### Abstract

Typical residential air conditioner coils accumulate water condensate and drain this condensate from the house. Collecting and repurposing this water elsewhere in the house reduces the human footprint on the environment. A condensate collection system has been designed to quantify the amount of condensate that can be collected from such a residential AC system. The system includes an Arduino Yun microcomputer, that collects data from a Temperature and Humidity sensor and a Reed Switch with a magnet on the tipping bucket.

### Background

Over the past year, colleague Bryan Danley has conducted much research with his Residential Condensate collection system. In his project, an Arduino Mega 2560 was used alongside a photogate, consisting of a LED and a photoresistor, to measure the amount of tips by the tipping bucket apparatus within the t-fitting of the collection system. Through calibration of the amount of water required to cause a tip, the total volume of water collected across the coils within the AC system can be calculated. This data is helpful to understanding the amount of water potentially lost across the coils.

### Introduction

Condensate that drips from the coils will be sent through a tipping bucket gauge into a storage tub and periodically pumped through drip tubing for irrigation in the yard. The gauge collects inflowing water, tipping upon filling to a certain consistent, level. To count the number of tips, an Arduino monitors a reed switch with a pull up resistor whose voltage will alter when the magnetic field between the reed switch and the magnet is induced. The water leaving the gauge drains into a tub, which then is pumped out by a sump controlled by a series of float switches. The water pumped out can be piped back to the environment or potentially to the household. The flow gauge tipping bucket measures the amount of water collected per tip.

### Progress of Project

Current modifications to the existing condensate collection system have included programming and wiring a new microcontroller data collection system that consists of an Arduino Yun, magnetic reed switch, and DHT11 temperature and humidity sensor. The tipping bucket mechanism that is used for measuring the amount of condensate has also undergone changes in order to house the reed switch within the bucket. Additionally, progress thus far consists of a preliminary design of a protective housing unit for the Arduino microcontroller that will be used to allow for a longer life cycle under the moist conditions.

### Photos of Specific Hardware

- [DS3231 Real Time Clock Module](image)
- [DHT11 Temperature and Humidity Sensor](image)
- [Arduino Yun Front Face](image)
- [Arduino Yun Rear Face](image)

### Arduino

The Arduino Yun is a new and improved microcomputer than consists of both an ATmega32u4 and the Atheros AR9331. The board has a built-in Ethernet and Wifi Support. Within these data exportation devices, the information collected from the temperature and humidity sensors as well as the number of tips by the tipping bucket apparatus. The board also has a micro SD port for storage of data as well. The complete program is being developed to the data. Also, a clock timer is being added to the system in order to give year, month, day and time to the data collected. The tipping bucket apparatus that will be implemented into the data collection system has been modified in order to house the reed switch that counts the number of times the bucket tips back and forth. This design is an integral part of the entire system, and the only measuring device that will calculate the amount of condensate being collected. Experimental testing will provide an approximation for the volume of condensate that each tip of the bucket will contain. Using this data along with counting the number of times the reed switch closes the circuit will produce the values for the amount of condensate that is collected.

### Tipping Bucket

The tipping bucket that will be implemented into the data collection system has been modified in order to house the reed switch that counts the number of times the bucket tips back and forth. This design is an integral part of the entire system, and the only measuring device that will calculate the amount of condensate being collected. Experimental testing will provide an approximation for the volume of condensate that each tip of the bucket will contain. Using this data along with counting the number of times the reed switch closes the circuit will produce the values for the amount of condensate that is collected.

### References


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