

μMOD II

Ring Modulator / Analog Logic



Manual Revision: 1.0

Table of Contents

[Table of Contents](#)

[Overview](#)

[Installation](#)

[Before Your Start](#)

[Installing Your Module](#)

[Front Panel](#)

[Controls](#)

[Inputs & Outputs](#)

[Analog Logic](#)

[Technical Specifications](#)

Overview

The μMod II is a multi-function module designed for combining audio or CV signals in a variety of ways. Apart from a versatile ring modulator / four quadrant multiplier it also performs analog logic functions useful for generating new combinations of waveforms.

The principle of operation is to take two signals, called X and Y, and produce a series of output signals that are derived from the sources using a variety of analog methods.

Installation

Intellijel Eurorack modules are designed to be used with a Eurorack-compatible case and power supply.

Before Your Start

Before installing a new module in your case you must ensure your case's power supply has sufficient available capacity to power the module:

- Sum up the specified +12V current draw for all modules, including the new one. Do the same for the -12 V and +5V current draw. The current draw will be specified in the manufacturer's technical specifications for each module.
- Compare each of the sums to specifications for your case's power supply.
- Only proceed with installation if none of the values exceeds the power supply's specifications. Otherwise you must remove modules to free up capacity or upgrade your power supply.

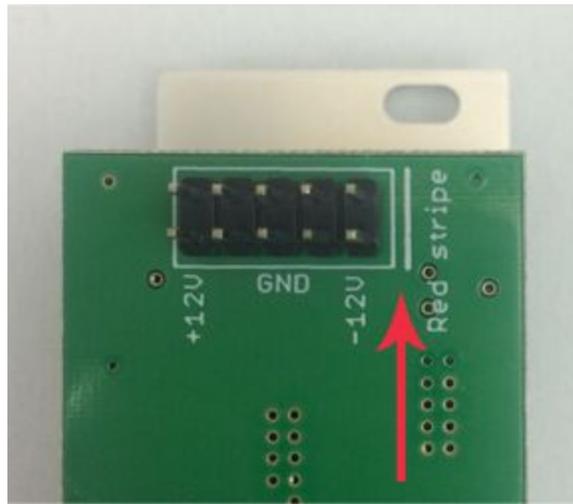
You will also need to ensure you have enough free space (hp) as well as free power headers in your case to fit the new module.

You can use a tool like [ModularGrid](#) to assist in your planning. Failure to adequately power your modules may result in damage to your modules or power supply. If you are unsure, please [contact us](#) before proceeding.

Installing Your Module

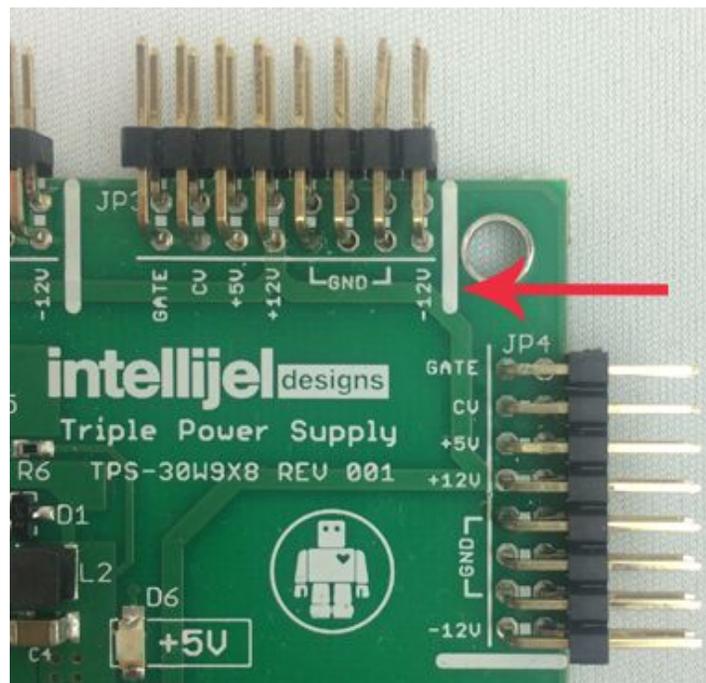
When installing or removing a module from your case always turn off the power to the case and disconnect the power cable. Failure to do so may result in serious injury or equipment damage.

Ensure the 10-pin connector on the power cable is connected correctly to the module before proceeding. The red stripe on the cable must line up with the -12V pins on the module's power connector. The pins are indicated with the label -12V, a white stripe next to the connector, the words "red stripe", or some combination of those indicators.



