**Software Architecture Design**



**Team No. #2**

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# 1 Overview

The project was divided in the following modules:

* Digital Inputs
* Analog Inputs
* Determine Output State
* Digital Outputs

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# 2 Inputs modules

These modules are in charge of process the analog and digital inputs provided by the sensor and switch and give as output a determinate state

# 2.1 Digital Input Module

The digital input module describes the state of the system using the switch as input, for details see the following table

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|  |  |  |  |
| --- | --- | --- | --- |
| **Selector** | | **Output** | **State** |
| 0 | 0 | 0 | OFF |
| 0 | 1 | 1 | PARK |
| 1 | 0 | 2 | HEAD |
| 1 | 1 | 3 | AUTO |

Table 1: Relationship between the inputs and outputs

# 2.2 Analog Input Mode

The objective of this module is to convert the value of voltage into ADC counts, this is useful for the Determine Output State module in which a state machine determines the state using this counts.

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|  |  |
| --- | --- |
| **Input** | **Output** |
| 0V – 5V (±5%) | 0 – 65535  (7.629V → ∆1 count |

Table 2: Table of conversion

# 3 Determine Output State

This module process all the inputs to give a final state, it contains a state machine in charge of process the analog input if the auto state is selected

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Digital Input Module** | **Analog Input Module** | **Previous**  **State** | **Output** | **State** |
| 0 | X | X | 00 | OFF |
| 1 | X | X | 01 | PARK |
| 2 | X | X | 11 | HEAD |
| 3 | <26214 (40%) | OFF | 00 | OFF |
| >3921 (60%) | PARK | 01 | PARK |
| >52428 (80%) | HEAD | 11 | HEAD |

Table 3: State machine

# 4 Digital Outputs Module

The propose of this module is to set the outputs in state of HIGH or LOW taking by input the computations of the previous module, this module turn on the LEDs as shown in the table 4.

|  |  |  |
| --- | --- | --- |
| **Inputs** | **LED 1** | **LED 2** |
| 00 OFF | OFF | OFF |
| 01 PARK | OFF | ON |
| 11 HEAD | ON | ON |

Table 4: Final Outputs

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# 5 HW Schematics

In this section is presented the schematics design and the HW specifications





