Global Design Document

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**Electric Blender**

**PO2\_EBL**

**By: Mostafa Ramadan**

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| 1.0 | **Mostafa Ramadan** | **28-02-2020** | **Adding the Public APIs for the software** |
| 1.0 | **Mostafa Ramadan** | **02-03-2020** | **Adding all of the public APIs for the software** |

**Reference Table:**

|  |  |  |
| --- | --- | --- |
| Document | Version | Author |
| SRS | **1.6** | **Mostafa Ramadan** |
| CYRS | **1.4** | **Mohamed Anis & Fatima Gomaa** |

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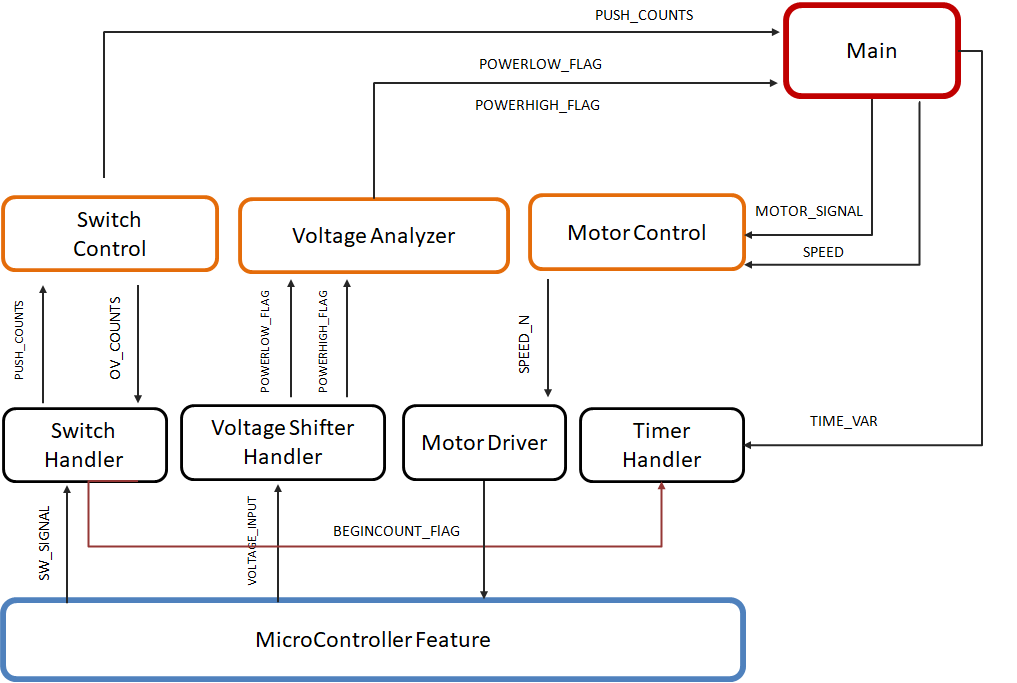
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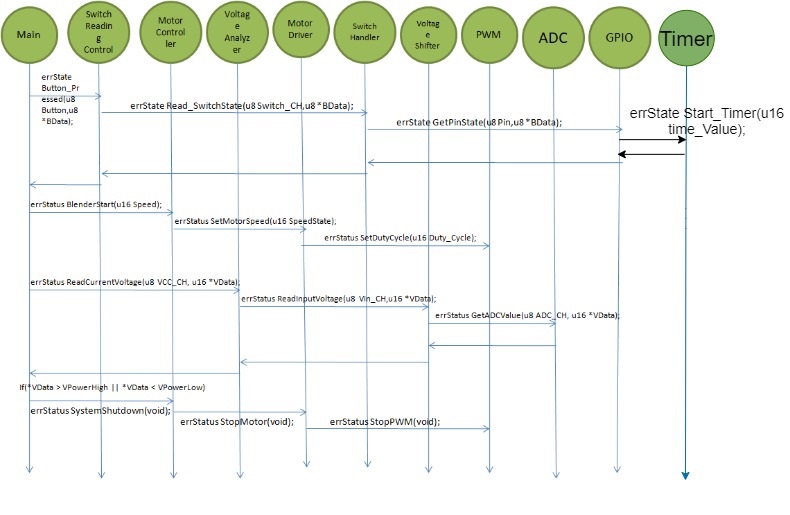
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1. ***Introduction***
   1. ***Purpose***

The purpose of this document is to present the flow of the software through the system and shows the APIs that will cover the functionality of the software. And how the software shall act and react against certain parameters.

This document will explain the features of the system from the functional software manner.

