Moisture Sensor Block Validation

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Design Details

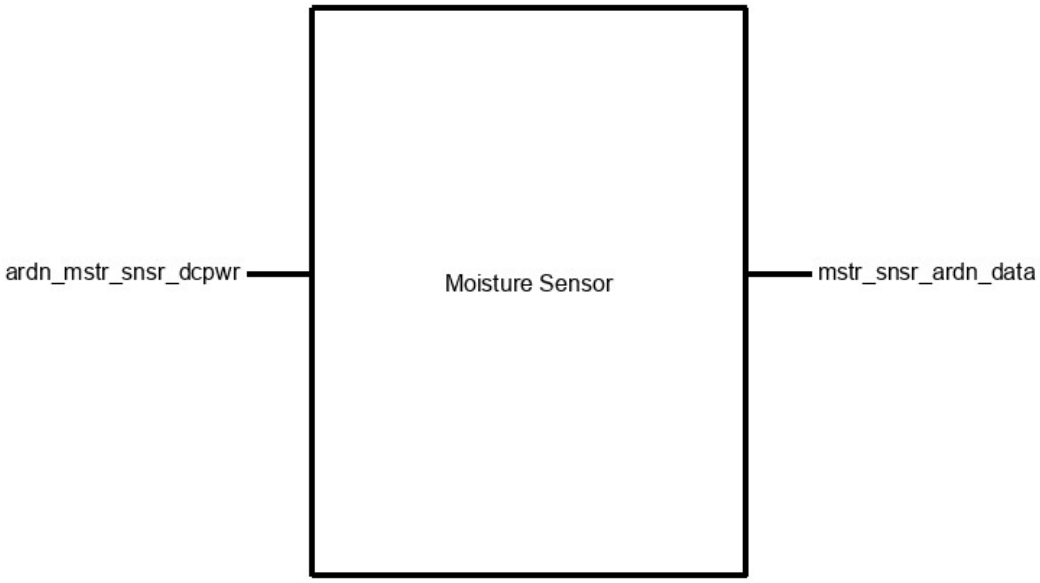

Figure 1: Black box for the Moisture Sensor Block

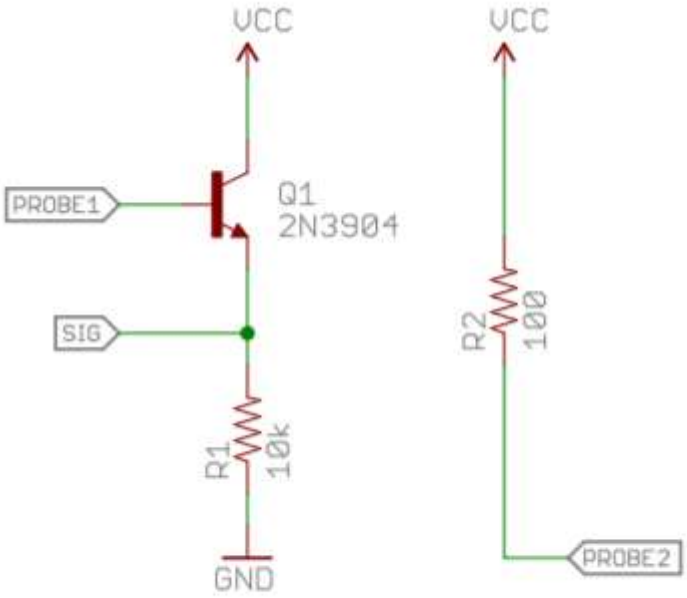

Figure 2: Schematic for the probe circuit section of the sensor

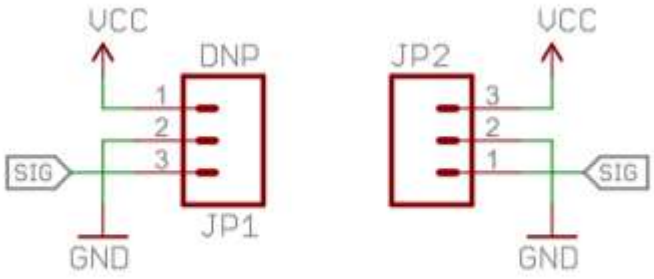

Figure 3: Schematic for the connectors

Design Validation Overview

This moisture sensor block represents a sensor module, specifically, a SparkFun Soil Moisture Sensor. One of the needs of the system is to be able to measure the volumetric water content of

the soil to determine whether the water content of the soil will affect the amount of electricity to pass through the plant material.

The sensor module has two large, exposed pads which function as probes for the sensor. Acting together, these probes act as a variable resistor. The more water that is in the soil, the better the conductivity between the pads will be, resulting in a lower resistance and a higher signal out. Vice versa, the less water in the soil would mean less conductivity, and a lower signal out.

Design Validation Interface Table

Interface Property	Why is this interface this value?	Why do you know that your design details for this block above meet or exceed each property?
ardn_mstr_snsr_dcpwr : Input		
Inominal: .5 mA (for 5 V)	This is what we expect the nominal current to be with an input of 5 V (standard Arduino voltage output)	This interface value is dependent on the input voltage, seeing as the resistor within the module is 10K Ω. Since the Arduino is generally 5V, the current throughout should be 0.5 mA
Vmax: 5 V	This is the highest voltage we expect the module to be capable of	This is the highest recommended voltage from the hook-up guide. The datasheet does not include a max; Sensor Data Sheet and Sensor hook-up guide
Vmin: 3.3 V	This is the lowest voltage we expect the module to be capable of	This is the lowest recommended voltage from the hook-up guide. The datasheet does not include a min; Sensor Data Sheet and Sensor hook-up guide
mstr_snsr_ardn_data : Output		
Datarate: 9.6 kHz	This is the frequency of the refresh rate	The Arduino baud rate is 9600 baud, which is the communication rate. 9600 baud is equivalent to 9.6 kHz
Messages: Analog value of volumetric water content	The module should send its readings to the arduino	Information only

References

https://www.sparkfun.com/products/13637

https://learn.sparkfun.com/tutorials/soil-moisture-sensor-hookup-guide

https://cdn.sparkfun.com/datasheets/Sensors/Biometric/SparkFun_Soil_Moisture_Sensor.pdf