Summary Description: Arduino Indoor Garden Box with Data Logger

Tags: electronics; software; nature projects; Arduino Uno; data logger shield; real time clock; relay; water pump; DC motor fan;

Why I did this: One of my passions is with nature related automation (because I like growing food plants and I love the idea of them being cared for through automation). Normally I can achieve this with minimal equipment (like a bubbler alone), but I have an Arduino, lots of sensors, and data logger shield;, and, as an engineer, I figured this would be a perfect project for test all of this equipment.

(summary pic of system)

Design Walkthrough:

Parts: Arduino microcontroller (Uno); data logger shield; real time clock; 2 relays; low voltage water pump; low voltage DC motor fan; water level sensor; photoresistor; temperature resistor; 1602 LCD display; BME280

The main two goals of this Arduino project are to make a system that controls relays and sensors, and, to do data logging of said sensors.

Basically, I installed the data logger shield (which includes a built-in real-time clock and requires an SD card and watch battery) on top of the Arduino Uno. I then wired the fan, pump, LCD, and sensors to the appropriate digital and analog ports on the Arduino. I uploaded some basic Arduino code used for: turning on the relay controls for the fan and pumps, capturing sensor data through the LCD, and recording the data on the SD card.

(pics of system)

Lessons Learned and Future Changes:

Bird’s nest on a wire. If I were to professionally build this I would tie down the bundle of wires better and place the system in an electronics compartment/box.

Data Logger for Uno only. I had a heck of a time trying to get this logger to work with an Arduino Mega but turns out that it just wasn’t natively compatible to work with (at least not that I knew of), it seemed to only work with the Uno model.

9V batteries are handy. I only have the water pump and wind fan on for like a minute at a time, so this we acceptable to be powered by a 9V battery (the motor could handle it, and the drainage from the battery at set intervals was minor).

Works pretty decently, but unnecessary for me. As mentioned before, I don’t need this system for my garden boxes (they are fine with just the bubblers), I just wanted to test this project just to get the experience from trying out the data logger and sensors. They work pretty well.

References:

Data Logger and RTC tutorial: https://learn.adafruit.com/adafruit-data-logger-shield/using-the-real-time-clock

Photoresistor and temperature resistor tutorial: https://github.com/adafruit/Light-and-Temp-logger/blob/master/lighttemplogger.ino

BME280 Temperature, humidity, and barometric pressure sensor tutorial: https://lastminuteengineers.com/bme280-arduino-tutorial/

Soil capacitive moisture sensor tutorial: https://how2electronics.com/interface-capacitive-soil-moisture-sensor-arduino/

Liquid level sensor tutorial: https://lastminuteengineers.com/water-level-sensor-arduino-tutorial/