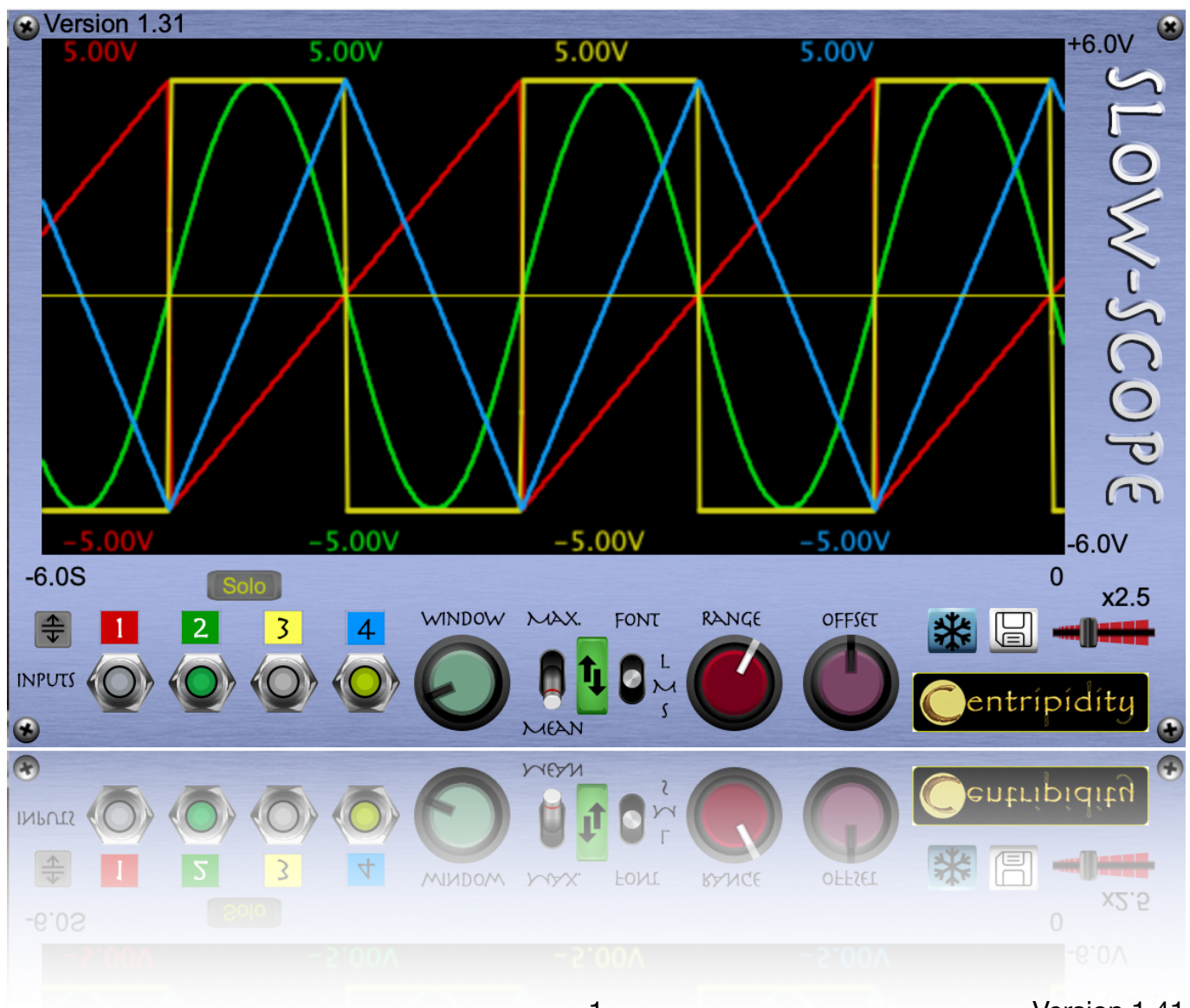


Centripidity

Slow-Scope



Introduction

This module is very much like a multi-trace oscilloscope but, as the name Slow-Scope implies, is designed to operate at much lower frequencies than the fixed, 48kHz internal sample-rate of Voltage Modular. It is hence more suited to view slowly changing values such as modulation control voltages rather than audio signals. It is especially well suited to display output from the Centripidity Complex LFO to allow visual tweaking of the wave shape.

