Homework 7: Chronograph: System Test Plan Rev 0

ECE 411 - Fall 2019 - 12/6/19

Team 5: Sean Schorzman, Jaeyoon Lee, Jianyu Hao, Kelly Makinster

1.0 INTRODUCTION

1.1. This Document
1.2. Conduct of the System Tests
1.3. Recording of Results, Witnessing, and Authorities
2.0 REFERENCE DOCUMENTS
2.1 Industry Standards
2.2 Design Documentation
- Chronograph System Specifications rev. 1
- Chronograph Block Level Diagram rev. 0
- Chronograph Schematic rev. 5

2.3 Other
- Chronograph platform
- Ballistic testing tube

3.0 Chronograph Overview
3.1. Operational Description
3.2. Definition of Terminology
3.3. Display Methods
3.4. Computational Methods
- Distance over time (in FPS)

4.0 Pretest Preparation
4.1 Test Equipment
- Various Nerf Guns (different known velocities)
- Arduino IDE
- Testing tube (IR sensors attached)

4.2 Test Setup and Calibration
5.0 System Tests
5.1. Functional Checks
5.1.1. Power Switch/Port and indicator Chronograph Schematic, rev. 5
- Turn on power supply, green LED turns on
- LCD backlight is on

5.1.2. Power supply voltage and current levels
5.1.2.1. Voltage regulator ~5V, ~1A
5.1.3. IR-SENSOR TEST Block Diagram, rev 0, PDS, rev. 1, Code rev 3
5.1.3.1. Initialization (Ready)
5.1.3.2. Signal strength check
5.1.4. RESET-TEST Chronograph Schematic, rev. 5
5.1.4.1. Sensor Calibration

6.0 Speed Range and Accuracy
7.0 LCD Display Visibility
8.0 24-Hour Stability
9.0 Environmental Testing

Chronograph: Test cases

Test Writer: Team 5						
Test Case Name:	**IR Sensors Test**		**Test ID:**	IR-SENSOR TEST		
Reference Doc.	**Block Diagram, rev 0 ; PDS, rev. 1, Code rev. 3**					
Description:	Tests the IR Pair sensors to ensure that they are triggering when acceptable. Lower analog value means detection.		**Type**	Black Box		
Tester Information:						
Name of Tester			**Date:**			
Hardware Ver:	**1.0**		**Time:**			
Setup:	Make sure that the system is started from an *off* state Upload Arduino code to read analog values of IR sensors					
step	**Action**	**Expected Result**	**Pass**	**Fail**	**N/A**	**Comments**
1	**Nothing**	Displays equilibrium analog values of sensors				
2	**Block IR Pair 1**	Displays lower analog value of IR pair 1				
3	**Unblock IR Pair 1**	Returns to equilibrium analog value of IR pair 1				
4	**Block IR Pair 2**	Displays lower analog value of IR pair 2				
5	**Unblock IR Pair 2**	Returns to equilibrium analog value of IR pair 2				
Overall Test Results:						

Test Writer: Team 5						
Test Case Name:	**Reset Test**		**Test ID:**	RESET-TEST		
Reference Doc.	**Chronograph Schematic, rev. 5**					
Description:	In case of unusual recordings and/or sensor malfunction, on-board Reset button recalibrates the sensors		**Type**	Black Box		
Tester Information:						
Name of Tester			**Date:**			
Hardware Ver:	**1.0**		**Time:**			
Setup:	Make sure that the system is started from an *off* state					
step	**Action**	**Expected Result**	**Pass**	**Fail**	**N/A**	**Comments**
1	**Nothing**	Device starts in ready state Display says: “Ready”				
2	**Cross sensor 1**	Device moves to waiting state Display says: “Started…”				
3	**Nothing (for .5 sec)**	Device times out Displays says: “Error”				
4	**Reset**	Reset BTTN is pushed Display says: “Ready”				
Overall Test Results:						