

# Q179 Envelope++

Mar 20, 2017

The Q179 Envelope++ module is a full-featured voltage-controlled envelope generator with many unique features including bizarre curves, a VCA and looping. Special modes offer dual-envelopes and 4-step sequencing. The Q179 can also be used as an LFO, gate divider, gate delay, arpeggiator, quantizer, random source, and more.

The envelope mode provides voltage-control of Attack, Decay, Release phases along with amplitude. Special features include control of initial Delay and Attack peak holding, along with linear, exponential and log curves.

Voltage control of slopes and amplitude is designed specifically to make using velocity signals from a keyboard intuitive and musically expressive. Press a key fast to produce a faster attack and higher amplitude. Use off-velocity from the Q174 MIDI Interface to control the release time according to how fast you release a key. The Q179 Envelope++ is made for musicians and their music.

Positive and inverted outputs makes it easy to send the output to a VCA and VCF without using a multiple and the THRU makes daisy-chaining simple. A multi-colored LED provides indication of the current state.

Envelope looping occurs automatically when a gate plug is not inserted, or controlled by a gate in GL mode (Gated Looping). When looping, outputs can be used as a multi-segment LFO with VC of speed, slopes and amplitude, and a variable pulse-width is available at the THRU output.

The dual-envelope mode creates an attack/sustain/decay envelope at the +OUTPUT and a separate delay/attack/hold/decay envelope at the -OUTPUT. These envelopes can loop automatically or by gate control. The THRU output operates as a voltage-controlled gate delay and gate extender.

The Q179 Envelope++ also offers a 4-step sequencer mode, complete with an internal clock and quantized outputs. Forward, up/down and random sequences are available. Works great as a keyboard arpeggiator, or stack multiple modules for longer sequences.



## Q179 Envelope++ Specifications

**Panel Size:** Single Width 2.125"w x 8.75". Moog Unit (MU) format.

**Functions:** Envelope, Dual Envelope, Sequencer, Arpeggiator, Gate Delay/Extend, LFO, Quantizer, etc.

**Envelope Outputs:** 0V-5V.

**Envelope Slope Speeds:** 0-1sec, 0-100sec.

**Delay and Hold Times:** 0-10sec.

**Envelope Curves:** Linear, Exponential, Logarithmic, Peaky, Bumpy.

**Voltage Control:** 0V-5V for Attack, Decay and Amplitude.

**Gate Input:** 5V positive.

**Thru Output:** 5V positive.

**Sequence Outputs:** 0V-2V quantized at 1/12V increments (semitones).

**Power Requirement:** +15V@30ma, -15V@30ma, +5V@50ma.

**Power Connector:** Synthesizers.com standard 6-pin MTA connector.

# Q179 Envelope++

## Modes: Envelope, Dual Envelope, Sequencer

The Q179 has 3 modes:

Envelope, Dual envelope and Sequence - set by the mode toggle switch near the center of the module.

### MODES:

Envelope  
Dual envelope  
Sequence



The Q179 front panel graphics describes the envelope generator functions which is its primary use.

In Dual envelope and Sequencer modes, the controls have different meanings so refer to the sections describing those for the details.

### Envelope Mode

This is the primary function of the Q179.

The four knobs control Attack time, Decay time, Sustain level, and Release times.

The toggle switch next to the SUSTAIN knob changes its function to sustain time instead of level.

The toggle switch next to the RELEASE knob changes its function to Hold time or Delay time.

Patch keyboard velocity into the AMP jack for a realistic playing response.

Patch On-Velocity and Off-Velocity into ATTACK and DECAY jacks for control over speeds.

The THRU output makes it easy to daisy-chaining multiple modules without a multiple.

Positive and negative outputs makes it easy to patch to VCA's and filters.

The LED indicates stage - Attack=red, Decay and Release=green, Sustain=blue.

Curve switch selects linear, log, exponential, peaky, bumpy.

Speed switch determines range of envelope stages. FAST = 0-1 second, SLOW = 0 - 100.

Without a plug in the GATE jack, the envelope loops automatically.

### Dual Envelope Mode

Envelope generator #1 controlled by the top two knobs to the +OUTPUT.

EG #2 controlled by the bottom two knobs to the -Output.

EG #1 is voltage controllable with AMP, ATTACK and DECAY jacks.

The SUSTAIN switch turns selects ASR or AD envelopes for EG #1.

Release switch selects AD, Hold/Decay, Delay/Decay for EG #2.

Without a GATE plug, both envelopes loop automatically.

The THRU output matches the release section of EG #2 and may be used as a gate delay/extender.

### Sequence Mode

The four knobs control Steps #1, #2, #3, #4 of a sequence, each with a range of 2 octaves.

The +OUTPUT is the voltage output from the 4-step sequence. Quantized to 1/12 volt.

The -OUTPUT is a DONE gate output to link sequencers.

Step the sequencer with the GATE input or with an internal clock controlled by knob #1.

The SUSTAIN switch adjusts the THRU output pulse from trigger (5ms) to 90% duty cycle.

The AMP jack transposes the sequence at the +OUTPUT. Useable as a quantizer too.

The CURVE switch selects Up, Random, Up/Down cycling.

The ATTACK jack acts as the START gate for linking multiple sequencers, start arpeggiations, etc.

The DECAY jack provides voltage control over the internal oscillator (1v/octave).

# Q179 Envelope++

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## Envelope Mode

The Q179 front panel graphics describes the envelope generator functions which is its primary use.

### Things you can do in the Q179's Envelope mode

- Full-featured envelopes with unique features.
- Delayed envelopes.
- Envelopes with fixed sustain times.
- Envelopes with adjustable attack peak hold times.
- Voltage controlled envelopes.
- Envelopes with On-Velocity and Off-Velocity control.
- Built-in amplitude control of envelopes.
- Unusual curves.
- Gate delay.
- LFO with unique waveforms and VC speed and amplitude.
- Clock generator with VC speed, pulse width, amplitude.

The Q179 offers very fast and very slow rise and fall times (.001s-100s). The first half of pot rotation in FAST mode goes from .001s to .1s for Attack, Decay and Release. This provides more sensitivity for the fast end than the typical EG. Very fast rise and fall times can create clicks and digital artifacts, wanted or unwanted, depending upon the type of patch.

The Attack, Decay, Amp and Gate jacks must use mono plugs, not stereo, because they use the plug's ring to sense plug insertion.

# Q179 Envelope++

## Envelope Mode - Panel Controls

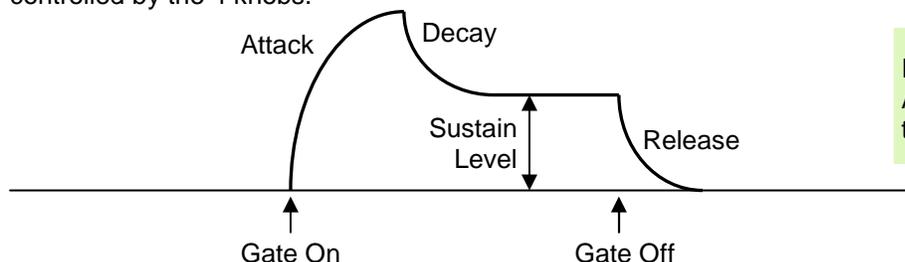
Set the mode switch to ENV. Envelopes are triggered with the GATE input. The 4 knobs control Attack time, Decay time, Sustain level and Release time. Or use the switches to control Sustain time, initial Delay or Attack peak Hold stages. Without a GATE input plug, the envelope loops automatically.



# Q179 Envelope++

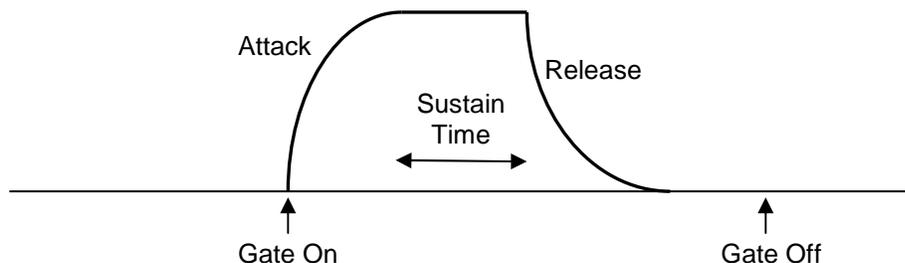
## Envelope Mode - Phases

The Q179 can create a standard 4-phase envelope with Attack, Decay, Sustain and Release phases controlled by the 4 knobs.

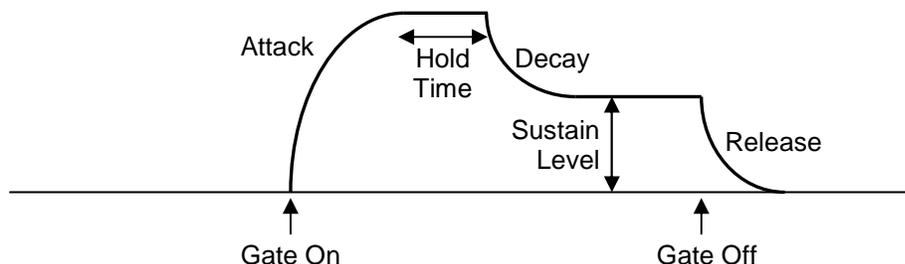


If the Gate falls before the Attack phase is done, then the Release phase begins.

The toggle switch next to the SUSTAIN knob gives you control of the Sustain Level like a normal envelope generator, or control of the Sustain Time. In the TIME mode, each sustain phase is the same length set by the SUSTAIN knob, regardless of the Gate input. At the end of Sustain Time, the release phase begins. The THRU output follows this. The Sustain Level is 100% and there is no Decay phase.

