

**Oakley Sound Systems**

**5U Oakley Modular Series**

**RM-4014 Ring Modulator**

**PCB Issue 3**

**User Manual**

**V3.0.0**

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*The suggested 5U panel design. Note the slightly different spacing of the knobs compared with the usual 41mm 5U Oakley standard.*

## Introduction

This is the User Manual for the issue 3 RM-4014 Ring Modulator 5U module from Oakley Sound. This document contains an overview of the operation of the unit and the calibration procedure.

For the Builder's Guide, which contains a basic introduction to the board, a full parts list for the components needed to populate the board or boards, and a list of the various interconnections, please visit the main project webpage at:

<http://www.oakleysound.com/ringmod.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>.



## Calibration

There are three trimmers on the PCB which need adjusting correctly to get the best out of the ring modulator module. It is important that you adjust these in your modular as the settings are affected by the power supply voltages.

Allow the modular and ring modulator to warm up for 15 minutes.

**BAL1:** Turn down X LEVEL and Y LEVEL pots to their minimum settings. Turn the Y OFFSET pot to its maximum level. Measure the output voltage from the output socket with a good digital voltmeter. Adjust BAL1 until the output voltage is 0.000V +/- 5mV.

**BAL2:** Insert a triangle wave signal at 440Hz to the IN Y AC input. Turn down the Y OFFSET pot to its minimum setting. Turn up the Y LEVEL to full. If you have a 'scope then adjust BAL2 until the signal seen at the output socket is minimised as much as possible. It will not go away completely. If you haven't got a scope then use your ears with your monitoring amp turned up somewhat. Adjust BAL2 until the sound from the output socket is at its smallest level. You will not get rid of it completely, the ring modulator is not perfect and as such it will leak or bleedthrough. Once you have done this remember to turn your amp down if you have turned it up high.

**GAIN:** Ensure that the Y LEVEL is set to minimum, but the other two pots to their maximum. Insert an audio signal into IN X (DC) and adjust GAIN so that the output signal is at the same level or volume as the input. That is, if you have a 5V peak signal inserted into IN X, then you should adjust GAIN for a 5V peak signal at the output.

Once that is completed the unit is ready to be used to make music, or just daft noises...

## Final Comments

I hope you enjoy using the Oakley Ring Modulator module.

If you have any problems with the module, an excellent source of support is the Oakley Sound Forum at [Muffwiggler.com](http://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 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](http://Muffwiggler.com).

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