

# **Software Requirements Specification (SRS)**

## **LCD (Liquid Crystal Display)**

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### **Table of content**

- **Introduction**
- **System overview**
- **Functional Requirements**
- **Non-Functional Requirements**
- **System Constraints**
- **State Machine**

# 1 Introduction

This document contains the Software Requirements Specification (SRS) for the LCD software driver.

**a. Purpose:** The purpose of this document is to define the requirements for the software system that interacts with an LCD (Liquid Crystal Display).

**b. Scope:** This document covers the functional and non-functional requirements of the LCD software system.

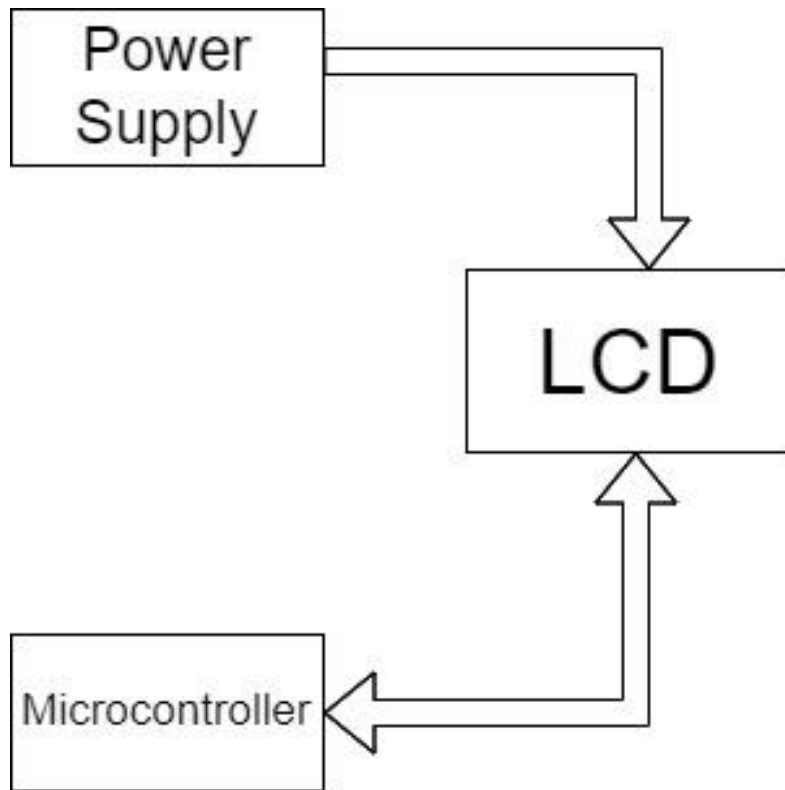
**c. Definitions, Acronyms, and Abbreviations:**

LCD: Liquid Crystal Display

# 2 System Overview

**a. Description:** The LCD system, which stands for Liquid Crystal Display system, is a widely used technology for displaying visual information in various electronic devices. LCDs are used in a wide range of applications, including televisions, computer monitors, smartphones, tablets, digital signs, and many other devices. Overall, the LCD system enables the creation of visually appealing and information-rich displays in a wide range of electronic devices, enhancing user experience and facilitating interaction with the device's content.

**b. System Context:**



### 3 Functional Requirements

**a. Display Control:** Specify the ability to control the display, including turning it on/off, adjusting brightness, and setting the contrast. [SRS\_LCD\_1]

**b. Text Display:** Define the capability to display text on the LCD, including support for different fonts, sizes, and character sets. [SRS\_LCD\_2]

**c. Character Display:** Define the capability to display text on the LCD, including support for different fonts and sizes. [SRS\_LCD\_3]

**d. Integer and float numbers display.**

[SRS\_LCD\_4]

**e. Screen Navigation:** Define the capability to navigate between different cells and characters on the LCD display.

[SRS\_LCD\_5]

**f. Error Handling:** Define how errors or exceptional conditions are handled by the LCD software system.

[SRS\_LCD\_6]

**g. Screen Clear:** Define the capability to clear different cells and characters on the LCD display.

[SRS\_LCD\_7]

**h. Configurability:** LCD must be supported in different modes 4bit mode and 8bit mode.

[SRS\_LCD\_8]

**i. Send specific command to LCD.**

[SRS\_LCD\_9]

**J. Initialize LCD.**

[SRS\_LCD\_10]

## 4 Non-Functional Requirements

**a. Performance:** Define the performance requirements, such as screen refresh rate, response time, and rendering speed.

**b. Usability:** Define the usability requirements, including user interface guidelines, intuitive navigation, and clear readability.

**c. Compatibility:** Specify any compatibility requirements, such as compatibility with different LCD models, display resolutions, or communication protocols.