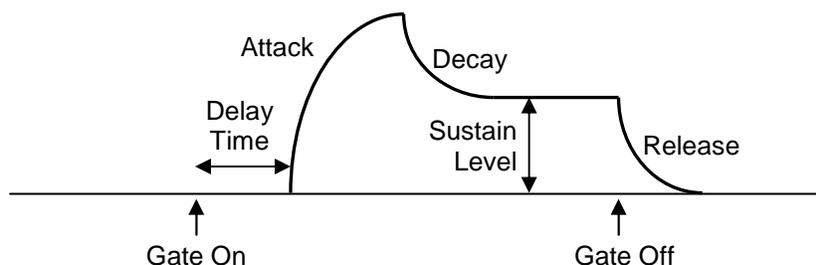


The toggle switch next to the RELEASE knob gives you control of the Release Time like a normal envelope generator, or control of the Attack Hold Time. In the Hold mode, the Attack peak is held for a certain period of time then the decay phase begins. The DECAY knob controls the speed of both the Decay and Release phases. The Release phase starts as soon as the GATE input falls.



If Sustain Time mode and Attack Hold mode are selected at the same time, their times add together for a longer Sustain phase.

The toggle switch next to the RELEASE knob also gives you the option to control Delay Time. In the DELAY mode, there is a delay before the Attack phase begins. The DECAY knob controls the speed of both the Decay and Release phases.

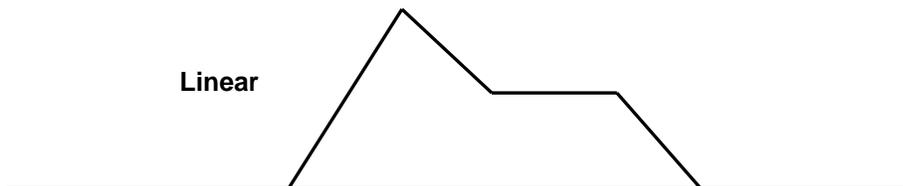


# Q179 Envelope++

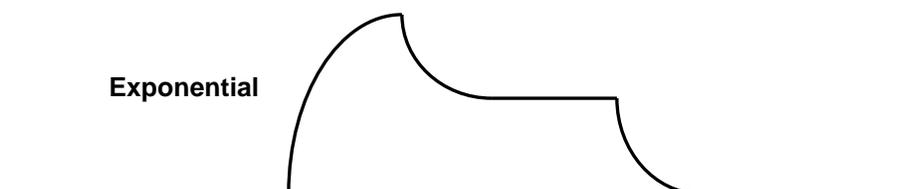
## Envelope Mode - Curves

The Q179 offers a variety of curves - from traditional exponential to linear and logarithmic. All of these curves work in SUSTAIN TIME and LEVEL modes, in RELEASE, HOLD and DELAY modes, and at FAST and SLOW speeds. Attack, Decay and Release voltage control also operate with all curves. These curve types can make a noticeable difference in sound, especially when modulating filters and oscillators.

Linear

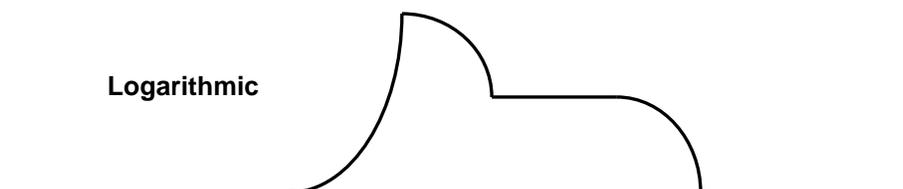


Exponential

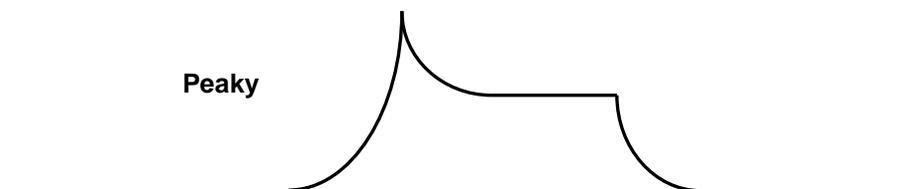


The CURVE switch's middle position alternates between Log, Peaky and Bumpy curves. Just move the switch up then back to the middle to select the next curve type.

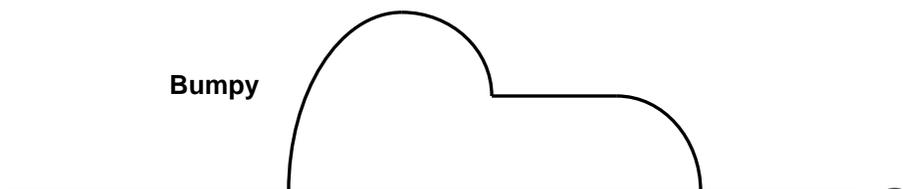
Logarithmic



Peaky



Bumpy



# Q179 Envelope++

## Envelope Mode - Gates, Looping and Thru

Typically, the Q179 envelope generator is triggered with gates from a keyboard or from a sequencer, but it can also loop automatically, with complete control over curves and speeds making it a unique LFO.

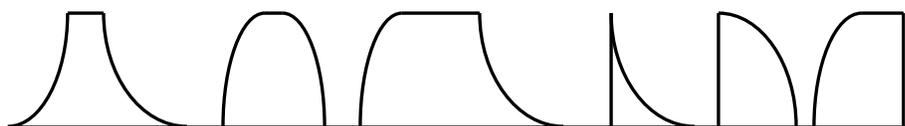
### Automatic Looping

Without a gate plugged into the GATE jack, the Q179 will automatically loop continuously. This provides an interesting source of modulation similar to an LFO but with different shapes. All of the switches, knobs and jacks act the same except the Decay phase is skipped. All possible curve options are available too.

### Gated Looping

With the SPEED switch in the GL position, the Gate input activates gated looping where envelopes loop over and over as long as the gate signal is present. This can provide some great playing possibilities. In the GL position, the envelope speeds are the same as in the FAST position.

With looping, the Decay phase is skipped. Use the SUSTAIN TIME mode for control over envelope Sustain length. Use the DELAY mode to make space between envelopes



### Thru Output

The THRU jack provides a buffered copy of the GATE signal to pass on to another module. This makes daisy-chaining multiple Q179's with other modules easy, reduces patch cables, and reduces the need for multiples. When looping, THRU turns ON at the beginning of Attack and OFF at the beginning of Release.



# Q179 Envelope++

## Envelope Mode - Voltage Control of Time and Amplitude

Attack, Decay and Release times are voltage-controllable. Higher voltages increase speeds (reduces time), like turning the knob CCW (to the left). The time is a combination of the knob and the jack. For example, setting the knob at 5 will let a control voltage of 0-5 volts drive the speed faster as if the knob is being turned CCW.

### Control Voltage Levels

The total range of the two control voltage inputs is 10 volts.

From 0 to 5 volts, the speed increases - faster.

From 5 to 10 volts, the speed decreases - slower.

This combination lets you use an offset'ed CV source to get either positive or negative responses, and can result in some interesting accidents.

### Attack Time

Attack time is controlled by a combination of the ATTACK knob and the control voltage jack. Patch the Velocity signal from the Q174 MIDI Interface for expressive control over Attack - the faster you press a key, the faster the Attack.

### Decay and Release Time

Release time is controlled by a combination of the RELEASE knob and the control voltage jack. In HOLD or DELAY mode, the DECAY knob and jack control both Decay and Release phases. Patch the Off-Velocity signal from the Q174 MIDI Interface for expressive control over Release - the slower you release a key, the slower the envelope decays.

### Amplitude Control

The AMP jack controls the amplitude of the both outputs.

The total range of the control voltage is 10 volts.

From 0 to 5 volts, the amplitude increases from off to 100% (5v peak).

From 5 to 10 volts, the amplitude decreases from 100% to 0.

This response lets you use an offset'ed control voltage for either positive or negative responses.

Patch the Velocity signal to the AMP input for realistic playing where pressing a key faster produces a bigger envelope to control volume of an amplifier, or control a filter's response based on the keypress speed.

You can also patch in an LFO or another envelope generator here to produce some very interesting effects.

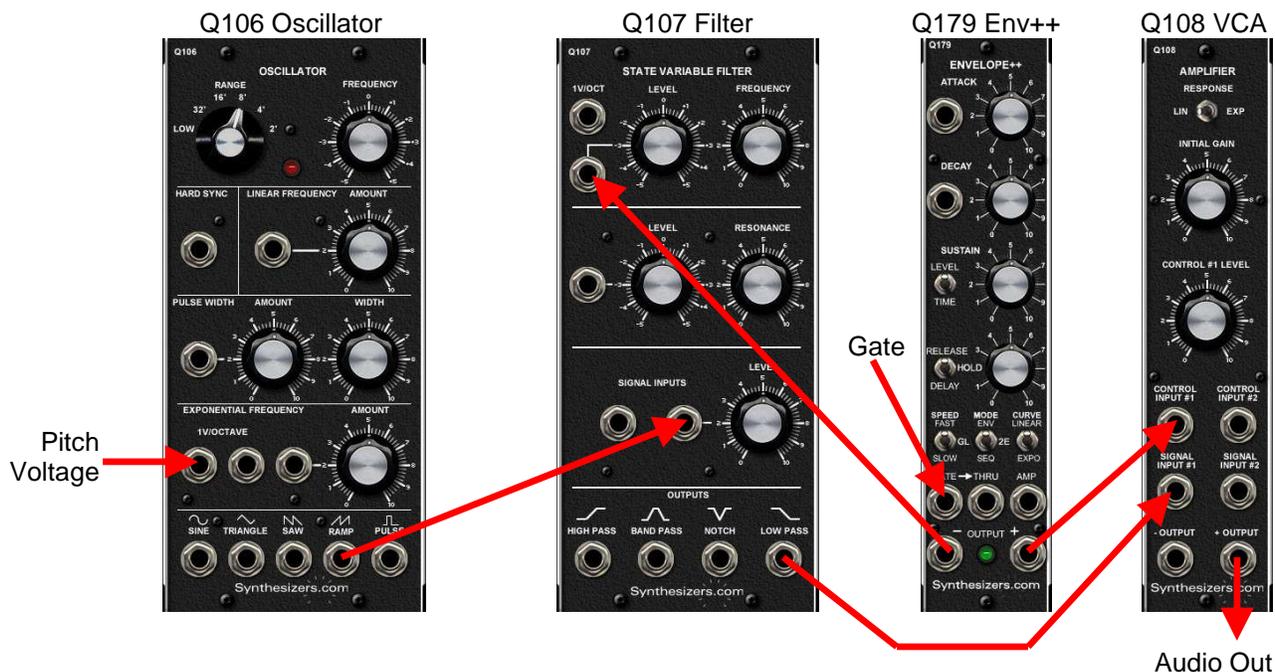


# Q179 Envelope++

## Envelope Mode - Patch Ideas

### The Basic Synthesizer Patch

Here's a simple, basic patch where one Q179's envelope controls both the filter and the amplifier. The + OUTPUT controls the Q108 amplifier and the - OUTPUT controls the Q107 filter. Since the filter has an invertable attenuator, you can get either response from the - OUTPUT.