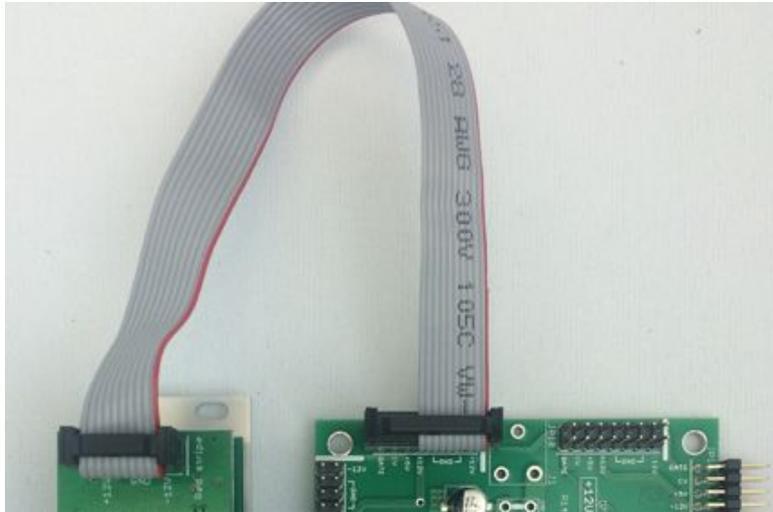
Most modules will come with the cable already connected but it is good to double check the orientation. Be aware that some modules may have headers that serve other purposes so ensure the cable is connected to the right one.

The other end of the cable, with a 16-pin connector, connects to the power bus board of your Eurorack case. Ensure the red stripe on the cable lines up with the -12V pins on the bus board. On Intellijel power supplies the pins are labelled with the label “-12V” and a thick white stripe:



If you are using another manufacturer's power supply, check their documentation for instructions.

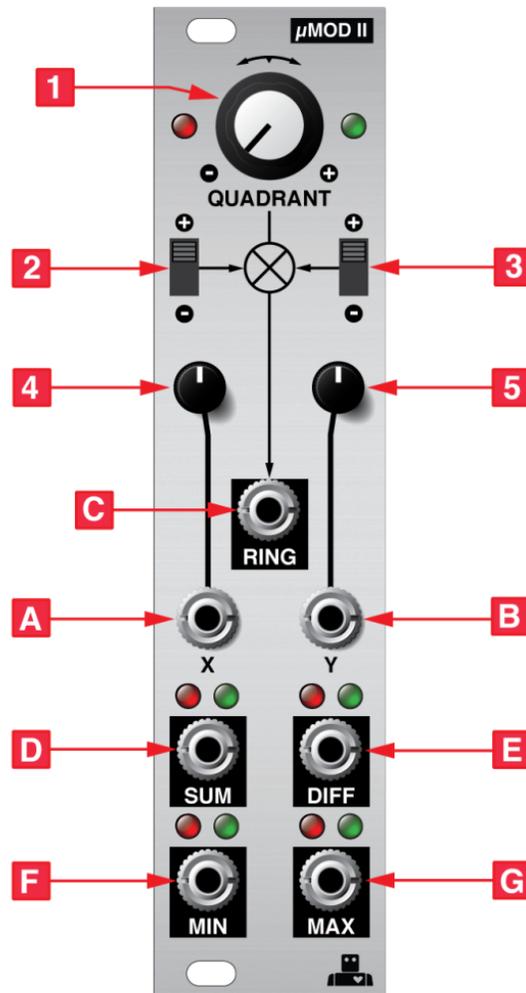
Once connected, the cabling between the module and power supply should resemble the picture below:



Before reconnecting power and turning on your modular system, double check that the ribbon cable is fully seated on both ends and that all the pins are correctly aligned. If the pins are misaligned in any direction or the ribbon is backwards you can cause damage to your module, power supply, or other modules.

After you have confirmed all the connections, you can reconnect the power cable and turn on your modular system. You should immediately check that all your modules have powered on and are functioning correctly. If you notice any anomalies, turn your system off right away and check your cabling again for mistakes.

Front Panel



Controls

1. **QUADRANT** - The quadrant knob controls shifts the multiplication in to the positive or negative quadrants. For standard ring modulation, set the knob at the 12 o'clock position.

