Q155 Curver

Aug 6, 2019

The Q155 provides a collection of four useful and experimental processing functions to manipulate control voltages and audio, all packaged in a single-wide module.

The Curver section bends signals into new shapes providing new modulation possibilities and changes harmonics in audio waveforms. Curve a triangle wave into a smooth sine or a peaky wave with high-frequency harmonics. Convert standard envelope attacks into a linear shape and bend pitch voltages into obscurity. Signal curving can be performed manually with the knob or via control voltage. The control voltage input has a built-in inverting attenuator.

The Inverter section provides control of a signal's polarity via voltage control. This works with audio and control to mangle sounds and sequences in surprising and unexpected ways.

The Slope Detector section produces a digital output indicating the slope of a waveform. When the waveform is rising the output is positive, when falling the output is zero. What you do with that output is up to you - control a filter, trigger one envelope from another, control LFO modulation, etc.

The bottom section of the Q155 is a simple and useful VCA to control the amplitude of a signal under voltage control. When CV=0 volts the output is off, when CV=5 volts the output is full on. Like patch cables, you can never have enough VCAs.

Q155 Curver Specifications

Panel Size: Single Width 2.125"w x 8.75" (Moog Unit Format).
Curver CV: -5V - +5V
Curver Input/Output Signals: 10Vpp.
Inverter CV: -5V - +5V
Inverter Input/Output Signals: 10Vpp.
Slope Detector Input Signal: 10Vpp.
Slope Output: 0V=down, 5V=up.
VCA Response: Linear, 5V=unity.
Power Requirement: +15V@60ma, -15V@60ma, +5V@20ma. Synthesizers.com standard.

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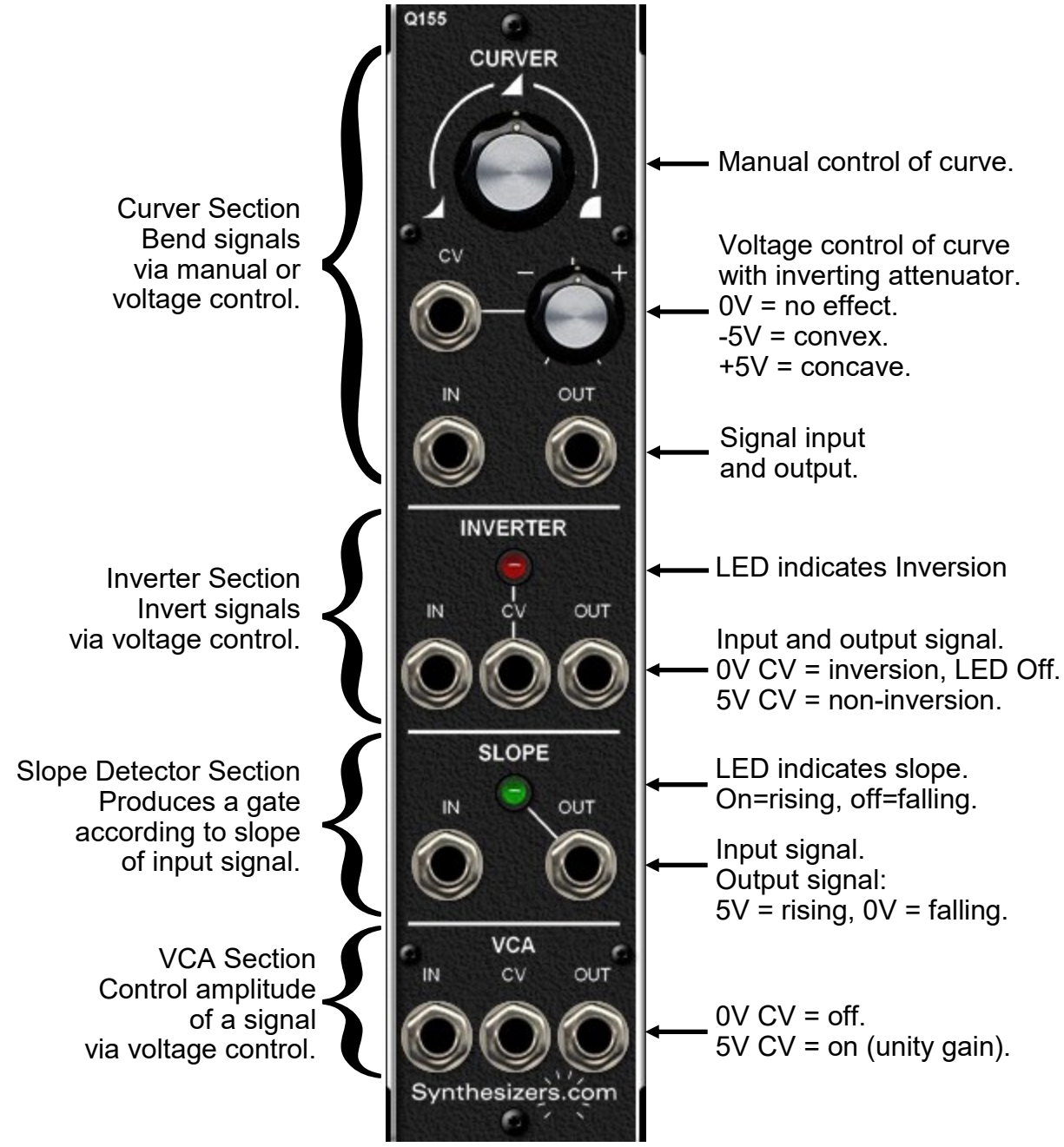
Panel Overview

