Quick Start Guide

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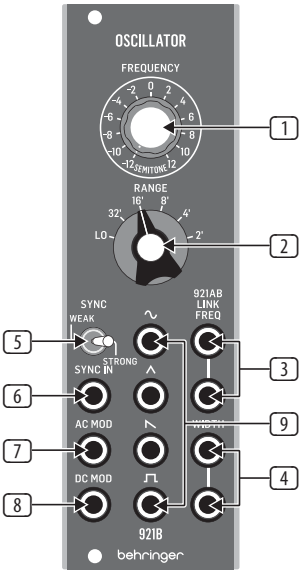
921B OSCILLATOR

Legendary Analog VCO Module
for Eurorack

Controls



1 **FREQUENCY** – This knob manually adjusts the frequency in semitones for the 921B oscillator circuit. This oscillator can generate both audio and sub-audio frequencies for control or audio.

2 **RANGE** – This knob sets the general frequency range of the oscillator in octaves, numbered to match pipe organ notations, which can then be adjusted up or down by semitones with the FREQUENCY knob.

3 **921AB LINK FREQ** – These parallel jacks accept frequency control voltage signals from a 921A module via cables with 3.5 mm TS connectors. The parallel wiring of the jacks also allows a control voltage signal to be sent through and back out to drive additional 921B modules.

4 **921AB LINK WIDTH** – These parallel jacks accept 921A control voltage signals for the rectangular wave width parameter via cables with 3.5 mm TS connectors. The parallel wiring of the jacks also allows a control voltage signal to be sent through and back out to drive additional 921B modules.

NOTE: If the 921B input voltage exceeds the range of 0 to +6 V, the excess voltage could result in the width being 0% or 100%, which means no waveform will be present at the square wave output until the control voltage is returned to the normal range. When using 921B with a 921A driver, the 921A's WIDTH OF RECTANGULAR WAVE knob can offset the control voltage output from 921A to compensate. For example, when 921A's WIDTH knob is set to 50%, the 921A's normal control voltage range into 921B becomes -3 V to +3 V.

5 **SYNC WEAK/OFF/STRONG** – Use this switch to set how closely 921B follows the sync signal routed in via the SYNC IN jack. If the SYNC IN input is not required, select the center OFF switch position.

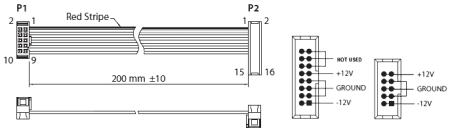
6 **SYNC IN** – Use this jack to route an external sync signal into the 921B module via cables with 3.5 mm TS connectors. A sawtooth waveform is recommended to produce the best sync results.

7 **AC MOD** – Use this AC-coupled input jack to control frequency modulation via a control signal.

8 **DC MOD** – Use this DC-coupled input jack to control frequency modulation via a control signal.

9 **WAVEFORM OUTPUTS** – Use these jacks to route oscillator signals out of the module via cables with 3.5 mm jacks. Four waveforms are available: sine, triangular, sawtooth and rectangular.

Power Connection



The 921B OSCILLATOR module comes with the required power cable for connecting to a standard Eurorack power supply system. Follow these steps to connect power to the module. It is easier to make these connections before the module has been mounted into a rack case.

1. Turn the power supply or rack case power off and disconnect the power cable.
2. Insert the 16-pin connector on the power cable into the socket on the power supply or rack case. The connector has a tab that will align with the gap in the socket, so it cannot be inserted incorrectly. If the power supply does not have a keyed socket, be sure to orient pin 1 (-12 V) with the red stripe on the cable.
3. Insert the 10-pin connector into the socket on the back of the module. The connector has a tab that will align with the socket for correct orientation.
4. After both ends of the power cable have been securely attached, you may mount the module in a case and turn on the power supply.

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Installation

The necessary screws are included with the module for mounting in a Eurorack case. Connect the power cable before mounting.

Depending on the rack case, there may be a series of fixed holes spaced 2 HP apart along the length of the case, or a track that allows individual threaded plates to slide along the length of the case. The free-moving threaded plates allow precise positioning of the module, but each plate should be positioned in the approximate relation to the mounting holes in your module before attaching the screws.

Hold the module against the Eurorack rails so that each of the mounting holes are aligned with a threaded rail or threaded plate. Attach the screws part way to start, which will allow small adjustments to the positioning while you get them all aligned. After the final position has been established, tighten the screws down.