It achieves this by processing incoming voltage, not as individual samples but, by averaging over a user specified time-window, variable between 1 - 100ms. Alternatively, it can display the maximum value occurring within that time window. This allows slower changing signals to be viewed in near-real time.

The module can display four separate signals, all on the same axes, and each in a different colour for easy identification. The range of voltages displayed, and voltage offset of the display's centre line voltage, can be modified with the Range and Offset knobs. Whatever the Offset, a fine yellow horizontal line will display the zero voltage level, unless the Range and Offset are set such that 0V does not lie within the display's vertical limits.

Note that these vertical limits can always be viewed as axes labels just to the right of the display's upper and lower right-hand corners.

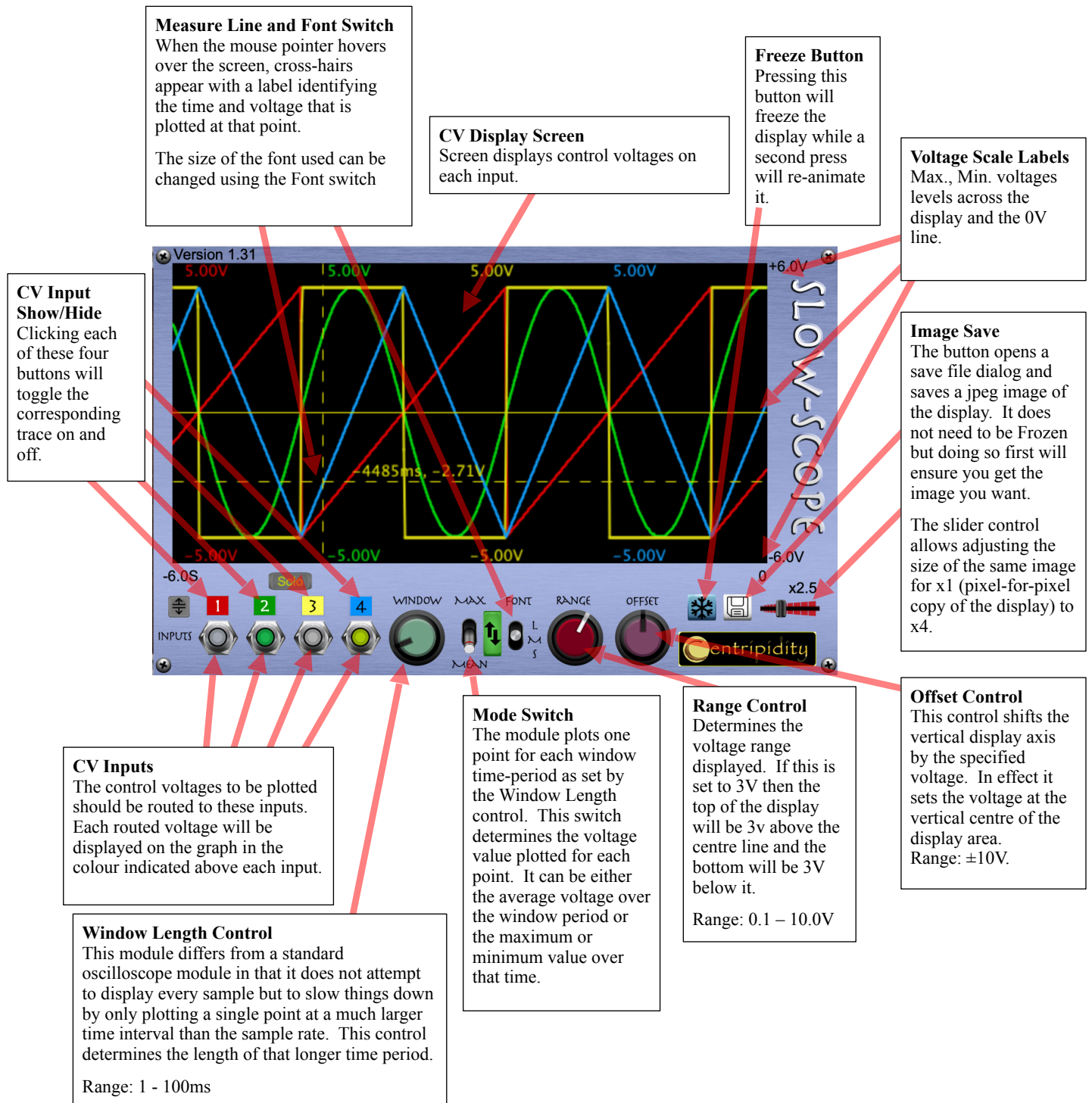
To allow closer measurement of a signal's voltage, hovering the mouse pointer over the screen will produce dashed horizontal (constant voltage) and vertical (constant time) lines annotated with the time and voltage represented at that level.