2. **X +/-** - This three position switch controls the rectification of the X input. When in the middle position the input waveform is unaltered. When at + only the positive half of the waveform is passed through. When at – only the negative half is passed through.
3. **Y +/-** - This switch functions the same as the X +/- but for the Y channel.
4. **X Attenuator** - This knob controls the attenuation of the X signal. It is unaltered when the knob is fully clockwise.
5. **Y Attenuator** - This knob functions the same as the X attenuator but for the Y channel.

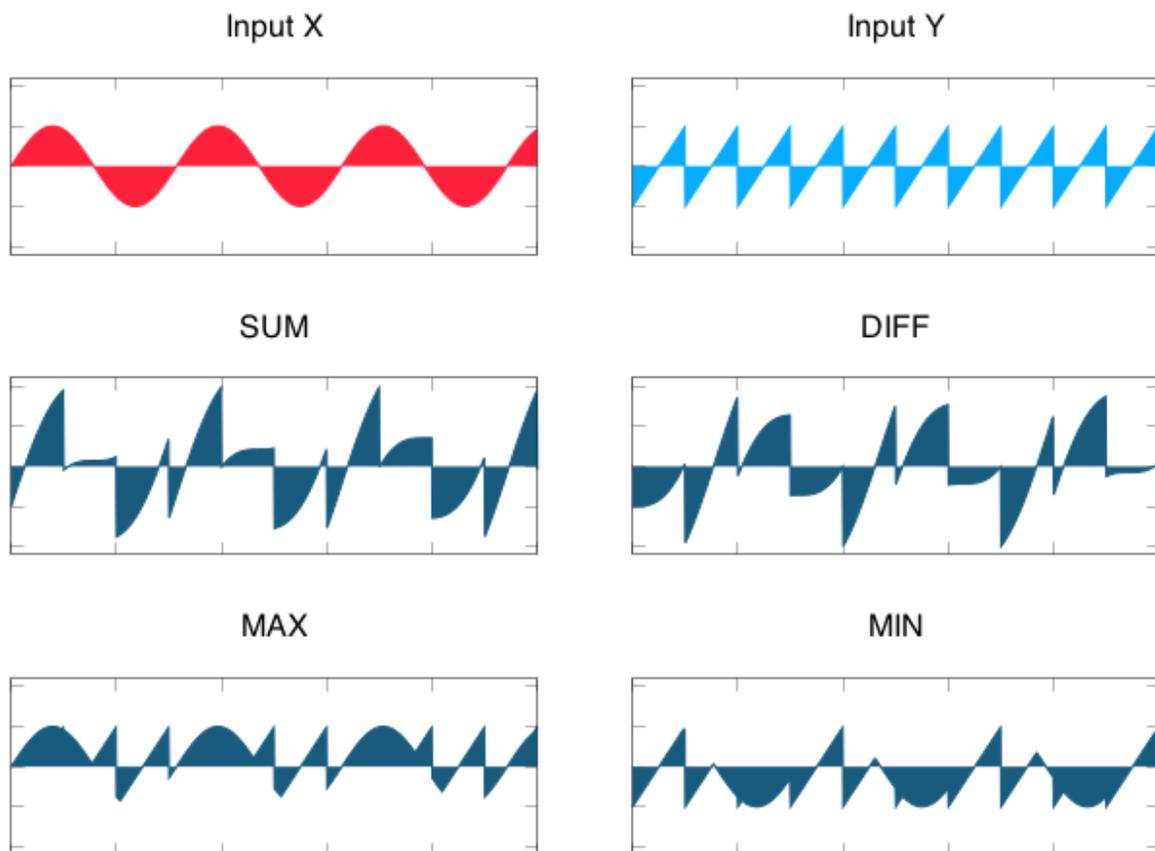
Inputs & Outputs

- A. **X** - X signal input.
- B. **Y** - Y signal input.
- C. **RING** - Ring modulator output.
- D. **SUM** - This output is the result of adding the X and Y inputs, $X + Y$.
- E. **DIFF** - This output is the result of subtracting the X input from the Y input, $Y - X$.
- F. **MAX** - This output is the maximum of the X and Y signals at any given point in time. It's the analog equivalent of the digital OR operation.
- G. **MIN** - This output is the minimum of the X and Y signals at any given point in time. It's the analog equivalent of the digital AND operation.

Analog Logic

The analog logic section of the module produces waveforms that are a combination of the X and Y inputs. This is well suited to creating complex CV from basic waveforms, or creating new interesting forms of audio.

The diagram below illustrates what's possible by combining sine and saw waveforms of two different frequencies via the various logic outputs:



Technical Specifications

Width	6 hp
Maximum Depth	35 mm
Current Draw	41 mA @ +12V 41 mA @ -12V