TEST PLAN
CLICK SENSOR HUB

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The rising STAR *of Texas*

Test Plan Revision History:

Version	Revision Date	Description	Author
0.1	11/21/2018	Filled out document with initial testing schedule	Alfonso de la Morena

Contents

1 Overview

The Click Sensor Hub Project will design a PCB that allows connection between the FRDM-KL46Z and four MikroBUS standard sockets. Having access to MikroBUS sockets allows users of the FRDM-KL46Z to gain access to over 250 Click sensors that can be used in a myriad of development projects.

2 Features to be tested/not to be tested

2.1 Features to be tested

The following are the major functionalities of the application that need to be tested in the testing process:

2.1.1 MikroBUS Standard Interface Connections

- Any mikroBUS socket on the PCB should be able to handle any of the 5 interface connections (PWM, SPI, IIC, UART and Analog).

2.1.2 PCB Sockets

- A Click should work on any of the 4 sockets on the PCB and perform the same function.
- Any mikroBUS socket on the PCB should be able to work with either 5V or 3.3V.

2.1.3 Software

- The software should reliable utilize the information received by the Click sensors without crashing or freezing.
- The software should handle up to 4 simultaneous clicks being connected at once.

2.1.4 Software (Stretch)

- The website should work on 4 most popular modern browsers (Chrome, Firefox, IE and Safari).
- The data should be updated automatically and reliably.

2.2 Features not to be tested

2.2.1 Click Sensors

- Off the shelf component.

2.2.2 FRDM-KL46Z

- Off the shelf component.

3. Testing Approach

MikroBUS Standard Interface Connections *2.1.1*	
Approach	Using the ICs that will eventually be placed on the PCB, each of the 5 interfaces will be tested in order to make sure the data is accurately transmitted from input to output. Each of the 5 interface connections will be tested, individually, on a breadboard and then verified with the FRDM-KL46Z.
Pass/Fail Criteria	If the design we have selected fails to transmit signals from any of the 5 interface points, we will consider this test a failure.
Verification Method	The same signals will be sent into the FRDM-KL46Z interface pins and we will expect to see an equal reading.

PCB Sockets *2.1.2*	
Approach	Once the design has been tested and PCB has been ordered, we will test each of the sockets on the PCB with all 5 interface modes in the MikroBUS standard. Additionally, we will test each socket for functionality in both voltage channels (3.3V and 5V).
Pass/Fail Criteria	If any of the sockets fail to transmit across any of the 5 interface channels or fail to work with either the 3.3V or 5V channels we will consider this test a failure.
Verification Method	Each of the 4 sockets will be tested with a Click that uses each of the 5 interface channels. Each of the sockets will also be tested with a Click that uses the 3.3V line and the 5V line.

Software *2.1.3*	
Approach	The software written to transfer the Click readings to a text file and assign one of the 10 Clicks to any of the 4 sockets on the PCB will be tested to work under normal conditions for a reasonable period without crashing.
Pass/Fail Criteria	If the code crashes too often to handle at least 2 minutes of continuous usage or fails to transmit the proper information to the selected channel we will consider this test a failure.
Verification Method	The PCB will be left collecting data and storing it and it will be expected to work for a period of at least 10 minutes without needing a manual reset. If the data read is not concurrent with our expectations of what the sensor should be reading, based on the selected Click, then we will also consider this test a failure.

Software (Stretch) *2.1.4*	
Approach	The website should be functional and accessible through any major browser. It should also load within a reasonable time and not crash due to bad design.
Pass/Fail Criteria	If the website crashes when being used normally by two users for a period of at least 2 minutes, if the website fails to load within a period of 30 seconds from a home computer or if any of the major browsers (Chrome, Firefox, IE, Safari) fail to open the website we will consider this test a failure.
Verification Method	The website will be loaded in all major browsers. The time it takes to load all the content will be timed with each of them. Additionally, there will be a test of 2, not professional, users utilizing the various links in the website for a period of 5 minutes trying to intentionally crash the website with clicks and inputs.

4. Test Cases

4.1 Test Case #1: MikroBUS Standard Interface Connections

Tested By:	Dylan Dean
Test Case Number	1
Test Case Name	MikroBUS Standard Interface Connections
Test Case Description	Using the ICs that will eventually be placed on the PCB, each of the 5 interfaces will be tested in order to make sure the data is accurately transmitted from input to output. Each of the 5 interface connections will be tested, individually, on a breadboard and then verified with the FRDM-KL46Z.

Item(s) to be tested	
1	Design choices in PCB that enable transmission of data utilizing any of the 5 interface connections the MikroBUS Standard can handle (PWM, SPI, IIC, UART and Analog).

