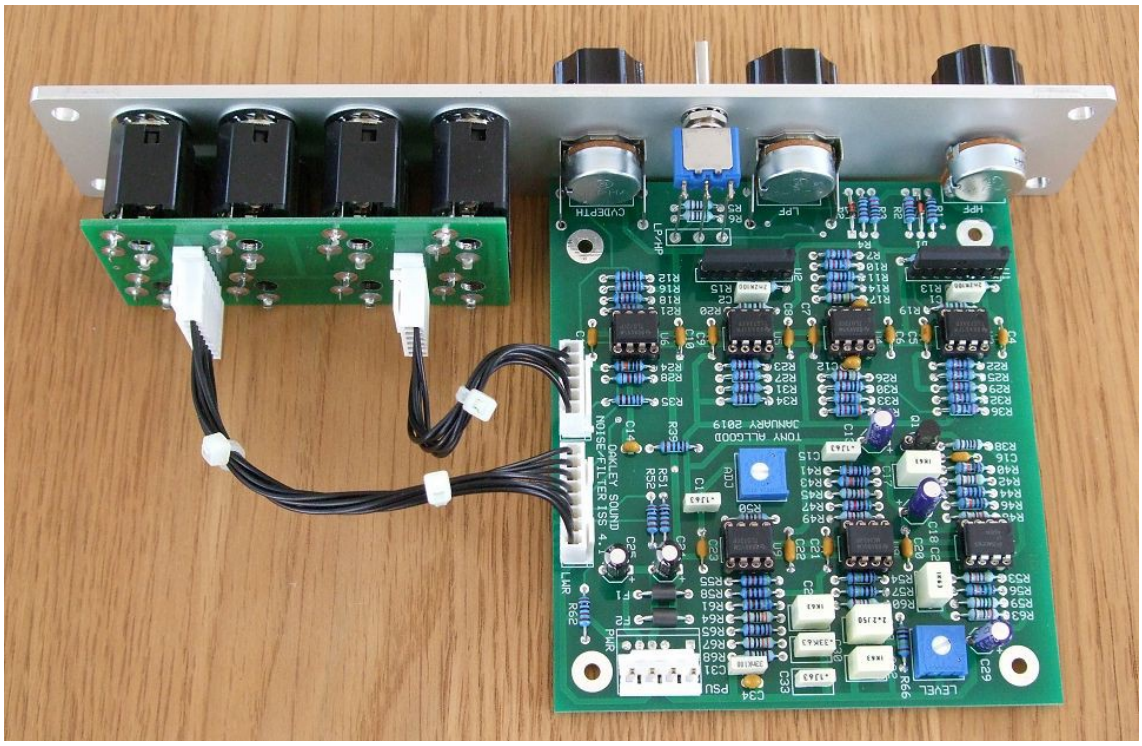
This document contains an overview of the operation of the unit and all the calibration procedures.

For the Builder's Guide which contains a circuit description and the full parts list for all the components needed to populate the board please visit the main project webpage at:

http://www.oakleysound.com/noise.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 issue 4.1 PCB mounted behind a 1U MOTM format Schaeffer panel in natural finish. Note the use of the Sock8 board to make easy the complicated socket wiring.

The Oakley Noise/Filter Module

The Oakley Noise and Dual Filter module is used to generate non pitched sounds such as wind, surf and other ethereal sounds. It can also be used as a sound source for percussive sounds like cymbals and snare drums.

Two types of noise output are provided. White noise which when unfiltered sounds like gas escaping, and pink noise which sounds more like a big waterfall. The module's pink noise circuitry comprises of a complex cascade filter network designed to replicate the -3dB/octave low pass response that true pink noise requires.

The module also gives a very low frequency output or infra-red signal. This can be heard as a serious of random thumps when listened too, but it is actually a randomly varying output voltage changing all the time, sometimes quickly and sometimes hardly at all. Fascinating to watch when it controls an LED, but it comes into its own when controlling filter cut-off on an otherwise static sound

This module also features two separate voltage controlled one pole filters, one high pass and one low pass. These are internally normalised to the noise generator's output, but may also be used separately to process other sound sources too. One pole filters have a roll-off of -6dB per octave, and do not possess any self resonance.

