

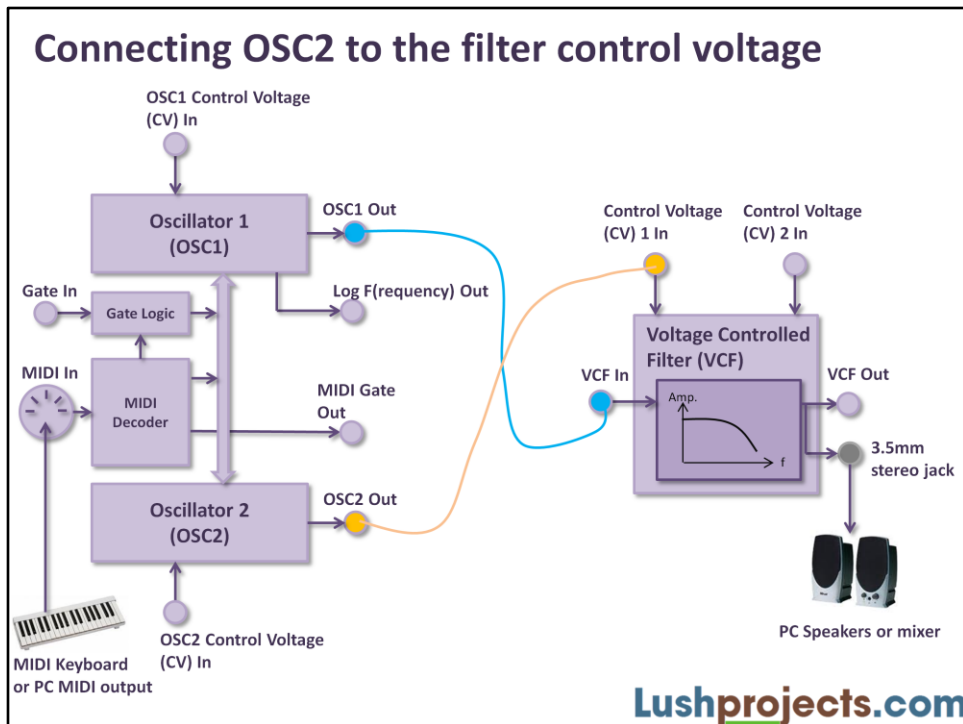
LushOne Synth 102
Adding LFO effects

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What are we going to do?

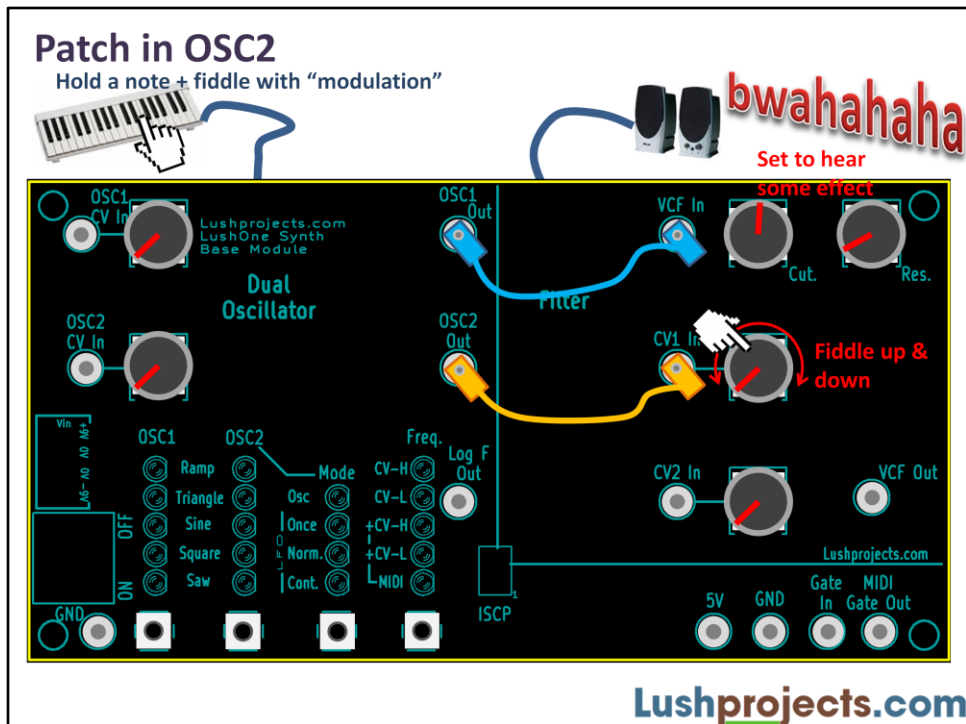
- Some of the best sounds come from manipulating the filter controls while holding a note
- Always doing this manually is tedious and impractical
- So we need a way to do it automatically
 - Connecting a signal to the filter control voltage inputs allows the filter's cut-off frequency to be controlled automatically
 - Each control voltage input has a gain control to set the sensitivity
 - The OSC2 output on the LushOne is a Low Frequency Oscillator (LFO) which is ideal for driving the filter's control voltage input

