V-Gates User Manual

(Versatile Gates)

V-Gates has a powerful combination of features for your clocking and gating pleasure - In fact, there are well over 300 variations of gates, functions and modes. And many of these functions can be voltage controlled! Yet with that power comes complexity and a bit of a learning curve. This manual humbly attempts to help you understand and explore what may well be the most versatile gate module available.

Modes vs. Functions

How do you first approach V-Gates? Let me suggest using a machete – cut through the dense tangle of thick vines and underbrush to gradually reveal some fairly simple concepts. The power is in the many combinations of features.

V-Gates has two "Modes" (Analog & Digital) and within each mode are three functions. Analog modes and functions are indicated on the panel with copper colored text, and Digital modes and functions in silver. Sometimes a function or jack will have multiple purposes depending on the mode. If a function is roughly the same in both modes, the panel text will be in silver for both modes. Don't worry, this will be more apparent as you become more familiar with V-Gates.

Analog Knobs on a Digital Gate?

Absolutely! You bet! Although knobs might seem to make more sense for analog, with digital functions the knobs actually allow very versatile selections of what we call "**Sub-Functions**". These sub-functions allow you to adjust how the gate outputs react with the input clock, among other things. Again, we'll get into that in more detail later.

Modes

Modes - Analog & Digital - are selected with the "**MODE**" switch, and the gate outputs toggle on and off in response to how each mode and function are set.

We will start with the Digital mode, since that's sort of the definition of "gate" and is probably more familiar to you. But be careful to note some of the subtle differences and expanded features, as these can be confusing at first. You may need to re-read a section a few times and try some of the sample patches to really understand what's going on.

Digital Modes

In **Digital** mode, V-Gates has three functions – **Rand** (random), **Step** and **Binary** as selected by the "**FUNC**" switch. The **Reset / CV In**, and **Clk In/Out** take on different uses in digital modes.

In each of these functions, a clock pulse is fed to the "**Clk In**" jack on the panel. A "**Reset**" input jack allows you to reset the input to the first stage at any time.

*Note: In Digital mode, the **CV Amt** pot is disabled and the **CV In** jack serves as the **Reset** input.*

Clk In Jack (Digital)
For each positive going edge, V-Gates will advance to the next gate "state" or "stage". Depending on the **Function** and **Sub-Functions**, **Clk In** will also respond to the width of the external clock pulse. This is a very powerful feature.

Reset In Jack (Digital)
When the **Reset** input goes high (positive), the V-Gates outputs are reset to the first stage. Low (negative) going levels are ignored. V-Gates outputs may be patched into this input to set the maximum number of output stages.

Rand Functions (Digital)
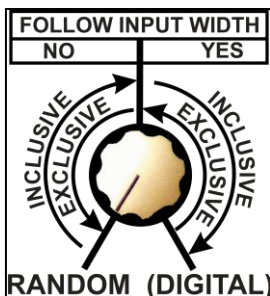
For each positive going external pulse, the outputs will change to a new random value. With the **INITIAL** knob fully counter-clockwise (left), each output will remain ON until the next clock pulse. Thus, any number of outputs will be on or off randomly. All outputs might be on, and then no outputs on. It's random.

Four **Sub-Functions** are controllable over the range of this knob. As the **INITIAL** knob is increased from full left (counter-clockwise), the lower stages will progressively start to output "*exclusively*", meaning that even while these lower stages are still random, only *ONE* of these may be active at a time.

For example, if the **INITIAL** knob is set to about 2 to 2 ½, only one of the lower four outputs can be randomly on at a time, while the upper four outputs can have any number of outputs on.

That covers the *first half* of the **INITIAL** knob's rotation. If the knob is moved more clockwise (right) past center position, the above **Sub-Functions** will repeat - *with one important exception* – they now follow the input pulse width. That's a lot of flexibility in a single knob, so it might be a bit confusing at first. Give it time and explore using a variable width gate pulse into the **Clk-In**.

In addition, the **Reset** input may be patched to one of the outputs to control the number of stages, although with random functions, it doesn't make much sense.

Step Functions (Digital)

| UP	UP/DOWN
FOLLOW INPUT WIDTH	
YES	NO	NO	YES

MORE STEPS — MORE STEPS

STEP (DIGITAL)
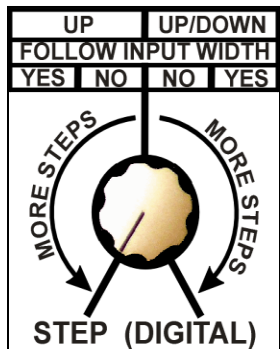
This is basically a simple 8 stage step sequencer, with a couple of twists. With each positive going clock pulse, the V-Gates will advance to the next stage until it gets to stage 8, when it will again start at stage 1. With the **INTITIAL** knob fully counter-clockwise (left), each output will remain ON until the next stage advance. Fairly straightforward so far.

