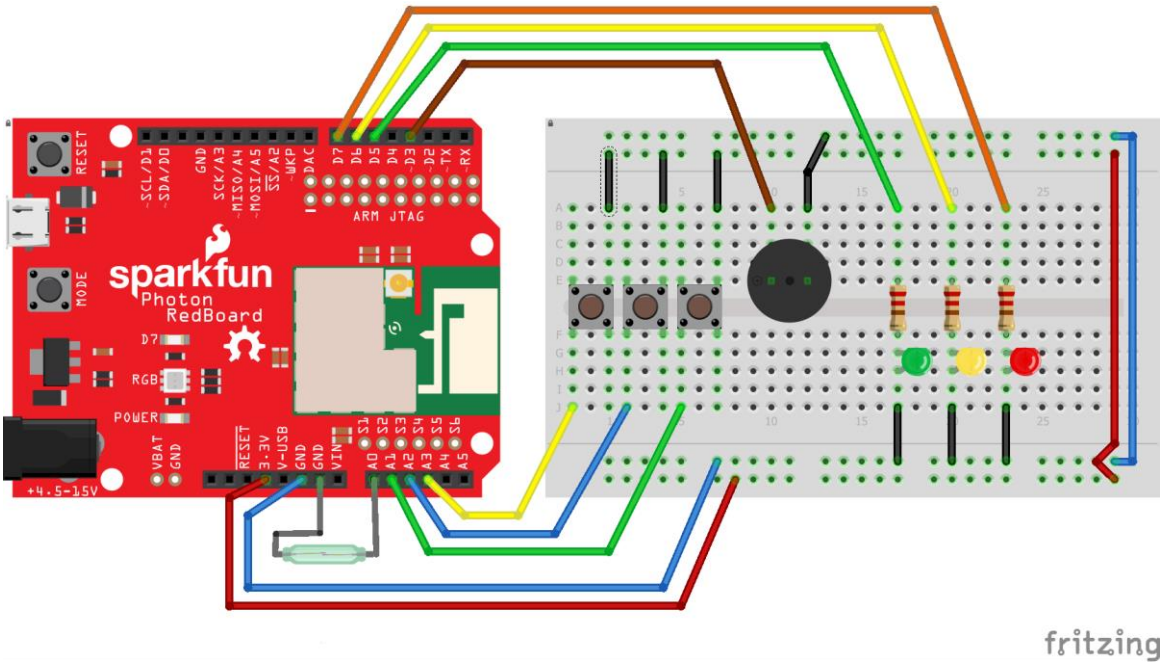
Alarm System
Leistungsnachweis LN3



Test Plan

Author: **Yves Ackermann** *(HF Technik Schaffhausen)*	*Date*	*Signature*
Approval: **Manuel Geissmann** *(HF Technik Schaffhausen)*	*Date*	*Signature*

Table of Content

1 Aim, Procedure

General

The aim of this documentation is to determine requirements and acceptance criteria to the above-named system. Meeting of the requirements and acceptance criteria ensures correct installation and proper functioning of the system.

2 References

This document bases on the following reference	Version	Date of Release
https://github.com/bbz-hft-software-engineering/ALARM_LN3	N/A	02.07.2023

3 Extract of the original task

3.1 Task definition

The aim of the project is to develop an alarm system to improve home security. The system is to be based on the Particle Photon Inventor's KIT Hardware. By using various sensors and actuators, the alarm system shall sound an alarm in case of unwanted intrusion into the home.

3.2 Product requirements

- The alarm system is activated by the activation button.
- A short tone sounds after activation.
- With the correct key combination of the two buttons, the alarm can be switched off within 30 seconds.
- The key combination is to press the left button twice and the right button once.
- If the correct combination is not entered within 30 seconds, the red control lamp lights up.
- If the correct combination is entered, it is confirmed by two short beeps.
- Once the correct combination has been entered, the green LED is lit on, the alarm system can be reactivated by pressing the activation button.

