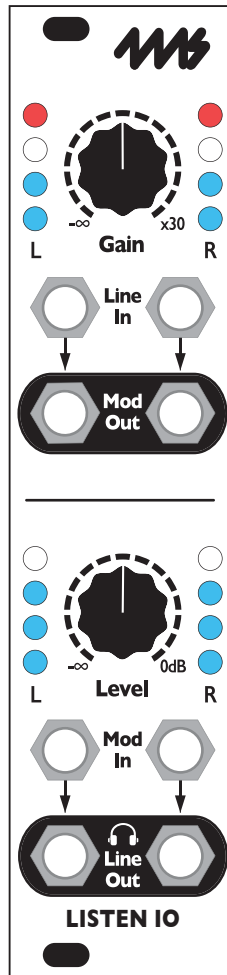


# Listen IO 4ms Company

User Manual 1.1 – Oct 15, 2020



The **Listen IO** is a simple module which gets signals in and out of a Eurorack system by converting to and from normal modular levels. The top section converts any external signal to modular levels by providing up to 30x gain (+30dB), allowing you to use table-top synthesizers, keyboards, phones/tablets, computers, toys, microphones, etc. in your patches. The bottom section does the opposite: modular signals are converted to normal line level signals. The bottom two jacks can be used as line outs or as headphone jacks, so you and a friend can listen in stereo at the same time.

Each section has two inputs and outputs for use with a stereo signal or two mono signals. An LED bar graph for each output shows the signal level and clipping.

The **Listen IO** features:

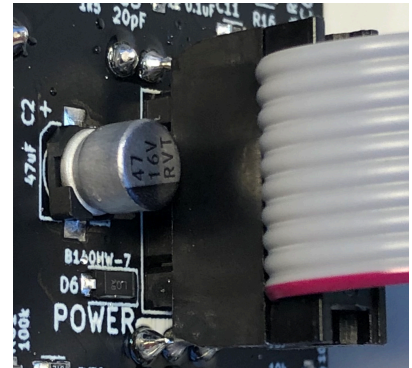
- Line to modular conversion, and modular to line/headphone conversion
- Works with guitars, table-top synths, effect pedals, keyboards, groove boxes, and many microphones
- Dual mono or stereo conversion
- LEDs show signal level and clipping
- Gain knob allows for wide range of boost or cut
- Headers in back for connecting to **Listen 4/4Q**, **Listen Up** or DIY adaptor module (1/4", banana, etc.)
- Two headphone outputs and stereo inputs for use as a compact headphones module

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## Setting up your Listen IO

1. Power off your Eurorack system.
2. Connect the free end of the included power cable to a 16-pin Eurorack power header on your power supply distribution system. The red stripe should match the white line or -12V marking on the power distribution board. The other end of the power cable is a 10-pin connector which should already be connected to the **Listen IO** with the red stripe on the power cable orientated towards the bottom of the module. *Note: The Listen IO is reverse-polarity protected, but incorrectly connecting any module can damage any other module on the power bus.*
3. Using the included screws, securely attach the **Listen IO** to the rails of your case.
4. Power on your Eurorack system.



## Line to Modular Section

The top half of the **Listen IO** converts low level signals such as line, instrument, or microphone to modular level. There are two independent channels which share a common **Gain** knob.



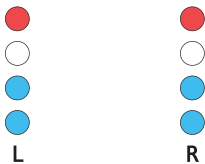
### Line In jacks

The two **Line In** jacks accept a wide range of signals; any guitar, effect pedal, synthesizer, keyboard, musical toy, etc. can safely be plugged into these jacks. Most microphones will also work, with the exception of mics that require power to be delivered over the cable (Phantom-powered and electret mics). These jacks are mono. If you have a stereo signal, patch the left channel into the left jack and the right channel into the right jack.



