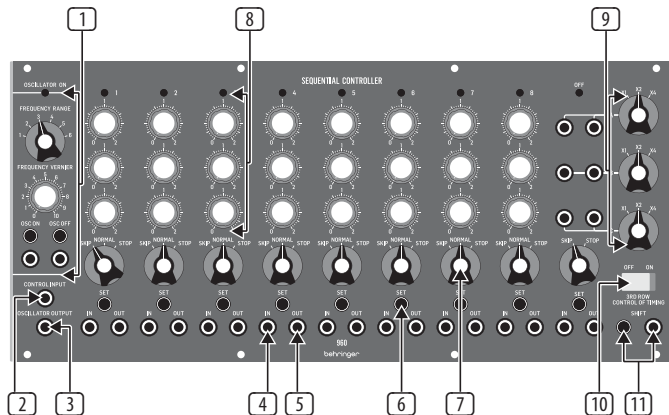


Quick Start Guide

960 SEQUENTIAL CONTROLLER

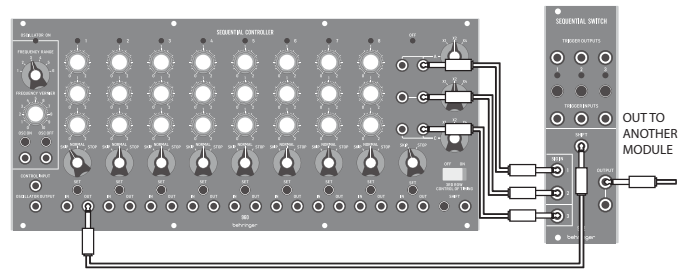
Legendary Analog Step Sequencer Module for Eurorack

Controls



- 1 **OSCILLATOR** - Select the broad oscillator range with the Frequency Range knob, and fine tune with the Frequency Vernier knob. Engage or disengage the oscillator manually with the OSC ON and OFF buttons, or connect external voltage trigger (V-trig) signals to control the on/off status.
- 2 **CONTROL INPUT** - Accepts voltage from another module to control the oscillator frequency.
- 3 **OSCILLATOR OUTPUT** - Send the oscillator signal via 3.5 mm TS cable.
- 4 **IN** - Activate any stage via an external voltage trigger (V-trig). Note that if a stage IN is patched to another stage OUT, it will cause the 960 to reset to stage 1, bypassing stages after the OUT jack.
- 5 **OUT** - Send the voltage trigger (V-trig) signal to another module.
- 6 **SET** - Manually activate a stage. In the event of a sequencing error, press any SET button to reset to a stage and restore normal operation.
- 7 **STAGE MODE** - In the Normal setting, the stage runs its cycle and proceeds to the next stage. Selecting the Skip setting will bypass the stage, and selecting Stop will stop the sequence. A 9th stage exists to continue the sequence (Skip) or Stop the sequence at stage 9 which makes the stage 9 output active. Whenever stage 9 becomes active, the oscillator is automatically turned off.
- 8 **VOLTAGE CONTROLS** - Adjust the voltage for each stage. The associated LED will light to indicate the currently-active stage.
- 9 **OUTPUT SECTION** - Send the voltage from the 8 stages to other modules. The outputs can be scaled with the associated knobs by a factor of 1, 2 or 4.
- 10 **3RD ROW TIMING** - Since many users will run the 960 as an 8-stage or 16-stage sequencer (via the 962 module), the 3rd row can alternatively be used to control the timing of each stage. Move the switch to the ON position and adjust each stage's 3rd knob to lengthen or shorten the duration.
- 11 **SHIFT** - Control the shifting via an external source or manually with the button.

24-Stage Operation



The main purpose of the 962 sequential switch module is to alternately select between the 3 output rows of the 960 to create a 24-stage sequence. Patch the trigger OUT jack from stage 1 into the SHIFT input of the 962. Patch the 3 output rows A, B, C from the 960 to the 962's 3 SIG inputs. Now the 962's output will be the 24-stage sequencer output, or leave out the C row patch cable for 16 steps.