### Daisy-Chaining Q179 Envelope++ Modules

The THRU output makes it easy to patch a gate signal to several modules without the need for multiples.



# Q179 Envelope++

## Envelope Mode - Patch Ideas

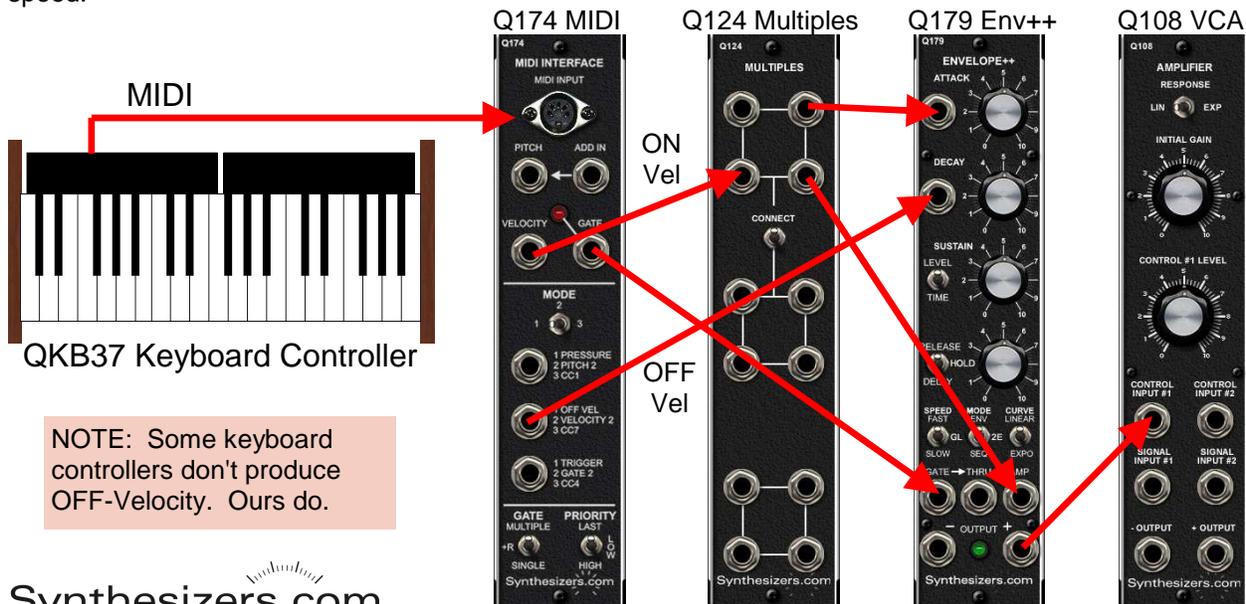
### Basic Velocity Control of Amplitude

This patch shows keyboard velocity being used to control the amplitude of the envelope for expressive playing. Normally this would take a much more complicated patch with several modules but with the Q179 it's easy. The audio path is not shown here.



### Velocity Control of Attack, Decay, Amplitude

This patch shows the keyboard's ON-Velocity controlling the amplitude and Attack, while the OFF-Velocity controls the Release. Set the ATTACK and RELEASE knobs to 7. The faster you press a key, the louder and faster the Attack, the speed at which you release the key determine the Release envelope speed.



# Q179 Envelope++

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## Dual Envelope Mode

The Q179 front panel graphics describes the envelope generator functions which is its primary use.

In Dual Envelope mode, the controls have different meanings which are described in this section.

### Things you can do in the Q179's Dual Envelope mode

Dual envelopes, AR, AD, ASR, Delayed.  
Voltage controlled gate delay and extender.  
LFO with voltage control and exotic waveforms.  
Auto and gated looping.  
Unusual curves.

The Attack, Decay, Amp and Gate jacks must use mono plugs, not stereo, because they use the plug's ring to sense plug insertion.

# Q179 Envelope++

## Dual Envelope Mode - Panel Controls

Set the mode switch to 2E for Dual Envelope Mode. EG #1 uses the top 2 knobs and the + OUTPUT and has voltage control. EG #2 uses the bottom 2 knobs and the - OUTPUT. Without a GATE input plug, the envelopes loop automatically. SPEED, CURVE and AMP settings affect both EGs.



# Q179 Envelope++

## Dual Envelope Mode - Panel Controls

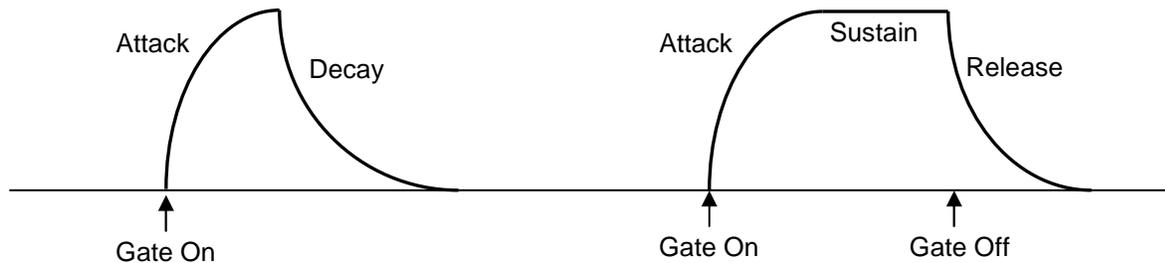
Here's how the panel would be labeled for dual EG mode. This might help understanding the functions.



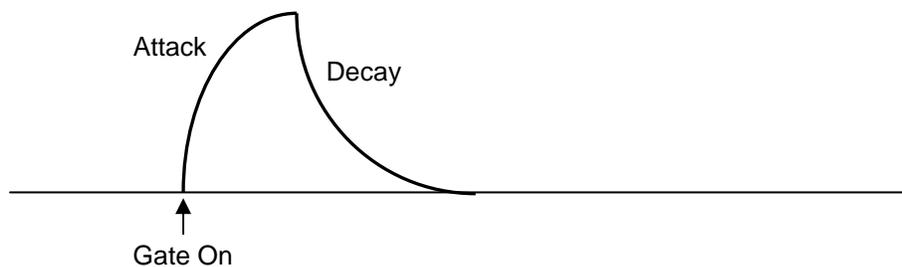
# Q179 Envelope++

## Dual Envelope Mode - Phases

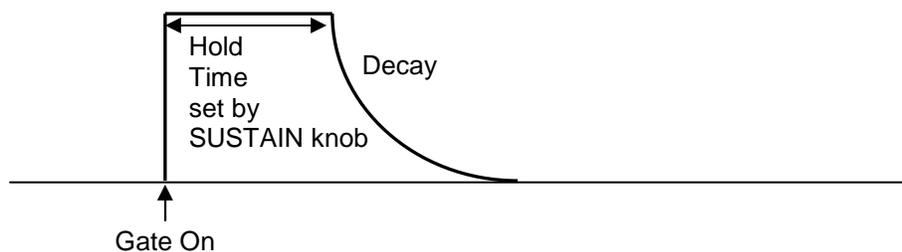
EG #1 operates as Attack/Decay when the SUSTAIN switch is set to TIME, and Attack/Sustain/Release when the switch is set to LEVEL. Attack and Decay/Release phases are also voltage-controllable, and the AMP jack controls the amplitude. The SPEED and CURVE switches also affect the envelope.



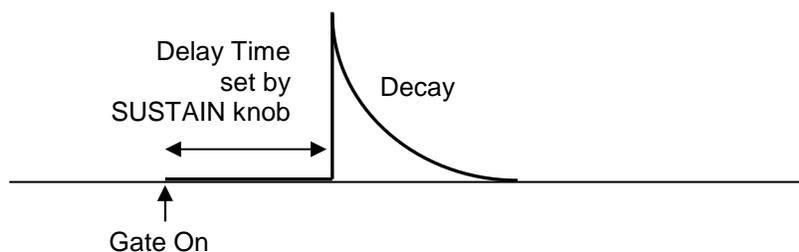
EG #2 operates as Attack/Decay when the RELEASE switch is set to RELEASE.



When the RELEASE switch is set to HOLD, EG #2 has a sharp Attack then a hold time like Sustain set by the SUSTAIN knob, then a Decay phase set by the RELEASE knob.



When the RELEASE switch is set to DELAY, EG #2 has a Delay phase set by the SUSTAIN knob followed by a sharp Attack then a Decay phase set by the RELEASE knob.



# Q179 Envelope++

## Dual Envelope Mode - Looping and Thru

Typical use of the Q179 envelope generator uses a keyboard gate signal patched into the GATE jack to start envelopes, but there are also Gated Looping and Automatic Looping modes.