Notes

Be aware that, because each point on the graph represents all of the received data over the window period, this module has a correspondingly lower sampling frequency than Voltage Modular's internal sample rate. Even with the window set to its minimum value of 1ms, the input signals are effectively only sampled as 1 kHz.

This places limitations on the frequencies in the displayed signal that can be accurately represented. For example, with the window set at 25ms the effective sampling rate is only 40 Hz and so passing in a signal with any components above 20Hz will result in aliasing and an inaccurate image of the data.

The Interface



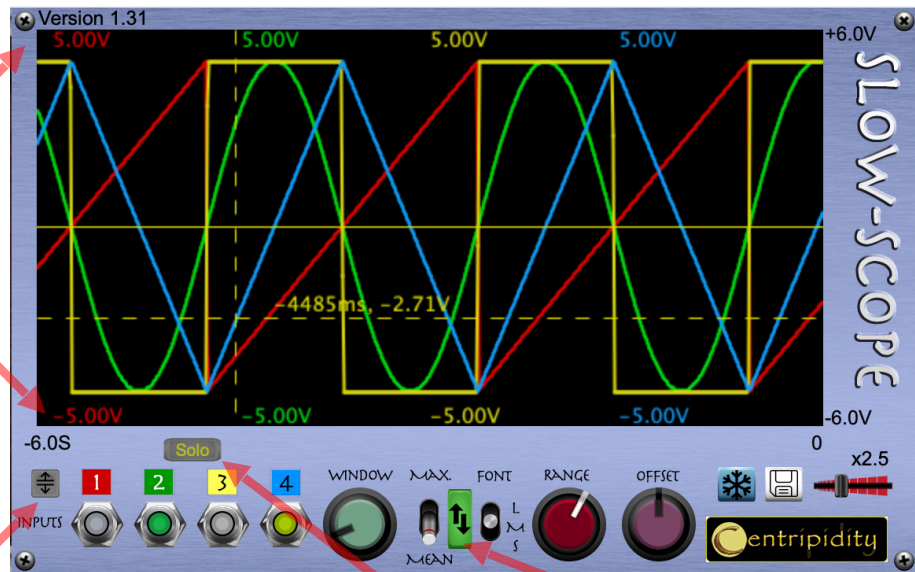
New Features in Version 1.3

Peak Values

When engaged, these areas show the maximum and minimum voltage levels received so far on each of the four traces.

To reset these values to zero simply click on any one and they will all reset.

The font size used in these displays will be the same as that selected for the measurement cross-hairs.



Display Split

To reduce clutter, this button toggles between overlaying all four traces on the same vertical axis or splitting the display into four distinct vertical regions.

The Range and Offset controls, described in the previous diagram, operate in both display modes.

The measurement cross-hairs also function in Split Display mode, albeit with reduced accuracy due to the greatly reduced vertical axis length.

Peak Level Button

This button turns the peak value display on and off.