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We are going to start with a very similar setup to that in module 101. Connect the MIDI keyboard and jack-socket output as before.

Patch the OSC1 output to the filter input (as in module 101) and also make a new patch between the OSC2 output and the filter Control Voltage 1 ("CV1") input.



By bringing in OSC2 to modify the filter you can start to explore the real potential of the LushOne to create SciFi sounds.

Power the LushOne off and on to reset it to the default state. Connect the patch leads as shown above and hold a note. Start by turning the gain control next to CV1 In down to minimum. Turn the cut-off control to a position around the centre where you can still hear the note but the filter is having some audible effect. You can set the resonance control how you like but to start with I suggest you keep it low. Now slowly turn the CV1 gain control upwards and fiddle up and down to hear the effect. As you turn the CV1 gain control up you should start to hear a pulsing modulation of the note caused by the low frequency oscillator modifying the cut-off frequency of the filter. The higher the CV1 gain control is turned-up the more the modulation effect.

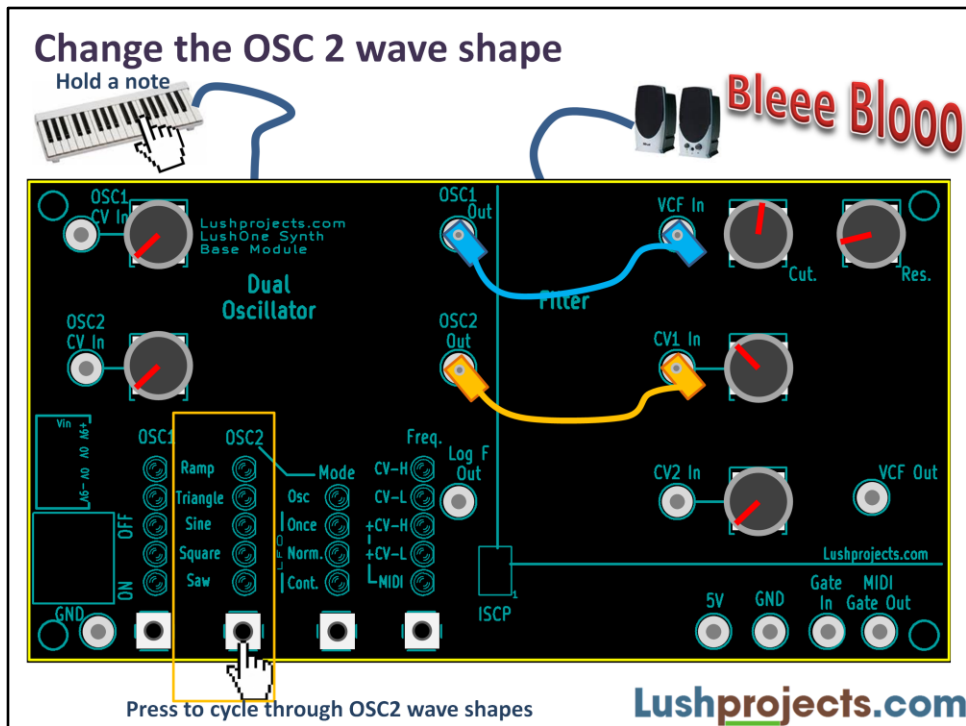
Fiddle with the CV1 gain control, cut-off and resonance to explore the range of sounds available.