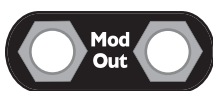
### Gain knob

The **Gain** knob controls how much the **Line In** signal is boosted. Although the signal paths of the left and right channels are separate, this knob controls both channels. The gain can range from negative infinity (muted) to about +30dB (which is about a voltage gain of 30).



### LED bar graph

The LED bar graph displays the level of the signal after the gain is applied. It also shows if there is any clipping. The more lights that are on and the brighter they are, the louder the signal. If the top light flashes red, then the signal is clipping. Adjust the **Gain** knob down until the red light stays off to avoid clipping. It's perfectly safe to clip and even overdrive the signal for a distortion effect if you wish.



### Mod Out jacks

The two **Mod Out** jacks output the boosted signal. The left jack is the output for the boosted signal of the left **Line In** jack, and the right jack is the output for the boosted signal of the right **Line In** jack. These jacks are mono. Typically, you would patch these to a Eurorack module.

## Modular to Line Section

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The bottom half of the **Listen IO** converts Eurorack signals to line or headphone level. The outputs are compatible, instrument-level equipment. There are two independent channels which share a common **Level** knob.



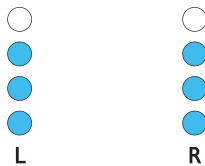
### Mod In jacks

The two **Mod In** jacks are the inputs to the bottom half of the module. Typically, you'll patch a modular signal into these jacks. These jacks are mono; if you have a stereo signal, patch the left channel into the left jack and the right channel into the right jack.



### Level knob

The **Level** knob controls how much the **Mod In** signal is attenuated (The process of taking a louder signal and converting it to a lower level signal is called *attenuation*). Although the signal paths of the left and right channels are separate, this knob controls both channels. The amount of attenuation can range from negative infinity (muted) to 0dB, which means the signal level is not changed.



### LED bar graph

The LED bar graph displays the level of the attenuated signal. The more lights that are on and the brighter they are, the louder the signal. Unlike the top half of the module, the bottom half will never cause clipping, and therefore there are no red lights.



### Line/Headphones Out jacks

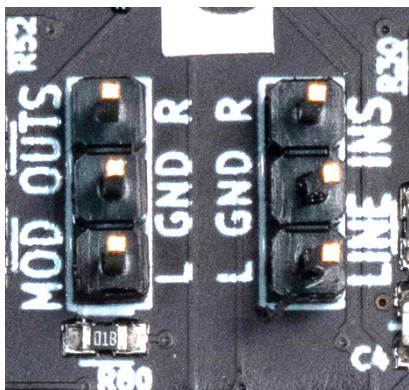
The two **Line Out** jacks output the attenuated signal. These are multi-purpose jacks and can be used as mono line level outputs or stereo headphone outputs.

If you're using these jacks with mono cables, then use the left jack as the output for the attenuated signal of the left **Mod In** jack, and the right jack as the output for the attenuated signal of the right **Mod In** jack.

If you're using these jacks with headphones, then both jacks will output both signals. The left jack will output the left signal in the left ear and the right signal in the right ear. The right jack swaps the left and right signals and outputs the left signal in the right ear and the right signal in the left ear.

## Headers and Jumpers

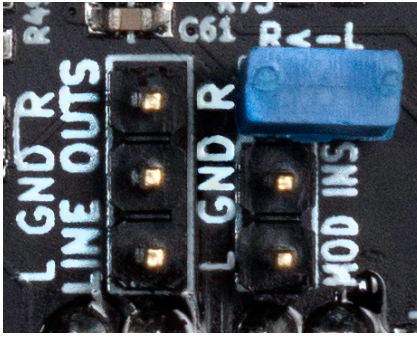
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On the rear of the module there are four 1x3 headers: **MOD OUTS** and **LINE INS** at the top, and **LINE OUTS** and **MOD INS** at the bottom. All four headers have pins for the left channel (bottom pin), right channel (top pin), and ground (center pin). The **MOD OUTS** header shares its top pin with the **R←L** header (more details below).

