|  |  |  |
| --- | --- | --- |
| |  | | --- | | **Software Design Notes** | |  | |
| **FOR EDUCATIONAL USE ONLY** |

|  |
| --- |
| **What is a miniPCB?** |
| A miniPCB is a printed circuit board that contains a layout of an electronic circuit. |
| A miniPCB has a mechanical design that is consistent with numerous similar miniPCBs. |
| A miniPCB has an interface connector that is simple and economical. |
| A miniPCB has educational documentation that is approved by an engineer. |
| A miniPCB is sold in minimum-order-quantities determined by the PCB panel size. |
| [www.minipcb.com](http://www.minipcb.com)  This document is available for free as a download from the GitHub repository: <https://github.com/miniPCB>  This document is associated with the miniPCB Channel on YouTube:  <https://www.youtube.com/@minipcb> |

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# Introduction

## Purpose

The purpose of this document is to record software design notes for the 13A-777 miniPCB.

## Scope

The scope of this document is limited to specifications and requirements, source code, and firmware releases.

## File Locations

|  |  |
| --- | --- |
| **FILE NAME** | **FILE LOCATION** |
| [ALL] | https://github.com/miniPCB/EAGLE/tree/main/miniPCB/13/A/13A-777 |

# Specification Requirements

#### SSR1 – Hardware Abstraction

No text (title)

#### SSR1.1 – Power

Manage power mode with these functions:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| sleepDeep | Minimal power consumption mode. |
| sleepActive | Low power consumption mode without sleeping. |
| activeGame | High power consumption mode. |
| batteryVoltage | Reads the current battery voltage. |

#### SSR1.2 – LCD

Control the 2x16 LCD with these functions:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| setContrast |  |
| setBacklight |  |
| refreshScreen |  |

#### SSR1.3 – LED

Control the LED indicator with these functions:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| setLED |  |
| clearLED |  |
| toggleLED |  |

#### SSR1.4 – Primary Select Button

Interface with the primary select button with this function:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| readSelectButton | Signals include: (1) wake, (2) confirm, (3) select. |

#### SSR1.5 – Rotary Encoder

Interface with a rotary encoder with these functions:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| setEncoderRGB | Sets color of the RGB LED on the encoder. |
| readEncoderButton | Reads the encoder button switch. |
| readEncoderRotation | Reads the encoder rotation count. |

#### SSR1.6 – Device Clock

Maintain a device clock with 1 second resolution with these functions:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| setTimer | Sets value in timer counter. |
| getTimer | Reads value in timer counter. |
| incTimer | Increments value in timer counter. |
| spareTime | Returns with the counts available in the long (8 bytes). |
| secondsRatio | Returns with the ratio of current\_count per max\_count. |

#### SSR1.7 – Device Histogram

Maintain a device histogram with these functions:

|  |  |
| --- | --- |
| **FUNCTION** | **DESCRIPTION** |
| recordHistogram | Adds a new record to the device histogram. |
| playHistogram | Moves each value of the device histogram through the working register. |

#### SSR1.7.1 – Device Histogram Matrix

Device histogram will be comprised of a matrix with three orthogonal vector spaces: (1) game result, (2) device count ratios, and (3) user feedback.

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **DATA NAME** | **TYPE** | **INTUITIVE FOCUS** |
| **0** | GAME RESULT 0 | char | GAME CONVITAE \* USER CONVITAE |
| **1** | GAME RESULT 1 | char |
| **2** | GAME RESULT 3 | char |
| **3** | GAME RESULT 4 | char |
| **4** | GAME RESULT 5 | char |
| **5** | GAME RESULT 6 | char |
| **6** | GAME RESULT 7 | char |
| **7** | GAME RESULT 8 | char |
| **8** | SECOND COUNT RATIO | char | DEVICE CONVITAE |
| **9** | BUTTONPRESS COUNT RATIO | char |
| **10** | ROTATION COUNT RATIO | char |
| **11** | ENCODERPRESS COUNT RATIO | char |
| **12** | BATTERY VOLTAGE RATIO | char |
| **13** | USER FEEDBACK 0 | char | DEVICE CONVITAE \* USER CONVITAE |
| **14** | USER FEEDBACK 1 | char |
| **15** | USER FEEDBACK 2 | char |

#### SSR1.7.2 – Device Count Ratios

Device count ratios are computed by dividing a count-value by the max-count-value.

#### SSR2 – Game Functionality

No text (title)

#### SSR2.1 – Core Functionality

Selects catalog entries according to three variables: (1) the user control of the button input, (2) the game being played, and (3) the state of game being played.

# Source Code

Table – \FilePath\FileName1.ext

|  |
| --- |
| INSERT CODE HERE |

Table – \FilePath\FileName2.ext

|  |
| --- |
| INSERT CODE HERE |

Table – \FilePath\FileName3.ext

|  |
| --- |
| INSERT CODE HERE |

Table – \FilePath\FileName4.ext

|  |
| --- |
| INSERT CODE HERE |

# Firmware Release History

Table – Release 000-000-0-NM.DDMMMYYYY

|  |  |
| --- | --- |
| **File Name** |  |
| **File Size** |  |
| **File Location** |  |
| **Target Hardware** |  |
| **Maturity Level** |  |
| **Compiler Notes** |  |

Table – Release 000-000-0-NM.DDMMMYYYY

|  |  |
| --- | --- |
| **File Name** |  |
| **File Size** |  |
| **File Location** |  |
| **Target Hardware** |  |
| **Maturity Level** |  |
| **Compiler Notes** |  |

# Change and Liability Notice

This document is subject to change without notice. While effort has been made to ensure the accuracy of the material contained within this document, Nolan Manteufel shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this document.

# Trademark Notice

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This document does not constitute permission to use the miniPCB trademark.

|  |  |  |
| --- | --- | --- |
| WORDMARK | FIGUREMARK | FIGUREMARK |
| miniPCB™ | A picture containing drawing  Description automatically generated™ | Icon  Description automatically generated™ |

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| REV | DESCRIPTION | ECO | DATE |
| A | Initial Release | N/A | DDMMMYYYY |
|  |  |  |  |

# Related Content

|  |  |  |  |
| --- | --- | --- | --- |
| # | TYPE | DESCRIPTION | LOCATION |
| 1 | Sale Posting | eBay |  |
| 2 | Sale Posting | Mouser |  |
| 3 | Repository | Engineering Files | https://github.com/miniPCB/EAGLE/tree/main/miniPCB/13/A/13A-777 |
| 4 | Video | Preparation | https://youtu.be/YeX36dg0lwk |
| 5 | Video | Design | https://youtu.be/6YcOx\_vTpKk |
| 6 | Video | Documentation | https://youtu.be/-dhOiV1X4uM |
| 7 | Video | Development |  |
| 8 | Video | Testing |  |
|  | Video | Engineering Release |  |