Production Model Design Report

F2019 – ECE 298

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| Lab Section: | 6 | Group: | 2 |

[For your project, your group will complete one Production Model Design Report. The audience is your manager and the manager of the Production Engineering team, so the document should be of high quality. Inside this report, you will each individually select two issues that must be addressed when bringing a project to production scale (one STEM and one non-STEM issues – choose different topics than your partner). Delete all the instructions in brackets before submitting this document. Use IEEE format to note any relevant references or links [1]. You do this in Word by going to References 🡪 Citations & Bibliography 🡪 Manage Sources to add a source, and then to Insert Citation to use it.]

# Team Members

|  |  |  |
| --- | --- | --- |
| # | Name | Role |
| 1 | Waleed Ahmed | Primary Software Developer |
| 2 | Muhammad Shah | *Primary Hardware Designer* |

# Design Overview

## Problem Statement

[Paste the problem description that you chose to pursue from the provided list of problems. You can edit it as you see fit.]

Autistic children sometime have trouble getting the attention of their parents and caregivers, especially those with verbal impediments. Conversely, parents and caregivers are often worried about leaving their autistic child unattended for fear that they will not know when the child needs their attention. Design a solution to this problem that includes at least one sensor and two indicators.

## Design Scope

*[Describe, at a high level, how you solved the problem within the scope of the course.]*

This project solves the problem by giving autistic children a non-verbal means of acquiring their parents’ attention. The solution consists of an ergonomic enclosure with a limited set of buttons that cause their parents’ and caregivers’ smartphones to notify them that the child needs attention.

*[State any assumptions that appropriately limit the scope of the project.]*

It was assumed that the device will operate in a home with reliable Wi-Fi, that the child is at least three years old, and that the child can hold objects.

## Project Design Requirements

[Paste the requirements that you developed and modified from your Feasibility Model Design document.]

1. The device must not be prone to accidentally turning it off
2. The battery must last at least one month while on
3. The device must remain connected to the internet via Wi-Fi
4. The enclosure must be easy for a child of age three and older to hold
5. The enclosure must have an easy means of securing it to a child so they don’t lose it
6. The project must display the output of the ultrasonic sensor readings, converting the sensor digital readings to a distance value to be displayed on the LCD.
7. The project must turn on a certain coloured LED corresponding to a distance value found from the front sensor value.
8. The project must also create 2 different sounds based upon the distance calculated from the back facing sensor value.
9. The project must also take in push button values that then correspond to setting up and configuring the MCU in either user mode or setup mode anzd the other push button should be able to set user threshold values.

## System-Level Design (High-Level)

[Include the updated/corrected figures from your Template for Feasibility Model Design document and add appropriate figure captions to explain what each one is.]

## Completed Prototype

[Include one or more pictures of your completed prototype system and add appropriate figure captions to explain what each picture shows.]

## Preliminary Production Design Changes

[Identify any simple enhancements or improvements that should be included in a future revision of the product.]

# Member 1 Production Details

[Member 1 Name] – ID# [Member 1 ID#]

## [STEM Issue]

[Replace heading with one of these topics: Design for Test (DfT), Design for Manufacturability (DfM), Design for Reliability (DfR), Cables and Connectors, Mechanical Enclosure, Further Integration.]

[Write one paragraph explaining the topic.]

[Write one paragraph explaining how the topic relates to your project.]

[Propose a high-level set of next steps and state any thoughts or issues that should remain top-of-mind for the production engineer who will take your prototype through to a production-ready product. Refer to any codes, standards, or parts that should be noted by the engineer.]

## [Non-STEM Issue]

[Replace heading with one of these topics: Energy Efficiency, Sustainability, Supply Chain Management, Cost Analysis at Volume, RoHS / Environmental Safety, Ethical Considerations, Safety Considerations.]

[Write one paragraph explaining the topic.]

[Write one paragraph explaining how the topic relates to your project.]

[Propose a high-level set of next steps and state any thoughts or issues that should remain top-of-mind for the production engineer who will take your prototype through to a production-ready product. Refer to any codes, standards, or parts that should be noted by the engineer.]

# Member 2 Production Details

[Member 2 Name] – ID# [Member 2 ID#]

## [STEM Issue]

[Replace heading with one of these topics: Design for Test (DfT), Design for Manufacturability (DfM), Design for Reliability (DfR), Cables and Connectors, Mechanical Enclosure, Further Integration.]

[Write one paragraph explaining the topic.]

[Write one paragraph explaining how the topic relates to your project.]

[Propose a high-level set of next steps and state any thoughts or issues that should remain top-of-mind for the production engineer who will take your prototype through to a production-ready product. Refer to any codes, standards, or parts that should be noted by the engineer.]

## [Non-STEM Issue]

[Replace heading with one of these topics: Energy Efficiency, Sustainability, Supply Chain Management, Cost Analysis at Volume, RoHS / Environmental Safety, Ethical Considerations, Safety Considerations.]

[Write one paragraph explaining the topic.]

[Write one paragraph explaining how the topic relates to your project.]

[Propose a high-level set of next steps and state any thoughts or issues that should remain top-of-mind for the production engineer who will take your prototype through to a production-ready product. Refer to any codes, standards, or parts that should be noted by the engineer.]

# References

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| [1] | "IEEE Style," 2019. [Online]. Available: https://pitt.libguides.com/citationhelp/ieee. |

# Appendix – Detailed Design

*[Include design documentation here. The idea is for this document to be a fully detailed snapshot of the prototype. Include the four tables from your Template for Prototype Design document, schematics, layouts, code or a link to a repository, mechanical drawings, etc. I put a Section Break before this part, so you can put the pages landscape if that works better and it won’t affect those pages up front.]*