|  |
| --- |
|  |
| SOVY |
| Digital Calculator PO1\_DGC\_SRS |

|  |
| --- |
|  |

# Table of Contents

1. [Document Status](#Document_Status) …………………………………………………………………… 2
2. [Document History](#Document_History) …………………………………………………………………… 3
3. [Reference Documents](#Reference_Documents) …………………………………………………………….. 4
4. [Project Description](#Project_Description) …………………………………………………………………. 4
5. [Software Context Diagram](#System_Context_Diagram) ……………………………………………….……… 5
6. [Software Requirements](#System_Requirements) …………………………………………..………………. 6

# Document Status

|  |  |
| --- | --- |
| Name | SOVY |
| Version | 1.2 |
| Status | Proposed |
| Author | NK |
| Date | 7/3/2021 |

# Document History

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Author | Date | Change |
| 1.0 | AAF | 5/3/2021 | Initial Creation. |
| 1.1 | HMM | 7/3/2021 | Added Requirements:   * Req\_1ST123\_SRS\_overall\_001-V1.0 * Req\_1ST123\_SRS\_overall\_002-V1.0 * Req\_1ST123\_SRS\_overall\_003-V1.0 * Req\_1ST123\_SRS\_overall\_004-V1.0 * Req\_1ST123\_SRS\_overall\_005-V1.0 * Req\_1ST123\_SRS\_overall\_006-V1.0 * Req\_1ST123\_SRS\_overall\_007-V1.0 * Req\_1ST123\_SRS\_overall\_008-V1.0 * Req\_1ST123\_SRS\_overall\_009-V1.0 * Req\_1ST123\_SRS\_overall\_010-V1.0 * Req\_1ST123\_SRS\_overall\_011-V1.0 * Req\_1ST123\_SRS\_overall\_012-V1.0 |
| 1.2 | NKK | 7/3/2021 | Added Requirements:   * Req\_1ST123\_SRS\_overall\_013-V1.0 * Req\_1ST123\_SRS\_overall\_014-V1.0 * Req\_1ST123\_SRS\_overall\_015-V1.0 * Req\_1ST123\_SRS\_overall\_016-V1.0 * Req\_1ST123\_SRS\_overall\_017-V1.0 * Req\_1ST123\_SRS\_overall\_018-V1.0 * Req\_1ST123\_SRS\_overall\_019-V1.0 * Req\_1ST123\_SRS\_overall\_020-V1.0 * Req\_1ST123\_SRS\_overall\_021-V1.0 * Req\_1ST123\_SRS\_overall\_022-V1.0 * Req\_1ST123\_SRS\_overall\_023-V1.0 * Req\_1ST123\_SRS\_overall\_024-V1.0 * Req\_1ST123\_SRS\_overall\_025-V1.0 * Req\_1ST123\_SRS\_overall\_026-V1.0 |

# Reference Documents

|  |  |  |  |
| --- | --- | --- | --- |
| Ref. No. | Doc. Name | Version | Status |
| 1 | PO1\_DGC\_CRS\_DigitalCalculator | 1.7 | Released |
| 2 | PO1\_DGC\_HSI\_DigitalCalculator | 1.4 | Released |

# Project Description

“Sovy” is a simple digital calculator that performs basic mathematical operations and displays the operation on an LCD-screen, with an ON/OFF button and keypad for user input.

