Bluetooth Data Acquisition System

Test Plan

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Pages:

Test Plan

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1. Introduction

The purpose of this product test plan is to document how the product will be tested to ensure reliable functionality and meet the engineering requirements specified in the product design specification document.

In the scope of our project. This document addresses the proper testing procedure and verification needed to the design of the BluDAQ communication product. This document contains test plan includes test cases for the hardware, firmware, and mobile application software.

2. Relevant Specifications and Requirements

- 2.1. The system should be able to detect motion within 6 m from the device.
- 2.2. The device must be interfaceable.
- 2.3. The system should be able to detect temperature in the range of -40 to 85 oC.
- 2.4. The system should be able to detect humidity in the range of 0 to 100% relative humidity.
- 2.5. The system should be able to detect pressure in the range of 300 to 1100 hPa.
- 2.6. The system should be able to detect light in the range of 400 to 500nm wavelength.
- 2.7. The system must be able to operate wirelessly with the use of a battery.
  - 2.7.1. The battery should be rechargeable.
  - 2.7.2. If the battery is not rechargeable it should be a commonly available battery type (AA, AAA, 9v, etc.).

3. Recording of Results

For the purpose of the practicum project all test result documentation will be noted in the individual test descriptions under Pass, Fail, N/A, and Comments. If further space is required, the person conducting the test can use an additional page with clear comments indicating which test and what step the specific comment is referring to.

4. Design Documentation

If needed, please refer to the following design documentation for more information.

BluDAQ practicum project Github page: https://github.com/ssalin/Practicum
BluDAQ Eagle schematic file:
https://github.com/ssalin/Practicum/blob/Master/Hardware/schematics/BlueDaq_V1.0.sch

BluDAQ Eagle PCB layout file:
https://github.com/ssalin/Practicum/blob/Master/Hardware/schematics/BlueDaq_V1.0.brd

5. Reference Design Documentation

Requirements Specification:
https://github.com/ssalin/Practicum/wiki/Requirements-Specification
SparkFun Power Cell - LiPo Charger/Booster: https://www.sparkfun.com/products/11231
Relevant Data Sheets:
https://github.com/ssalin/Practicum/tree/Master/Hardware/Data%20Sheets

6. Objective Overview

The objective of these tests is to do a parametric test to verify power parameters such as input voltages from USB and LiPo battery. Additionally, functional testing will also occur to test for the various functionality of the overall system such as Bluetooth connectivity and sensor capabilities along with firmware testing.

7. Required Resources

- 7.1. At least one assembled BluDAQ PCB (more for concurrent testing) with battery and charger
- 7.2. Personnel Training and Expertise
  - 7.2.1. Ability to use digital multimeter
  - 7.2.2. Create test scripts
  - 7.2.3. Understand schematics and PCB layouts
- 7.3. Equipment
  - 7.3.1. Digital multimeter
  - 7.3.2. Eagle CAD
  - 7.3.3. Thermometer
  - 7.3.4. Barometer
  - 7.3.5. Humidity sensor
- 7.4. Environment
  - 7.4.1. Temperature testing
    - 7.4.1.1. 4 °C and 21 °C (room temperature)
  - 7.4.2. Humidity and pressure testing will test against the current humidity and pressure for when the test is occurring

8. Test Cases

- 8.1. Power Testing
  - 8.1.1. Power with 9v battery

8.1.2. Power directly with Micro USB
8.1.3. Power directly LiPo battery
8.1.4. Recharge LiPo battery and power system
8.1.5. Battery Lifetime?
8.2. Bluetooth Connectivity
8.2.1. Detect Bluetooth signal from BluDAQ by device
8.2.2. Establish connection between BluDAQ and app
8.3. App Testing
8.3.1. Verify authentication with BluDAQ
8.3.2. Display environmental sensor outputs
8.3.2.1. Temperature
8.3.2.2. Pressure
8.3.2.3. Humidity
8.3.2.4. Light
8.3.2.5. Motion
8.3.3. Disable to connection with BlueDAQ
8.4. Functional Testing
8.4.1. Temperature sensor
8.4.2. Pressure sensor
8.4.3. Humidity sensor
8.4.4. Light sensor
8.4.5. Motion sensor
8.5. Firmware Testing
8.5.1. EEPROM functionality
8.5.2. Automation and authenticate struct updates
8.5.3. Host Authentication

9. Test Case Descriptions

Test Writer: Sam Salin						
Test Case Name:	Power Supply Test				**Test ID#:**	Blu-PWR-01
Description:	the power supplies need to be thoroughly and completely before they are connected to the rest of the board in order to ensure that the rest of the chipset does not catch fire, explode, or otherwise die from being exposed to incorrect voltage.				**Type:**	White Box
Test Information						
Name of Tester:					**Date:**	
Hardware Ver:	BlueDAQ Version 3				**Time:**	
Setup: Board should be assembled entirely except for the jumper resistors that connect the power supply to the VCC rails.						
Step	**Action**	**Expected Result**	**Pass**	**Fail**	**N / A**	**Comments**
1	Make sure Vcc is 5v when running off USB. test both with and without LiPo connected	Vcc should be 5v				
2	Make sure Vcc is 5v when running off LiPo, disconnected from usb	Vcc should be 5v				
3	Make sure Vcc is 5v when powered by 9v battery	Vcc should be 5v				

Test Writer: Jelon Anderson						
Test Case Name:	Overall Firmware			**Test ID#:**	Blu-FWR-01	
Description:	Functional testing of system firmware. Test serial communication with target device. Utilize MCU EEPROM to authenticate access and automation to load and update system flags to control relays.			**Type:**	White Box	
Test Information						
Name of Tester:				**Date:**		
Firmware Ver:	Rev 1			**Time:**		
Setup: Using Arduino nano and serial window to verify test results.						
Step	**Action**	**Expected Result**	**Pass**	**Fail**	**N/A**	**Comments**
1	Verify Host Authentication. By providing valid and invalid hosts.	Program should grant access if authentication host key matches.				
2	Verify load and update automation from EEPROM. Check status after EEPROM execution	Program should be able to read and write from static EEPROM address. Elements will be parsed out to set up INTC oscillation				
3	INTC Detection. Verify interrupt occurs and change program flag for loop execution.	Main loop execute when global run flag is set to true.				
4	Test communication with BME chip via I^2C bus	The program should be able to read temp, pressure, humidity values. These values should be the same as the environment within the device's accuracy tolerance.				