cedargrove_range_slicer

A CircuitPython class for scaling a range of input values into indexed/quantized output values. Output slice hysteresis is used to provide dead-zone squelching.

Range_Slicer is a general-purpose analog value converter that compresses or expands an input value then quantizes it into a collection of precise output slice values. The class detects input value changes and applies selectable hysteresis when slice edge thresholds are reached to eliminate dead-zone issues. Applications include converting rotary knob position to MIDI control or note values, analog signal noise processing, as well as level detection and display.

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Implementation Notes

Hardware:

Software and Dependencies:

- Adafruit CircuitPython firmware for the supported boards: https://github.com/adafruit/circuitpython/releases

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class cedargrove_range_slicer.Slicer(*, *in_min=0, in_max=65535, out_min=0, out_max=65535, slice=1.0, hyst_factor=0.25, debug=False*)

Class representing the CedarGroveMaker Range_Slicer.

Parameters:	
	• **in_min** – The input range minimum. Can be any positive or negative value, smaller or larger than the input range maximum. Input range minimum and maximum values cannot be equal. Defaults to 0.
	• **in_max** – The input range maximum. Can be any positive or negative value, smaller or larger than the input range minimum. Input range minimum and maximum values cannot be equal. Defaults to 65535.
	• **out_min** – The output index minimum. Can be any positive or negative value, smaller or larger than the output index maximum. Output index minimum and maximum values cannot be equal. Defaults to 0.
	• **out_max** – The output index minimum. Can be any positive or negative value, smaller or larger than the output index maximum. Output index minimum and maximum values cannot be equal. Defaults to 65535.
	• **slice** – The size of an output index slice. Can be any positive or negative value other than zero. Defaults to 1.0.
	• **hyst_factor** – The size of the hysteresis threshold expressed as a factor of the slice size. Can be a positive value from 0 to 1.0. Defaults to 0.25 (25% of the slice size value).
	• **debug** – Turn on debug printout. Defaults to False.

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range_slicer(*input=0*)

Applies the slicer algorithm to an input value using the initialization parameters. Returns the output index value. This is the primary function of the Range_Slicer class.

Parameters:	**input** – The input value to convert. Can be any positive or negative numeric value. Defaults to 0.

range(*in_min=0, in_max=65535*)

Changes the default input range to new values.

Parameters:	**in_min** – The input range minimum. Can be any positive or negative value, smaller or larger than the input range maximum. Input range minimum and maximum values cannot be equal. Defaults to 0.
	in_max – The input range maximum. Can be any positive or negative value, smaller or larger than the input range minimum. Input range minimum and maximum values cannot be equal. Defaults to 65535.

index(*out_min=0, out_max=65535*)

Changes the default output index to new values.

Parameters:	**out_min** – The index output minimum. Can be any positive or negative value, smaller or larger than the output index maximum. Output index minimum and maximum values cannot be equal. Defaults to 0.
	out_max – The output index maximum. Can be any positive or negative value, smaller or larger than the output index minimum. Output index minimum and maximum values cannot be equal. Defaults to 65535.

slice(*size=1.0*)

Changes the default slice size to a new value.

Parameters:	**size** – The size of an index output slice. Can be any positive or negative value other than zero. Defaults to 1.0.

hysteresis(*hyst_factor=0.25*)

Changes the default hysteresis threshold to a new value.

Parameters:	**hyst_factor** – The size of the hysteresis threshold expressed as a factor of the slice size. Can be a positive value from 0 to 1.0. Defaults to 0.25 (25% of the slice size value).