### Gated Looping

When the SPEED switch is in the GL position, incoming gates activate gated looping where envelopes loop over and over as long as the Gate signal is present. This can provide some great playing possibilities. In the GL position, envelope speeds are the same as in the Fast position. With gated looping, EG #2 will loop inside of EG #1, as many times as there is space for.

### Automatic Looping

Without a gate plugged into the GATE jack, the Q179 will automatically loop continuously. This provides an interesting source of modulation like an LFO but with different shapes. All of the curve options are available too.

One EG will be faster than the other. EG #1 sets the pace and restarts both EGs when it's finished. EG #2 loops as long as EG #1 is running, once per. When EG #1 finishes, EG #2 restarts from its current level.

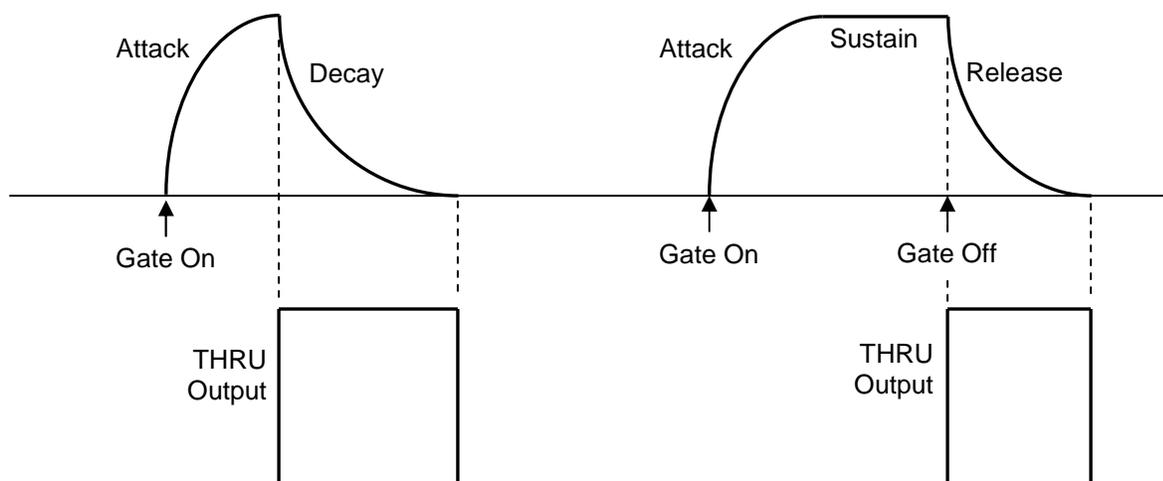
With looping, there is no Sustain phase for EG #1 and the Sustain Time/Level switch is inactive.

The Release/Hold/Delay switch adds these options in place of the Attack Phase for EG #2. Use the Sustain knob to control the timing.



### Thru Output

The THRU jack offers a gate signal which turns ON at the beginning of EG #1's Release/Decay phase and turns OFF when it's done. Since EG #1's Attack and Decay/Release phases are voltage controlled, this results in the THRU output essentially being a voltage-controlled gate delay and extender.



# Q179 Envelope++

## Dual Envelope Mode - Voltage Control of Time and Amplitude

Attack, Decay and Release times are voltage-controllable for EG #1. Higher voltage increases speed (reduces time), like turning the knob CCW (to the left). The time is a combination of the knob and the jack and the response is non-linear. The knob's position determines the overall range of the voltage control input.

### Control Voltage Levels

The total range of the control voltage levels is 10 volts.

From 0 to 5 volts, the speed increases - faster.

From 5 to 10 volts, the speed decreases - slower.

This combination lets you use an offset'ed CV source to get either positive or negative responses, and can result in some interesting accidents.

Patch the Velocity signals from the Q174 MIDI Interface for expressive control over EG #1.

### Amplitude Control

The AMP jack controls the amplitude of EG #1.

The total range of the control voltage is 10 volts.

From 0 to 5 volts, the amplitude increases from off to 100% (5v peak).

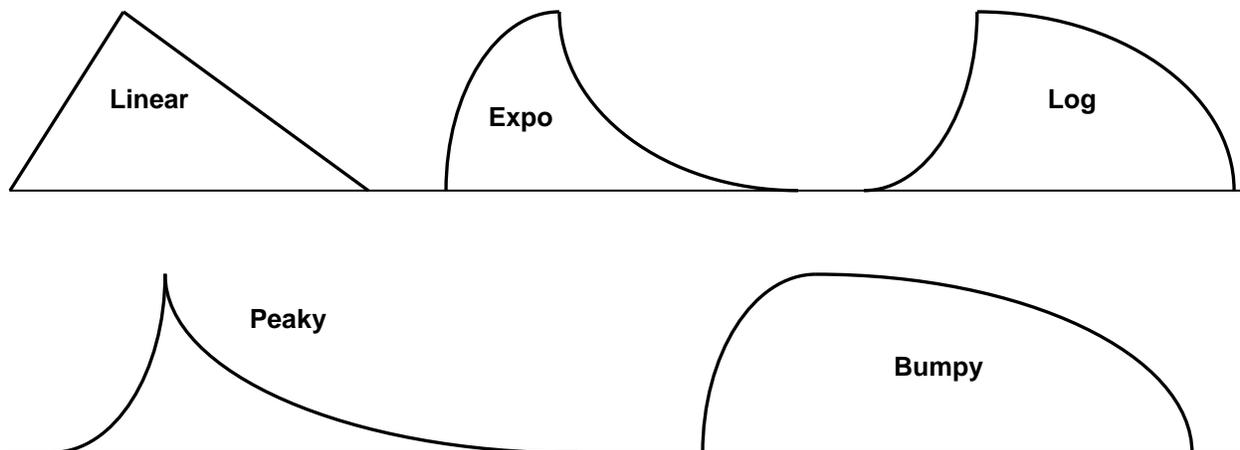
From 5 to 10 volts, the amplitude decreases from 100% to 0.

This response lets you use an offset'ed control voltage for either positive or negative responses.

Patch the keyboard's Velocity signal to the AMP input for a realistic playing where pressing a key faster produces a bigger envelope to control volume of an amplifier, or control a filter's response based on the keypress speed.

## Dual Envelope Mode - Curves

Curves in dual mode work the same as in regular mode. The CURVE switch affects both EG #1 and EG #2.

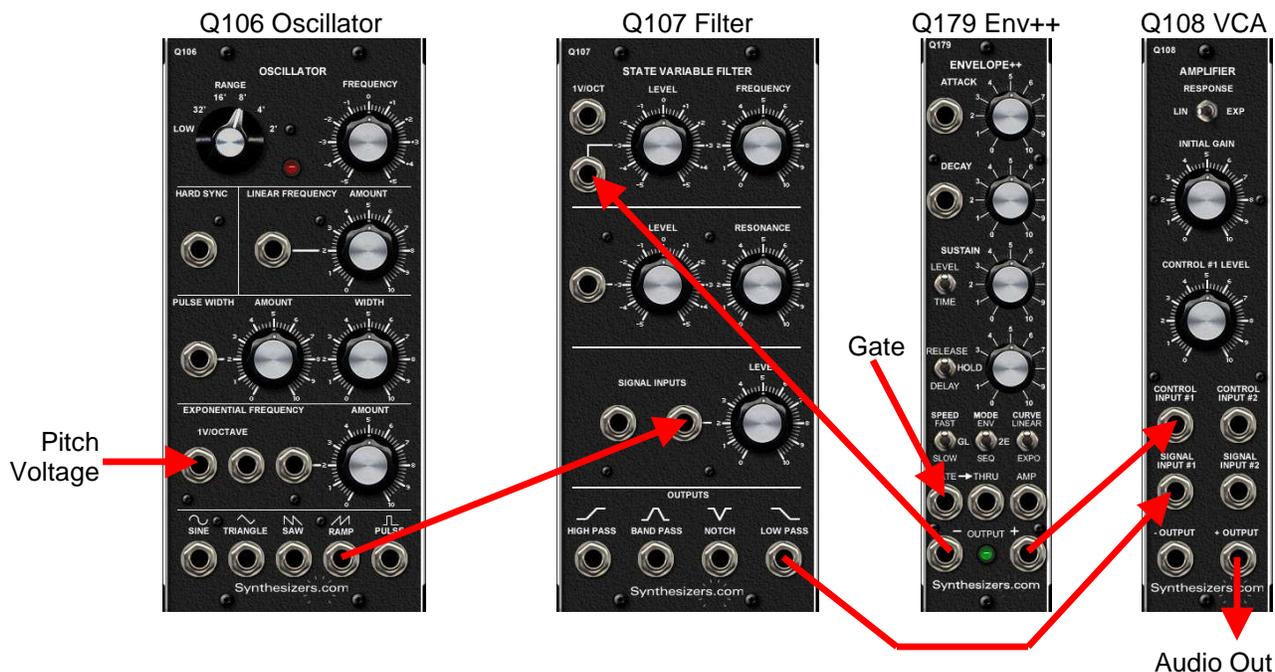


# Q179 Envelope++

## Dual Envelope Mode - Patch Ideas

### A Basic Dual-Envelope Synthesizer Patch

Here's a simple patch using the Q179 in Dual Envelope mode. The top 2 knobs control the VCA envelope and the bottom 2 knobs control the filter. Try setting the filter EG to delay mode to get a delayed envelope relative to the VCA. Lots of possibilities here.



### Gate Delay

The Q179 can operate as a voltage-controlled gate delay and extender.

In the Dual Envelope mode, the THRU output follows EG #1's decay cycle. Since Attack and Decay are voltage-controllable, this produces a voltage-controlled gate delay and extender. The Attack length is a combination of the ATTACK knob and jack which controls the delay before the THRU gate begins. The Decay length is a combination of the DECAY knob and jack which controls the length of the THRU gate.

If you're using the Q179 as a gate delay/extender, you can still use the envelope generator outputs to control modules.

## Sequencer Mode

The Q179 front panel graphics describes the envelope generator functions which is its primary use.

In Sequencer mode, the controls have different meanings which are described in this section.

