LED String Animation

PO5\_LSAN

**Software Requirements Specification Document**

Document status

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| Version | Author | Date | Status |
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Document history

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| v.01 | Mohanad Sallam | 23/1/2020 | Create initial draft |
| v.02 | Mohanad Sallam  Sarah AbdelRahman | 29/01/2020 | Adding requirements |
| v.03 | Sarah Abdelrahman | 29/01/2020 | Adding requirements, System features and system interfaces |
| v.04 | Mohanad Sallam | 04/02/2020 | Removing Unused tittles,  Changing ID colors and Removing curly brackets |
| v.05 | Mohanad Sallam  Sarah AbdelRahman | 07/02/2020 | Updating requirements, System features and system interfaces |
| v.06 | Mohanad Sallam | 07/02/2020 | Update requirement 12 & 13, Removing system feature section. |
| v.07 | Mohanad Sallam | 11/02/2020 | Remove Requirement Description and updating Requirement tables. |

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# Introduction

## Purpose

This is a v.02 of the requirements specifications for a LED String Animation.

## Project Description

This project consists of strings of LEDs in a certain pattern. The LEDs turn on/off based on input signals. The LEDs structure consists of two parts Tail and TI. Each Part will be activated according to the corresponding switches.

At Startup Mode there are two options (Modes):

First mode: LEDs shall turn-on from L6 to L1, then from R1 to R6 and vice versa, and then all LEDs are ON and OFF.

Second mode: LEDS from R1 to R6 are ON LED by LED and also the left branch at the same time, and then repeat the scenario again.

## Block diagram



# 2.0 The Overall Description

## 2.1 User Needs

- Control the system through buttons

- Change the startup mode when needed

## 2.2 Product perspective

### 2.2.1 System interfaces

The system consists of 3 subsystems each has its own functionality:

1. Controls TI LEDs
2. Controls Tail LEDs
3. Sets the Startup mode

### 2.2.2 Interfaces

A unique signal is sent to the controller each controls one of the functionality.

# 3.0 Specific Requirements

## 3.1 Requirements Tables

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| --- | --- | --- | --- |
| **Req ID** | Req \_ PO5\_SRS \_ 001 \_ v01 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 001 \_ v01 | **Test Scope** | ITD |
| **Input** | Switch Signal | **Output** | Mode |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall select first mode if the switch is on. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 002 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 001 \_ v01 | **Test Scope** | ITD |
| **Input** | Switch Signal | **Output** | Mode |
| **Description** | Software shall select second mode if the switch is off. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 003 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | L LEDs sequence |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on L LEDs in the following sequence:   1. L6 will only turn-on for 200ms by setting pin #6. 2. L5 will only turn-on for 200ms by setting pin #5. 3. L4 will only turn-on for 200ms by setting pin #4. 4. L3 will only turn-on for 200ms by setting pin #3. 5. L2 will only turn-on for 200ms by setting pin #2. 6. L1 will only turn-on for 200ms by setting pin #1. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 004 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | R LEDs sequence |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on R LEDs in the following sequence:   1. R1 will only turn-on for 200ms by setting pin #14. 2. R2 will only turn-on for 200ms by setting pin #15. 3. R3 will only turn-on for 200ms by setting pin #16. 4. R4 will only turn-on for 200ms by setting pin #17. 5. R5 will only turn-on for 200ms by setting pin #18. 6. R6 will only turn-on for 200ms by setting pin #19. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 005 \_ v01 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | Turn-off LEDs |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-off all LEDs for 200ms. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 006 \_ v01 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | R LEDs sequence |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on R LEDs in the following sequence:   1. R6 will only turn-on for 200ms by setting pin #19. 2. R5 will only turn-on for 200ms by setting pin #18. 3. R4 will only turn-on for 200ms by setting pin #17. 4. R3 will only turn-on for 200ms by setting pin #16. 5. R2 will only turn-on for 200ms by setting pin #15. 6. R1 will only turn-on for 200ms by setting pin #14. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 007 \_ v01 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | L LEDs sequence |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on L LEDs in the following sequence:   1. L1 will only turn-on for 200ms by setting pin #1. 2. L2 will only turn-on for 200ms by setting pin #2. 3. L3 will only turn-on for 200ms by setting pin #3. 4. L4 will only turn-on for 200ms by setting pin #4. 5. L5 will only turn-on for 200ms by setting pin #5. 6. L6 will only turn-on for 200ms by setting pin #6. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 008 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | Turn-off LEDs |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-off all LEDs for 200ms. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 009 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | Turn-off LEDs |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on all LEDs for 300ms. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 010 \_ v01 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 002 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | Turn-off LEDs |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-off all LEDs. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 011 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 003 \_ v01 | **Test Scope** | ITD |
| **Input** | None | **Output** | L LEDs and R LEDs sequence |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on L LEDs in the following sequence:   1. L1 and R1 will only turn-on for 200ms by setting pin #1 and pin #14. 2. L2 and R2 will only turn-on for 200ms by setting pin #2 and pin #15. 3. L3 and R3 will only turn-on for 200ms by setting pin #3 and pin #16. 4. L4 and R4 will only turn-on for 200ms by setting pin #4 and pin #17. 5. L5 and R5 will only turn-on for 200ms by setting pin #5 and pin #18. 6. L6 and R6 will only turn-on for 200ms by setting pin #6 and pin #19. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 012 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 004 \_ v01 | **Test Scope** | ITD |
| **Input** | Tail Switch Signal | **Output** | Tail LEDs status |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on tail LEDs if tail switch is pressed. | | |