# Software Context Diagram

# 

1. **Software Req****uirements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_001-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_001-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall wait for “**Button Pressed**” signal to be received. | | | | |
| Inputs: | “**No Pressed Buttons**” signal | Outputs: | | “**No signal**” signal | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_002-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_002-V1.0 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | When Keypad Handler receives “**Button [0-9] Signal**” it sends “**Data signal**” to System Manager. | | | | |
| Inputs: | **“Button [0-9] signal”** | Outputs: | | **“Data signal”** | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_003-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_003-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall do subtraction operation when “**Sub signal**” is received. | | | | |
| Inputs: | “**Sub signal**” | Outputs: | | “**Sub operation signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_004-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_003-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall do add operation when “**Addition signal**” is received. | | | | |
| Inputs: | “**Addition signal**” | Outputs: | | “**Add operation signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_005-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_003-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall do multiply operation when signal “**Multiply signal**” is received. | | | | |
| Inputs: | “**Multiply signal**” | Outputs: | | “**Multiply operation signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_006-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_003-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Manager shall do Division operation when “**Division signal**” is received from the Keypad Handler. | | | | |
| Inputs: | “**Division signal**” | Outputs: | | “**Division operation signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_007-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_003-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The Keypad Handler shall send “**Clear Command signal**” to System Manager when “**Clear signal pressed**” is received. | | | | |
| Inputs: | “**Clear signal pressed**” | Outputs: | | “**Clear signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_008-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_003-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | when signal “**Equal signal**” is received, the system manager shall calculate the result and send “**Result signal**” to Lcd Handler | | | | |
| Inputs: | “**Equal signal**” | Outputs: | | “**Result signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_009-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_006-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall do another operation on the result when **“Multiply signal”, “Add signal”, “Sub signal”**, **“Division signal”** is received after a “**Result signal**” | | | | |
| Inputs: | **“Multiply signal”,**  **“Add signal”,**  **“Sub signal”**,  **“ Division signal”** | Outputs: | | “ **Multiply operation** ”  “ **Add operation**”,  “ **Sub operation**”,  “ **Division operation**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_010-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_004-V1.2 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall support multi operations in one line.  E.g: 2+4\*2= 10 | | | | |
| Inputs: | **“Multiply signal”,**  **“Add signal”,**  **“Sub signal”**,  **“ Division signal”** | Outputs: | | “ **Multiply operation** ”  “ **Add operation** ”,  “ **Sub operation** ”,  “ **Division operation** ” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_011-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_008-V1.1 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Handler shall secure division by zero and send “**Math Error signal**” to the Lcd Handler | | | | |
| Inputs: | **“Division signal”** | Outputs: | | **“Math Error signal”** | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_012-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_010-V1.2 |
| Author: | Habiba Mahmoud | | Date: | | 7/3/2021 |
| Description: | The System Manager shall send “**Syntax Error signal**” to the Lcd Handler when two operation signals are sent consecutively. | | | | |
| Inputs: | **“Multiply signal”,**  **“Add signal”,**  **“Sub signal”**,  **“ Division signal”** | Outputs: | | **“Syntax Error signal”** | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_013-V1.0 | | Covers: | | Req\_1ST123\_ HSI\_overall\_006-V1.0 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | The system manager shall send Lcd initialization sequence to Lcd handler.  1. “**Function Set signal**”  2. **“Cursor display mode signal**”  3. **“Clear signal**”  4. “**Entry Mode signal**” | | | | |
| Inputs: |  | Outputs: | | “**Function Set signal**”  **“Cursor display mode signal**”  **“Clear signal**”  “**Entry Mode signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_014-V1.0 | | Covers: | | Req\_1ST123\_CRS\_ overall\_004-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If The system manager receives “**Data** **signal**”, it shall send “**operand** **signal**” to the Lcd handler. | | | | |
| Inputs: | “**Data** **signal**” | Outputs: | | “**operand** **signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_015-V1.0 | | Covers: | | Req\_1ST123\_CRS\_ overall\_004-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If The system manager receives “**Sub operation signal“,** it shall send “ **Sub signal** ” to the Lcd handler. | | | | |
| Inputs: | “**Sub operation signal“** | Outputs: | | “ **Sub signal** ” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_016-V1.0 | | Covers: | | Req\_1ST123\_CRS\_ overall\_004-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If The system manager receives “**Add operation“,** it shall send “**Add signal**” to the Lcd handler. | | | | |
| Inputs: | “**Add operation signal“** | Outputs: | | “**Add signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_017-V1.0 | | Covers: | | Req\_1ST123\_CRS\_ overall\_004-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If The system manager receives “**Multiplication operation signal“,** it shall send “ **Multiply signal** ” to the Lcd handler. | | | | |
| Inputs: | “ **Multiplication operation signal“** | Outputs: | | “ **Multiply signal** ” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_018-V1.0 | | Covers: | | Req\_1ST123\_CRS\_ overall\_004-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If The system manager receives “ **Division operation signal“,** it shall send “ **Division signal** ” to the Lcd handler. | | | | |
| Inputs: | “**Division operation signal“** | Outputs: | | “ **Division signal** ” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_019-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_005-V1.0 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | When the system manager receives an “**Equal signal**” , it shall send “**Change cursor position\_signal**” to the Lcd handler. | | | | |
| Inputs: | “**Equal signal**” | Outputs: | | **“Change cursor position\_signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_020-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_005-V1.0 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | When the system manager receives an “**Result \_signal**” , it shall send “**Result** **data\_signal**” to the Lcd handler. | | | | |
| Inputs: | “**Result \_signal**” | Outputs: | | “**Result** **data\_signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_021-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_010-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If the system manager receives **“Syntax Error signal”**, it shall send  **“Syntax Error data signal ”** the Lcd handler. | | | | |
| Inputs: | Command/Data | Outputs: | | Data | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_022-V1.0 | | Covers: | | Req\_1ST123\_ CRS\_overall\_008-V1.1 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If the system manager receives **“Math Error signal”**, it shall send  **“Math Error data signal”**, to the Lcd handler. | | | | |
| Inputs: | Command/Data | Outputs: | | Data | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_023-V1.0 | | Covers: | | Req\_1ST123\_ CRS\_overall\_009-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | The system manager shall ignore any received operation signal if it is received after **“Clear command signal**” or before any “**Data signal**”. | | | | |
| Inputs: | **“Add signal”**  **“Sub signal”**  **“Mul Signal”**  **“Div Signal”** | Outputs: | | No output | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_024-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_007-V1.1 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | The System manager shall receive maximum number of “**Data signal**“ equals to the (length of LCD / 2) -1, before or after any signal operation . | | | | |
| Inputs: | “**Data** **signal**” | Outputs: | | “**operand** **signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_025-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_004-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If the System manager receives **“Clear command signal”**, the lcd handler shall clear the Lcd display. | | | | |
| Inputs: | **Clear command signal** | Outputs: | | **Clear signal** | |
| Test Scope: | ITD/ VTD | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req\_ID: | Req\_1ST123\_SRS\_overall\_026-V1.0 | | Covers: | | Req\_1ST123\_CRS\_overall\_011-V1.2 |
| Author: | Nihal Khaled | | Date: | | 7/3/2021 |
| Description: | If the System manager receives **“Clear command signal”** , any operation signal , “**Data** **signal**”, it shall send a **“Buzzer signal**” to the Buzzer handler . | | | | |
| Inputs: | **“Clear command signal”**  **“Add operation signal”**  **“Sub operation signal”**  **“Division operation signal“**  **“Multiplication operation signal“** | Outputs: | | **“Buzzer signal**” | |
| Test Scope: | ITD/ VTD | |  | |  |