

Digital Distance Meter

Software Requirements Specification

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Revision History

| Date | Description | Author | Comments |
|-----------|----------------|------------|----------------|
| Date | Version Number | Your Name | First Revision |
| 18/3/2016 | #1 | Nuha Bahaa | |
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1. Introduction

1.1 Purpose

This SRS is written for technical engineer in order to be aware of customer requirements and it is also written for all the project team members to make the product targets clear.

1.2 Scope

Digital Distance Meter is a device used to measure distance accurately and efficiently, the device's range limit is 3m max and 10cm min.

The Project will introduce new digital distance meter; including the following:

- *Ultrasonic sensor HC-SR04*
- *Alphanumeric LCD 2x16*
- *Atmega32 micro-controller*
- *Buzzer*

The project target is to measure distance accurately and when reaching certain threshold distance a buzzer gets turned on.

The project only measure distance and take action based on it, no more features are included.

1.3 Definitions, Acronyms, and Abbreviations

LCD: Liquid Crystal Display

1.5 Overview

- *The 1st section describes the product definition, purpose and scope.*
- *The 2nd section describes the product description, perspective, functionality, characteristic and constraints.*
- *The 3rd section describes the product requirement (functional and non functional) and the system functions using case diagram.*

2. General Description

2.1 Product Perspective

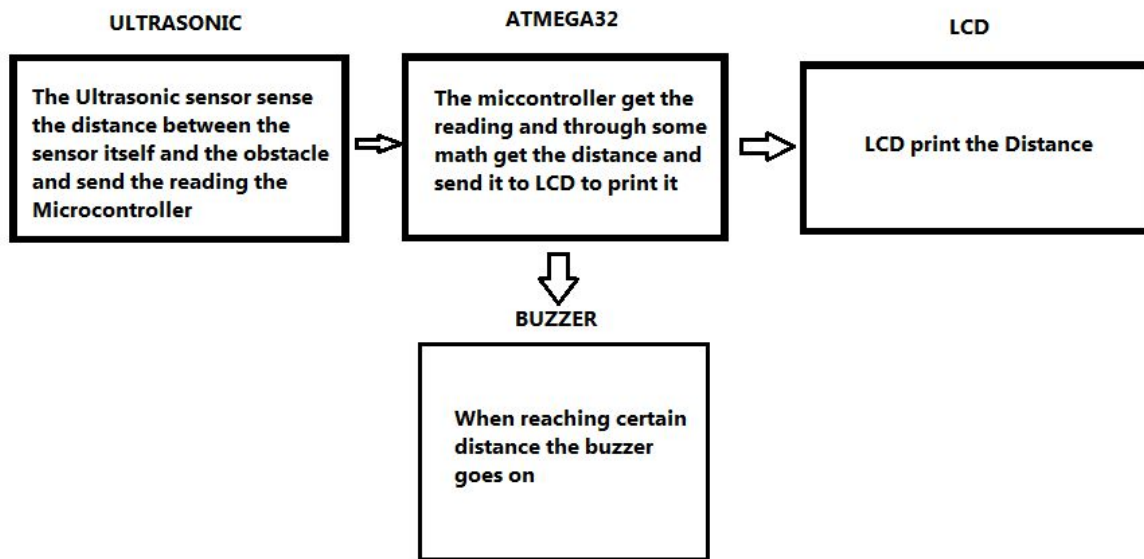
This Product is one time stand alone product, no further development will be introduced in this product.

This product is composed of 4 main components:

- *LCD module*
- *Ultrasonic sensor module*
- *Atmega32 micro-controller*
- *Buzzer*

2.2 Product Functions

- Through Ultrasonic sensor's reading and after some math calculations using Atmega32 micro-controller distance will be calculated between the user and the obstacle and print the distance on LCD.
- When the measured distance reaches a certain threshold point a buzzer goes on.



2.3 User Characteristics

This product is not dedicated for certain or specific user it's for general public any gender with any age can use it but the user age must be at least 15 years old and above.

2.4 General Constraints

Due to using micro-controller with limited memory we can't save the past distance measurements which leads to less functionality and limit any further development in the product

2.5 Assumptions and Dependencies

- The hardware components are available and no shortage of any of the component's stock

3. Specific Requirements

3.1 External Interface Requirements

Supports unit selection of meter

Handheld Digital Distance Meter 3m

High accuracy Measurement for distance,area,Volume Wide measuring range

Supports data hold and data clear function

No Log system or memory Required

Voice indication

Battery Power Based

3.1.1 User Interfaces

-16 character *2 Lines LCD with colored back-light

-English Language used for the interface

-Digital Number Displays the Distance in form(0.0m)

3.1.2 Hardware Interfaces

-Button to switch the meter on and off

-Led to indicate power on and off

-Ultrasonic sensor measure the distance

3.2 Functional Requirements

3.2.1 <Power On>

3.2.1.1 Introduction

System is Battery based which is must be able to turned on by push button used to power on the system the LCD screen must light on when this function execute.

