**PO2EBL\_ELECTRIC BLENDER**

**HSI DOCUMENT**

**Version 2.1**

**Proposed**

# Document Status:

|  |  |  |  |
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| **Date** | **Version** | **Document Status** | **Author** |
| 02/28/2020 | 2.1 | Proposed | Amira Zaher |

# Revision History

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| **Date** | **Version** | **Description** | **Author** |
| 01/23/2020 | 1.1 | Initial Draft, mentioning all the hardware components needed for the system. | Amira Zaher |
| 01/26/2020 | 1.2 | Update Pin Mode Representation | Ali Samir |
| 01/31/2020 | 1.3 | Update the functional requirement | Amira Zaher |
| 02/1/2020 | 1.4 | Update the document header | Amira Zaher |
| 02/5/2020 | 1.5 | Adding Table of Content | Amira Zaher |
| 02/6/2020 | 1.6 | Update Functional Requirements with the number 5 requirement (Transistor) | Amira Zaher |
| 02/8/2020 | 1.7 | Update the Pin representation and the Functional Requirements | Amira Zaher |
| 02/8/2020 | 1.8 | Remove the AVR component from the functional requirement , Update the block diagram | Amira Zaher |
| 02/8/2020 | 1.9 | Update Reference Table and the Revision History | Amira Zaher |
| 02/19/2020 | 2 | Update The Hardware System Section | Amira Zaher |
| 02/28/2020 | 2.1 | Adding two Hardware Requirements and their modifications in Pin representation and block diagram | Amira Zaher |

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# Introduction

This section introduces the hardware specification for the project.

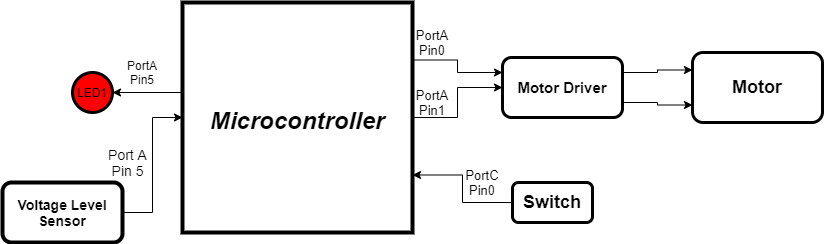
## 1.1 Hardware Requirement

This specification documents all the hardware requirements for the Electric Blender including:

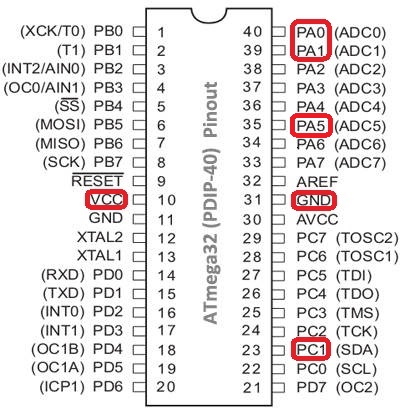
* Microcontroller (AVR Atmega32)
* Push button
* LED
* DC motor
* Motor Driver
* Voltage Level Sensor

# Hardware System:

## 2.1 The System Block Diagram



## 2.2 Atmega32 Pinout



## 2.3 Pin Mode Representation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Component Name** | **Req\_ID** | **Pin** | **Mode** | **Function** |
| Motor | REQ\_PO2EBL\_HSI\_01\_V02 | 2 Pins: - VCC - Transistor Collector | 5V Input | Operates when the Transistor base is HIGH |
| LED | REQ\_PO2EBL\_HSI\_03\_V02 | 2 Pins:  - PA5 - GND | Digital Output | Operate when it receives HIGH based on the state of the Motor |
| Push Button | REQ\_PO2EBL\_HSI\_02\_V02 | 2 Pins: - PC0 - GND | Digital Input pull up | Gives the signal to the motor pin |
| Motor Driver | REQ\_PO2EBL\_HSI\_04\_V01 | 8 Pins:  - Motor Pin1  - Motor Pin2  - Enable  - PC0  - PC1  -VCC  -GND  - VS | Digital Output | Maintain the level of isolation between the microcontroller and the motor |
| Voltage Level Sensor | REQ\_PO2EBL\_HSI\_05\_V01 | 4 Pins:  - Positive Terminal  - Negative Terminal  - PA5  - GND | Analog Input | Measuring the system output voltage |

# Functional Requi­­rements:

|  |  |  |
| --- | --- | --- |
| **REQ\_ID** | **Component Name** | **Description** |
| REQ\_PO2EBL\_HSI\_01\_V02 | Speed Change | In order to get the motor speed from speed 1,2,3 and finally the OFF mode, DC motor will be used.  #imp HW |
| REQ\_PO2EBL\_HSI\_02\_V02 | Speed Control | In order to control the speed of the blender, with each click the mode will be changed from one state to another, push button will be used.  #imp HW |
| REQ\_PO2EBL\_HSI\_03\_V02 | State Indicator | In order to show the speed level of the blender, the LED intensity would change with respect of the blender mode, a LED will be used.  #imp HW |
| REQ\_PO2EBL\_HSI\_04\_V01 | Direction Control | In order to maintain the isolation level between the microcontroller and the motor. When the motor needs to switch on the Enable mode is has to be though a Motor Driver.  #imp HW |
| REQ\_PO2EBL\_HSI\_04\_V02 | Voltage Measuring | In order to monitor the voltage level of the system to avoid any under or over voltage that may occur, we will add a Voltage Level Sensor.  #imp HW |

# Reference Table:

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Version** | **Document** | **Status** |
| 1 | 1.0 | Electric Blender customer requirement | Released |
| 2 | - | SIQ | - |