3.3 HW structure

- Door sensor
- Three buttons "left", "right", "activation button"
- Green, orange, red LED
- Loudspeaker (Buzzer)

3.4 Artefacts

The following artefacts are to be submitted and will be evaluated:

Artefacts	Description	Delivery date
Source-Code	Source code of the project	~~30. June. 2023~~ 02. July. 2023
Design Artefacts	explanation, idea Sequence diagram,	~~30. June. 2023~~ 02. July. 2023
Use Case	Requirements, Non-functional requirements, Sequence of use-case, Error case	~~30. June. 2023~~ 02. July. 2023
Test Protocol	Test concept, as well as protocol of tests carried out	~~30. June. 2023~~ 02. July. 2023

*All Artefacts will be in the Github Repository "*bbz-hft-software-engineering/ALARM_LN3*"*

The function of the system is already acknowledged by Manuel Geissman, therefore no video is needed

4 URS - User Requirement Specification

4.1 Overview

The Alarm System is used to detect unauthorized access and triggers an alarm, if the password is not entered during a specified time (30s). Different Input (Button, Door sensor) and Outputs (Led, buzzer) is used to execute the task

4.2 User Requirements

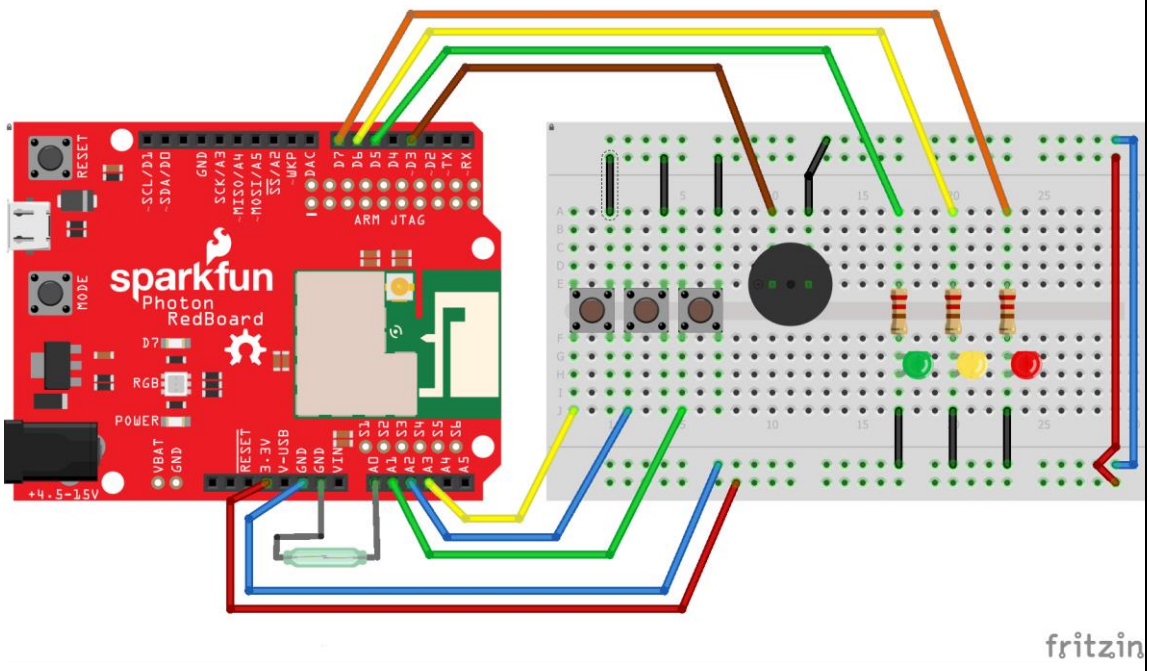
- The System must be armed with the activation button.
- The System can only be deactivated after it is armed, and the door sensor is triggered
- The System must be deactivated with the defined button combination (mentioned in 3.2).
- The System must trigger an alarm after the door is opened and the defined button combination is not entered within the specified time.
- The alarm must generate audible and visual signal to inform the surrounding of the intrusion.
- The alarm must remain active and can only be deactivated by the authorized person.

4.3 Non-functional Requirements

- The System should give either visual or audible feedback to acknowledge the user of his actions.
- The Interface should be easy to understand, and the signals follows common color code
- The system must respond reliable and quickly

4.4 Hardware and blueprint

The Hardware components is defined in the original task stated in 3.3 and is used accordingly.

Blueprint

Note: The blueprint shows the connection of the components. *The arrangement and appearance of the actual system may vary.*

5 Source-code

The source-code is in the Github Repository "*bbz-hft-software-engineering/ALARM_LN3*"

6 Design artefacts

6.1 Use case

6.1.1 Actor:

- The User abbreviated to "U".
- The Alarm System abbreviated to "AS".
- For alternative flow: an authorized person

6.1.2 Preconditions:

- The Alarm System is correctly installed
- The AS is already armed, and the door is closed

6.1.3 Main Flow "Sunny Day"

1. The User opens the door.
2. The AS changes from its active state to its password state -> a continuously beep tone is played and the yellow led is active.
3. The U pushes a button (example: button left)
4. For every pressed button, the yellow led blinks shortly to signalize that the input is acknowledged by the AS.
5. The U types in the correct combination
6. The beep tone stops and the yellow led fades. Now the blink of the green led signalizes that the alarm is deactivated and the state of the AS in now in idle.
7. The U wants to reactivate the AS
8. The U closes the door and presses the activation button
9. The AS transition from its idle state to the activated state and signalizes that with two beep tones.