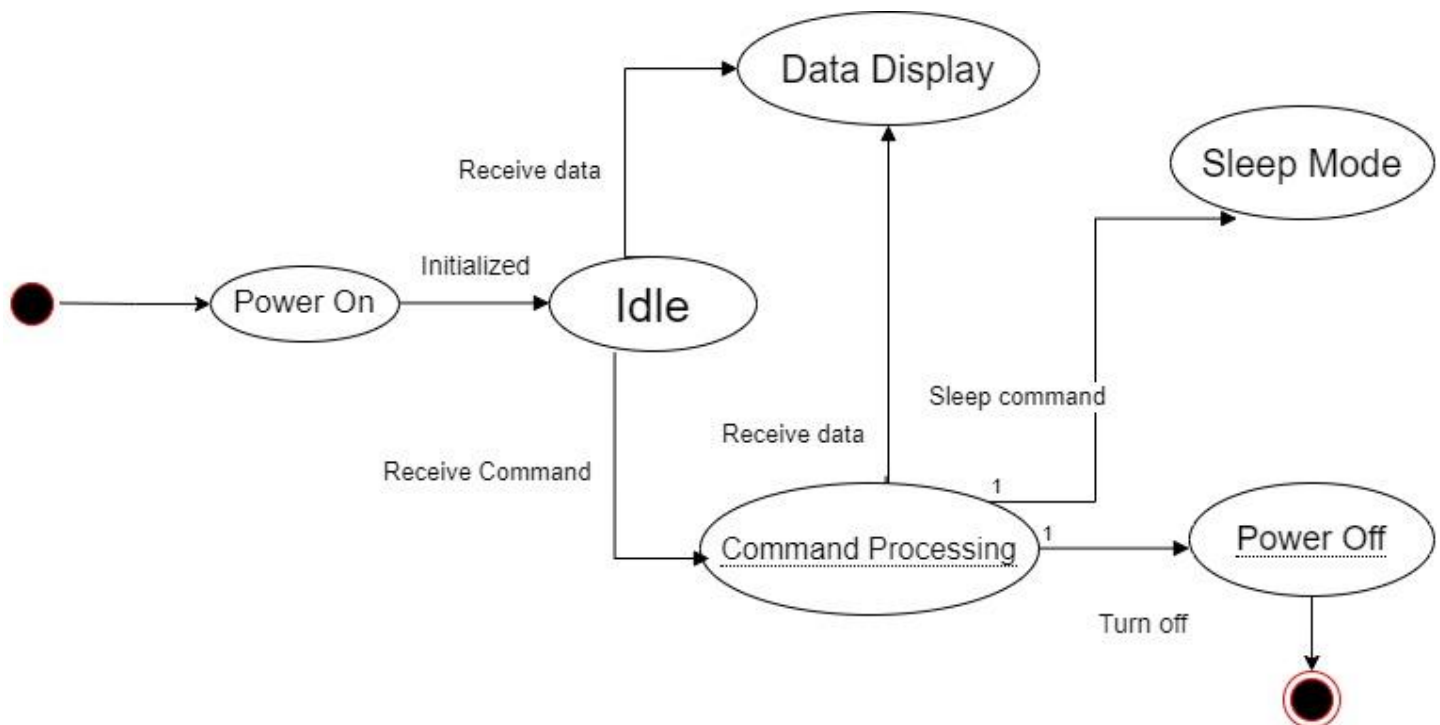
## 5 System Constraints

**a.Response Time:** LCDs have a response time, which refers to the speed at which the liquid crystals can change their orientation in response to voltage changes.

**b.Contrast Ratio:** The contrast ratio represents the difference in brightness between the darkest and brightest parts of an LCD display.

**c.Power Consumption:** LCD displays require a backlight to be illuminated, which contributes to power consumption.

## 6 State Machine



### State 1: Power-On Initialization

This state represents the initial power-up of the LCD system.

Actions in this state include initializing the LCD controller, configuring display settings, and setting up the necessary hardware components.

Transition: Upon completion of initialization, the LCD transitions to the Idle state.

### State 2: Idle

In this state the LCD is ready to receive data and commands for display.

LCD remains in this state until it receives instructions for a specific operation.

The transition to other states occurs upon receiving specific commands or data.

### State 3: Display Data

This state involves displaying data or information on the LCD screen.

The LCD controller receives data from the host device and processes it for display.

The transition to other states can occur based on specific commands or events, such as a request to clear the display or change the displayed content.

### State 4: Command Processing

In this state, the LCD controller processes commands from the host device.

Commands can include operations like setting the cursor position, adjusting display settings, or controlling backlight intensity.

After processing the command, the LCD transitions back to the Idle state to await further instructions.

## State 5: Sleep Mode

This state represents a low-power or sleep mode for the LCD.

In this state, the display may be turned off or go into a standby mode to conserve power.

The transition to other states occurs upon receiving a wake-up command or an interrupt signal.

## State 6: Power-Off

This state represents the powered-off state of the LCD system.

The display is completely turned off, and the LCD controller and associated hardware are deactivated.

The transition back to the Power-On Initialization state occurs when power is restored to the LCD system.