### Things you can do in the Q179's Sequence mode

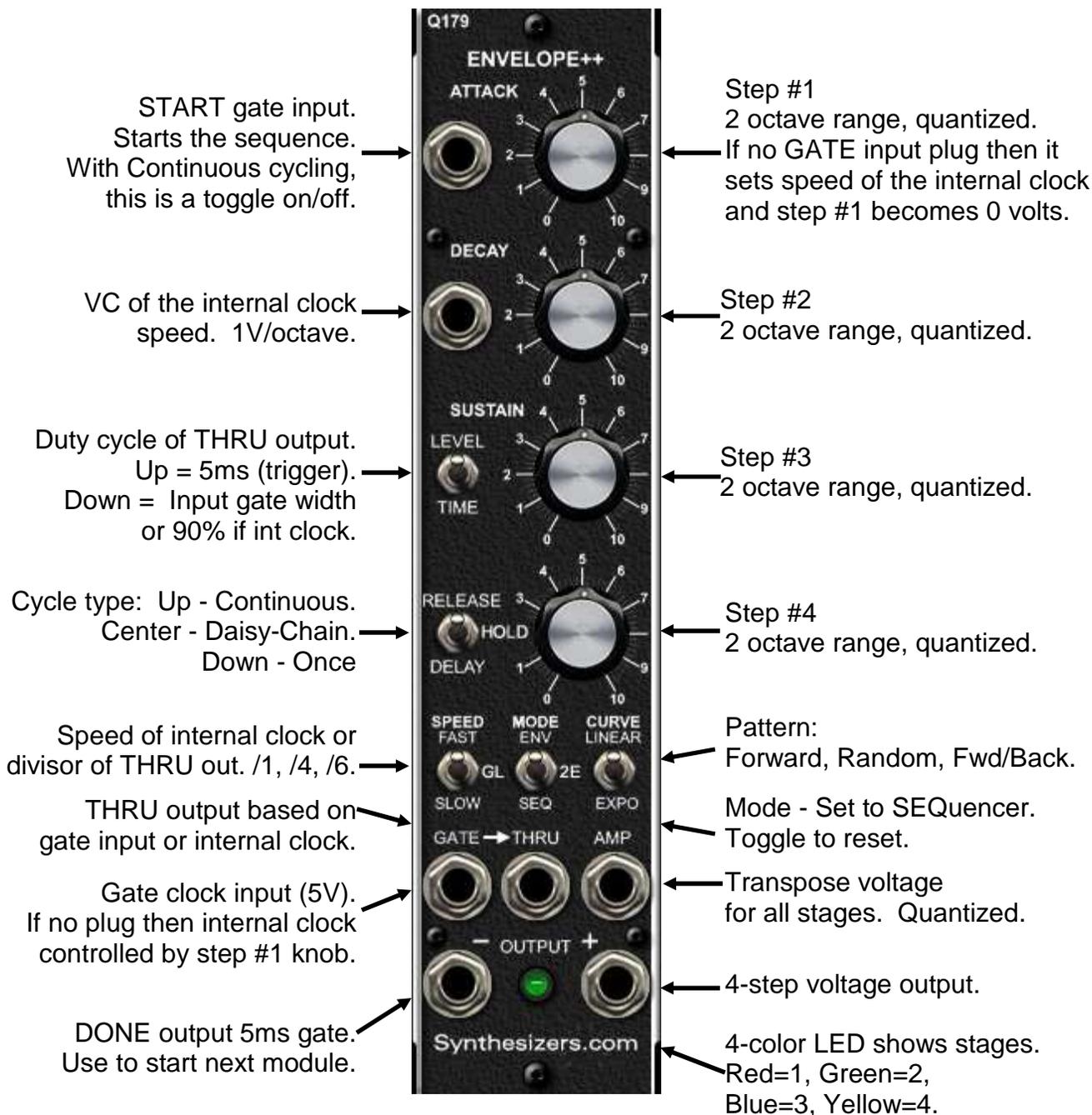
- 4-step sequences with internal clock or external gates.
- Link sequencers in series for more steps.
- Link sequencers in parallel for more rows.
- Keyboard Arpeggiator.
- Single channel note quantizer.
- Manual quantized voltage source for transposing.
- Clock source with voltage control.
- Clock divider - /2, /4, /6.
- Bar counting and transposing for other sequencers.
- Random voltage source.
- Stepped envelopes.
- Zipper effect for external signals.

The Attack, Decay, Amp and Gate jacks must use mono plugs, not stereo, because they use the plug's ring to sense plug insertion.

# Q179 Envelope++

## Sequencer Mode - Panel Controls

Set the mode switch to SEQ. The 4 knobs control 4 steps. Step the sequence with the GATE input. Without a GATE plug, the internal clock steps and the top knob sets the speed and the 1st step is 0v. Modules can be linked in series for long sequences or in parallel for multiple rows. Works nicely as an arpeggiator too. This mode can also act as a quantizer for external signals, a gate divider, or LFO.



# Q179 Envelope++

## Sequencer Mode - Panel Controls

Here's how the panel would be labeled for sequencer mode. This might help understanding the functions.



# Q179 Envelope++

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## Sequencer Mode Behavior

Adding more labels to the panel would be too cluttered, so here are the operational details:

### **Knobs - Each step voltage**

The knobs control steps 1-4 of the sequence. Each knob has a range of 2 octaves (0-2 volts) and is quantized to 1/12 volts for easy programming of melodies. When there is no GATE input, the top knob becomes the speed control for an internal clock, and the 1st step becomes 0v. Knob position 0 is off.

### **ATTACK Jack - Start gate**

This jack is the START gate input. A rising gate signal starts the sequence or resets it to step 1. Use to start an arpeggiation or to link sequencers. Use a VPlug here for manual starting and resetting. In CONTINUOUS cycling, a START signal toggles on/off.

### **DECAY Jack - Internal clock voltage control**

This jack is a voltage control of the internal clock allowing another sequencer to control the step timing.

### **SUSTAIN Switch - Gate output width**

This switch sets the length of the THRU output. With the internal clock, LEVEL = 5ms trigger pulse, TIME = 90% duty cycle. With an external clock, LEVEL = 5ms trigger pulse, TIME = same as GATE input.

### **RELEASE Switch - Cycling**

RELEASE selects CONTINUOUS cycling. DELAY selects ONCE cycle. HOLD selects DAISY mode which cycles links sequencers in series.

### **SPEED Switch - Internal clock speed range or external gate divider**

When there is no GATE input, this switch sets the speed range of the internal clock and knob 1 is speed. The center position is OFF. With an external clock input, this switch selects /1, /4, /6 of the input gate.

### **MODE Switch**

Set this switch to SEQ for sequencer mode. Toggling this switch will reset the sequence.

### **CURVE Switch - Pattern**

Sets the sequence pattern. LINEAR = forward (1,2,3,4), EXPO = forward/backward, center is random.

### **GATE Input Jack - Step the sequence**

This input advances the sequence. It can be any square-wave source, from a Q106 oscillator, a Q167 LFO++, keyboard gate, or gate from another sequencer. Use a VPlug (see website) for manual stepping.

### **THRU Jack - Gate output**

When there is no GATE input, this is the output of the internal clock. It starts and stops with the internal clock. When there is an external clock source into the GATE input it becomes a divide-able gate set by the SPEED switch (/1, /4, /6) useful for sequence bar counting.

### **AMP Jack - Transpose**

A voltage at this jack transposes the sequence. Use it for stacking sequencers and for arpeggiations.

### **OUTPUT Minus Jack - Done Output**

This is the DONE gate output - a 5ms pulse when a sequence is finished. Use it to start other sequencers. In CONTINUOUS mode, this output pulses at every step 1.

### **LED - Current step**

Red = step 1, Green = step 2, Blue = step 3, Yellow = step 4.

### **OUTPUT Positive Jack - Output**

This is the sequencer voltage output which is typically used as a pitch voltage but can also be used to control anything including filters or the speed of other sequencers. A sum of the knob and AMP jack. The maximum output is 5v (5 octaves of pitch).

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## Sequencer Mode - Cycle Option Details

In SEQUENCER mode, the RELEASE switch offers three cycle options.

### CONTINUOUS

The top switch position is CONTINUOUS cycling.

Use this mode for melody lines or modulation that constantly runs.

At power-up, no step is active and the +OUTPUT is equal only to the AMP (transpose) input.

If there is a GATE plug, gates come from there, otherwise the internal clock is active.

When the internal clock is active, step #1 is 0 volts, and its speed is controlled by knob 1 and the VC jack.

When external gates are used, the SPEED switch provides pre-dividing /1, /4, /6.

With no plug in the START jack, the sequence automatically begins at step #1.

With a plug in the START jack, the sequence begins when a rising edge is received.

If a sequence is running when a START signal is received, it will turn off. Toggling on/off.

The sequence steps with each gate and continues forever.

The DONE output fires at step #1 of each cycle.

For each step, there is a GATE output at THRU.

Each step's voltage is added to AMP for transposing then sent to the +OUTPUT.

To manually stop a continuous sequence, toggle the mode switch to reset it.

### ONCE

The bottom switch position is ONCE cycling.

Use this mode for keyboard arpeggiations, 4-step envelopes, gate dividing, and bursts of modulation.

At power-up, step #4 is active and the +OUTPUT is equal to step #4 and the AMP input.

If there is a GATE plug, gates come from there, otherwise the internal clock is active.

When the internal clock is active, step #1 is 0 volts, and its speed is controlled by knob 1 and the VC jack.

When external gates are used, the SPEED switch provides pre-dividing /1, /4, /6.

With no plug in the START jack, the sequence automatically begins at step #1.

With a plug in the START jack, the sequence begins when a rising edge is received.

The sequence steps with each gate and stops at step #4.

The DONE output fires after step #4.

For each step, there is a GATE output at THRU.

Each step's voltage is added to AMP for transposing then sent to the +OUTPUT.

