

**LushOne Synth 201**  
**Contour Module –**  
**Intro, Using ADSR Envelope**

[Lushprojects.com](http://Lushprojects.com)

## Introduction to the LushOne Contour

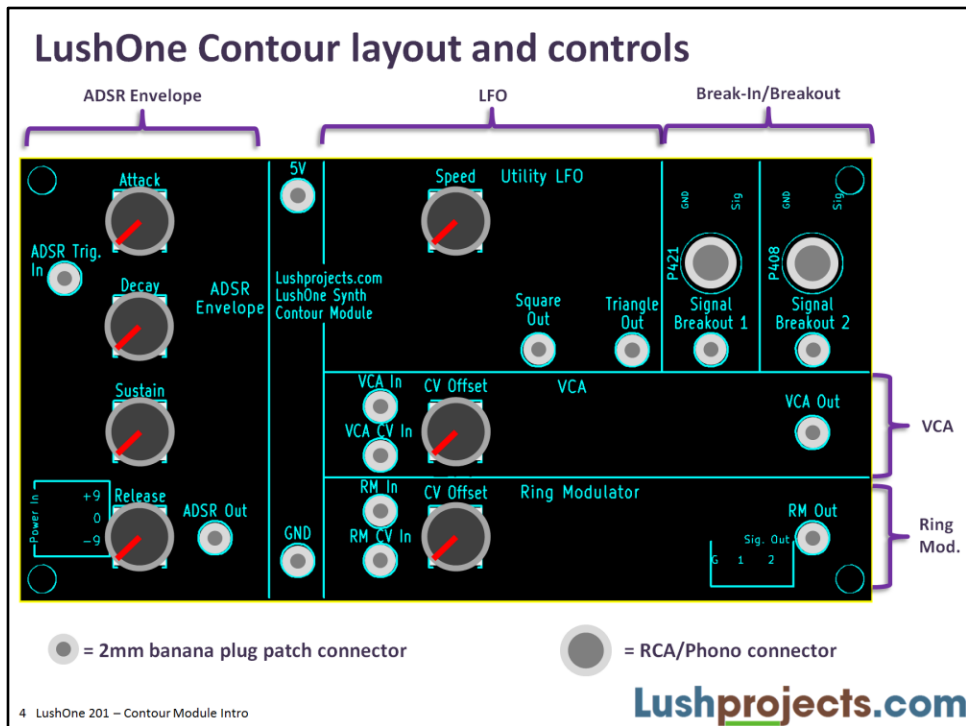
- Additional module to the LushOne base
  - For richer and more sophisticated sounds
  - Scores of interesting patches possible
- CV (Control Voltage) generators:
  - ADSR (Attack, Decay, Sustain, Release) Envelope
    - Control voltage that tracks the “natural” contour of a note
  - LFO (Low Frequency Oscillator)
    - More complex effects through use of multiple LFOs
- Effects/Modifiers:
  - VCA (Voltage Controlled Amplifier)
    - Change volume based on a control voltage
    - Also useful as a control voltage multiplier
  - Ring Modulator (RM)
    - Classic circuit to add rich harmonics to a sound
- Break-in/Breakout
  - Conveniently integrate LushOne with external signals

Though the LushOne Contour is designed to work with the LushOne base module it can also work with other modular sound systems provided voltage levels are compatible or made compatible through a buffer.

The LushOne Contour uses analogue electronics for all the elements. This gives a system that responds freely and interestingly to inputs. It also means that it is less “perfect” than a pure digital system, for example some control voltage inputs may break through in to the output of the VCA and the Ring Modulator. Both the VCA and RM can be adjusted during assembly to minimize CV breakthrough.

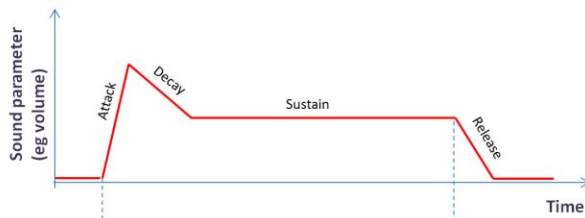
## Contour - included effects

- Attack, Decay, Sustain, Release (ADSR) Envelope
  - Control voltage that changes during a note
- Voltage Controlled Amplifier (VCA)
  - Change volume of note under control of a control voltage
  - Multiply control voltages together
- Ring Modulator
  - Multiply input signal by a sign-changing control voltage
- Low Frequency Oscillator (LFO)
- Break-in/Breakout



The LushOne Contour uses the same board size as the LushOne base and follows the same design principle of putting all the connectors and controls on a single board. Patching connections are made using 2mm banana plugs – the same as those on the LushOne base. You'll want to have quite a few banana leads around to make the best of the LushOne Contour capabilities.

