*Instrument tuner*

Product Design Specification

Designer: *Andrew Timmons, Brian Cummings*

Version: *1.0*

*04/21/2023*

TABLE OF CONTENTS

[1 Introduction 3](#_Toc4584630)

[1.1 Purpose of The Product 3](#_Toc4584631)

[2 General Overview and Design Guidelines/Approach 3](#_Toc4584632)

[2.1 Assumptions / Constraints / Standards 3](#_Toc4584633)

[3 Architecture Design 3](#_Toc4584634)

[3.1 Logical View 3](#_Toc4584635)

[3.2 Hardware Architecture 3](#_Toc4584636)

[3.3 Software Architecture 3](#_Toc4584637)

[3.4 Security Architecture 3](#_Toc4584638)

[3.5 Communication Architecture 3](#_Toc4584639)

[3.6 Performance Considerations 3](#_Toc4584640)

[3.7 Power considerations 3](#_Toc4584641)

[3.8 SENSORS/aCTUATORS DESCRIPTION 3](#_Toc4584642)

[4 System Design 3](#_Toc4584643)

[4.1 Use-Cases 4](#_Toc4584644)

[4.2 Data Conversions 4](#_Toc4584645)

[4.3 Application Program Interfaces 4](#_Toc4584646)

[4.4 User Interface Design 4](#_Toc4584647)

[4.5 Performance 4](#_Toc4584648)

[4.6 Bill of material (BOM) 4](#_Toc4584649)

[4.7 Calibration and test procedures 4](#_Toc4584650)

[5 Conclusion on Product Design Specification 5](#_Toc4584651)

[Appendix A: References 6](#_Toc4584652)

[Appendix B: Key Terms 7](#_Toc4584653)

# Introduction

## Purpose of The Product

This product can be used to tune a stringed instrument to a specific tuning by specifying the targeted frequency for each string. This provides a simple way for musicians to tune their instrument without needing to be able to recognize the target note by ear.

# General Overview and Design Guidelines/Approach

Describe the general use of the product. What are the principles and strategies used when designing and implementing the system.

This product is used to tune instruments using a sound sensor. When the sound sensor detects a frequency it recognizes, an LED corresponding to that frequency will light up. Higher or lower frequencies within a close range to the target frequency will light a calibration LED, (red, blue, or green). If the calibration LED is green your instrument is calibrated.

## Assumptions / Constraints / ~~Standards~~

[Describe any general design assumptions / constraints / standards related to any of the project’s design]

Design Assumptions:

1. The instrument being tuned is a guitar.
2. The user does not strum a cord (assumes a single frequency)
3. The sound sensor is within a close distance to the instrument.

# Architecture Design (At least one block diagram is required in this section)

This section outlines the system and hardware architecture design of the system that is being built.

[Describe the system architecture, how the application interacts with other applications. Not necessarily how the application itself works but, how the appropriate data is correctly passed between applications.]

## Logical View

[Insert any related logical views]

## Hardware Architecture

[Insert any related hardware architecture documents]

## Software Architecture

[Insert any software architecture documents]

## Communication Architecture

[Insert any related communication architecture documents]

## Performance Considerations

[Insert any performance documents]

## Power considerations

[Insert any power considerations]

## SENSORS/aCTUATORS DESCRIPTION (required section)

[Insert any sensors/actuators description]

# System Design

## Use-Cases

[Insert any related project use cases]

## Data Conversions

[Insert any documents describing any necessary data conversions.]

## Application Program Interfaces

[Insert any application program interface documents

\*Serial plotter graph\*

## User Interface Design

[Insert any user interface design documents or provide a reference to where they are stored.]

No user interface

## Performance

[Insert any performance documents.]

## Bill of material (BOM) (required section, include only component that are part of your product)

[Insert the list of required components with the cost]

## Calibration and test procedures

[Insert any calibration and/or test procedure]

Calibration of the potentiometer to make sure the device is sensitive enough to register noise.

# Conclusion on (required section)

[Summarize your experience with this project. What challenges you faced, did you mean the specifications, any ways to improve]

Appendix A: References

[Insert the name, version number, description, and physical location of any documents referenced in this document. Add rows to the table as necessary.]

The following table summarizes the documents referenced in this document.

|  |  |  |
| --- | --- | --- |
| **Document Name and Version** | **Description** | **Location** |
| *<Document Name and Version Number>* | *[Provide description of the document]* | *<URL or Network path where document is located>* |

Appendix B: Key Terms

*[Insert terms and definitions used in this document. Add rows to the table as necessary. Follow the link below to for definitions of project management terms and acronyms used in this and other documents.*

*http://www2.cdc.gov/cdcup/library/other/help.htm*

The following table provides definitions for terms relevant to this document.

|  |  |
| --- | --- |
| **Term** | **Definition** |
| *[Insert Term]* | *[Provide definition of the term used in this document.]* |
| *[Insert Term]* | *[Provide definition of the term used in this document.]* |
| *[Insert Term]* | *[Provide definition of the term used in this document.]* |