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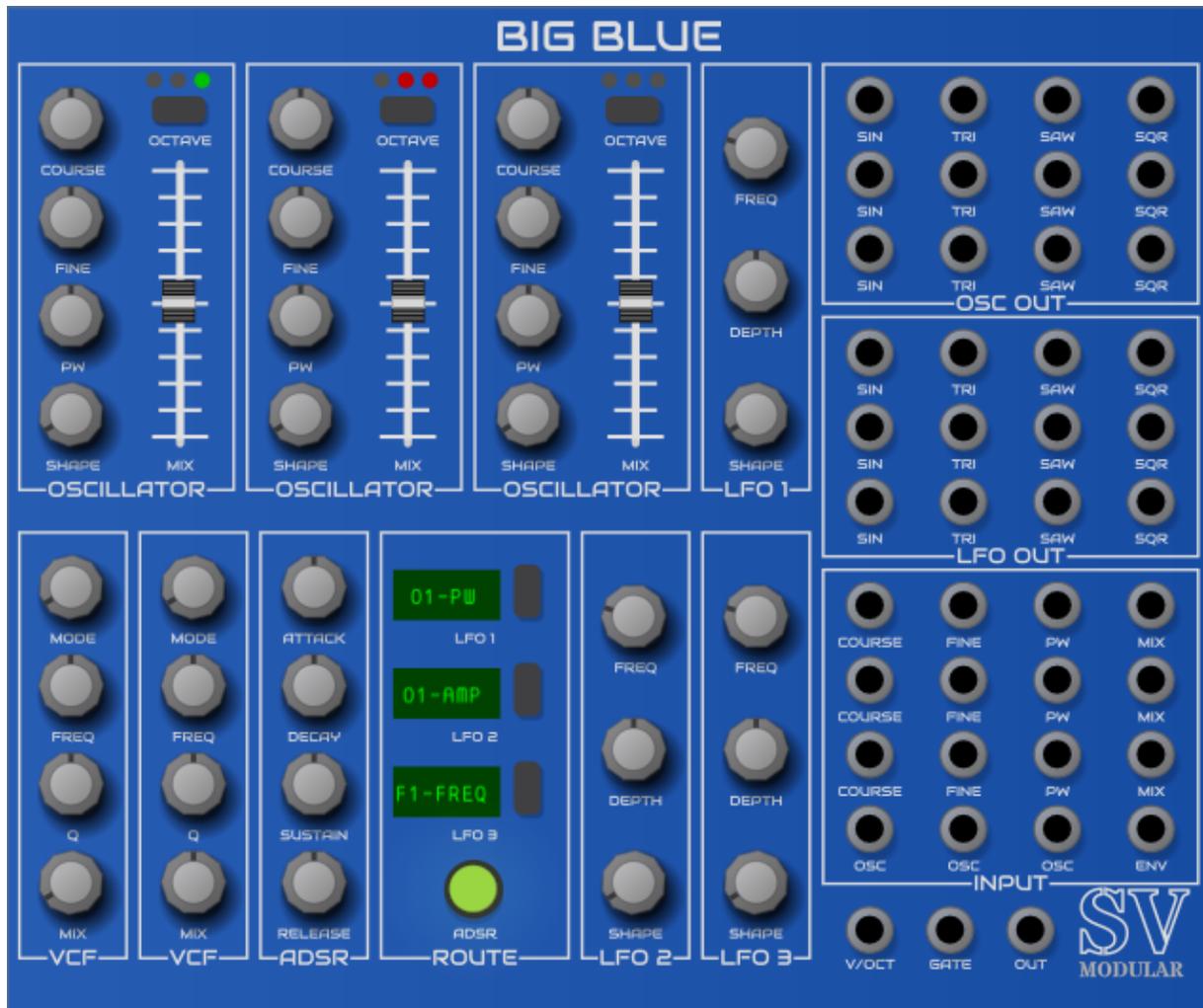
# Big Blue Manual

SV Modular



August, 2019

## Big Blue Users Manual



**Figure 1:** Big Blue

Big Blue is what is referred to as a Semi-Modular Synthesizer. Each function has been designed as a module, but the useful parts are “pre-wired” internally. This means that Big Blue will produce and output sound without any patching. You can extend the functionality by using the patch bay.