6.1.4 Alternativ Flow "Rainy Day"

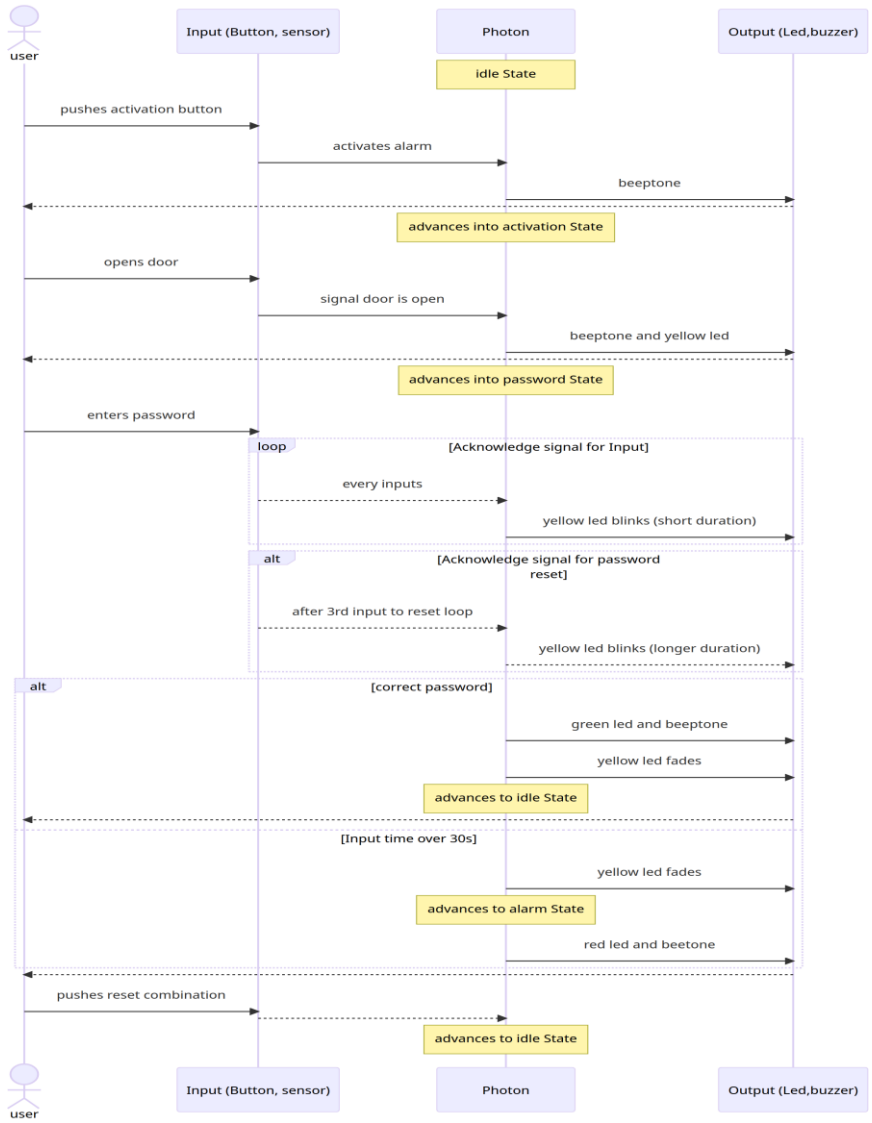
1. The U opens the door.
2. The AS changes from its active state to its password state -> a continuously beep tone is played and the yellow led is active.
3. The U pushes a button (button left)
4. For every pressed button, the yellow led blinks shortly to signalize that the input is acknowledged by the AS
5. The U types in the wrong combination
6. After every 3rd input the yellow led blinks longer to signalize that the entered password is reset.
7. The U did not enter the correct combination within 30s.
8. The beep tone changes its frequency and its volume and the yellow led fades. Now the red led signalizes that the alarm is triggered, and the AS is in alarm state.
9. An authorized person detects the alarm and can reset the AS by pushing the input buttons both at the same time