### DAISY

See next page...

# Q179 Envelope++

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## Sequencer Mode - Cycle Option Details

### DAISY

The center switch position is DAISY cycling.

Use this mode to link multiple Q179 modules to create longer sequences. If you want more than 4 or 8 steps often, it probably makes sense to have a real sequencer like the Q960 or Q119, but if you want to link Q179's together and have plenty of patch cables, it can be done.

DAISY cycling is like ONCE but it stops stepping after step #4 and turns off. This behavior allows Q179 modules to be linked together for unlimited steps.

### Behavior:

At power-up, no step is active and the +OUTPUT is equal only to the AMP input.

If there is a GATE plug, that's the source of gates, otherwise the internal clock is active.

When the internal clock is active, its speed is controlled by knob #1 and step #1 is 0 volts.

When external gates are being used, the SPEED switch provides pre-dividing /1, /4, /6.

With no plug in the START jack, it begins automatically begin stepping and allowing THRU gates.

With a plug in the START jack, it waits for a START signal to begin stepping and allowing THRU gates.

The sequence advances with each gate and stops advancing after step #4.

The DONE output fires after step #4.

Each step's voltage is added to AMP for transposing then sent to the +OUTPUT.

Toggleing the MODE switch resets everything.

### Patching:

Set all modules in the chain to DAISY.

On each module, patch in a source of Gates, or leave the plug out to use the internal clock.

Patch each THRU to a multiple to mix gates, this is the synth voice's gate.

Patch each +OUTPUT to the next module's AMP to pass along the pitch signal.

The synth voice pitch comes from +OUTPUT on the last module.

Patch each DONE to the next module's START.

Patch the last module's DONE output back to the first module's START to create a continuous cycle. This requires a mixer or a signal processor to modify the signal since the DONE output is very low impedance and doesn't automatically mix in a multiple.

### Operation:

When a START signal is sent to the first module in the chain, it begins counting 1,2,3,4 with a THRU gate for each step. This gate is mixed using a multiple to provide the synth voice gate.

Each step's voltage goes down the chain to the end module to provide the synth voice pitch.

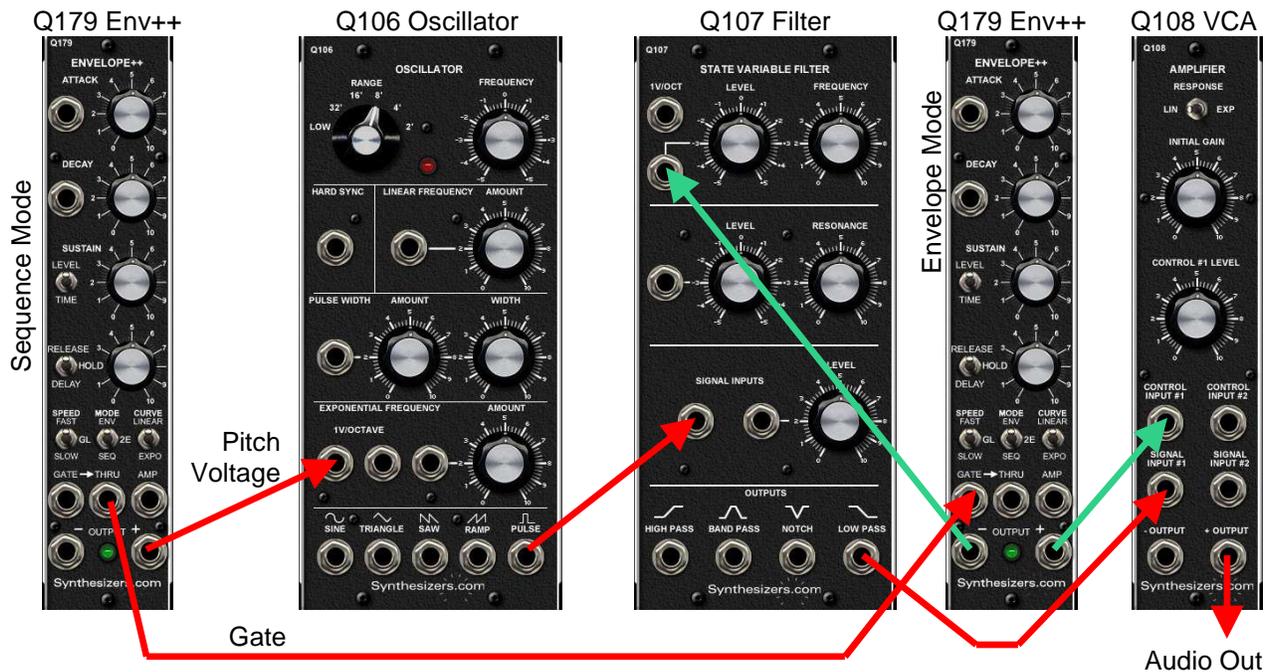
After each sequencer has finished step #4 it turns its voltage off and a DONE signal starts the next module which begins stepping. Remember that when using the internal clock, step 1's knob controls the speed and step 1 is off (0v).

# Q179 Envelope++

## Sequencer Mode - Patch Ideas

### Basic Sequencing Patch

Here's a simple where the Q179 in SEQUENCER mode drives an oscillator. Another Q179 in ENVELOPE mode provides envelopes for the filter and VCA.



### Arpeggiator

This patch uses the Q179 in SEQUENCER mode to act as a keyboard arpeggiator. The Q179's internal clock is controlled by the top knob. The keyboard's pitch transposes the sequence using the AMP input and the keyboard's gate starts the sequence via the START input (ATTACK). Set the RELEASE switch ONCE cycling.

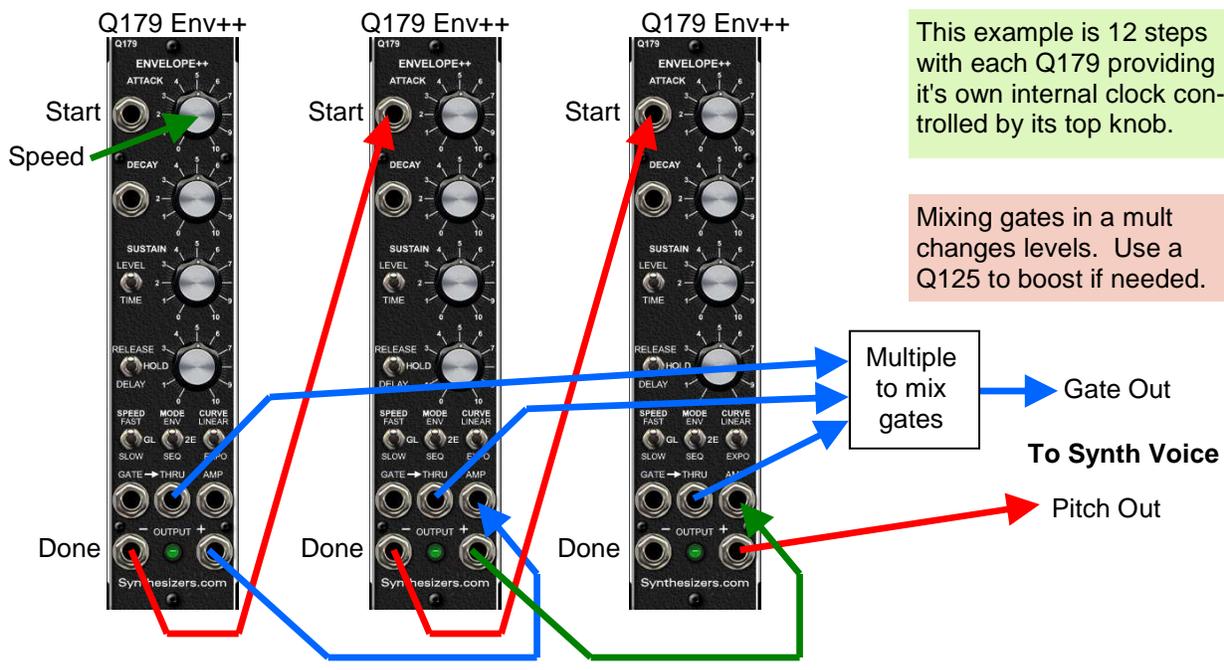


# Q179 Envelope++

## Sequencer Mode - Patch Ideas

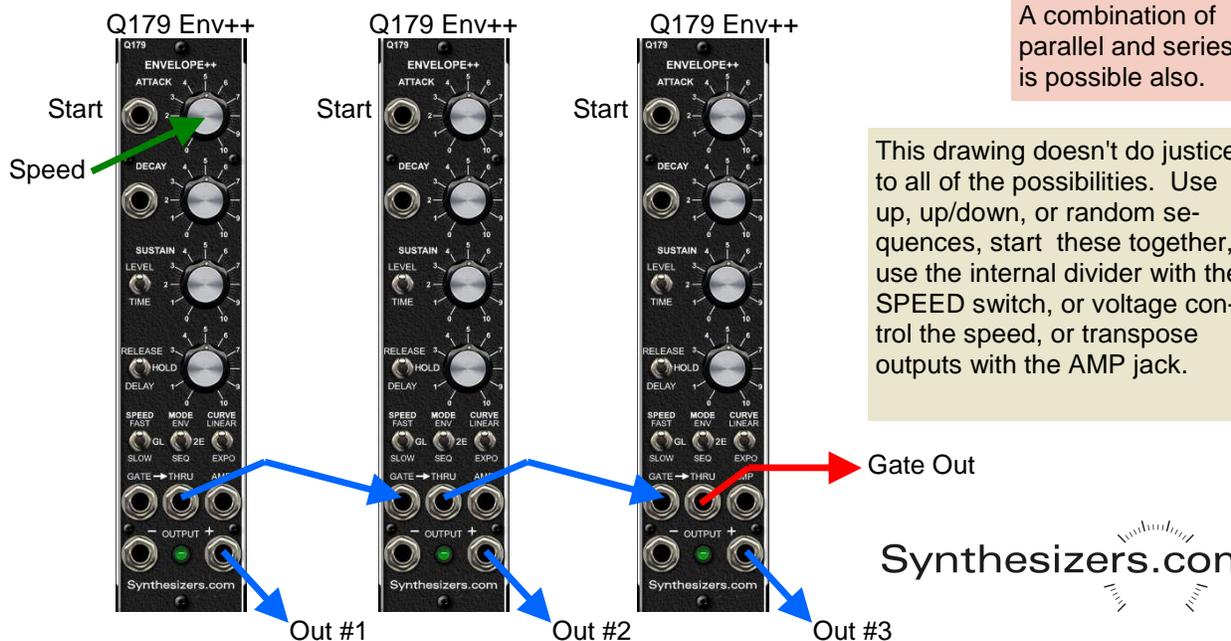
### Daisy-Chaining Sequencers in Series for More Steps

Set all Q179's to SEQ and set RELEASE to center for Daisy-Chain cycling. Patch DONEs to STARTs of the next sequencer. Patch +OUTPUTs to AMPs of the next to pass along pitch. Patch THRUs to a multiple to mix them, that's the synth voice gate. In the patch below, each module is using its internal clock controlled by the first knob, but you could patch a shared source of gates to all GATE inputs.