The two filters may be used in cascade to produce a bandpass response.

One pole filters sound particularly nice with audible noise, and give far more natural wind and surf sounds than the usual 2 or 4 pole filters. The two filters are both voltage controlled so they may be controlled by an external CV signal from, perhaps, an ADSR, LFO or midi-CV convertor. A front panel pot and three way toggle switch allows you to control the depth of the modulation for each filter. This pot is a 'reversible attenuator, so you are able to control not only the depth of the modulation but also the polarity.

The control range of each of the filter sections is identical, and covers the whole audio range from below 20Hz to above 20kHz. The whole range can be swept by the front panel LPF FREQ or HPF FREQ pots.

The low pass filter (LPF) input socket is normalised to the pink noise output. This means that when no jack plug is inserted into the LPF IN socket the pink noise is automatically routed into the low pass filter circuitry. The LPF OUT socket is then a source of low pass filtered pink noise.

The high pass filter (HPF) input socket is normalised to the white noise output. This means that when no jack plug is inserted into the HPF IN socket the white noise is automatically routed into the high pass filter circuitry. The HPF OUT socket is then a source of high pass filter white noise.

The noise source is true analogue, a reverse biased NPN transistor, which generates completely random white noise.

Power Supply

Current consumption is approximately 30 to 35mA per 15V rail.

MOTM and Oakley

The PSU power socket is 0.156” Molex/MTA 4-way header. Friction lock types are recommended. This system is compatible with MOTM systems.

Power	***Pin number***
+15V	1
Module ground (0V)	2
Socket ground	3
-15V	4

Pin 3 on the LWR header is connected to pin 3 of the PSU header and has been provided to allow the ground tags of the jack sockets to be connected to the power supply ground without using the module’s 0V supply. Earth loops cannot occur through patch leads this way, although screening is maintained.

MU and Synthesizers.com

The PWR power socket is to be fitted if you are using the module with a Synthesizers.com system. In this case you should not fit the PSU header. The PWR header is a six way 0.1” MTA, but the pin in location 2 is removed. In this way location 3 is actually pin 2 on my schematic, location 4 is actually pin 5 and so on.

Power	***Location number***	***Schematic Pin number***
+15V	1	1
Missing Pin	2	
+5V	3	2
Module ground (0V)	4	3
-15V	5	4
Socket Ground *	6	5

+5V is not used on this module, so location 3 (pin 2) is not actually connected to anything on the PCB.

If fitting the PWR header and using it with a standard MU power distribution system, you will also need to connect together the middle two pads of the PSU header on the main board. This link connects the socket and panel ground with the module ground. Simply solder a solid wire hoop made from a resistor lead clipping, or bit of solid core wire, to join to the two middle pads of PSU.

* The issue 4.1 boards connect the normally unused pin 6 of the MU connector to socket ground. With the link on PSU not fitted, and using an Oakley MU Dizzy distribution board

with a five way power cable, will allow the socket ground to be kept separate from module ground to prevent ground loops.

Calibration

There are just two trimmers to be set on this module. The LEVEL trimmer allows you to trim the output of the white noise and also the pink noise. Monitor the white noise with an oscilloscope. Adjust LEVEL until the peak signal is around +/-6V. If you don't have a oscilloscope, then just adjust it until you get the roughly the same volume as one as your modular's VCOs.

The ADJ control can be set in a variety of ways. What we need to do is to set the average voltage of the IR output to zero. One way is to use an oscilloscope and try and get equal swings either side of zero volts. Another way is to patch the IR output to modulate the pitch of an oscillator or self-oscillating filter. The ADJ trimmer is then adjusted so that the oscillating frequency heard spends an equal time above the starting frequency as it does below. Note that the infra red output is very random and very slow. Be prepared to spend around a minute in waiting for the output to settle to the new ADJ position.

If you find you cannot get the IR output to get away from either supply rail, then please re-adjust the LEVEL trimmer to give a higher level of noise to the IR circuitry.

Final Comments

I hope you enjoy using the Oakley Noise/Filter module.

If you have any problems with the module, an excellent source of support is the Oakley Sound Forum at Muffwiggler.com. I am 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 Synth-diy and Analogue Heaven mailing lists, and those at Muffwiggler.com.

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