Specifications	
Input	**Expected Output/Result**
PWM, SPI, IIC, UART and Analog signals from FRDM-KL46Z.	A digital representation of those readings as seen in a personal computer.

Resources Required	
1	FRDM-KL46Z
2	PCB ICs
3	Breadboard
4	Click Sensors that operate a different interface channel for each of the 5 in the MikroBUS standard

Procedural Steps	
1	Recreate PCB design for one of the 5 selected interfaces on a breadboard
2	Record the signal being captured by a Click that uses that recreated interface channel
3	Connect the same Click to the existing interface channel pins of the FRDM-KL46Z
4	Compare the two readings
5	Repeat steps 1-4 for all 5 interfaces

4.2 Test Case #2: PCB Sockets Functionality

Tested By:	Mohamed Sghari
Test Case Number	2
Test Case Name	PCB Sockets Functionality
Test Case Description	Once the design has been tested and PCB has been ordered, we will test each of the sockets on the PCB with all 5 interface modes in the MikroBUS standard. Additionally, we will test each socket for functionality in both voltage channels (3.3V and 5V).

Item(s) to be tested	
1	PCB

Specifications	
Input	**Expected Output/Result**
PWM, SPI, IIC, UART and Analog signals from Click Sensors attached to the PCB	A digital representation of those readings as seen in a personal computer.

Resources Required	
1	PCB with all ICs attached
2	FRDM-KL46Z
3	Click Sensors that operate a different interface channel for each of the 5 in the MikroBUS standard
4	A power source

Procedural Steps	
1	Select a socket in the PCB
2	Select a combination of Clicks so that between all of them you have every interface connection available in the MikroBUS Standard and you have at least one Click that works with 3.3V and one that requires 5V
3	Test all the selected Clicks on the selected socket and ensure that the readings are correct by testing the same Clicks with a FRDM-KL46Z board. The readings should be identical
4	Repeat steps 1-3 for all 4 Sockets on the PCB

4.3 Test Case #3: Software Functionality

Tested By:	Alfonso de la Morena
Test Case Number	3
Test Case Name	Software Functionality
Test Case Description	The software written to transfer the Click readings to a text file and assign one of the 10 Clicks to any of the 4 sockets on the PCB will be tested to work under normal conditions for a reasonable period without crashing.

Item(s) to be tested	
1	PCB Software for interpreting Click readings and storing the information

Specifications	
Input	**Expected Output/Result**
PWM, SPI, IIC, UART and Analog signals from Click Sensors attached to the PCB	A digital representation of those readings as seen in a personal computer.

Resources Required	
1	PCB with all ICs attached
2	FRDM-KL46Z
3	Click Sensors that operate a different interface channel for each of the 5 in the MikroBUS standard
4	A power source

Procedural Steps	
1	Select a combination of Clicks so that between all of them you have every interface connection available in the MikroBUS Standard and you have at least one Click that works with 3.3V and one that requires 5V
2	Connect a combination of the selected Clicks, 4 at a time, to the PCB and have them collect readings for at least 2 minutes.
3	Ensure that all the data was correctly stored in a file. At this stage it is not a concern weather the readings are correct, simply making sure the data was stored
4	Repeat steps 1-3 for at least 3 combinations of the selected Clicks making sure to include each Click at least once

4.4 Test Case #3: Software Functionality (Stretch)

Tested By:	Alfonso de la Morena and Dylan Dean
Test Case Number	4
Test Case Name	Software Functionality (Stretch)
Test Case Description	The website should be functional and accessible through any major browser. It should also load within a reasonable time and not crash due to bad design.

Item(s) to be tested	
1	Website

Specifications	
Input	**Expected Output/Result**
User Clicks and text inputs in available sections of the website	Interaction with the website

Resources Required	
1	Two Personal Computer
2	Internet Access

Procedural Steps	
1	Select a browser from either Chrome, Firefox, IE or Safari
2	Have two users use the selected browser to connect to the website
3	Record the time it takes for each user to load the website
4	Allow each user to interact with the website for a minimum of 2 minutes interacting with the different interactable parts of the website
5	Repeat steps 1-4 for all 4 browsers

5. Testing Schedule

Test Dates	Test Case Number	Test Name	Responsible Engineers
2/3/19 – 3/3/19	#1	MikroBUS Standard Interface Connections	Mohamed Sghari
3/3/19 – 4/16/19	#2	PCB Sockets Functionality	Dylan Dean
3/3/19 – 4/16/19	#3	Software Functionality	Alfonso de la Morena
3/16/19 – 4/16/19	#4	Software Functionality (Stretch)	Alfonso de la Morena and Dylan Dean