The Q155 module consists of 4 independent sections - they can be patched together or used independently.



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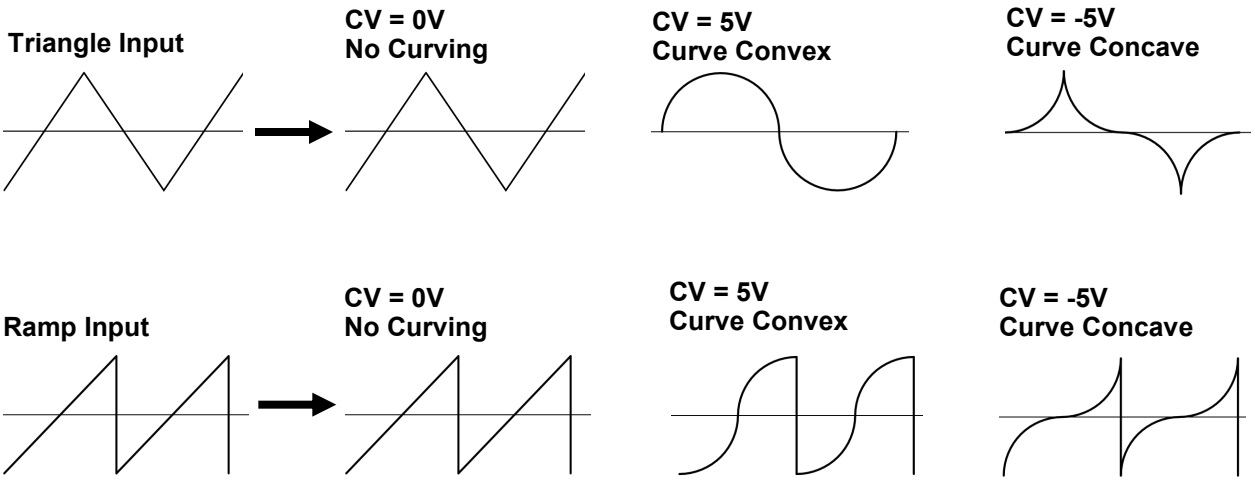
Curver Section

The Curver section takes an input signal, typically 10V peak-to-peak, and produces an output signal that is bent either concave, convex or unbent.

Bending is determined by the combination of the knob, the CV (Control Voltage) input and its invert-able attenuator knob. If the sum of these control inputs is 0 volts then the signal output is unaffected. If positive then the signal will be rounded convex. In this case, a linear waveform such as a triangle will resemble a sine wave. If negative then the signal will be bent concave. In this case, a linear waveform such as a triangle will have a sharpened peak.



Harmonics
Curving a signal does not change its fundamental frequency but affects its harmonics. Harmonics are additional frequencies above the fundamental. Signals with sharp changes in slope contain more harmonics than signals with smooth changes. For example, a square wave has many harmonics whereas a sine wave has none, only the fundamental.

Harmonics are important because they determine the color of a sound and they can be manipulated by filters to remove and emphasize them.

