Epicycloid Engineering Voluptron

Ladder Lowpass Filter

Updated January 18, 2020

Cautions

The Voluptron is a vacuum tube circuit, and as such contains high voltages and components that may become hot during operation. Voltages as high as 300V DC are present on the circuit board. To avoid serious injury or death, always mount the module in a rack before operating, and ensure that no fingers, other body parts, wires with insulation not rated 300V or higher, or other components can come into contact with the circuit board. Before removing the module or reaching inside the rack, ensure that power from the Illuminox Prime is turned off.

Setup

The Voluptron requires 35 mm depth from the faceplate for mounting, and uses 35 mA from both the +12V and -12V supplies for its semiconductor circuits. Due to space constraints, the 10 pin header is a standard shrouded type with keying.

Power for the tube portion of the Voluptron comes from the Illuminox Prime via a separate cable, which uses a 4 pin Molex connector. An 18 inch/460 mm cable is supplied with the Voluptron; do not cut or modify it without consulting with Epicycloid. To minimize electromagnetic interference, connect the end of the cable with the black sleeve to the Illuminox Prime and the end with the red sleeve to the Entubulator.

The Voluptron is supplied with 3 6ES8 tubes, which have an exponential cutoff curve to allow 1V/oct control of the filter frequency. However, it can be used with several other types of tubes for different sounds, and different tube types can be mixed in the ladder; most dual triodes with a pinout matching the 6ES8 or 12AX7 can be used. We have identified the following tubes as compatible:

6 volt heater: 6AQ8 • 6BK7 • 6BQ7 • 6CG7 • 6DJ8 • 6ES8 • 6FQ7

12 volt split heater: 12AT7 • 12AU7 • 12AV7 • 12AX7 • 12AY7 • 12BH7 • 12DW7

Jumpers, located on the back of the module, are used to select the heater voltage for each tube. The module is shipped set up for 6V – jumpers installed across pins 2 and 3 of the voltage select headers, on the side labeled "6". For 12V tubes, move the jumpers to pins 1 and 2, next to the "12". The tube will not be damaged if the heater voltage is set wrong, but it will not work. There is a jumper for each tube so that they can be mixed and matched.

To maximize tube life, shut off power before swapping tubes; this allows the heater time to warm up the tubes, so that any gas that has leaked into the tubes since they were last operated can be captured by the getters before high voltage is applied. If you've used a tube recently, you can plug it in with power on, but wait 20 seconds before hot-swapping another tube to avoid tripping the thermal protector in the power supply.

Inputs and Controls

Cutoff: The Tracking knob adjusts how much the filter's cutoff frequency responds to the CV input. It goes from zero (CV input no effect on cutoff) to 2 octaves/volt. With the knob set at mid-scale it is 1 octave/volt. The Offset knob adjusts the absolute cutoff frequency.

Audio Input: The input gain can be adjusted to overdrive the input to the ladder, producing tube distortion at higher levels. High gain settings will also cause the cutoff frequency to increase slightly as the input signal gets stronger; this can produce some cool effects if you put an EG controlled VCA before the Voluptron.

Feedthrough Cancel: Sets the compensation for CV input that is applied to the audio output, to minimize the amount of CV signal that appears on the output (mostly noticeable as a pop or thump when CV changes rapidly). It is adjusted before shipment using the tubes supplied with the unit. If you notice CV appearing on the output, adjust this setting using a flat blade screwdriver to minimize CV feedthrough.

Bias Calibration: Sets the conversion ratio between CV and grid bias voltage, to achieve 1 octave/volt with the Tracking knob at mid-scale. It is adjusted before shipment using the tubes supplied with the unit. If the cutoff frequency changes at a different rate and 6ES8 tubes are being used, this potentiometer can be adjusted to correct it. (If tubes other than 6ES8 are being used, a consistent octave/volt relationship is not expected.) If Bias Calibration is changed, Feedthrough Cancel will also require adjustment.