Follow Input Width - As the **INITIAL** knob is increased, the lower stages will progressively begin to follow the width of the clock pulse. So, for instance, if the **INITIAL** knob is at about 3 ½ to 4, the lower 4 stages will flash on, then off, following the width of the external **Clk In** pulse, and the upper stages will remain ON until the next clock pulse. At full clockwise rotation, all outputs will follow the width of the clock.

The **Reset** input may be patched to one of the outputs to control the number of stages, or to an external source to reset the count to zero.

Binary Functions (Digital)

FOLLOW INPUT WIDTH	
NO	YES

MORE STEPS

BINARY (DIGITAL)
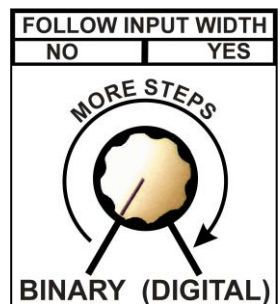
Each high (positive) going external pulse, the outputs will change to the next higher binary value. Once all the outputs are turned on (Value: 255, or binary 11111111), the output automatically goes back to zero (no outputs on).

Follow Input Width - As the **INITIAL** knob is increased, the lower stages will progressively begin to follow the width of the clock pulse. So, for instance, if the **INITIAL** knob is at about 3 ½ to 4, the lower 4 stages will flash on, then off, following the width of the external **Clk In** pulse, and the upper stages will remain ON until the next clock pulse. At full clockwise rotation, all outputs will follow the width of the clock.

The **Reset** input may be patched to one of the outputs to control the number of stages, or to an external source to reset the count to zero.

Analog Modes

In Analog mode, V-Gates has three functions – **Slope**, **Step** and **Binary** as selected by the "**FUNC**" switch. The **Reset / CV In**, and **Clk In/Out** take on different uses in **Analog** modes.

Unlike the **Digital** Mode, the **CV Amt** knob and **CV In** jacks are functional in **Analog** modes.

CV Input Jack (Analog)
In Analog mode, the **CV In** jack shares its function with the Digital mode's Reset input. External control voltages applied to this jack are attenuated by the **CV Amt** knob, and added to the voltage generated by the **INITIAL** knob. The total combined range of CV inputs is 0 to 5 volts. Negative voltages are clipped.

Clk Out Jack (Analog)
For each change in any one of the outputs, this jack generates a brief positive going 5 volt pulse, 5 milliseconds in width.

Slope Function (Analog)
As the **INITIAL** knob is increased from left to right (or increasing CV is applied), gate outputs from 1 to 8 are sequentially turned on until all outputs are on. This different than the **Step** function below. With each output change, a brief 1ms pulse is output from the **Clk Out** jack.

Step Function (Analog)
As the **INITIAL** knob is increased from left to right (or increasing CV is applied), gate outputs from 1 to 8 are sequentially turned one by one (exclusively) so only one output is on at a time. This different than the **Slope** function. With each output change, a brief 1ms pulse is output from the **Clk Out** jack.

Binary Function (Analog)
As the **INITIAL** knob is increased from left to right (or increasing CV is applied), gates 1 to 8 are output in binary (base-2) order - (Value: 0 to 255, or binary 00000000 to 11111111). With each output change, a brief 1ms pulse is output from the **Clk Out** jack.

Installation
V-Gates is installed like any other Euro style module. Your power supply is connected via the 16 pin polarized ribbon cable (included), and the module is attached to your rack with two Philips drive M3 x 6mm screws (included). Different racks may require a different screw.

V-Gates has a jumper configurable option to allow you to power the +5 volts to the module by either your power supply (if your supply provides this), or internally stepped down from your +15 volt supply as shown below. V-Gates is shipped with this jumper set to Internal (as shown). When changing this jumper or connecting / disconnecting your V-Gates, please remember to turn off your system's power first.

Specifications
Controls
Initial CV (analog) / Function Controls (digital)
External CV Amount
Mode Selector: Analog / Digital
Function: Binary, Step, Slope (analog) / Binary, Step, Random (digital)

Inputs
Reset (digital) / CV In (analog)
Clock In (digital)

Outputs
Clock Out (analog)
Step (Stage) outputs - x8; 0 to +5V

Indicators
Step (Stage) LEDs (Soft Blue) - x8

Frequency Response
DC to >400Hz – (At rates greater than about 60Hz, jitter is more apparent)

Power
+12V @5ma (21ma if Int +5 used), -12V @3ma, +5V @16ma (if used), 16 pin Euro standard.
Jumper selectable option: +5V source - Internal (from +12V) or External from host power supply.

Size
Width - 10 HP (Euro rack)
Depth - 33mm (1.25") behind panel. Skiff ready.