Via Controls and IO

You are encouraged to try just about any patch you can think of with Via. While the exact function of the controls, inputs, and outputs varies from module to module, a few things are always true:

The markings adjacent to each jack convey some useful information to guide patching:

- Inputs are outlined. Outputs have solid fill.
- Logic inputs and outputs are marked with sharp corners. The corners are rounded for CV/Audio IO.
- Exposed copper indicates the analog IO. White silkscreen indicates the IO that varies from module to module.
- Likewise with knobs, the manually set reference voltages for the analog circuit have grey caps while the knobs that interact with the programmable parts of the module have black caps.

The rest of the section lays out the key operating details for the following UI features:

Core Inputs

The A and B inputs follow an analog signal path through the module. Each input passes through a digitally controlled sample and hold/VCA circuit.

This allows a pair of digitally generated signals to be be injected into the linear VCA control inputs. In this fashion, the digital signal can scale the analog signal, or vice versa.

The inputs can accept voltages from -10V to 10V.

Core Controls

The B scale control sets an attenuverter on the B input. Noon is off. Fully counterclockwise, it is inverted. Fully clockwise, it passes at unity gain. With nothing plugged into the B input, the control to behaves as a reference voltage with a range of -5V to 5V.

The A normal control on the expander sets another -5V to 5V reference voltage with a dead zone at ground. Plugging a signal into the A input overrides A normal control. When the expander is disconnected, A is normally to 0V

Main Output

After processing, the analog inputs are mixed at the output. The output clips at -10V and 10V. The output impedance is 560 Ohms.

The relationship between the output and the inputs on a given module depends on how the main circuit is controlled, for more details check out this section on circuit control scheme.

Manual Controls

KNOB1, KNOB2, and KNOB3 provide manual controls with mappings that vary from module. The knobs are a quick way to explore the range of the module in a patch.

CV Inputs

Like the manual controls, the CV inputs are implemented in a different way on each module.

The input voltage range is -5V to 5V.

CV1 is scaled for V/oct response. It has a sampling rate of 3kHz and a precision of 12 bits, making it more suitable for CV than audio.

CV2 and CV3 sample at 50kHz with 16 bits of precision, making them suitable for audio or CV.

CV Attenuators

The CV2 and CV3 knobs always act as attenuators for signals connected to the CV2 and CV3 inputs. The exact effect of those inputs (and hence attenuating them) vary from module to module, but it helps to know that these knobs will have no effect unless a signal is patched into the corresponding input.

The two black knobs on the expander provide attenuation for the CV2 and CV3 inputs. Counterclockwise mutes the inputs, clockwise passes at unity gain. With no CV input, they have no effect.

From a hardware design perspective, the function of these knobs never changes, but from a user perspective, the perceived result will depend on a given module's implementation for that CV.

Logic Inputs

The main logic input and aux logic input detect the rising and falling transitions with a voltage threshold of about .7V, allowing for trigger, gate, clock, and step-style inputs. Square or pulse inputs give the most consistent results, but other clean, simple waveforms can be used as well. Complex waveforms will cross the logic threshold multiple times per cycle, yielding unpredictable results.

Pushbutton

The pushbutton on the expander is a simple switch, detecting press and release events. It usually provides a manual control for one of the logic inputs but is defined per-firmware.

Across all firmwares, holding this button down and pressing a touch sensor allows for storage and recall of presets.

Wildcard Output

The signal output ranges from -5.33V to 5.33V, and can be trimmed for V/Oct scaling. It has 12 bits of precision with frequency response down to DC. Typical sample rate is 50kHz with the possibility of oversampling (an experimental video oscillator samples at 1.6 mHz). The same bit-depth and sample rate specifications apply to the VCA control signals.

Logic Outputs

The logic outputs have two levels, high (~5V) or low (0V). Sometimes they are used as gate or trigger outputs, sometimes they are driven at audio rates to create a square/pulse wave output.

LED Display

The triangular RGB display and the 4 white LEDs in the jack field serve two purposes: they give visual feedback when setting parameter modes using the touch interface, and they display information about the state of the module.

The bicolor LED provides a visual representation of the main output. Green represents a positive voltage, red negative, and brightness the level relative to ground.

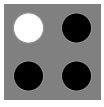
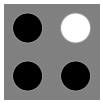
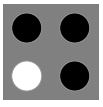
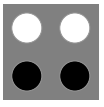
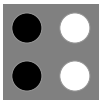
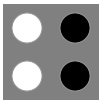
Expander

The vital functions of some modules are partitioned off onto the 8hp core unit, allowing you to break off a 4hp expander to free up that space in your system.

Touch

Each touch sensor is dedicated to a parameter. Tap a sensor to cycle to the next mode for that parameter. If a sensor is held for more than a second, the parameter does not change, allowing you to reference the current mode if you are unsure of its setting. The triangle blinks to indicate the one second timeout.

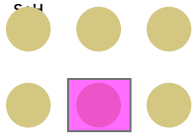
When selecting modes for a parameter, a clockwise pattern represent the numbers 1-8 on the white LEDs:

1.  2.  3.  4.  5.  6.  7.  8. 

On some firmwares, one or more of the buttons are loaded with an auxiliary parameter, indicated by a subscript on the button legend.

To access an auxiliary parameter, use the bottom middle sensor like a "shift" button. While

holding shift, tap a button to change its aux parameter and hold for more than second to display the current value.



A preset storage and recall system is activated by pressing and holding the pushbutton.

The preset system works like an old car stereo tuner. Each sensor functions as a preset storage slot and is associated with a color on the LED display.

With the pushbutton held, double tap a sensor to recall the associated preset. The preset hue is shown on the RGB led and a short animation plays on the white LEDs.

With the pushbutton held, press and hold a sensor to store the current state as the preset for that slot. As you hold, you will see the RGB led fade. Keep holding until it fades completely and an animation plays on the white LEDs. This indicates successful storage.