**Hardware - Software Interface (HSI)**

**Kenodo-ElectricBlender (PO2\_EBL)**

### DocumentStatus:Proposed

**Document status:**

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| 1.0 | Draft | Mohamed Megahed  Esraa Mansour | 23/1/2020 |
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**DocumentHistory:**

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| **Version** | **Author** | **Date** | **Change Description** |
| 1.0 | Mohamed Megahed  Esraa Mansour | 23/1/2020 | Initial Creation of HSI |
| 1.1 | Mohamed Megahed  Esraa Mansour | 5/2/2020 | * Reference table was added * REQID and direction to pin connections table were added * TAGID was changed to REQID * Unreverent details were removed from the ATMEGA32 section |
| 1.2 | Mohamed Megahed  Esraa Mansour | 5/2/2020 | * Document status table was added * Reference table format was edited |
| 1.2 | Fatma Gomaa | 8/2/2020 | * name of the company "Kenovo" instead of Kenodo and Project name should have space "Electric Blender" * The Document Should have spaces between Different Words   ex- page 2 -> DocumentHistory -> "Document History"   * in Document History, each editor should clarify his work   ex- Esraa and Anwar in version 1.2 made 2 edits, who did what, assign your names to the points   * In the Introduction Section:   Purpose and scope paragraph have no spaces between words   * in Component Desciption: You need to add the requirement IDs above the requirement description and should write the implementation type (SW or HW) like that #Imp: HW beside the requirement ID * the removed section of ATMEGA32, could have been replaced by "microcontroller specifications (AVR ATMEGA 32) Internal peripherals have and could add an image for uc layout if you would" * the document is 10 pages and only 7 are found. |

**Reference Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref. number** | **Doc. name** | **Version** | **Status** |
| 1 | CRS | 1.0 | Released |

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# Introduction

* 1. **Purpose**

ThisdocumentdefinestheHSIdatadictionaryforElectric Blender.

* 1. **Scope**

ThisdocumentdescribesthestructureoftheHSI.

1. **Requirements**

# Block Diagram

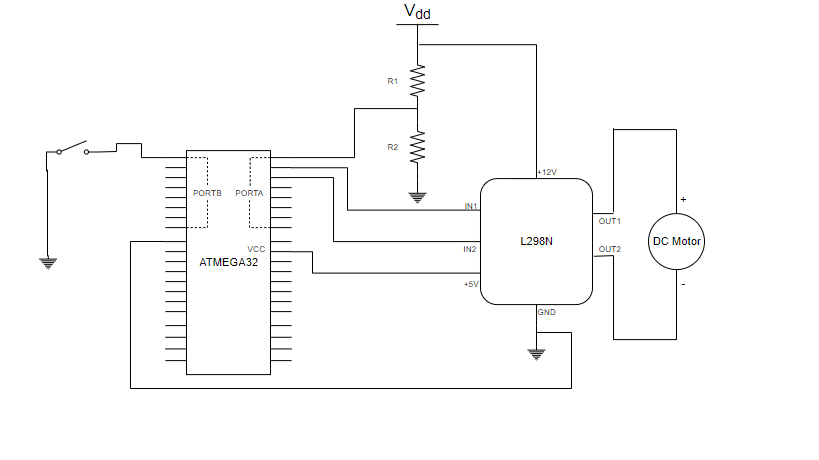


Figure 1 –Block diagram

# Pins Connection

# REQID:Req\_PO2\_EBL\_Electric\_Blender\_HSI\_001\_1.0

|  |  |  |  |
| --- | --- | --- | --- |
| **Component** | **Pin Number** | **Connection** | **Direction** |
| ATMEGA32 | PINA0 | Voltage Divider | Input |
| PINA1 | Motor Driver (IN1) | Output |
| PINA2 | Motor Driver (IN2) | Output |
| PINB0 | Tactile Switch | Input |
| VCC | Motor Driver (+5V) | Input |
| GND | Motor Driver (GND) | - |
| Motor Driver | +12V | VDD | Input |
| 5V | ATMEGA(VCC) | Output |
| GND | ATMEGA(GND) | - |
| IN1 | PINA1 | Input |
| IN2 | PINA2 | Input |
| OUT1 | DC Motor (+) | Output |
| OUT2 | DC Motor (-) | Output |
| DC Motor | Terminal1(+) | Motor Driver(OUT1) | Input |
| Terminal2(-) | Motor Driver(OUT2) | Input |
| Tactile Switch | Terminal1 | GND | - |
| Terminal2 | PINB0 | Output |
| Voltage Divider | Terminal1 | VDD | Input |
| Terminal2 | PINA0 | Output |
| Terminal3 | GND | - |

Table 1 – Pins Connection

# Components Description

* + 1. Switch

This Component change the electric blender speed from Off -> Speed 1 ->Speed 2 -> Speed 3 to Offagain, it’s connected to ATMEGA32 PINB0 in pull up mode.

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* + 1. Motor Driver

This Component is used to supply the DC motor with enough current as microcontroller can’t supply enough current to rotate the motor.

It takes power from external power supply (VDD), it takes input from microcontroller through pins IN1 and IN2 and its output OUT1 and OUT2 is fed to the DC motor terminals.

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* + 1. DC Motor

This component takes its input from the motor driver and changes its speed according to that input.

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* + 1. Voltage Divider

This circuit consists of two resistances to drop down the power supply’s voltage to 5 volt.

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* + 1. ATMEGA32

This is the microcontroller the core of the process, it has two functions.

First function: it reads the input of the switch and according to that input it produces different wave forms with pulse width modulation (PWM).

Second function: The microcontroller reads the output voltage of the voltage divider to make sure that only the desired voltage range is delivered to motor driver.

**REQID:** Req\_PO2\_EBL\_Electric\_Blender\_HSI\_006\_1.0