Control Voltages
The Curver works for unipolar control voltages such as envelopes and bipolar control voltages such as LFO waveforms. Curving control voltages can result in large effects depending upon the patch.

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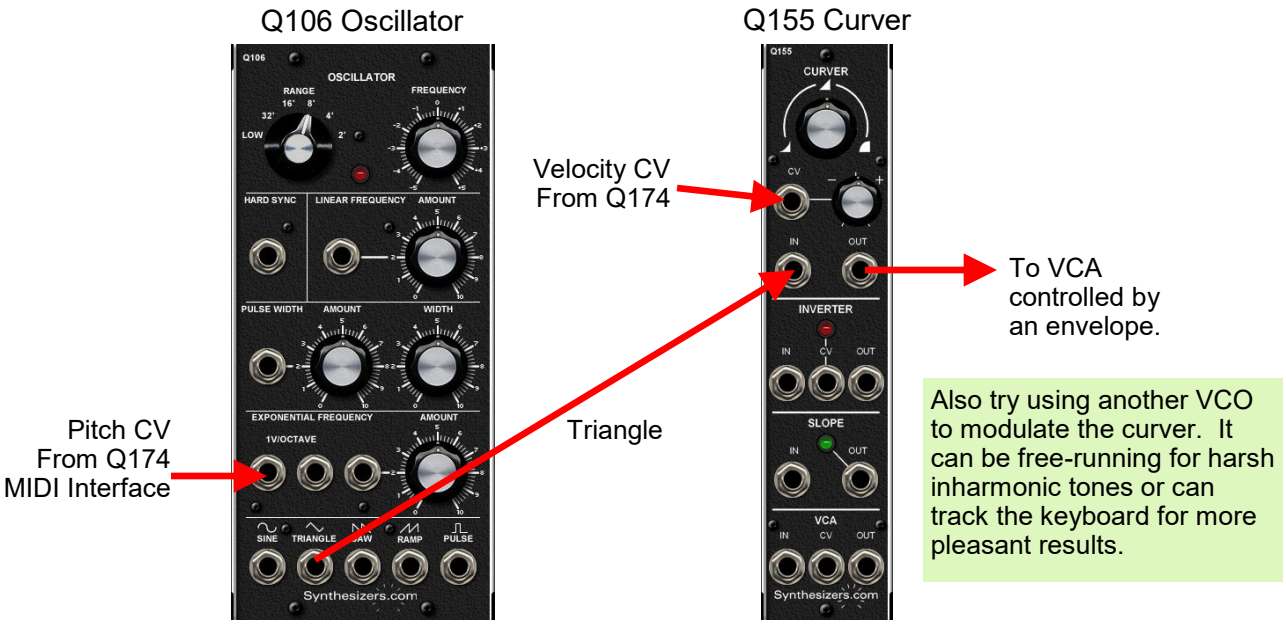
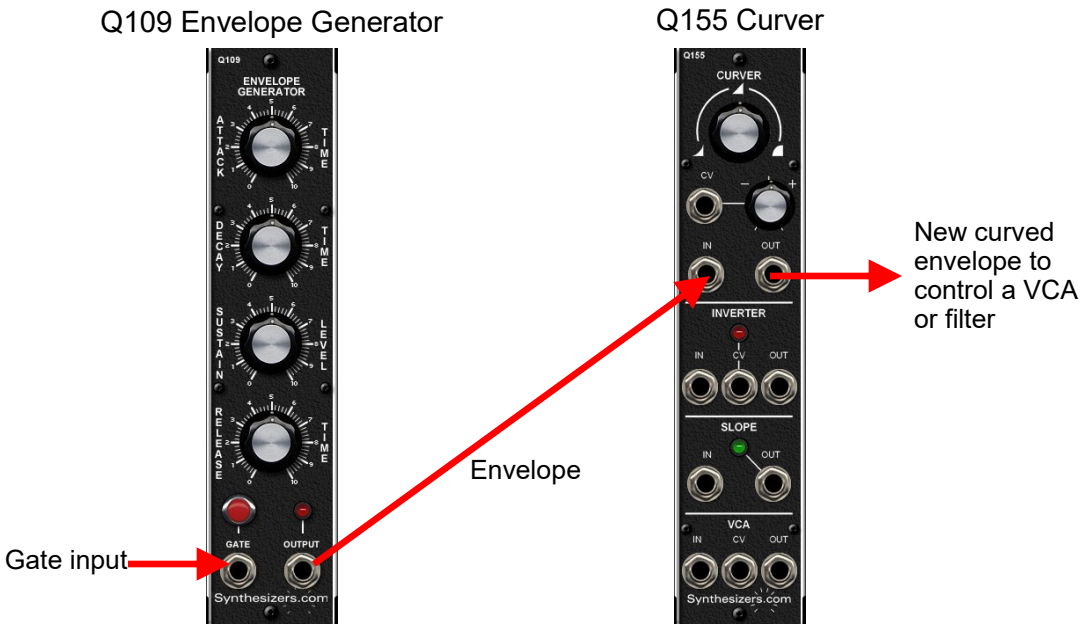
Curver Section Patch Ideas