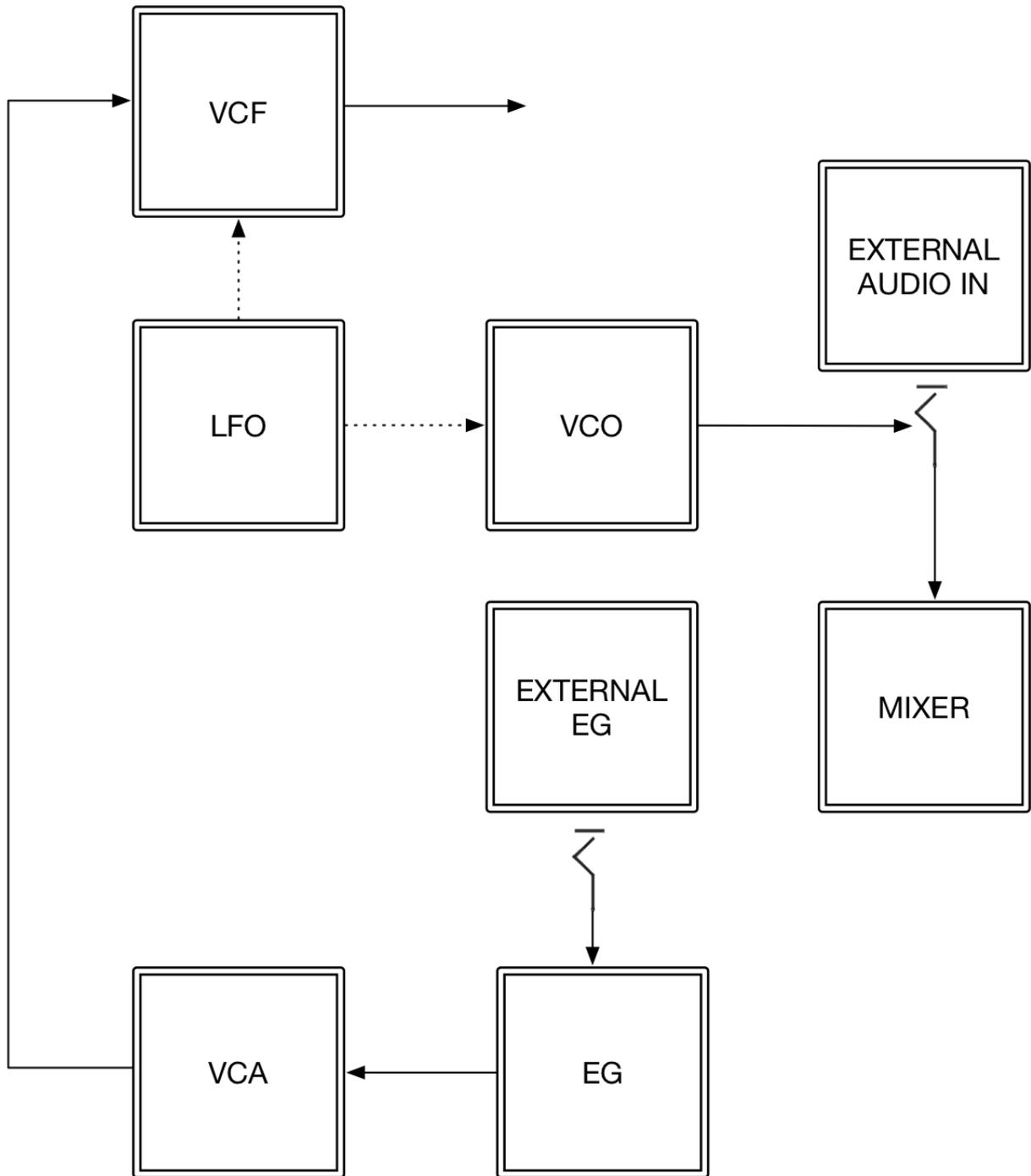
Big Blue provides for eight voice polyphony, allowing you to use up to eight voices from a single input.

