HSI

for

Digital Elevator

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Document name** | **Version** | **Author** | **Last update Date** | **Document Status** |
| HSI\_DIGITAL\_ELEVATOR | V\_1.4 | Marcelle Samir | Feb 7, 2020 | Proposed |

Prepared by /   
- Ahmed Refaat  
- Marcelle Samir

Table of Contents

[Revision History 2](#_Toc31968927)

[1. Introduction 3](#_Toc31968928)

[Purpose 3](#_Toc31968929)

[2. Components block diagram 4](#_Toc31968930)

[3. list of components 4](#_Toc31968931)

[4. Pin description 5](#_Toc31968932)

[5. Hardware/Software specification 6](#_Toc31968933)

[Req\_DIGELV\_HSI\_01\_V1.2 6](#_Toc31968934)

[Req\_DIGELV\_HSI\_02\_V1.2 6](#_Toc31968935)

[Req\_DIGELV\_HSI\_03\_V1.2 7](#_Toc31968936)

[Req\_DIGELV\_ HSI\_04\_V1.2 7](#_Toc31968937)

Revision History

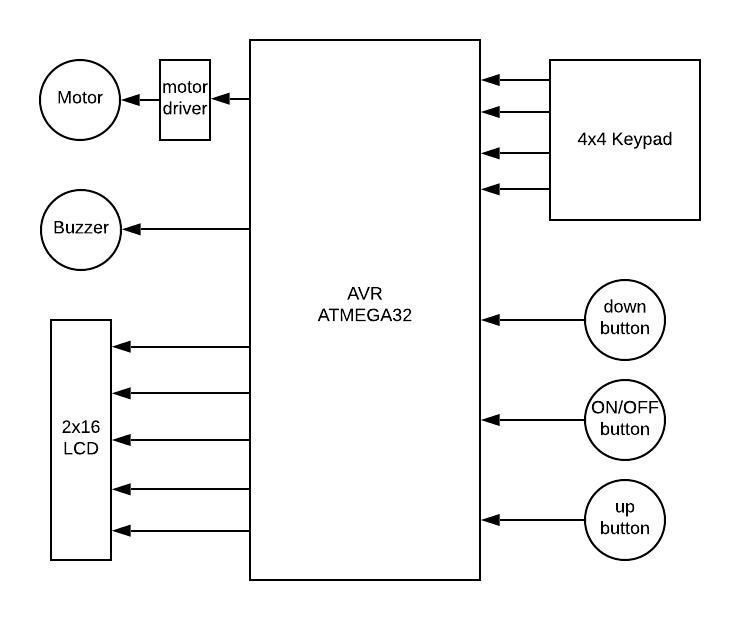
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Version** | **Author** | **Date** | **Change Description** | **Doc. Status** |
| HSI\_DIGITAL\_ELEVATOR | V\_1.0 | Ahmed Refaat,  Marcelle Samir | Jan 23, 2020 | Initial creation of the HSI Document. | Draft |
| HSI\_DIGITAL\_ELEVATOR | V\_1.1 | Ahmed Refaat,  Marcelle Samir | Jan 28, 2020 | Applying review’s suggested modifications | Proposed |
| HSI\_DIGITAL\_ELEVATOR | V\_1.2 | Ahmed Refaat | Feb 5, 2020 | - Reformatted the requirements  - Added pin description table | Draft |
| HSI\_DIGITAL\_ELEVATOR | V\_1.3 | Marcelle Samir | Feb 5, 2020 | - Requirements modification according to reviewing the CRS document  \* adding motor into the requirements  \* reviewing each requirement details to make sure it covers all CRS points  - modifying the document formatting  - editing pin description table design  - Editing the components block diagram | Proposed |
| HSI\_DIGITAL\_ELEVATOR | V\_1.4 | Marcelle Samir | Feb 7, 2020 | - unifying the requirement ID Naming  - adding more details to “Change Description” section |  |

# 1. Introduction

## Purpose

This document describes the hardware-software interface specifications for the digital elevator project as HSI document.