### Patching in Parallel for More Rows

This patch shows how multiple Q179's can sequence in parallel to drive multiple melodies or control filters, etc. The first Q179 provides the clock. Set mode to SEQ and the RELEASE switch to up for CONTINUOUS cycling. The top knob on the first sequencer is the speed.



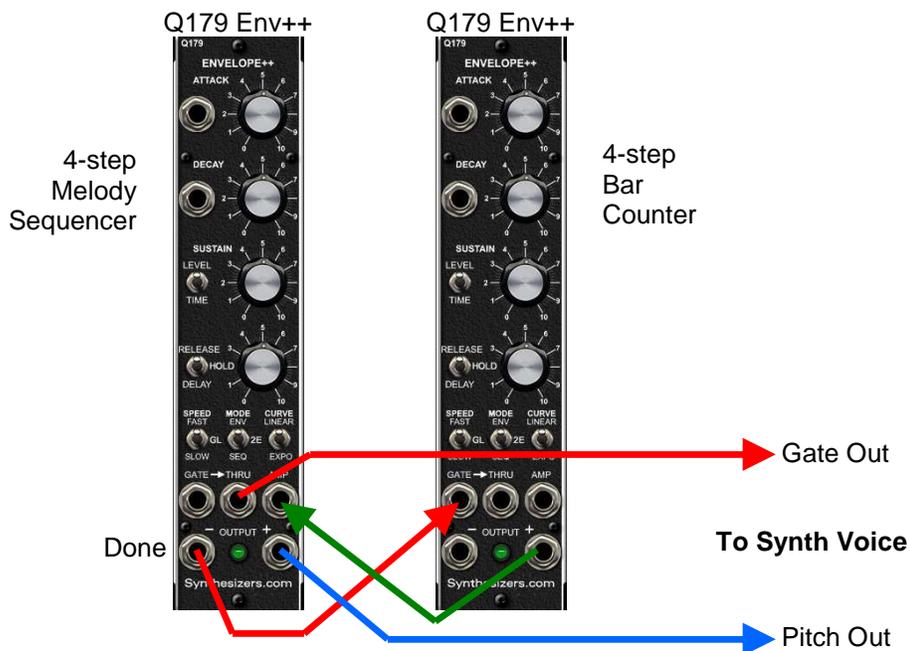
# Q179 Envelope++

## Sequencer Mode - Patch Ideas

### Bar Counting and Transposing

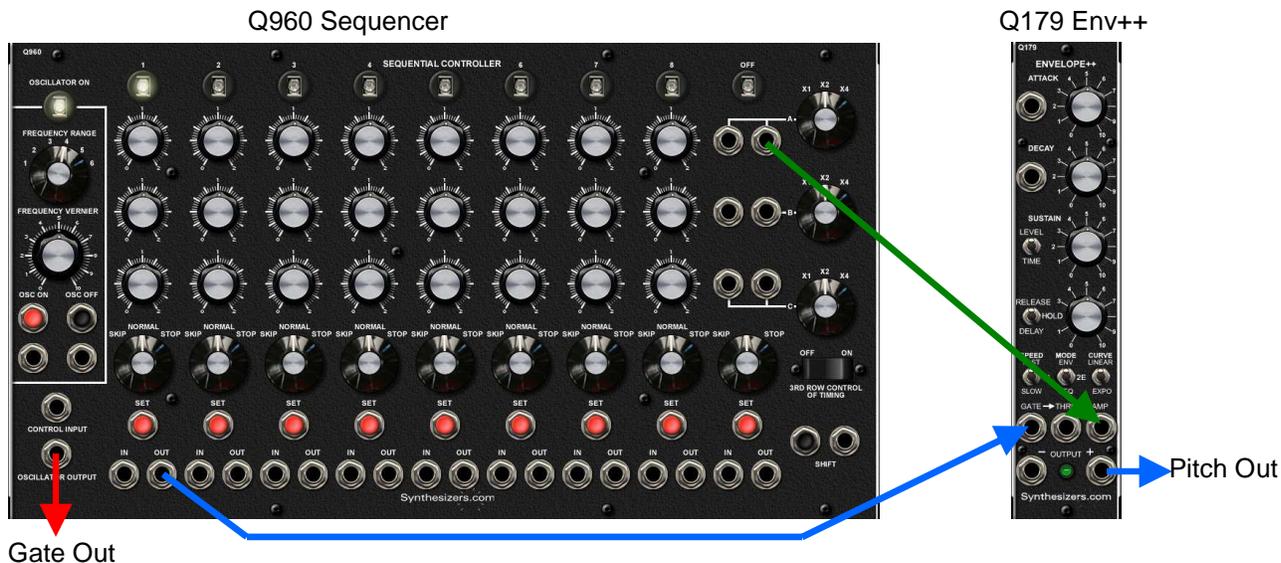
The Q179 can be used to count complete cycles of another sequencer and use its output to transpose the sequence. This is musically very useful and can add life to a static sequence. Random or up/down patterns add even more variety.

Here's a patch using two Q179 modules in sequence mode. The first provides a 4-step melody for a synth voice, the second steps once every time the first finishes a cycle. This is done by patching the DONE output into the gate of the next. The outputs are mixed together to create a transposing effect.



### Bar Counting and Transposing with a Q960 Sequencer

This idea can be used for most sequencers including our Q119 and Moog-style Q960 sequencers. The idea is make the bar counter module step once for each cycle of the sequence, then mix their outputs together to transpose them according to the bar counting sequencer. Use CONTINUOUS cycling.



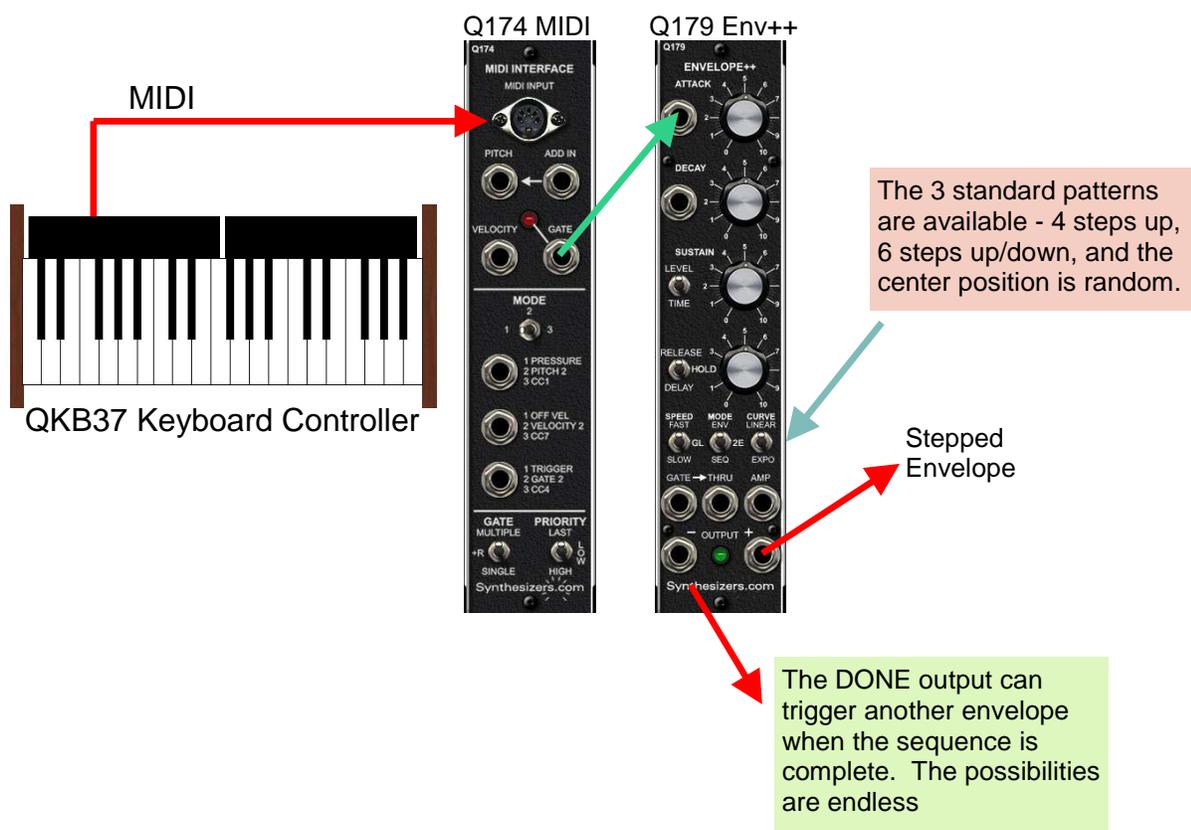
# Q179 Envelope++

## Sequencer Mode - Patch Ideas

### Stepped Envelopes

The Q179 can be used to create a burst of 4 steps started by a Gate. This can substitute as an envelope, one with discrete steps instead of smooth like a normal envelope. This works great for modulating a filter.