In this basic synth patch VCO-->VCF-->VCA, an oscillator's output is curved under voltage control to change harmonics. A Triangle waveform works best since it can be bent into a sine-wave-like wave with few harmonics or a peaky wave with many harmonics. The control voltage in this case comes from the keyboard velocity. The faster you press each key, the higher the harmonics. The patch does not show the other common modules used in a typical patch.



Use the curver to change the response of an envelope generator. In this patch, the curve is set manually with the knob - no voltage control.



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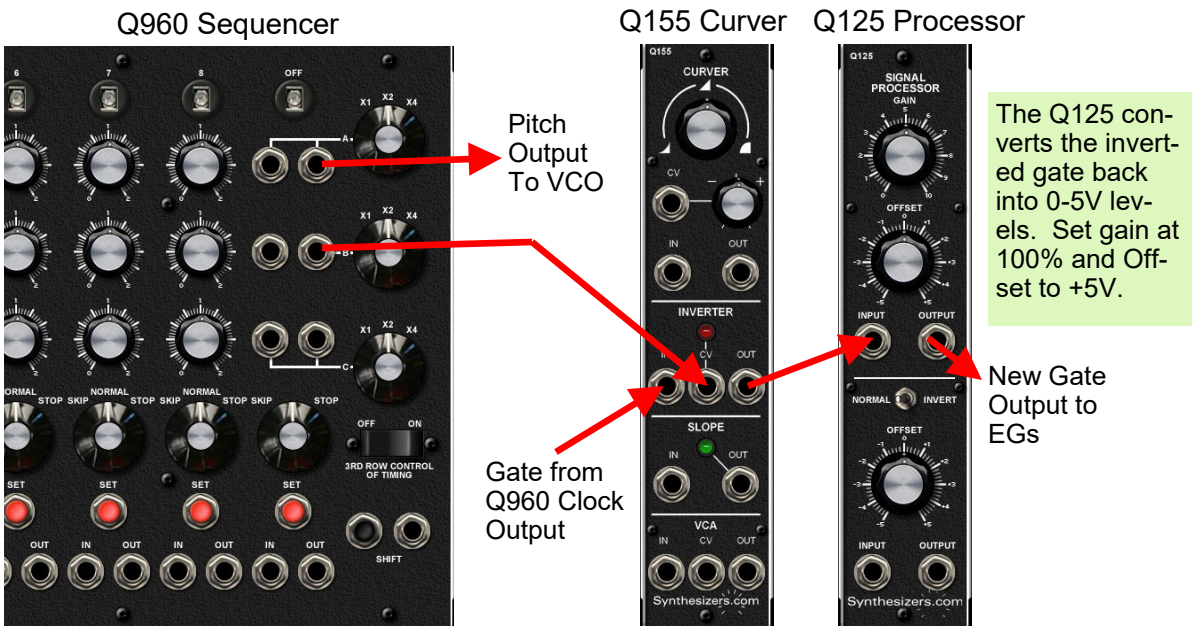
Inverter Section Patch Ideas

Like all sections, the Inverter section operates independently of the others, but can be patched to them. Inverting audio signals adds harmonics and a sharp edge to produce harsh metallic sounds. In this example, a triangle wave is inverted and controlled by an LFO (Another oscillator). The CV voltage controlling the inverter needs to be a pulse or square wave.

Use the inverter section to invert gate signals or envelopes. In this example, gate from a sequencer is patched through the Q155 and the gates polarity is controlled by a row of sequencer knobs.