# 2. Components block diagram



# 3. list of components

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Component’s name | Quantity | Type | Notes |
| 1 | AVR kit | 1 | controller | ATmega32A controller |
| 2 | LCD | 1 | OUTPUT device | Size of (2x16) |
| 3 | Keypad | 1 | INPUT device | Size of (4x4) |
| 4 | Buzzer | 1 | OUTPUT device |  |
| 5 | Push button | 3 | INPUT device | 2 for up/down, 1 for ON/OFF |
| 6 | Motor driver | 1 | OUTPUT device | LM298 |
| 7 | Motor | 1 | OUTPUT device | 5v DC motor |

4. Pin description

|  |  |  |  |
| --- | --- | --- | --- |
| Pin num. | Symbol | Direction | Connection |
| 1 | PB0 | Output | LCD\_D0 |
| 2 | PB1 | Output | LCD\_D1 |
| 3 | PB2 | Output | LCD\_D2 |
| 4 | PB3 | Output | LCD\_D3 |
| 5 | PB4 | Output | LCD\_D4  fffffdddddddd |
| 6 | PB5 | Output | LCD\_D5 |
| 7 | PB6 | Output | LCD\_D6 |
| 8 | PB7 | Output | LCD\_D7 |
| 14 | PD0 | Output | LCD\_RS |
| 15 | PD1 | Output | LCD\_RW |
| 16 | PD2 | Output | LCD\_Enable |
| 17 | PD3 | Output | Keypad\_R1 |
| 18 | PD4 | Output | Keypad \_R2 |
| 19 | PD5 | Output | Keypad \_R3 |
| 20 | PD6 | Output | Keypad \_R4 |
| 21 | PD7 | Input | Keypad \_C1 |
| 22 | PC0 | Input | Keypad \_C2  C |
| 23 | PC1 | Input | Keypad \_C3 |
| 24 | PC2 | Input | Keypad \_C4 |
| 25 | PC3 | Output | Buzzer |
| 26 | PC4 | Input | Button1 |
| 27 | PC5 | Input | Button2 |
| 28 | PC6 | Input | Button3 |
| 29 | PC7 | Output | Motor\_driver\_IN1 |
| 33 | PA7 | Output | Motor\_driver\_IN2 |
| 34 | PA6 | Input | Not connected |
| 35 | PA5 | Input | Not connected |
| 36 | PA4 | Input | Not connected |
| 37 | PA3 | Input | Not connected |
| 38 | PA2 | Input | Not connected |
| 39 | PA1 | Input | Not connected |
| 40 | PA0 | Input | Not connected |

5. Hardware/Software specification

|  |  |
| --- | --- |
| Requirement ID | ****Req\_DIGELV\_HSI\_01\_V1.2**** |
| Title | **Enter user’s data.** |
| Description | **Hardware needed:**  **- keypad**  **It’s used as input device to enter user’s name and password.**  **- LCD (2\*16)**  **It’s used as output device to display the user’s entered information**  **- Micro controller**  **The main component to write the software on** |

|  |  |
| --- | --- |
| Requirement ID | ****Req\_DIGELV\_HSI\_02\_V1.2**** |
| Title | **Verifying user’s ID and selecting the direction** |
| Description | **Display ok if the ID is correct, up and down buttons are used to change the floor desired by the user.**  **Hardware needed:**  **- LCD**  **To display the status**  **- 2 push buttons (Up and Down)**  **It’s used as INPUT device to identify the  desired direction**   * **Motor (&motor driver)**   **To show the buttons response** |

|  |  |
| --- | --- |
| Requirement ID | ****Req\_DIGELV\_HSI\_03\_V1.2**** |
| Title | **Exceeding the number of the defined number of trials (3).** |
| Description | **Hardware needed:**  **- LCD**  **LCD will display NOK or OK**  **- Buzzer**  **The buzzer will start beeping.** |

|  |  |
| --- | --- |
| Requirement ID | ****Req\_DIGELV\_ HSI\_04\_V1.2**** |
| Title | **Reset functionality.** |
| Description | **Hardware needed:**  **Reset push button (on/off button)**  **A reset for the whole system is done when pressing on /off button for 2 sec** |