## ADSR envelopes

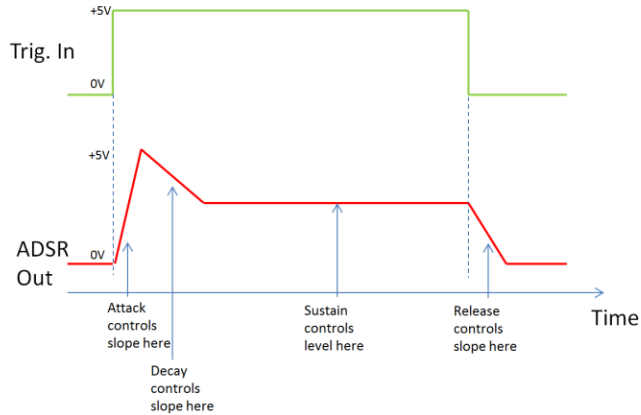


- Four stages in simplified model of how a note varies as it is played
- Commonly applied to the note volume but could be any sound parameter

## LushOne Contour ADSR

Normally connected to "MIDI Gate Out" of the LushOne base

Trigger Input  
(0V – off, +5V high)



ADSR Control Voltage  
Out (0V to +5V)

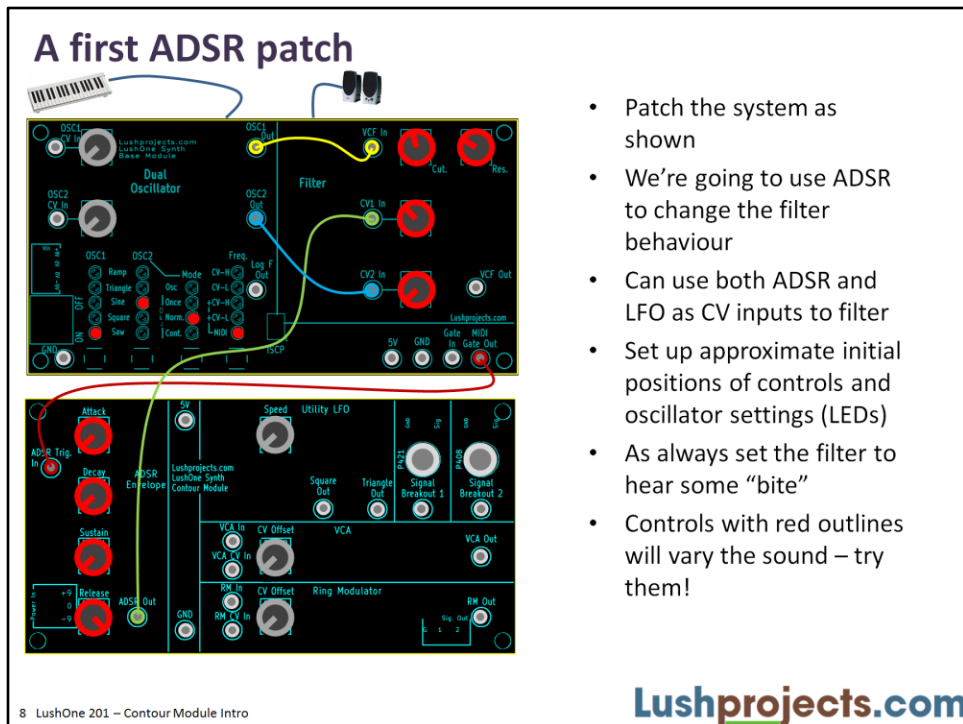
Connect to CV input(s) you want to modify

The LushOne Contour module ADSR responds to a 5V trigger in and produces an ADSR output that varies between 0V and 5V. Note that the Sustain control varies the level of the sustain. The other controls vary the corresponding slopes (higher is steeper).

Now I get confused...



.... there are so many ways to patch things together I don't know where to start!



The filter's CV1 gain control will vary the amount of impact due to ADSR. Similarly the CV2 gain control will vary the amount of LFO input. Start with the LFO gain control turned down to minimum to just get the feel of the ADSR. Once you've played with the ADSR bring in the LFO as well.

The most useful controls for the ADSR in this configuration are the attack and decay. Try low, medium and high settings of these controls. Vary the filter cutoff and resonance to get different sounds.

The sustain control will vary the amount of drop-off during the decay period.

The release control doesn't do much in this configuration because the gate in the oscillator will cut the note off before the release happens. The release control does vary the recovery time between one note and the next though. I suggest you start with it turned up to max for quickest recovery.

Once you bring the LFO in then the "modulation" wheel on the keyboard can also be used to change the LFO frequency.

Using the ADSR in this way is a more sophisticated alternative to using the LFO in "once" mode as we did in the first modules. It also leaves the main LFO free for other things.



## Next time

- Using ADSR with the VCA to create classic volume envelopes
- VCA as a control voltage multiplier