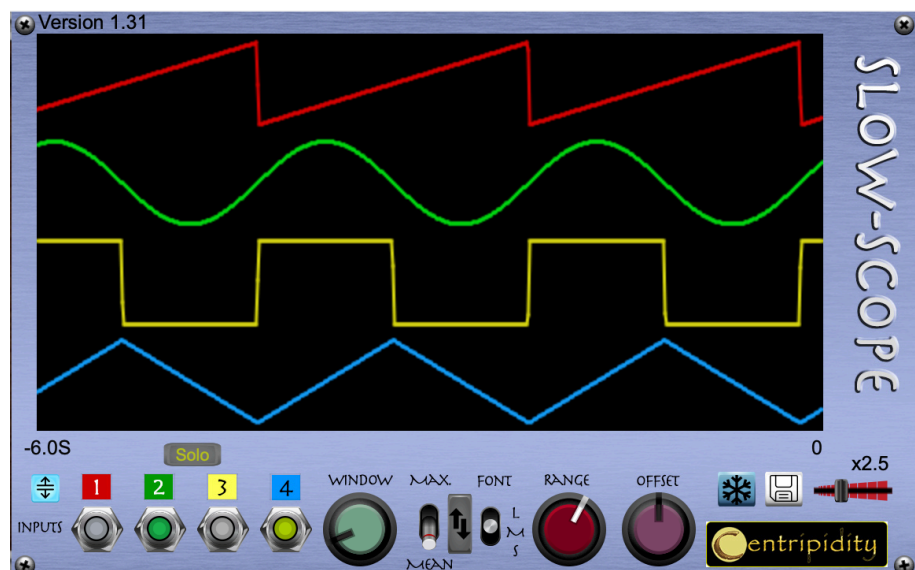
Solo Button

This button engages Solo mode. While in Solo mode the Show/Hide buttons become Solo display controls.

Selecting Solo mode will not immediately effect the display but subsequently clicking any of the Show/Hide buttons will turn the selected trace on and all others off, thus displaying only one signal at a time.

When Solo mode is disengaged the display will return to displaying whichever signals were showing before Solo mode was engaged.

Split Display Mode



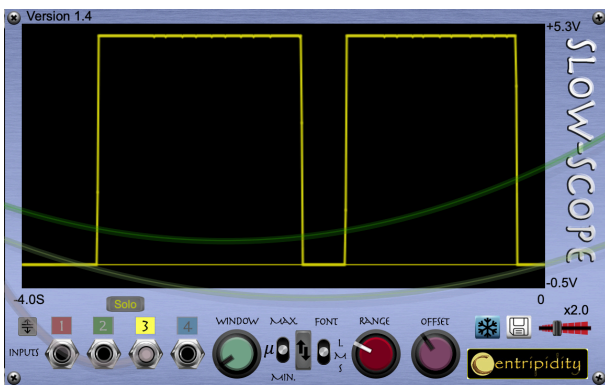
New Features in Version 1.4

This version has two significant changes. The first is a fix for a bug introduced in version 1.3. Under certain circumstances loading a preset would not correctly restore the states of the four trace on/off switches.

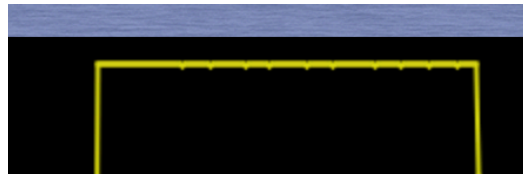
The second, and more significant change is the addition of an extra mode. The scope can now be set to display the minimum value within a window. In this context minimum means the smallest absolute value, the value closest to zero.

This can be handy when analysing a clock or gate signal that has a very wide pulse on phase but an off phase that is very short compared with the window time.

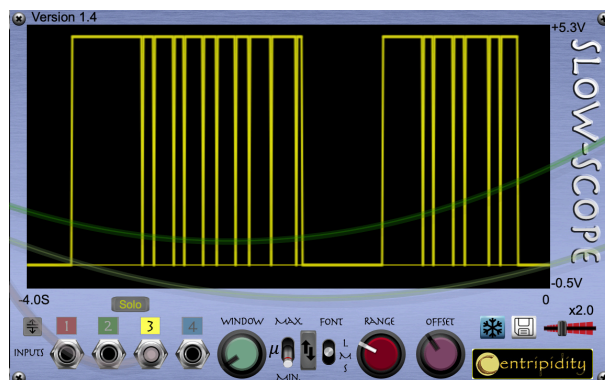
For example, consider a gate signal that has only one 0V sample between gate one states. The first diagram below shows what that might look like with the scope set to plot the mean value.



Superficially this looks like two gate pulses but if you look very carefully at the trace you can see a series of very slight dips. This is because it is, in fact, a larger series of gate pulses with an off time of only one sample. The Slow-Scope is set in Mean mode and so these occasional 0V values cause a small drop in the mean.



If the same type of signal is plotted in the new Min mode the trace will look like this.



New Features in Version 1.41

In previous versions the plot could be set to display either the minimum, mean or maximum values within the data window. This setting was global.

In this update that selection is now available on a per channel basis.

The global plot mode switch has been removed and replaced by four, small three-way switches, beneath each channel's input jack.

In the left most position the channel will display the absolute minimum value in the window; in the middle position the mean value across the window and, in the rightmost position, the maximum value in the window.