The signal in to the CV1 input is always added to the cut-off frequency set by the cut-off master control. This means that there is no audible effect if the master cut-off is set too high or too low as the net effect if the cut-off is still above or below the useful range regardless of the CV1 input.

If your MIDI keyboard has a “modulation” wheel (and it’s much better for this module

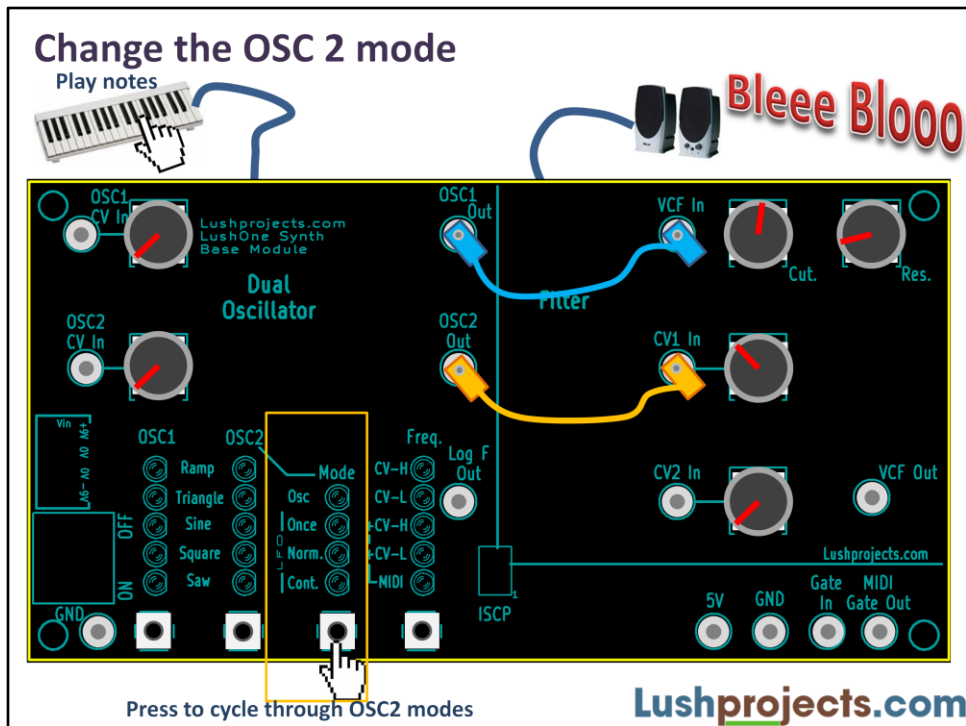
if it does) then you can use this wheel to change the OSC2 frequency. Try using the modulation wheel to hear the effect of this. . [For MIDI geeks: the LushOne uses MIDI control number 1 to control the OSC2 fequency]

It's worth noting that the CV1 In and the CV2 In are identical – you could if you prefer patch the OSC2 Out to the CV2 In.



OSC2 has the same five wave shapes as OSC1. You can cycle through the wave shapes by pressing the second button. Set the cut-off, resonance and CV1 gain control to hear a note modulated by OSC2 and try the different wave shapes. The differences in wave shape are most obvious at the lower frequencies of OSC2. For OSC2 the difference between “saw” and “ramp” is normally easily audible.