The patch is simple - patch the gate source (usually from a Q174 MIDI interface or a sequencer) into the START jack. Make sure you're in SEQuencer mode. Set the cycle switch to ONCE if you want the sequence to stop at 4, or DAISY if you want the sequence to stop at OFF after 4. Without a GATE input, the first knob controls the speed of the stepping, and the first step is OFF. The +OUTPUT is your stepped envelope.



# Q179 Envelope++

## Sequencer Mode - Patch Ideas

### Quantizing

The Q179 can operate as a single-channel quantizer by turning off sequence stepping and applying a signal to the AMP input. The +OUTPUT provides a quantized version of the input.

Quantizing locks voltages into steps like frets on a guitar. When a signal is quantized before going to an oscillator, the pitch will lock into semitones. This makes tuning sequences from a knob much easier because voltages land on notes.

Here's how it works. In Sequencer mode, the AMP jack is used to transpose the sequence. Transposing means the transpose voltage (pitch) and the current step's voltage (pitch) are simply added together then sent to the output.

The +OUTPUT is quantized to 1/12 volt increments which corresponds to semitones on an oscillator. If a sequence is not running, any signal at the AMP input will be quantized and sent to the output.

Q179 Env++



There are several ways to stop stepping of the sequencer. Remove the GATE plug and turn the first knob to 0 to turn off the internal clock.

Make sure SEQ mode is selected.

Input voltage to be quantized

Quantized voltage output

#### Ideas:

Use the Q179's quantizer feature to make tuning a Q119 or Q960 Sequencer easier.

Patch a Triangle or Sine wave from an LFO into the AMP input and use the output to drive a synth voice. This can result in some great patterns.

Patch an envelope through the quantizer to get stair-stepped envelopes.

### Q171/Q172 Quantizer Modules

If you're looking for more quantizer channels and more features, consider the Q171/Q172 Quantizer modules.



# Q179 Envelope++

## Sequencer Mode - Patch Ideas

### Dividing

The Q179 can operate as a single-channel gate divider. With an external gate input, the SPEED switch sets division at the THRU output to /1 (up), /4 (center), /6 (up/down).

For dividing by 4 or 6:

Patch the gate or clock source you want to divide into the GATE input. Set the cycle to CONTINUOUS. Set SPEED to the center position for divide-by-4 and the bottom position for divide-by-6. Take the divided output from the THRU jack. The sequencer will still step and produce a voltage at the +OUTPUT but you can ignore that part. The THRU output always starts at ON.

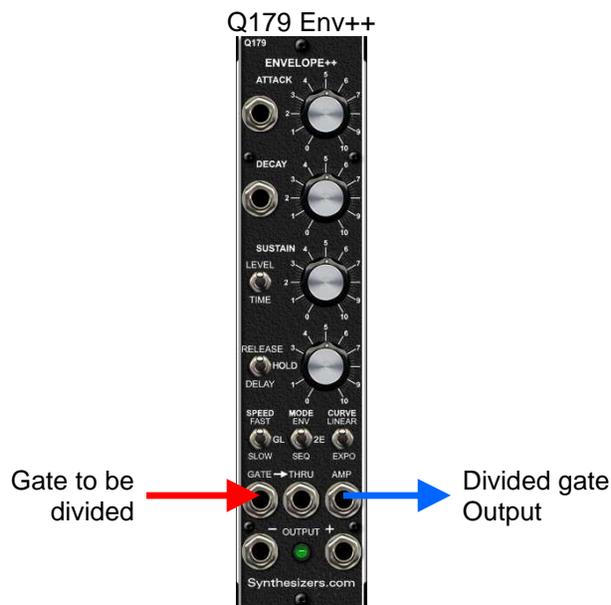
Dividing using the DONE output:

The DONE output fires at the end of each sequence. Up is a 4-step sequence so the DONE output fires after the 4th step is finished on each sequence. Down is a 6-step Up/Down sequence so DONE fires after then 6th step. Random is an 8-step sequence so DONE fires at 9. These alignments are different than dividing with the THRU output.

Dividing using step voltages:

Each step knob produces a voltage of 0-2 volts (2 octaves). This voltage range is enough to act as a gate in almost every circumstance even though it's not a full 5 volts. So, start a sequence and use the 4 knobs to produce the pattern or division you want. Setting the knob to 0 is off and 10 is on. Remember that the Up/Down pattern is 6 steps which gives you another set of gate pattern possibilities. And don't forget about Random patterns selected by the center position of the CURVE switch.

Using the step voltages as gates offers an interesting source of gate patterns when the internal clock is going also. Activate the internal clock by removing the GATE plug. Its speed is set by knob number 1, and step #1 is off (0v). With the internal clock, the SPEED switch sets the speed range and center is off.



### Q173 Gate Math Module

If you're looking for more dividing possibilities, check out the Q173 Gate Math module which offers 4 channels, division, multiplication, random and various patterns.



# Q179 Envelope++

## Troubleshooting

The Q179 is complicated enough that when you think things are not working right, 99% of the time it is doing exactly what it is suppose to do, so please review its operation in the previous pages.

### General things

Check that a cable hasn't come loose from the circuit board. Verify you have correct power and that the power cable is plugged in properly. Make sure the Q179 is in the mode you're expecting.

### Constant envelopes

Automatic looping occurs if there is not GATE plug.

### No outputs

The AMP jack controls the amplitude of both outputs in EG mode. If there's a plug inserted and it's voltage is zero then there will be no output. Also, if the speed is set to SLOW you may get envelopes and times so slow that it might appear to not be operating correctly.

### Short envelopes

If the GATE input is a very short trigger then it will proceed to the Release phase very fast and may appear not to be working. Use full length gates, eg: BINARY or GATE option from the Q173 Gate Math.

### Clicks

With fast rise/fall times, the envelope may produce clicks on a VCA or filter, and digital artifacts might be noticeable.

### Sequencer clock

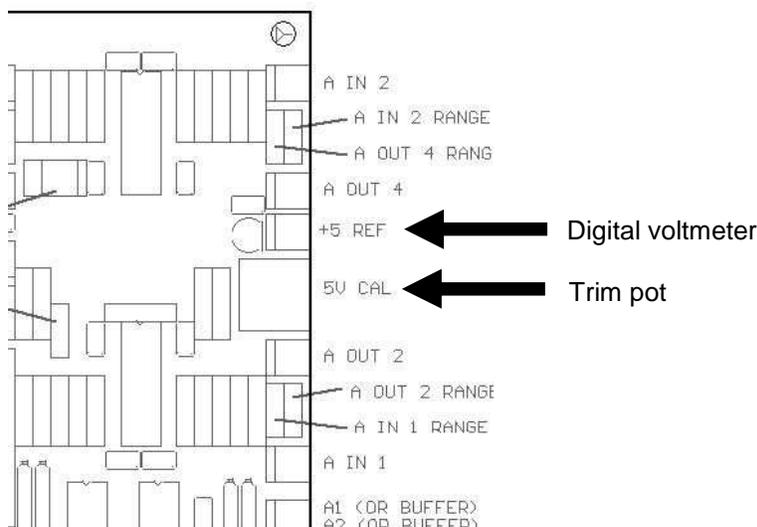
When using the internal clock in SEQ mode, having the Release knob in full CCW position turns the internal oscillator off.

### Unwanted Looping

The jacks for GATE, ATTACK, DECAY and AMP detect plug insertion by relying on the ring to be grounded and require mono cables. Using stereo cables with these will produce unexpected results.

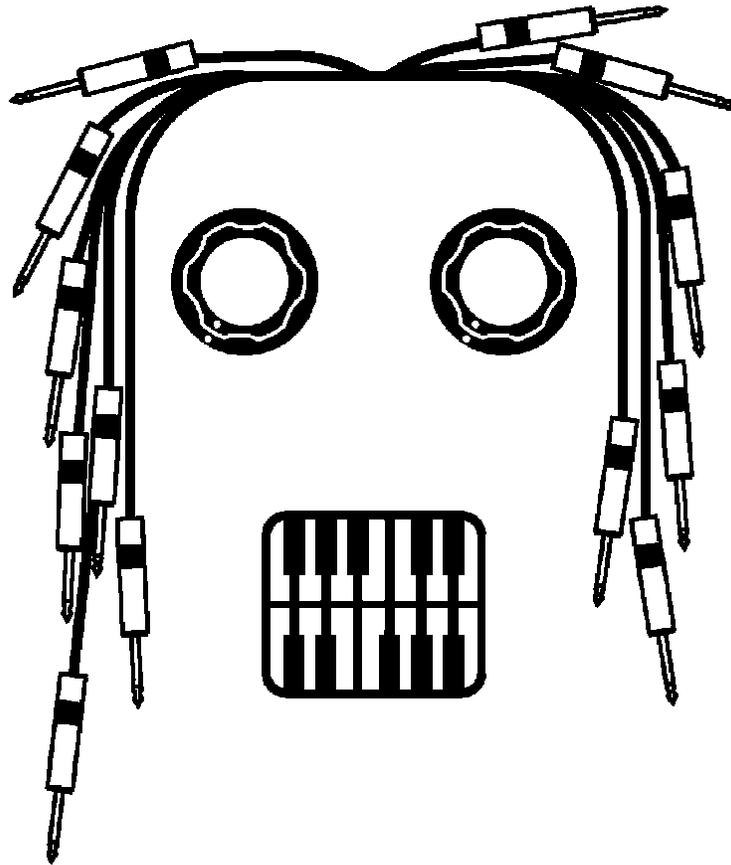
## Calibration

Calibration includes setting the trim pot for exactly 5.00 volts. There are no other jumpers or settings.





# Patcher Jack



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