1. ***Software Feature Diagram***
2. ***Static Architecture***
3. ***Software Sequence Diagram***



1. ***Public APIs***
   1. *Button Component*

|  |  |  |  |
| --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_001-1.0 | **Covers** | Covers\_ PO2\_EBL\_Electric\_Blender\_SRS\_001-1.0 |
| **Author** | Mostafa Ramadan | **DATE** | 28/2/2020 |
| **API** | errState Button\_Pressed(u8 Button\_CH, u8 \*BData); | | |
| **Description** | This Function shall read if the button is pressed or not. | | |
| **Inputs** | u8 Switch\_CH, u8 \*Data | **Outputs** | errStatus |

* 1. Switch Component

|  |  |  |  |
| --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_002-1.0 | **Covers** | Covers\_ PO2\_EBL\_Electric\_Blender\_SRS\_001-1.0 |
| **Author** | Mostafa Ramadan | **DATE** | 28/2/2020 |
| **API** | errState Read\_SwitchState(u8 Switch\_CH, u8 \*BData); | | |
| **Description** | This Function shall get the status of the Switch and return an error status in case it met the required functionality or not. | | |
| **Inputs** | u8 Switch\_CH, u8 \*Data | **Outputs** | errStatus |

* 1. Delay Component

|  |  |  |  |
| --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_003-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_012-1.5 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_013-1.5 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_015-1.5 |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 |
| **API** | errState delay\_ms(u16 time\_Value); | | |
| **Description** | This Function shall set the delay value for the system to know the time period of the button press | | |
| **Inputs** | U16 time\_Value : value = 200ms | **Outputs** | errStatus |

* 1. Timer Component

|  |  |  |  |
| --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_004-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_002-1.5 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_014-1.5 |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 |
| **API** | errState Start\_Timer(u16 time\_Value); | | |
| **Description** | This Function shall start the timer as soon as the button is pressed to calculate the time the button is pressed | | |
| **Inputs** | U16 time\_Value : value = 200ms | **Outputs** | errStatus |

* 1. Blender Component

|  |  |  |  |
| --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_005-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_006-1.4 |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 |
| **API** | errState BlenderStart(u16 speed); | | |
| **Description** | This Function shall control the blender motor speed | | |
| **Inputs** | u16 speed: value range:   1. Speed 1 = 30% 2. Speed 2 = 60% 3. Speed 3 = 100% 4. Speed 4 = 0% | **Outputs** | errStatus |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_006-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_009-1.4 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_011-1.5 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState SystemShutdown(void); | | | | |
| **Description** | This Function shall shutdown the blender if there is voltage error to the system | | | | |
| **Inputs** | n/a | | | **Outputs** | errStatus |

* 1. Motor Component

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_007-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_005-1.4 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState SetMotorSpeed(u16 SpeedState); | | | | |
| **Description** | This Function shall control the duty cycle of PWM to feed the motor speed | | | | |
| **Inputs** | u16 SpeedState: value range:  SPEED\_1 🡺 from 0% up to 30% of the duty cycle.  SPEED\_2 🡺 from 30% up to 60% of the duty cycle  SPEED\_3 🡺 from 60% up to 100% of the duty cycle | | | **Outputs** | errStatus |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_008-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_009-1.4 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_011-1.5 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState StopMotor(void); | | | | |
| **Description** | This Function shall stop the motor of the blender | | | | |
| **Inputs** | n/a | | | **Outputs** | errStatus |

* 1. PWM Component

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_009-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_005-1.4 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState SetDutyCycle(u16 Duty\_Cycle); | | | | |
| **Description** | This Function shall Set the Duty Cycle of the PWM. | | | | |
| **Inputs** | u16 Duty\_Cycle: value range:  SPEED\_1 🡺 from 0% up to 30% of the duty cycle.  SPEED\_2 🡺 from 30% up to 60% of the duty cycle  SPEED\_3 🡺 from 60% up to 100% of the duty cycle | | | **Outputs** | errStatus |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_010-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_009-1.4 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_011-1.5 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState StopPWM(void); | | | | |
| **Description** | This Function shall shutdown the PWM peripheral. | | | | |
| **Inputs** | n/a | | | **Outputs** | errStatus |

* 1. Voltage Analyzer Component

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_011-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_008-1.5 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_010-1.5 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState ReadCurrentVoltage(u8 VCC\_CH,u16 \*VData); | | | | |
| **Description** | This Function shall Read the input voltage to the blender | | | | |
| **Inputs** | U8 VCC\_CH: the current voltage is connected to which channel  U16 \* VData: the value of the current voltage applied to the system | | | **Outputs** | errStatus |

* 1. Voltage shifter Component

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_012-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_008-1.5 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_010-1.5 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState ReadInputVoltage(u8 Vin\_CH,u16 \*VData); | | | | |
| **Description** | This Function shall Read the input voltage to the system | | | | |
| **Inputs** | U8 Vin\_CH: the input voltage is connected to which channel  U16 \* VData: the value of the current voltage applied to the system | | | **Outputs** | errStatus |

* 1. ADC Component

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req\_ID** | Req\_ PO2\_EBL\_Electric\_Blender\_GDD\_013-1.0 | **Covers** | Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_008-1.5 & Req\_ PO2\_EBL\_Electric\_Blender\_SRS\_010-1.5 | | |
| **Author** | Mostafa Ramadan | **DATE** | 2/3/2020 | | |
| **API** | errState GetADCValue(u8 ADC\_CH,u16 \*VData); | | | | |
| **Description** | This Function shall get the value applied to the ADC | | | | |
| **Inputs** | U8 ADC\_CH: the input Signal is connected to which channel  U16 \* VData: the value of the current Signal applied to the ADC | | | **Outputs** | errStatus |