Try different filter settings and OSC2 frequencies with different wave shapes to hear the range of sounds.



In module 101 we saw how OSC1 has a gated output which is controlled by the MIDI key state or can be kept open by applying 5V to the “Gate In” connection. The state of OSC2 also interacts with the MIDI keyboard but in a more complicated way. The type of interaction can be controlled using the OSC2 Mode setting which is cycled by the third button. Making effective use of the different modes allows a further range of sounds to be created from the LushOne.

There are four OSC2 modes:

LFO: Continuous (“Cont.”)

In continuous mode OSC2 just oscillates constantly with no impact due to MIDI notes. This mode is most useful if you are using some kind of external envelope circuit. If you connect the output to a filter CV input at high gain you might hear some effects from the LFO in this mode even if no note is being played.

LFO: Normal (“Norm.”)

The normal mode is the default setting and right for many situations. OSC2 is reset when a MIDI note starts (so each note has the same sound effect) and OSC2 stops when a MIDI note is released.

LFO: Once

This is a way of doing “poor mans” envelope shaping on the filter cut-off. In once

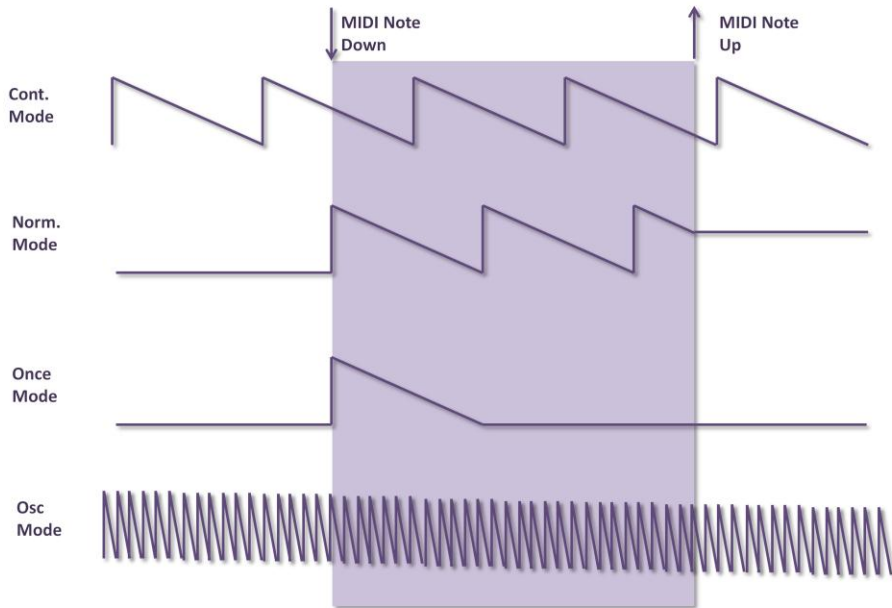
mode OSC2 is reset when a MIDI note starts and stops after just one cycle. Setting the OSC2 shape to “Saw” and the mode to “Once” can create a sharp attack sound at the start of notes.

Second Oscillator (“Osc”)

In this mode OSC2 acts as another high-frequency oscillator at the same frequency as OSC1 (though this can be modified by the OSC2 CV input – see later). This mode is normally only useful if you are using additional circuit modules to provide special effects.

The behaviour of OSC2 in the four modes is shown on the next slide.

OSC2 Modes (Sawtooth wave)



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Recap

Congratulations! This is the end of module 102.

You now know how to:

- Use the Control Voltage inputs to the filter
- Use OSC2 as an input to the filter control voltage
- Change the frequency, shape and mode of OSC2

You should now be able to make some excellent retro sounds from the LushOne.

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Next time

- LushOne 103
- Match the filter response to note frequency
 - More consistent sounds
- Use the LFO for modulating the OSC1 frequency
 - More sound effects

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