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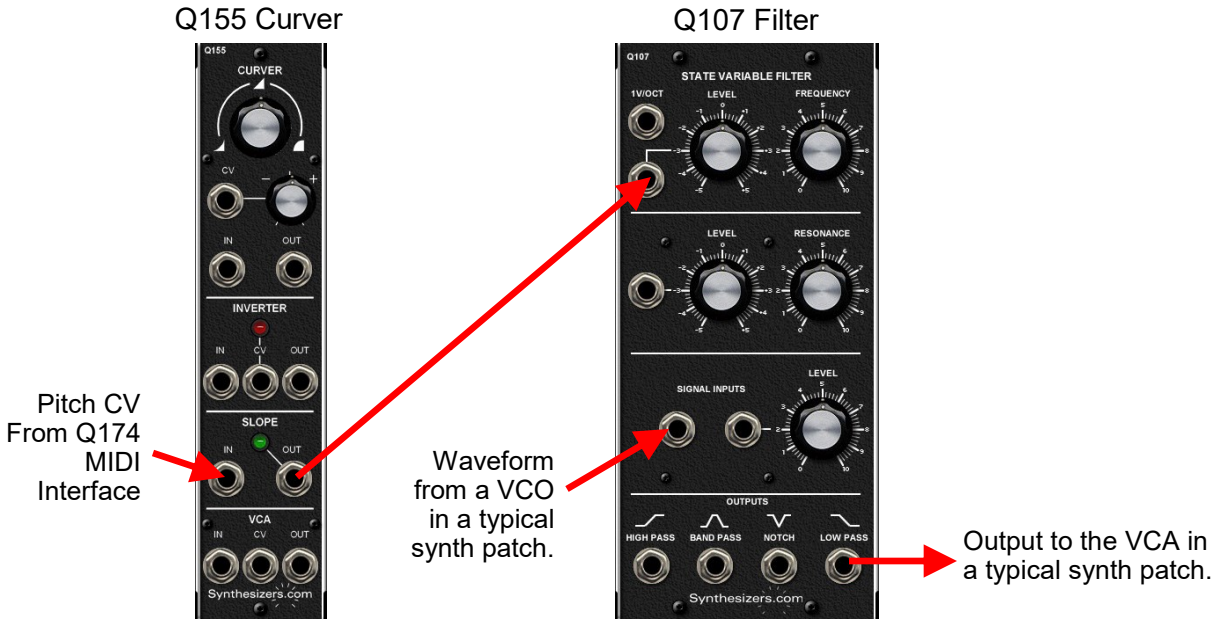
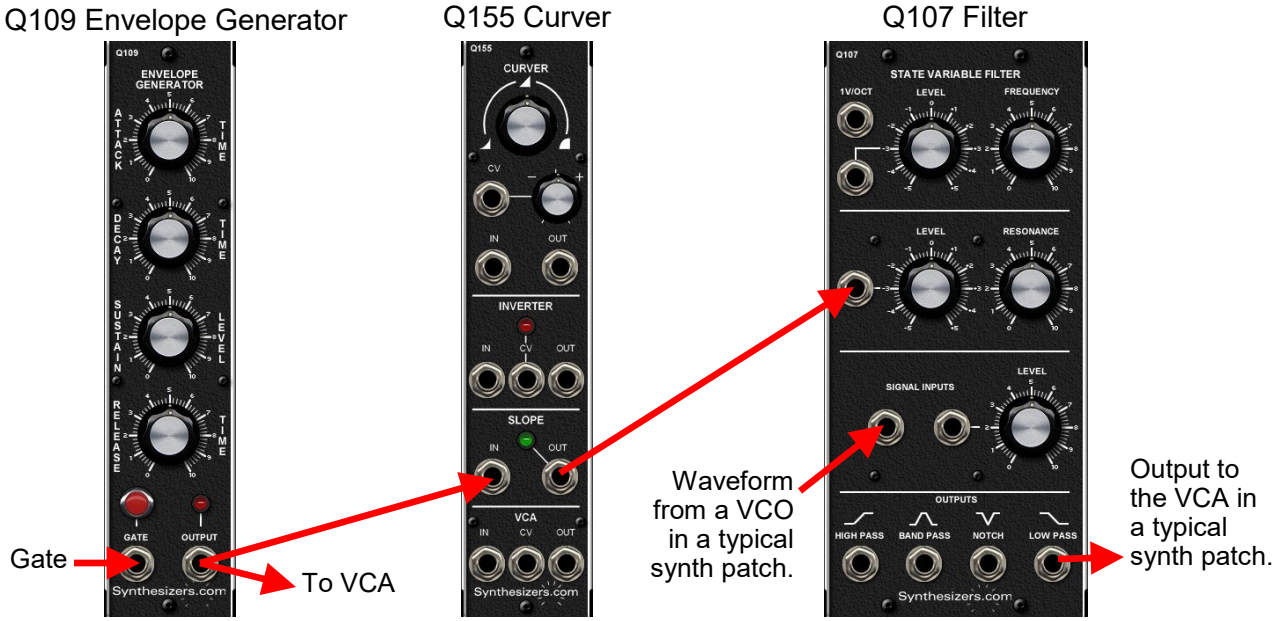
Slope Section Patch Ideas

