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ECE 411

Group 12 Test Plans

11/26/18

Test Plan of Plant Watering System

PART 1: Initial Power Setup

1. Before Power is provided to the board for the first time a visual inspection should be performed by a at least one person whom is not the assembler.
- 2. Power module test:**
 - a. Power cable connection test
 - b. Voltage regulator test
- 3. Power up test:**
 - a. Current level test
 - b. Voltage level check
 - c. Leakage check: Check movement of current between two conductors that are not connected.
 - d. Opens Test: Check to make sure there is current flow from one "node" to the next for every net on the board, again by measuring the amount of resistance of the conductor.
 - e. Shorts Test: Check to make sure that NO current flows between separate nets by measuring the amount resistance between them.

PART 2: System test

The test session of the system includes two parts:

1. Single component test:

- a. Check the type and the specification model of the sensor and actuator
- b. Test the functionality of the sensor and actuator

2. System test:

- a. Design Validation: PCB Layout validation and code verification.
- b. Manufacturing test: Detect the manufacturing defects.
- c. Function test: Follow the block diagram of the system to make sure each part of the system can work correctly.

PART 2 - 1 - 1: Moisture sensor test (FINISHED)

- A. Structure of the sensor:** Moisture sensor is testing the resistance across two probes, the moisture level of the soil is represented as the voltage value.
- B. Test Method:** Plug the probes into the different soil samples(each soil sample got different level moisture), measure the returned voltage level.
- C. Results:** By increasing the moisture level of the sample soil, the measured maximum voltage level is about 4.3V(Under 5V power supply voltage). The minimum voltage level is about 2V.

PART 2 - 1 - 2: Actuator Test (FINISHED)

The actuator of the automated watering system is a water valve. The I/O pin of the processor control the ON and OFF of the actuator. When the moisture level lower than the threshold value,

the system will turn on the valve. In other words, the goal of the test is to make sure that the actuator is capable for multiple ON/OFF in a short time period.

A. Test Method: Connect the valve to the output pin of the circuit, run the “Blink” file on the circuit.

B. Results: Run the program for 2 minutes, the system will keep turning ON/OFF of the valve, the valve worked correctly.

PART 2 - 2 - 1: PCB Validation

A. Parts completion check:

- a. All major components included?
 - i. Processor
 - ii. Power supply (Voltage regulator)
 - iii. Moisture sensor
 - iv. The actuator (Valve)
- b. All support components included?
 - i. USB connection port
 - ii. Power connection port
 - iii. Reset switch
- c. All the surface mount circuit component included?

B. PCB footprint check

C. Parts placement test

PART 2 - 2 - 2: Function Test

A. Debug the code to make sure the code can successfully flash into the processor.

- B. After the program is flashed to the processor via USB, a test run should be performed.

PART 2 - 2 - 3: Manufacturing Test

- A. Follow the schematic and assemble the circuit on each board.
- B. Follow the test method in PART 2 - 2 - 2 to test all the prototypes.