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| **Req ID** | Req \_PO5\_SRS \_ 013 \_ v01 | | |
| **Covers** | Req \_PO5\_CYRS \_ 004 \_ v01 | **Test Scope** | ITD |
| **Input** | Tail Switch Signal | **Output** | Tail LEDs status |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-off tail LEDs if tail switch is released. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 014 \_ v02 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 005 \_ v01 | **Test Scope** | ITD |
| **Input** | TI Right Switch Signal | **Output** | R LEDs status |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on the R LEDs , If right TI switch is pressed based on the following sequence:   1. R1 will only turn-on for 200ms by setting pin #14. 2. R2 will only turn-on for 200ms by setting pin #15. 3. R3 will only turn-on for 200ms by setting pin #16. 4. R4 will only turn-on for 200ms by setting pin #17. 5. R5 will only turn-on for 200ms by setting pin #18. 6. R6 will only turn-on for 200ms by setting pin #19. 7. Repeat. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 015 \_ v02 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 005 \_ v01 | **Test Scope** | ITD |
| **Input** | TI Right Switch Signal | **Output** | R LEDs status |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall stop the pattern when the TI right switch is released. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 016 \_ v02 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 006 \_ v01 | **Test Scope** | ITD |
| **Input** | TI Left Switch Signal | **Output** | L LEDs status |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall turn-on the L LEDs , If left TI switch is pressed based on the following sequence:   1. L1 will only turn-on for 200ms by setting pin #1. 2. L2 will only turn-on for 200ms by setting pin #2. 3. L3 will only turn-on for 200ms by setting pin #3. 4. L4 will only turn-on for 200ms by setting pin #4. 5. L5 will only turn-on for 200ms by setting pin #5. 6. L6 will only turn-on for 200ms by setting pin #6. 7. Repeat. | | |

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| **Req ID** | Req \_ PO5\_SRS \_ 017 \_ v02 | | |
| **Covers** | Req \_ PO5\_CYRS \_ 006 \_ v01 | **Test Scope** | ITD |
| **Input** | TI Left Switch Signal | **Output** | L LEDs status |
| **Date** | 11/02/2020 |  |  |
| **Description** | Software shall stop the pattern when the TI left switch is released. | | |