cedargrove_ad5293

A CircuitPython driver for the AD5293 digital potentiometer.

The AD5293 Digital Potentiometer is an SPI, 10-bit, 100K-ohm device. The device operates with a digital logic power source of 2.7v to 5.5v and a dual analog power source of +/-9v to +/-16.5v. The potentiometer pins act similarly to a passive resistive potentiometer, but requires that voltages placed on any of the three pins not exceed the analog power supply voltage.

The CircuitPython driver supports a single SPI potentiometer device per instance. It does not work with daisy-chained devices.

The AD5293 requires a specific SPI configuration that may not work with other SPI devices. The SCK signal polarity must be set for a base state of 0 with a falling edge trigger. The internal `SPIDevice` settings are:

SPIDevice(spi, chip_sel, baudrate=1000000, polarity=0, phase=1)

where ***spi*** is the ***busio.SPI*** definition and ***chip_sel*** is the ***board*** chip select pin name. Baud rate settings above 1MHz are not recommended.

The Cedar Grove AD5293 custom breakout board provides power and signal connections for SPI and the potentiometer chip. The AD5293 is also used in the AD9833-based Cedar Grove Precision VCO Eurorack module.

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Implementation Notes

Hardware:

- Cedar Grove Studios AD5293 breakout or equivalent

Software and Dependencies:

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

class cedargrove_ad5293.AD5293(**, spi, select, wiper=0*)

Class representing the Cedar Grove AD5293, a 10-bit SPI digital linear taper potentiometer.

Parameters:

- **spi** – The board's ***busio.SPI*** definition. No default.
- **select –** The AD5293 chip select pin designation. No default.
- **wiper** – The initial wiper integer value ranging from 0 to 1023. Default is 0.

wiper

A class get/set property.

Parameters: Change or read the integer value of the potentiometer wiper position, ranging from 0 to 1023.

normalized_wiper

A class get/set property.

Parameters:	Change or read the normalized floating-point potentiometer wiper position, ranging from 0.0 to 1.0.

reset()

A class helper function.

Parameters:	Reset the potentiometer. Refresh the wiper position to mid-scale. Disable write-protect.

shutdown()

A class helper function.

Parameters:	Connects the ***W*** pin to the ***B*** pin and opens the ***A*** pin. The content of the wiper register is not changed.