FH CAMPUS WIEN
UNIVERSITY OF APPLIED SCIENCES

Design document

Group Nr. 3

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Contents

1 Project description

1.1 Problem desription

When the CO2 level in a room reaches a certain level, a window should automatically open and a fresh air fan should switch on. After a certain lower CO2 level is reached and a certain run-on time has elapsed, the window is closed again and the fan is switched off again.

1.2 Hardware

1. MH-Z19 CO2 Sensor
2. Arduino with bluetooth module
3. Raspberry
4. Electric motor

1.3 Hardware

1. Analog input for measuring the CO2 contentr
2. Digital output for controlling a window opener
3. Digital output to control a fan

1.4 Schema

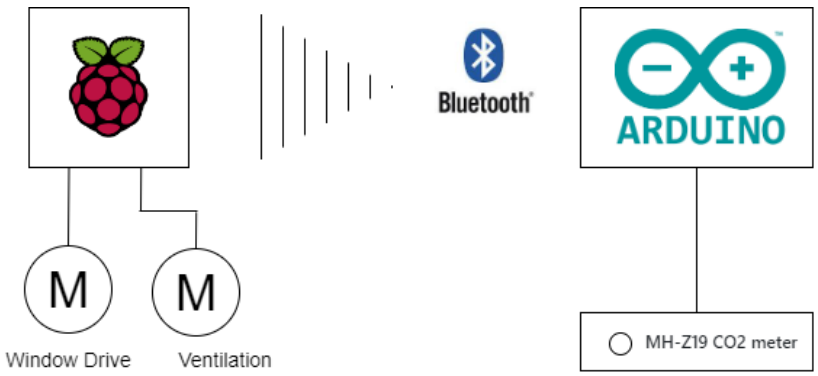

Figure 1: system description

2 Software architecture and design

2.1 Software modules

Safety related modules

1. Modul x:
   Description:
   Functions:
   Data:
   Requirements see: 1.1., ...

Security related modules

Modules with no influence on Safety and Security

2.2 Libraries

Description of used function with parameters.

2.3 Interrupts

Definition of priorities.

2.4 Pinout

3 Program flowchart

Hier bitte Sequenzdiagramme, bzw. Programmablaufdiagramme

4 Hazard identification

4.1 Identified hazards and countermeasures

1. Hazard 1:

   Co2 sensor delivers incorrect values

2. Hazard 2:

   The window is stuck and does not open or close

3. Hazard 3:

   Arduino fails

4.2 Identified hazards without countermeasures

1. Hazard 1:

   The Co2 sensor fails and does not provide data

2. Hazard 2:

   The power supply fails

3. Hazard 3:

   The engine fails

5 Threat identification

5.1 Identified threats and countermeasures

1. Threat 1:
2. Threat 2:
3. Threat 3:

5.2 Identified threats without countermeasures

1. Threat 1:
2. Threat 2:
3. Threat 3:

6 Requirements

6.1 Safety related requirements

1. Requirement:
   At program start all safety related functions must be tested.
   Folge Requirements: 1.1. , 1.2.

   1.1. Requirement
   At program start the LED indicating an error must be tested.2.

   1.2. Requirement
   At program start the USART sending error messages must be tested.

2. Requirement:

3. Requirement:

6.2 Security related requirements

6.3 Requirements with no influence on Safety and Security