Tuning Procedure

This procedure tunes the 921B OSCILLATOR module's "octave scaling" to an exact 1 V/oct. calibration to facilitate precise control.

1. Power up the 921B module and allow it to warm up for a few minutes.
2. Prepare the following control settings on 921B:
    a. Set the SYNC toggle switch to the center OFF position.
    b. Set the RANGE switch to 2'.
    c. Set the FREQUENCY control knob to exactly 0 on the scale.
    d. Make sure no 921AB LINK FREQ jacks are connected.

Note: All adjustment trimmers are accessible from the 921B module's underside. Note the positions of the FREQ ADJ, SCALE, HI ADJ multi-turn trimmers and the OCT ADJ single-turn trimmer. Make sure you have suitable tools to adjust the trimmers if required.

3. Carry out an initial FREQUENCY control calibration by adjusting the FREQ ADJ trimmer so that the 921B sawtooth output shows exactly 640 Hz when checked with an accurate frequency meter.
4. Fine-tune the 921B oscillator's low-frequency scaling via the following steps:
    a. Make sure the FREQUENCY control knob remains at 0 on the scale during this procedure.
    b. Apply exactly -2 V to a 921AB LINK FREQ input jack. (A 921A module can be used to supply the -2 V or use a similar low-impedance stable-voltage source.)
    c. Trim the SCALE trimmer to set 160 Hz, then remove the -2 V input and readjust the FREQ ADJ trimmer to 640 Hz.
    d. Repeat this cycle until both 160 Hz and 640 Hz are accurate to ±1 Hz when the -2 V is plugged in and out of the 921AB LINK FREQ input jack.
5. Fine-tune the 921B oscillator's high-frequency scaling via the following steps:
    a. With no 921AB LINK FREQ jack connected, check the frequency is still set for 640 Hz output, then apply exactly +5 V to the 921AB LINK FREQ input.
    b. Trim the HI ADJ trimmer to set the 921B sawtooth output to exactly 20.48 kHz.
    c. Re-check that 640 Hz is still correct when the +5 V input is removed.
    d. Repeat as required.
6. Make a final fine-tune of the RANGE rotary switch scaling, if required, via the following steps:
    a. With no 921AB LINK FREQ jack connected, check the frequency is still set to 640 Hz on the RANGE knob 2' setting.
    b. Set the RANGE switch to 32' and adjust the OCT ADJ trimmer for 40 Hz at the 921B sawtooth output.
    c. Re-check to make sure that 2' = 640 Hz and adjust the FREQ ADJ trimmer if required.
    d. Repeat as required.

Specifications

Signal Connections	
Frequency control link inputs	2 x 3.5 mm jacks, 1 V/oct.
Input Impedance	100 kΩ, unbalanced
Maximum input level	-6 V to +6 V
Frequency range	< 1 Hz to > 40 kHz
Rectangular width link inputs	2 x 3.5 mm parellel jacks, 1 V/16%
Input Impedance	100 kΩ, unbalanced
Maximum input level	0 V to +6 V
Width range	< 10% to > 90%
Sync input	1 x 3.5 mm jack, AC coupled
Sync input impedance	1.5 kΩ, unbalanced
Sync input lock range	± 6 semitones
Sync input response	10 Hz to 20 kHz, > -10 dBu
Maximum input level	+15 dBu
AC / DC mod input	2 x 3.5 mm jacks, AC/DC coupled
AC / DC mod input impedance	100 kΩ, unbalanced
AC / DC mod response	10 Hz to 10 kHz, > -10 dBu
Maximum input level	+4 dBu
Waveform outputs	4 x 3.5 mm jacks, mono
Waveforms	Sine, triangular, sawtooth, rectangular
Output Impedance	< 800 Ω, unbalanced
Output level	Typically -4 dBu
Controls	
Frequency	1 x rotary knob ±12 semitone, selectable
Range	1 x rotary switch LO / 32' / 16' / 8' / 4' / 2', selectable
Sync selector	1 x 3-position toggle switch Weak / off / strong, selectable
Power	
Power supply	Eurorack
Current draw	45 mA (+12 V), 45 mA (-12 V)
Physical	
Dimensions	58 x 40 x 129 mm (2.3 x 1.6 x 5.1")
Rack units	8 HP
Weight	0.14 kg (0.31 lbs)

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