SwitchDoc Labs

The **WeatherRack Weather Sensors** is a set of sensors designed to measure your local weather conditions. It is designed to be compatible with the SparkFun and ArgentData weather sensors and interface with either your own board, or the SwitchDoc Labs **WeatherPiArduino** board (available on SwitchDoc.com).

- Cup Anemometer
- Wind Vane
- Tipping Rain Bucket
- Mounting Hardware

Features and Benefits:

- Provides an excellent sensor suite to hookup a Raspberry Pi or Arduino
- Supports SwitchDoc Labs **WeatherPiArduino** Weather Station Interface Board
- Cup-Based Anemometer
- Tipping Rain Bucket Gauge
- Wind Vane
- RJ11 Plugs
- No Active Electronics
- Works with Raspberry Pi (3.3V) GPIO and Arduino (5.0V) GPIO
- Includes Mounting Hardware
- Software Available on SwitchDoc.com
- Low Cost
- Full Test Code Supplied
- Quantity Discounts Available
- Immediate Availability

Introduction

The SwitchDoc Labs WeatherRack Sensors provide a suite of weather sensors for use by Arduino and Raspberry Pi based small computers. It can also be used to connect with other computers and systems. It includes a Wind Vane, Anemometer and a tipping bucket Rain Gauge. Mounting hardware and a metal mast is also included. The included wires are terminated in RJ11 plugs. The WeatherRack is compatible with the SwitchDoc Labs WeatherPiArduino Weather Station Interface Board available on SwitchDoc.com.

The WeatherRack sensors contain no active electronics. The sensors use sealed magnetic reed switches and magnets to take readings. A voltage must be supplied to each sensor to take a reading.

Cup Anemometer Sensors

The Anemometer measures wind speed by closing a contact as a magnet moves past a switch. One contact closure a second indicates 1.492 MPH (2.4 km/h).

The Anemometer should be pulled high to 3.3V or 5V via a 10K Ohm pullup resistor. This is intended to connect to an interrupt input on the host computer.

The Anemometer switch is connected to the inner two conductors (pins 2 and 3) of the RJ11 cable shared by the Anemometer and Wind Vane. Note that most RJ11 cables only have 4 wires instead of the six allowed by the plug.
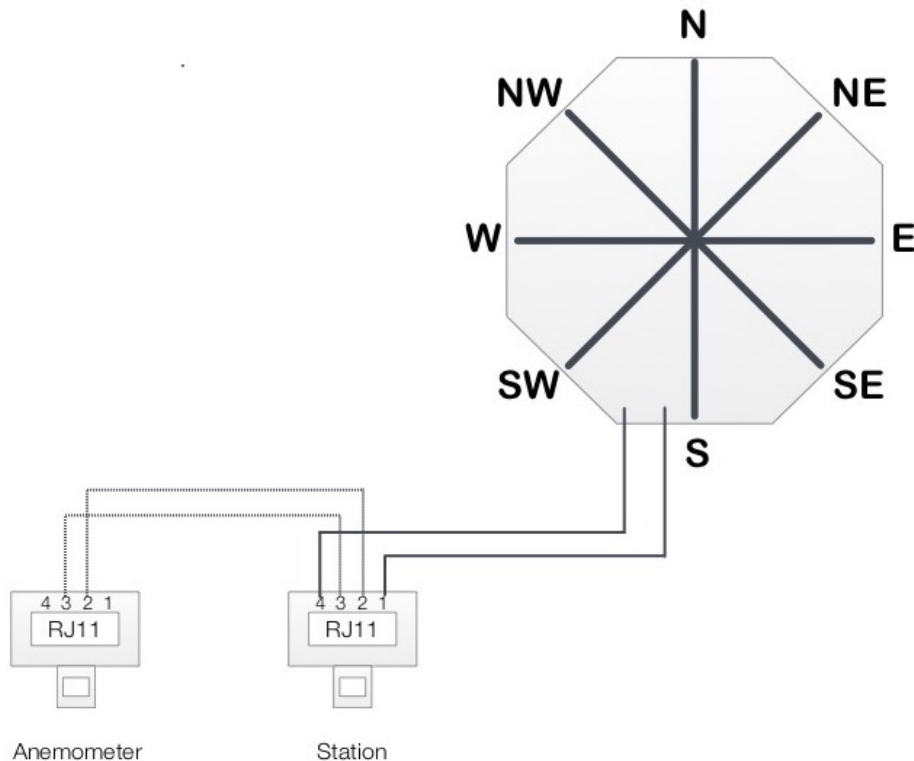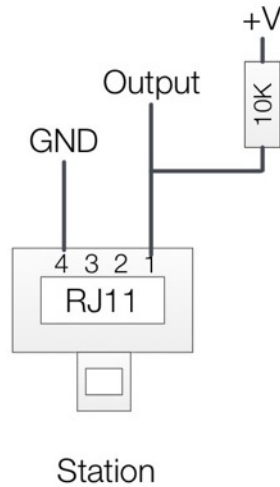
Wind Vane

The Wind vane has 8 switches, each connected to a different resistor. The WeatherRack measures the resistance value of the resistor by measuring the voltage on a resistor divider (with 10K Ohm onboard resistor). Typically, the Wind Vane will only report a total of 8 directions. It is possible to occasionally read 16 directions (when two contacts are closed at the same time), but this is a rare event. In all our testing at SwitchDoc Labs, we have never seen this case. The voltage values for each direction are shown in the table below.

Direction (Degrees)	Resistance (Ohms)	Voltage (V=3.3v, R = 10KOhms)
0	33K	2.53V
22.5	6.57K	1.31V
45	8.2K	1.49V
67.5	891	0.27V
90	1K	0.30V
112.5	688	0.21V
135	2.2K	0.59V
157.5	1.41K	0.41V
180	3.9K	0.92V
202.5	3.14K	0.79V
225	16K	2.03V
247.5	14.12K	1.93V
270	120K	3.05V
292.5	42.12K	2.67V
315	64.9K	2.86V
337.5	21.88K	2.26V

To use 5V as the pullup voltage, multiply the voltages by 5.0/3.3 (1.52).

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The output of the Wind Vane should be connected to a 10K pullup resistor as shown below.

Wind Vane Connection

Rain Bucket

The tipping bucket Rain Gauge used in the SwitchDoc Labs WeatherRack, makes one momentary contact closure that can be recorded with a micro computer interrupt input. Each contact closure of the standard unit indicates 0.011 inch (0.2794 mm). Tie the output of the Rain Bucket to a 10K Pullup resistor to interface it to a computer. The Rain Gauge is connected to Pin 2 and 3 of the RJ11 terminated cable.

Assembly

The Wind Sensor arm mounts on top of the metal mast (two pieces) and supports the Anemometer and the Wind Vane. Bolts, screws and nylon wire ties are supplied to hold the wires to the arm and mast. The Rain Gauge has it's own mounting arm that can be attached to the metal mast with bolts.

WeatherPiArduino Connections

WeatherPiArduino is an inexpensive weather station controller board designed to interface to Arduino and Raspberry Pi computers. It is an interface board developed by SwitchDoc Labs to allow the user to easily build a fully functioned Weather Station while allowing customization of functions.

WeatherPiArduino is derived from Project Curacao. Generation 1 of this board was deployed and tested on the island nation of Curacao before Generation 2 was released to production.

Combine the WeatherPiArduino with a SunAir or SunAirPlus board to create a solar powered weather station.

Additional code and examples on www.switchdoc.com