### Signal Path

Big Blue has five distinct module sections:

- Voltage Controlled Oscillator (VCO)
- Low Frequency Oscillator (LFO)
- Voltage Controlled Filter (VCF)
- Envelope Generator (EG)
- Voltage Controlled Amplifier (VCA)

The LFO has the ability to affect parameters on the VCO and VCF using internal routing. The VCO and EG can both be overridden by external inputs, and the EG can be bypassed completely. Output is finally routed through the VCF.



**Figure 2:** Signal Path

## Panel Controls and Functions

Big Blue is divided into discrete components each with specific functionality.

### VCO (Voltage Controlled Oscillator)



**Figure 3:** VCO

Big Blue contains three Voltage Controlled Oscillators, with each one being able to be overridden by external audio.

**Coarse** The *Coarse* parameter provides a coarse tuning of the oscillator. It provides adjustment from one octave below to one octave above the base frequency fed into the oscillator itself.

**Fine** The *Fine* parameter allows for an adjustment of  $-1/10$  of an octave to  $+1/10$  of an octave.

**PW** The *PW* or *Pulse Width* parameter allows you to adjust the width of the pulse when outputting square waves.

**Shape** The shape parameter changes between four oscillation modes.

*Sine Wave* provides a smooth sounding tone, and is the fundamental building block of sound. A sine wave provides a single frequency with no harmonics.

*Triangle Wave* provides two sloping sides with a sharp peak. Triangle waves provide a sharper sound with harmonics at the inverse square of its harmonic number. This means that a triangle wave at 100Hz would provide harmonics at 300Hz with an amplitude of  $1/3^2$  (0.1111), 500Hz, 700Hz, etc.

*Sawtooth Wave* provides a sharp ramp followed by an immediate drop. This is characterized by a more *brassy* sound. The harmonics are equal to the inverse of its harmonic number, meaning that a 100Hz tone will be accompanied by a 200Hz tone at 1/2 the amplitude, a 300Hz tone at 1/3 the amplitude, etc.

*Square Wave* provides an oscillation of on and off, at equal intervals. These give a warm sound, but not as clean as a sine wave. Square waves provide odd harmonics at the inverse of its harmonic number. Thus, a 100Hz square wave will provide a 300Hz harmonic at 1/3 the amplitude, 500Hz at 1/5 the amplitude, etc.

**Octave** The *Octave* parameter allows you to specify octaves above or below the current octave. This allows for you to adjust the octave to be up to 5 octaves above and 5 octaves below the current octave.

The octave that is selected is displayed by the three LEDs above the button, with *Green* being octaves above, and *Red* being octaves below.

Lights	Octave
Off Off Off	Current Octave
Off Off On	One Octave Above or Below
Off On Off	Two Octaves Above or Below
Off On On	Three Octaves Above or Below
On Off Off	Four Octaves Above or Below
On Off On	Five Octaves Above of Below

**Mix** The *Mix* parameter allows for you to choose the volume at which the VCO or external input is when mixed into together.

## LFO (Low Frequency Oscillator)



**Figure 4:** LFO

There are three Low Frequency Oscillators that can affect different aspects of the sound, ranging from altering portions of the VCO or altering portions of the VCF. These LFOs are bipolar, meaning that they cycle between  $-1v$  and  $1v$ .

The LFO output is routed using the *Route* parameter.

**Frequency** The *Frequency* or *Freq* parameter allows you to adjust the frequency of the LFO from  $0.01Hz$  to  $300Hz$ .

**Shape** The *Shape* parameter can alter the shape of the LFO, allowing you to choose between the four basic oscillator shapes: Sine, Triangle, Sawtooth, and Square.

**Depth** The *Depth* parameter acts as an attenuator to the LFO, changing the rise and fall voltages. These voltages will vary from 0% to 100% of the full voltage, depending on the position of the knob, where 0% is when the knob is fully to the left, and 100% when the knob is fully to the right.

## Route

Routing in Big Blue is modified in the Route module. Each LFO can be routed to any of the following parameters. They are considered additive.

