



Using Soilwatch 10 soil moisture sensors with Vinduino R3 sensor stations

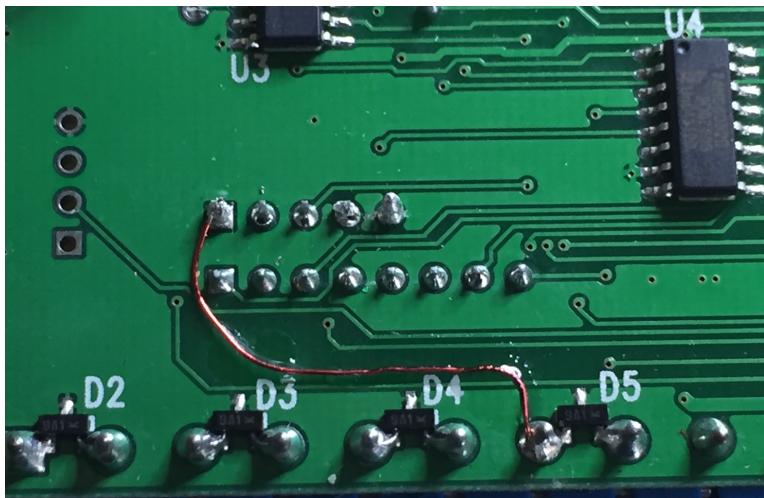


The Soilwatch 10 is a very affordable FDR (Frequency Domain Reflectometry) sensor, also called capacitive sensor, made by Pino-Tech. Measurement is done at 75 MHz, which is a good frequency for reducing soil type effects. According to the designer, the design is waterproof and can be buried in soil for extended period of time without affecting accuracy. It is available via the Tindie market place (www.tindie.com).

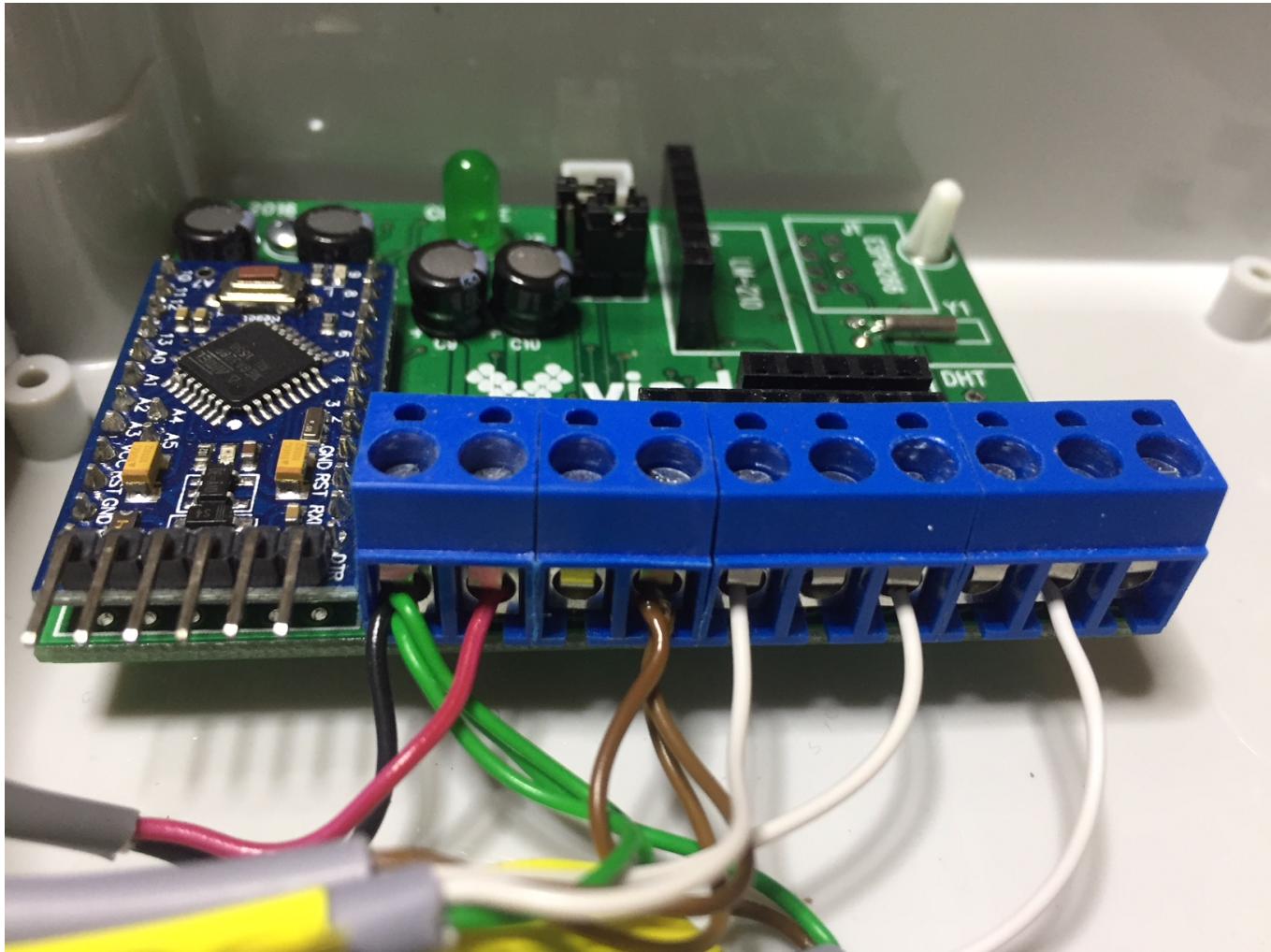
Although the Vinduino R3 sensor station was originally designed for resistive soil moisture sensors, measuring soil water tension, it can easily be adapted to support FDR sensors.



FDR sensors are active devices, and must have electrical power to work. Besides operating voltage and ground, there is an analog output wire that provides 0-3V according to the measured soil water volume. The Soilwatch 10 sensor can operate between 3.1 and 5 V, and has internal voltage regulation. For connection to the Vinduino station, we can connect the sensor supply voltage to the battery via a power switch. We do not need the sensor during sleep mode. To save battery power, a built-in power switch on the Vinduino station can apply power to the sensors only when we need to make measurements. In this blog article we describe how to connect three sensors, and how to re-assign one of the wire terminal blocks for connecting sensor power. To do this we add a wire connection from the Accessory connector, J13/pin 1, to the terminal block J4/pin7 (SENS_X4). That's all the change needed.



For 3 sensors, we can combine the green wires (ground) and brown (Vcc) together and connect them to the terminal block ground (J4/pin 10), and Vcc (J4/pin7). The sensor analog outputs can be connected to J4/pin2 (sensor 1), J4/pin4 (sensor 2), and J4/pin 6 (sensor 3). Although this article describes using 3 sensors, up to 6 FDR sensors can be connected to one Vinduino station.



Vinduino example code for using the Soilwatch 10 is now available on github:

<https://github.com/ReiniervdL/Vinduino>

Upload the Vinduino code for Soilwatch 10 before connecting the sensors and power the system.

With FDR sensors, the soil type influences the measurement, and you need to calibrate for 0% soil moisture. For 0% calibration, place the sensor in oven-dried soil. Find the ADC reading and map that as "0%" in the Vinduino code. For 100% reading fully immerse the sensor in water. By using the map function, we assume a linear calibration curve.