6.1.5 Postconditions:

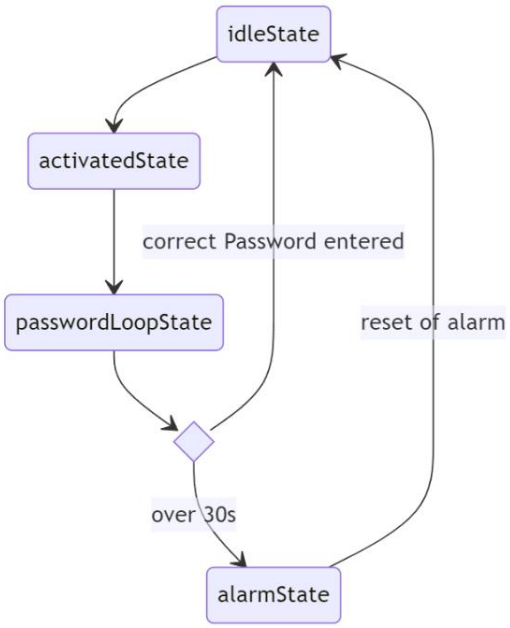
The AS is in its respective state based on the outcome of the situation

6.2 Sequence diagram

Sequence diagram and state diagram



Sequence diagram and state diagram



7 Functional tests

Test ID	Test Step	Expected Result	Complies
Hardware (HW)			
1	**The Inputs were correctly read** *Test procedure:* *Checking the Inputs with puTTY*	All Input works correctly	☒ Yes ☐ No, Discr. D____
2	**The Output are controlled correctly** *Test procedure:* *In a test program every output is individually controlled*	Every visual- or audio signal works correctly.	☒ Yes ☐ No, Discr. D____
Software (SW)			
3	**The System is flashed correctly** *Test procedure:* *Flashing the Microcontroller*	The flash was successful, and no error appeared during and after flashing procedure.	☒ Yes ☐ No, Discr. D____
4	**System activation** *Test procedure:* *press every button except the green button*	The system does not transition from idle to the activation state.	☒ Yes ☐ No, Discr. D____
1	**System activation** *Test procedure:* *press the green button*	The system transitions from idle to the activation state with two short beep tones.	☒ Yes ☐ No, Discr. D____
2	**Detection of Door** *Test procedure:* *Opens the door*	The system transitions from active state to the passwordLoop state with two short beep tones and activates the yellow led.	☒ Yes ☐ No, Discr. D____

Test ID	Test Step	Expected Result	Complies
3	**Deactivating the system** *Test procedure:* *Closes the door in the passwordLoop state*	The system ignores the door sensor input and proceeds without interruption.	☒ Yes ☐ No, Discr. D____
4	**Deactivating the system** *Test procedure:* *enter wrong button combination*	The system acknowledges (short blink of the yellow led) all input and resets the entered password (long blink of the yellow led). The system does not transition to the next state.	☒ Yes ☐ No, Discr. D____
5	**Deactivating the system** *Test procedure:* *enter right button combination*	The system acknowledges (short blink of the yellow led) all input and resets the entered password. The yellow led and the beep tone fades and the green led blinks a single time. The system transitions from the passwordLoop state to idle state.	☒ Yes ☐ No, Discr. D____
6	**Activating the alarm** *Test procedure:* *wait for 30s while the paswordLoop state is active*	The beep tone changes its frequency and additionally the red and yellow led are activated. The system transitions from the passwordLoop state to the alarm state.	☒ Yes ☐ No, Discr. D____
7	**Deactivating the alarm** *Test procedure:* *pushes every button individually*	There is no reaction from the system and the system does not transitions to another state.	☒ Yes ☐ No, Discr. D____
8	**Deactivating the alarm** *Test procedure:* *pushes both input button at the same time*	The system transitions to the idle state and all outputs were deactivated.	☒ Yes ☐ No, Discr. D____

Remarks	☒ **Yes** ☐ **No**
Complies	☒ **Yes** ☐ **No** *Date/Visa (person executing)*

8 Report

8.1 Qualification state

State of System	
☒ System is qualified ☒ without Discrepancy ☐ with approved Discrepancy ☐ closed ☐ open ☐ without Trackwise Record ☐ with approved Trackwise Record ☐ closed ☐ open	☐ System is not qualified

Report performed, reviewed & completed.		
Yves Ackermann	***02.07.203***	*yves Ackermann*
Name	*Date*	*Signature*

9 History of change

Date	Change description	Author
16.02.2016	Version A01, document created	Yves Ackermann
02.07.2023	Version A, document submitted	Yves Ackermann

*****End of document*****