The Slope section produces a digital gate output based on the slope of the input. If the input waveform is rising then the slope output will be +5V. If the input waveform is falling then the output will be 0V. This output can be used as a gate to trigger envelopes, step sequencers, modify filters, or even as audio.

In this example the Slope output follows the direction of keyboard playing and changes the filter frequency. Notes higher than the previous note will sound different than ones that are lower.



In this example the slope output follows an envelope. Since the Attack portion of an envelope is rising, the slope output will be +5V during that time. For all other portions the output is 0V. Use this signal to adjust the filter frequency or resonance to affect just the Attack portion of each note.



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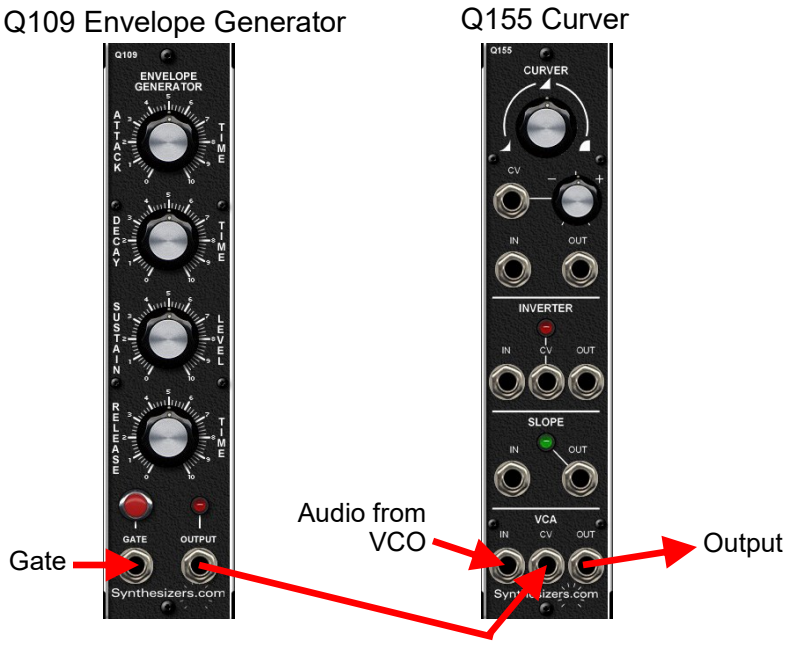
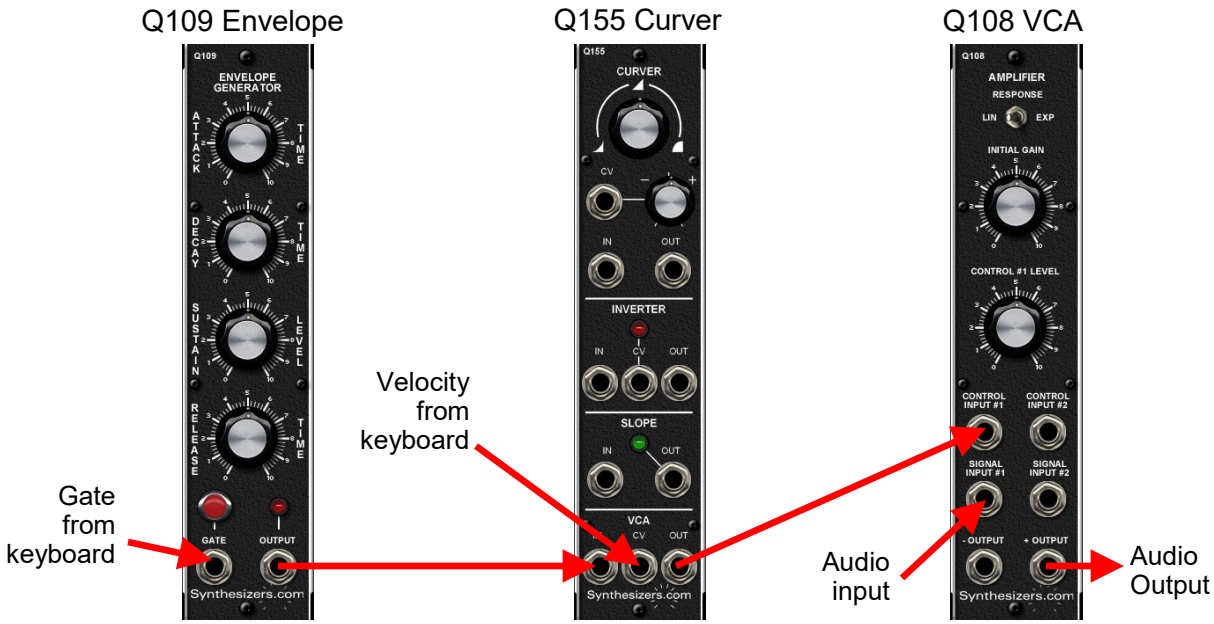
VCA Section Patch Ideas

