**PO1\_DGC\_Digital Calculator**

**SRS Document**

**Version 1.2**

**Proposed**

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|  | **Document Change History** | | |  |
| **Version** | **Author** | **Date** | **Change** | **Status** |
| 1.0 | Mina Helmi | 03/2/2020 | * Initial creation | Draft |
| 1.1 | Hazem Mekawy | 05/2/2020 | * Review | Proposed |
| 1.2 | Mina Helmi | 07/2/2020 | * Removed requirement **Req\_PO1\_DGC\_SRS\_010\_V01**, and appended its useful parts to requirement **Req\_PO1\_DGC\_SRS\_007\_V01** * Added a new requirement **Req\_PO1\_DGC\_SRS\_012\_V01** to indicate that the user input shall be received from the keypad. * Added the desired previous state of the switch in both requirements **Req\_PO1\_DGC\_SRS\_010\_V01** and **Req\_PO1\_DGC\_SRS\_011\_V01** * Changed requirement **Req\_PO1\_DGC\_SRS\_006\_V01** to be more explicit and clear regarding the operator and the operand * Added a new requirement **Req\_PO1\_DGC\_SRS\_013\_V01** to indicate that the software design should follow the described flow chart * Renamed State Machine to Flow Chart | Proposed |

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| **Reference Document** | | |
| **Reference document** | **Version** | **Status** |
| CYRS | 1.2 | Proposed |
| HSI | 1.2 | Proposed |

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# Requirements

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| --- | --- | --- | --- |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_001\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_001\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall accept from the user 2 operands <**Opr1**> and <**Opr2**> and an operator <**Operator**> in the following order:   1. Operand 1 is a number, may contain decimal point character and/or a sign. 2. Operator, could be one of the following ASCII characters: '**+**' '**-**' '**/**' '**\***' 3. Operand 2 is a number, may contain decimal point character and/or a sign.   Operands shall be of accuracy up to 2 decimal points.  The software shall report an OK error state to <**ErrState**>.  The result of the mathematical operation shall be assigned to <**Result>**. | | |
| **Inputs** | * Opr1 * Opr2 * Operator | **Outputs** | * Result = <Opr1> <Operator> <Opr2> * ErrState = OK |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_002\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_001\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall report a bad error state <**NOK**> if an operand, either <**Opr1**> or <**Opr2**> already contained a decimal point and the user tried to type another decimal point. | | |
| **Inputs** | * Opr1 * Opr2 | **Outputs** | ErrState = NOK |
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| **Req\_ID** | Req\_PO1\_DGC\_SRS\_003\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_001\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall report a bad error state <**NOK**> if any operand either <**Opr1**> or <**Opr2**> is preceded by more than one sign. | | |
| **Inputs** | * Opr1 * Opr2 | **Outputs** | ErrState = NOK |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_004\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_002\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall send a signal to the buzzer on each press from the user on the keypad. | | |
| **Inputs** | Keypad press | **Outputs** | Buzzer tone 1 |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_005\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_002\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall send a signal to the buzzer when a bad error state is reported <**NOK**> at any point during the software execution. | | |
| **Inputs** | ErrState = NOK | **Outputs** | Buzzer tone 2 |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_006\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_003\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall check the operator <**Operator**> if it’s equal to the ASCII symbol '**/**' and the second operand <**Opr2**> if it’s equal to 0, and report a bad error state <**NOK**> if a division by zero occurred. | | |
| **Inputs** | * Opr2 * Operator | **Outputs** | ErrState = NOK |
|  | | | |

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| **Req\_ID** | Req\_PO1\_DGC\_SRS\_007\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_003\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall display an error message if a bad error state <**NOK**> was reported at any point during the software execution for only 2 seconds on the first line of the LCD exclusively, then the retained user input shall be displayed again and the cursor is set back to its last saved location. | | |
| **Inputs** | ErrState = NOK | **Outputs** | Error message: "**ERR: Wrong Input**" |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_008\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_004\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall display the user operands <**Opr1**> and <**Opr2**> and the operator <**Operator**> on the first line of the LCD, then update the cursor position <**Cur\_x**> and <**Cur\_y**>. | | |
| **Inputs** | * Opr1 * Opr2 * Operator | **Outputs** | * Cur\_x * Cur\_y * Output on the first line of the LCD |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_009\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_004\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall display the result of the mathematical operation <**Result**> on the second line of the LCD, and update the cursor positions <**Cur\_x**> and <**Cur\_y**> correspondingly. | | |
| **Inputs** | Result | **Outputs** | * Cur\_x * Cur\_y * Output on the second line of the LCD |
|  | | | |

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| **Req\_ID** | Req\_PO1\_DGC\_SRS\_010\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_005\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall turn on and clear the display, reset the cursor location <**Cur\_x**> and <**Cur\_y**>, and start a new session if the user pressed the ON/OFF switch, regardless of the previous switch state. | | |
| **Inputs** | ON/OFF switch | **Outputs** | * LCD on * Clear LCD * Cur\_x * Cur\_y |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_011\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_005\_V01 |
| **Author** | Mina Helmi | **Date** | 03 / 02 / 2020 |
| **Description** | Software shall turn off the display if the user pressed the ON/OFF switch, and the previous switch state was <**OFF**> | | |
| **Inputs** | ON/OFF switch = OFF | **Outputs** | Turn off LCD |
|  | | | |

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| **Req\_ID** | Req\_PO1\_DGC\_SRS\_012\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_001\_V01 |
| **Author** | Mina Helmi | **Date** | 07 / 02 / 2020 |
| **Description** | Software shall accept the user input from the keypad and store it in either one of the operands <**Opr1**> or <**Opr2**> or in the operator <**Operator**> | | |
| **Inputs** | ON/OFF switch = OFF | **Outputs** | * Opr1 * Opr2 * Operator |
|  | | | |
| **Req\_ID** | Req\_PO1\_DGC\_SRS\_013\_V01 | **Covers** | Covers\_ PO1\_DGC \_CYRS\_001\_V01 |
| **Author** | Mina Helmi | **Date** | 07 / 02 / 2020 |
| **Description** | Software shall follow the described flow chart | | |
| **Inputs** | Flow Chart | **Outputs** | Overall software design |
|  | | | |

# Flow Chart

Figure : Flow Chart

**No**

No

Yes

No

Yes

No

Turn off  
display

Is calculator on?

Result = <Opr1> <Operator> <Opr1>

Trigger  
buzzer

Display error message

Display error message

Trigger  
buzzer

Is operand valid?

Get  
operand 1  
<Opr1>

Get  
operator

Is operand valid?

Turn on  
display

Reset  
cursor

Clear  
display

Get  
operand 1  
<Opr1>