Parameter	Description
OFF	Not Routed
01-PW	Pulse Width on Oscillator 1
01-FREQ	Frequency on Oscillator 1
01-AMP	Amplitude on Oscillator 1
02-PW	Pulse Width on Oscillator 2
02-FREQ	Frequency on Oscillator 2
02-AMP	Amplitude on Oscillator 2
03-PW	Pulse Width on Oscillator 3
03-FREQ	Frequency on Oscillator 3
03-AMP	Amplitude on Oscillator 3
F1-FREQ	Frequency on Ladder Filter
F1-Q	Resonance on Ladder Filter
F1-MIX	Mix of Ladder Filter
F2-FREQ	Frequency on State Variable Filter
F2-Q	Resonance on State Variable Filter
F2-MIX	Mix of State Variable Filter

The ADSR Envelope Generator can be engaged or disengaged by pressing the ADSR button. When lit, the ADSR is engaged, as is the VCA. If it is unlit, the VCA is bypassed.

Note that overriding the Envelope Generator with an input will override this selection and engage the VCA.

**EG (Envelope Generator)****Figure 5:** EG

Eastside incorporates an ADSR Envelope Generator, featuring an Attack, Decay, Sustain, and Release. This envelope alters the characteristics of the sound by allowing for a timed note release, based on the parameters and the length of the *Gate* input.

**Attack** The *Attack* parameter controls how quickly the sound is brought to full volume. Attack can be adjusted between 0 and 5 seconds.

**Decay** The *Decay* parameter controls how quickly the volume of the sound falls after the *Gate* is released. Decay can be adjusted between 0 and 5 seconds.

**Sustain** The *Sustain* parameter controls the overall volume when the *Gate* is held open. It ranges from 0 to 100 percent.

**Release** The *Release* parameter controls how rapidly the volume decreases to 0 when the *Gate* is released. Release can be adjusted between 0 and 5 seconds.

**VCF (Voltage Controlled Filter)****Figure 6:** VCF

Big Blue provides two Voltage Controlled Filters, a Ladder Filter, similar to what you would find on a Moog synthesizer, and a State Variable Filter. Each of these has multiple modes to modify the sound using subtractive synthesis.

**Mode** The *Mode* parameter changes the mode of each filter. When using the Ladder Filter, the modes are *Low Pass*, *High Pass*, and *Band Pass*. The State Variable Filter allows you to choose between *Low Pass*, *High Pass*, *Band Pass*, and *Notch*.

**Frequency** Each filter operates across a large frequency range. The *Frequency* or *Freq* parameter allows you to adjust the cutoff frequency of each filter. These frequencies can be between 20Hz and 6000Hz.

**Q** The *Q* parameter adjusts the resonance of each filter.

**Mix** The *Mix* parameter controls the dryness and wetness of the filter. It adjusts from 0 to 100 percent, where 0 is fully to the left.

## Inputs



**Figure 7:** Input

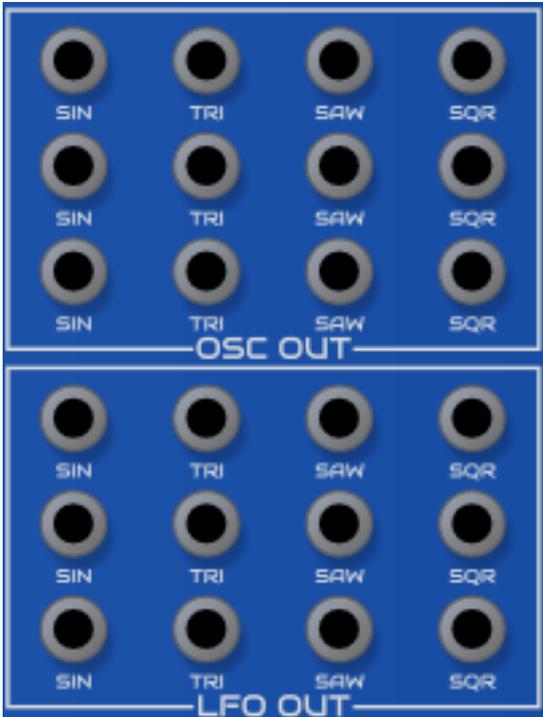
Big Blue offers a range of CV inputs to adjust parameters or to override built in modules.

Each VCO has CV inputs for *Coarse*, *Fine*, *Pulse Width*, and *Mix*.

Each VCO can be overridden by an audio input, bypassing the oscillator and inserting right before the Mixer.

The EG can be overridden completely as well.

**Outputs**



**Figure 8:** Output

Big Blue offers broken out outputs from each VCO and LFO. Each waveform is output separately, regardless of the shape of each oscillator.