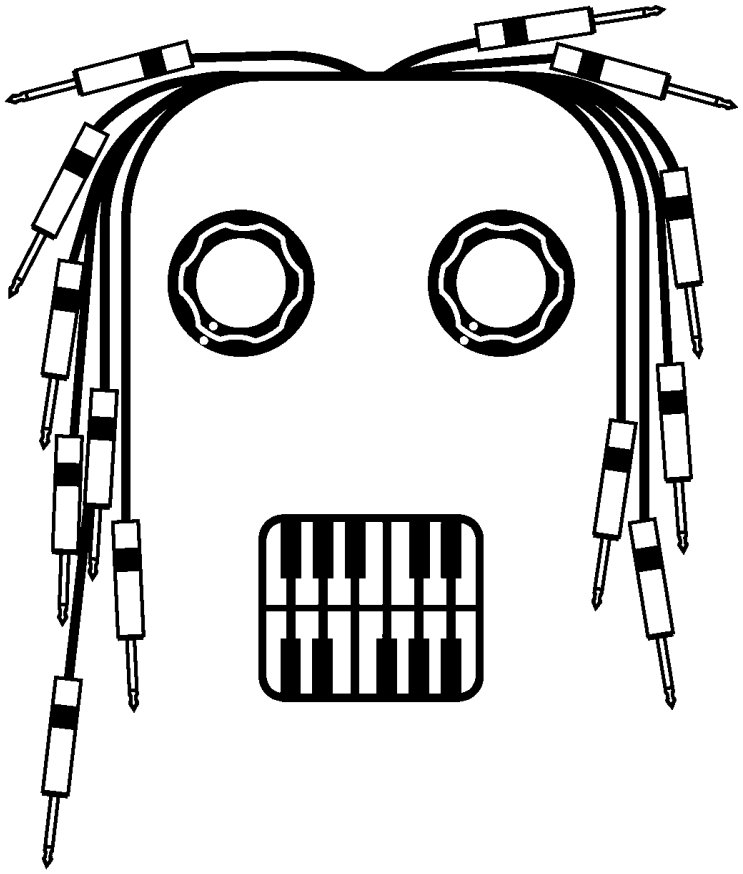
The bottom section of the Q155 is a simple utility VCA (Voltage Controlled Amplifier). It takes an input signal and controls its amplitude. A CV of 0 volts results in no output. A CV of 5 volts results in full output (unity gain). Technically, most VCAs are voltage controlled attenuators since they only reduce amplitude of a signal. The VCA section can be used for both audio and control signals.



The VCA section is very useful to modify control voltage signals. In this example, the VCA is controlled by keyboard velocity which in turn, controls the amplitude of an envelope. That envelope controls the patch's final VCA. This gives a keyboard player expressive control over the volume of notes.



Patcher Jack



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