The **MOD OUTS** header can be used to connect to the **INS** header on a **Listen Four** or **Listen Four Quarters**. Doing this makes the **Listen IO's** top section act as a fifth channel to the **Listen** module. This header can be used to connect to a **WAV Recorder** module to be used as an analog pre-amp. The signal on this header is the same as the **Mod Out** jacks: the **Gain** knob sets the level, and the **Mod Outs** jacks can be used at the same time. The output impedance is 1k.

The **LINE INS** header can be used to connect to an adaptor module such as the **Listen Up** in order to use a 1/4" (6.35mm) jack. The input impedance is 100k. Whatever signal is present on the header will be added to the signal on the **Line In** jacks: both can be used simultaneously.



The **LINE OUTS** header outputs the same signal as the **Line Out** jacks, without the ability to drive headphones. This header can be used to connect to an adaptor module such as the **Listen Up** for outputting to a 1/4" (6.35mm) jack. The output impedance is 1k, and the header can be used simultaneously with the **Line Out** jacks.

The **MOD INS** header is located to the right of the **LINE OUTS** header. In the factory, a jumper is installed across the top pin of the **MOD INS** header as well as the adjacent pin to the right. These two pins are the **R←L** header. The photo on the left shows the **R←L** jumper installed. The **R←L** header and the **MOD INS** header share a common pin and cannot be used at the same time.

To use the **MOD INS** header, you must remove the **R←L** jumper. This header can be used to connect to an adaptor module such as the **Listen Up** in order to input a 1/4" (6.35mm) modular-level signal into the **Listen IO**. You also could connect the **OUTS** header of a **Listen Four** to this header, essentially adding two headphone jacks to the **Listen Four**. The input impedance is 100k. Whatever signal is present on the header will be added to the signal on the **Mod In** jacks: both can be used simultaneously. When the **R←L** has a jumper installed, the left **Mod In** jack will normalize to the right **Mod In** jack. This lets you patch a mono signal into the left **Mod In** jack and hear it in both ears when using headphones in the **Line Out** jacks. Patching a signal into the right **Mod In** jack will remove the normalization. When the jumper is not installed, the left and right jacks will not have any normalization between them.

## Electrical and Mechanical Specifications

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- 6HP Eurorack format module
- 0.95" (24mm) maximum depth (includes power cable)
- 10-pin Eurorack power header
  
- **Power consumption**
  - Maximum values: *All output jacks shorted to ground, 22Vpp signal on all input jacks, knobs at 100%*
    - +12V: 62mA
    - -12V: 55mA
  
- **Line to Mod section (top)**
  - Output: 1k impedance
  - Input: 100k impedance
  - Frequency Response: +/-0.1dB max deviation, 20Hz – 20kHz
  - Maximum output level: 22V peak-to-peak
  - Maximum gain: +30dB
  - Channel cross-talk:
    - Test conditions: Test signal input into left Line In jack. Sine wave at frequencies from 20Hz to 20kHz tested. Gain adjusted to maximum value without clipping. Result given as a ratio of the appearance of test frequency measured on right Mod Out jack to left Mod Out jack. Test repeated with left and right jacks swapped. Worst-case results for any channel and frequency reported. Note: cross-talk is much higher when clipping occurs.*
    - @1kHz: <-110dB; @10kHz: -78dB; @20kHz: -74dB
  
- **Mod to Line section (bottom)**
  - Output: 68Ω impedance
  - Input: 100k impedance
  - Frequency Response: +/-0.1dB max deviation, 20Hz – 20kHz
  - Maximum output level: 22V peak-to-peak
  - Maximum gain: 0dB (unity)
  - Channel cross-talk:
    - Test conditions: Same as **Line to Mod** section test, but using Mod In and Line Out jacks*
    - 20Hz – 20kHz: <-110dB