Product Test Plan (PTP)

Autonomous Coffee Machine

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Revision 2 Date:
Revision 3 Date:

1. Information Required for Execution

A. Purpose

The purpose of this test protocol is to verify the full and complete operation of Scott's Autonomous Coffee Machine.

B. Scope

This test protocol should be executed to verify that each feature and function performs within specification lined out in the engineering requirement document. In addition, other necessary specifications shall be tested such as specific and necessary user, installation, and power requirements.

C. Responsibilities

It is the responsibility of the assigned test engineer to execute all tests included herein to the best of their ability.

D. References

https://www.sciencebuddies.org/science-fair-projects/references/how-to-use-a-multimeter

E. Definitions

Digital Multi-meter: An instrument designed to measure electric current, voltage, and resistance.

Router: A device that routes and forwards data packets to the appropriate hosts of a computer network.

Port Forwarding: Mapping a port on a default gateway router to an IP address within the local area network.

F. **Equipment/Supplies**

1) Digital Multi-meter

2) Assembled Machine

3) Power Supply & Access to wall outlet

4) Router with Port Forwarding Capabilities

5) Device with web browser to test the user interface

G. **Precautions & Warnings**

- High Voltage and Current around power source and outlet

- Exposed moving parts

- Pot warmer will be very hot

2. Testing Features & Functions

2.1 Equipment Required

- Assembled Machine

- Device with access to a web browser

2.2 Input

Input will be user selected brewing parameters selected via the products webpage.

2.3 Output

Output will include everything required to brew the amount of coffee the user wants brewed. Initially sensors will be checked to make sure the brew is possible. Then grounds will be added to the first available filter. Then water will be added to the reservoir. Then the brew will start. The pot burner will remain warm for an hour after the brew finishes.

2.4 Test Description

Test Engineer will need to run multiple tests for when a brew is possible and all the cases for when a brew is not possible. (Such as not enough grounds, not enough water,

no available filter, coffee pot busy, as well as all the different pot sizes including 2-12

cups in 2 cup intervals.) This document only outlines how to test the cases when a brew

is possible, but the Test Engineer should verify that the user is notified of the proper

message when a brew is not possible.

Test Engineer will (1) open up the product webpage and navigate to the brew page.

Once there select the brew parameters you are testing for and press the start brew

button. (2) Ensure the sensors read an appropriate value for the coffee ground reservoir,

water reservoir, coffee pot, and the sensor checking for a clean filter. (3) Ensure the

carousel spins the appropriate amount checking for clean filters, and placing the filter

below the water spigot. (4) Ensure the amount of water and coffee added from the

reservoirs corresponds to the amount of coffee selected by the user. (5) Ensure the pot

burner remains warm for an hour after the brew finishes.

2.5 Tests Results

Test	Pass/Fail	Notes
(1) User interface works - Webpage running and sending form data correctly to server	__ Sending Proper Data to Server __ User interface is easy to use	
(2) Sensors working - Resource availability sensors reading appropraite values	__ Ground reservoir sensor __ Water reservoir sensor __ Available filter sensor __ Coffee pot sensor	
(3) Carousel working - Spinning the correct amount and checking for	__ Carousel spins 360 degrees or until a clean filter is found __ Carousel places filter directly	

available sensor and preparing for brew	under the water spigot	
(4) Resources added correctly - Correct amount of coffee and water is added based on user input	__ Amount of coffee added correct __ Amount of water added correct	
(5) Coffee remains hot after brew	__ Pot burner remains on 1 hour after brew finishes	

2.6 Test Analysis/Results

Not applicable at this time.

3. Testing Power Source

3.1 Equipment Required

- Digital Multi-meter

3.2 Input

120 V 60hz power from a household outlet.

3.3 Output

Different voltage rails necessary to power all the peripherals on the machine.

- 120 V AC rail to power the machine's burner

- 12 V DC rail to power solenoid valves

- 5 V DC rail to power motor and raspberry pi

3.4 Test Description

Test Engineer will (1) measure the voltage across the 120 V AC rail to ensure the

coffee machine is getting the appropriate voltage. (2) Then the Engineer will test the 12

Volt rail to ensure the transformer is operating as it is supposed to. (3) Test the 5 Volt rail to ensure the voltage regulator is working as it is supposed to. (4) Connect raspberry pi and make sure it is getting power whenever connected.

3.5 Test Results

Test	Pass/Fail	Notes
(1) 120 Volt AC rail is functioning and enclosed	_ 120 V AC on rail _ No exposed wire(s)	
(2) 12 Volt DC rails is functioning and enclosed	_ 12 V DC on rail _ No exposed wire(s)	
(3) 5 Volt DC rail is functioning and enclosed	_ 5 V AC on rail _ No exposed wire(s)	
(4) Raspberry Pi is being powered properly and functioning	_ Raspberry Pi has power _ Raspberry Pi functioning properly	

3.6 Test Analysis/Results

Not applicable at this time.