3.2.1.2 Inputs

Push Button pressed

3.2.1.3 Processing

push button sends powering on signal to the system components.

3.2.1.4 Outputs

LCD turned on .

3.2.1.5 Error Handling

Test the system when the push button fails by connect the system directly to the power source.

3.2.2 <Display Distance>

3.2.1.1 Introduction

Display distance in digital format in meters

3.2.1.2 Inputs

reads from the ultrasonic sensor

3.2.1.3 Processing

send signal by the ultrasonic sensor to the target point and calculate the distance according to the reflected signal.

3.2.1.4 Outputs

Distance in digital representation on led represents in digital english numbers.

3.2.3 <Power Off>

3.2.1.1 Introduction

System is Battery based which is must be able to turned off by push button used to power off the system the LCD screen must light off when this function execute.

3.2.1.2 Inputs

Push Button pressed

3.2.1.3 Processing

push button sends cut the power from the system components.

3.2.1.4 Outputs

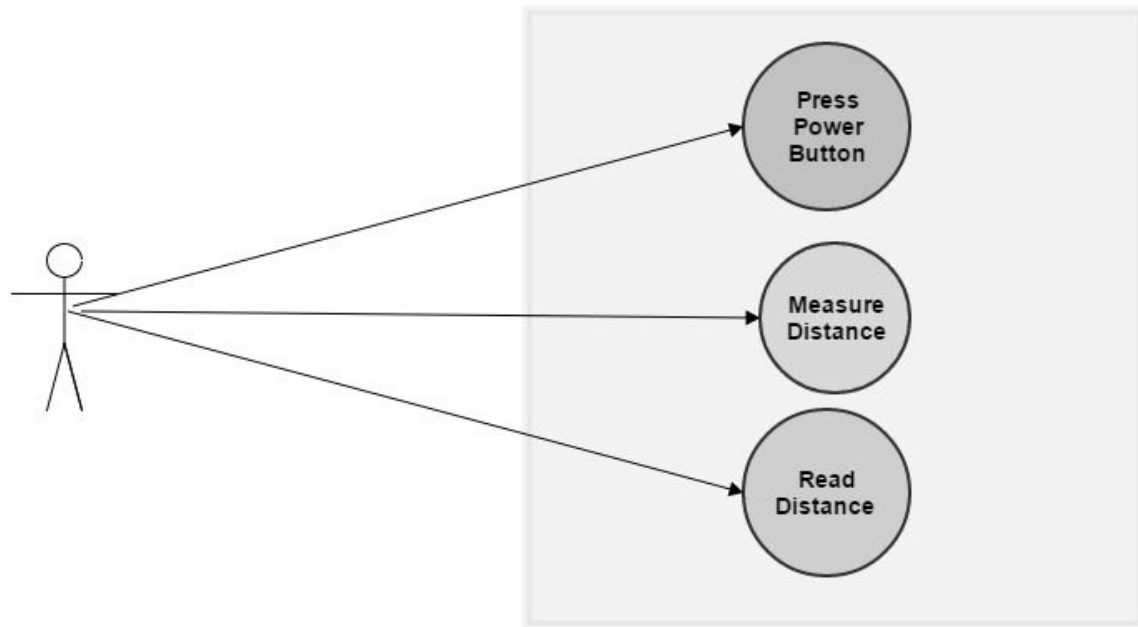
LCD turned off .

3.2.1.5 Error Handling

Test the system when the push button fails by disconnect the system directly from the power source.

3.3 Use Cases

3.3.1 Digital Distance Meter System



3.4 Non-Functional Requirements

3.4.1 Performance

System should be able to work with 100% performance and regular power consumption in normal room temperature and Humidity.

3.4.2 Reliability

System responding to user action should be in less than 1second.
distance should be accurate error parentage shouldn't exceed 1%.
battery can bias the system for one hour.

3.4.3 Maintainability

Device is surrounded by shield to protect the inner components from destroying

3.4.4Portability

Handheld device with acceptable size and holder.

3.5 Design Constraints

-Ultrasonic sensor maximum range is 3m ,so if distance is larger than 3m device will not be able to measure the distance.and should be able to sense till 10cm.

5. Change Management Process

| <i>Name</i> | <i>Update Number</i> | <i>Update Description</i> | <i>Update Date</i> | <i>Approving Check</i> |
|-------------|----------------------|---------------------------|--------------------|------------------------|
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