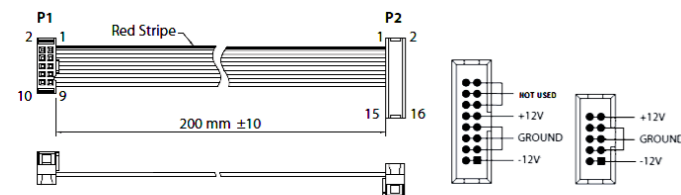
Tuning Procedure

1. Power up the 960 module and press the OSC ON button. Allow the unit to warm up for a few minutes.
2. Prepare the following control settings:
 - a. Set the 3RD ROW CONTROL OF TIMING switch to off.
 - b. Set the FREQUENCY rotary switch to 6 on the scale.
 - c. Make sure no jack is connected to the oscillator CONTROL INPUT.
3. Set the FREQUENCY VERNIER for exactly 100 Hz at the OSCILLATOR OUTPUT measured with an accurate frequency meter and adjust the DUTY CYCLE ADJ for 90% duty cycle.
4. Fine-tune the 960 oscillator's high frequency scaling as follows:
 - a. Apply exactly +2.0 VDC to the CONTROL INPUT jack (A 921A module can be used to supply the +2.0 VDC or use a similar low-impedance stable-voltage source).
 - b. Trim the 960 SCALE ADJ trimmer to set 400 Hz, then remove the +2.00 V input and readjust the 960 FREQ VERNIER to 100 Hz.
 - c. Repeat this cycle until both 100 Hz and 400 Hz are accurate to ± 1 Hz when the +2.00 VDC is plugged in and out of CONTROL INPUT jack.
5. Fine-tune the 960 oscillator's low frequency scaling as follows:
 - a. Apply exactly -2.0 VDC to the CONTROL INPUT jack (A 921A module can be used to supply the -2.00 VDC or use a similar low-impedance stable-voltage source).
 - b. Trim the 960 LOW END ADJ trimmer to set 25 Hz, then remove the -2.00 V input and readjust the 960 FREQ VERNIER to 100 Hz.
 - c. Repeat this cycle until both 100 Hz and 25 Hz are accurate to ± 1 Hz when the -2.00 VDC is plugged in and out of CONTROL INPUT jack.



6. Set the 960 oscillator's maximum high frequency as follows:
 - a. Make sure no jack is connected to the CONTROL INPUT.
 - b. Set the FREQUENCY VERNIER fully clockwise (10 on the scale).
 - c. Adjust the FREQUENCY ADJUST trimmer to set exactly 500 Hz at the OSCILLATOR OUTPUT.
 - d. Apply exactly +2.0 VDC to the CONTROL INPUT jack (this may stop the oscillator running).
 - e. Adjust the FREQ STOP ADJ trimmer until the oscillator starts running and set the maximum frequency to around 550 Hz.
 - f. Disconnect the +2.0 VDC CONTROL INPUT and check the oscillator frequency is 500 Hz. Adjust the FREQUENCY ADJUST trimmer if required.
 - g. Apply exactly +2.0 VDC to the CONTROL INPUT jack, if the oscillator stays running, the trimming is completed. If not, repeat as required.

Power Connection



Connect end P1 to the module socket
Connect end P2 to the power supply

The 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.

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.

Specifications

Inputs	
Oscillator on/off	
Type	2 x 3.5 mm TS jacks, AC coupled
Impedance	>3 k Ω , unbalanced
Maximum input level	+5 V
Minimum switching threshold	+3.5 V trigger
Control input	
Type	3.5 mm TS jack, 1 V/oct
Impedance	100 k Ω , unbalanced
Maximum input level	\pm 2 V, vernier set to 5
Shift input	
Type	3.5 mm TS jack, DC coupled
Impedance	7 k Ω , unbalanced
Maximum input level	\pm 5 V
Minimum switching threshold	+1.5 V
Stage triggers	
Type	8 x 3.5 mm TS jacks, AC coupled
Impedance	>3 k Ω , unbalanced
Maximum input level	+5 V
Minimum switching threshold	+3.5 V trigger
Outputs	
Row outputs	
Type	6 x 3.5 mm TS jacks, DC coupled
Impedance	500 Ω , unbalanced
Maximum output level	+8 V (range X4)
Stage trigger outputs	
Type	8 x 3.5 mm TS jacks, DC coupled
Impedance	250 Ω , unbalanced
Maximum output level	+5 V, active high
Oscillator output	
Type	3.5 mm TS jack, DC coupled
Impedance	4 k Ω , unbalanced
Maximum output level	+4 dBu
Duty cycle	90%
Controls	
Frequency range	1 (0.04 to 0.5 Hz), 2 (2.75 to 30 Hz) 3 (0.17 to 2 Hz), 4 (11 to 130 Hz) 5 (0.7 to 8 Hz), 6 (44 to 500 Hz)
Frequency vernier	Tune the oscillator range, 3 octave range
Oscillator on/off	Manually start or stop the oscillator
Voltage knobs	$-\infty$ to max voltage set by the range switch
Mode switch	Skip stage, play stage, stop sequencer
Set	Manually select stage
Range switches	X1 (+2 V), X2 (+4 V), X4 (+8 V) max. output
Timing on/off	Allows 3rd row knobs to control stage duration
Shift button	Manually skip to next stage
Power	
Power supply	Eurorack
Current draw	100 mA (+12 V), 50 mA (-12 V)
Physical	
Dimensions	284 x 129 x 47 mm (11.2 x 5.1 x 1.9")
Rack units	56 HP
Weight	0.64 kg (1.41 lbs)

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