

Home Safe

Requirements Definition Document

RDD Version 1.0

Team #1

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1 Introduction

This Required Definition Document (RDD) outlines the functional and non-functional requirements of the digital safe box. Smart digital locks are getting increasingly popular in the United States than its mechanical counterparts because it is more convenient, relatively faster, and provides smart access to the end user over the security system. To develop a well-secured digital lock system requires advanced technology and engineering, making it more expensive, and difficult to deploy or maintain as compared to a regular mechanical lock box. Our top-notch engineers promise to develop and deliver a robust digital safe box that is secure, affordable, portable, convenient, and easier to maintain. This document provides a detailed overview of our objectives, system components and organization, functionalities, and design constraints of the system.

Digital home safe is an electronic lock which uses 4 pin authentication mechanism to prevent any unauthorized access to the system. It is also portable, durable, easy to use and reprogram, and is the perfect safe for keeping personal items of value.

2 Objectives

Digital home safe promises to be

2.1 Security

Our Digital Home Safe assures secure access to the system using authentication systems like 4-digit pin codes and two factor authentication. The system is also brute-force resistant because it includes an embedded security notification system that notifies the main account (via email or phone) when there are more than 4 failed login attempts into the system.

2.2 Convenience

Digital safe box provides faster access to the system using pin or password entry methods. Along with this, our digital safe box is portable and fully functional on a rechargeable embedded battery. Users can also interact with Home Safe via Bluetooth. It is more convenient and easier to use.

2.3 Smart Control

Digital Home safe enables distributed access to the system through a profilebased user system. However, the administrative privileges like deleting, creating or time-based freezing of a user profile belongs to the parent account created during the time of initial setup and installation. Furthermore, Home Safe offers more regulated control with inbuilt features such as one-time guest code and timed lockout.

2.4 Affordability

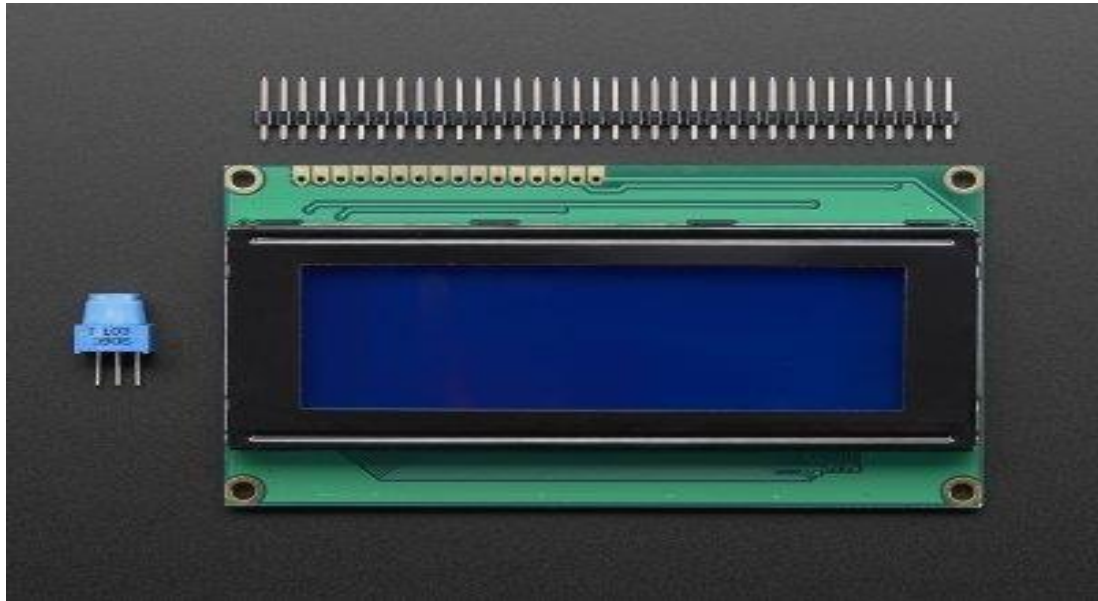
Home safe promises to be highly affordable with a cap price of \$200 maximum for a standard unit of dimension as follows: Interior: 10 * 8 * 12 inches
Exterior: 14 * 12 * 14 inches

3 System Organization

Home Safe is a hardware-software integrated system. The building components of the systems are detailed as follows:

3.1 Hardware Components

3.1.1 Storage Container



Digital Home Safe has a small display connected to a keypad which is used for the following features:

- Displays the state of the lock. i.e Open, closed or freeze.
- Displays the UI for the system.
- Displays the input made by the user from the keypad.

Specifications:

Dimensions:	3 * 1.5 * 0.3 inches
Display:	0.9 * 2.7 inches

3.1.2 Keypad



Digital Home safe consists of a keypad the user can use to operate the system.

The keypad consists of 10 numeric keys (0-9), 2 buttons (enter and backspace) to navigate the UI.

Specifications:

Total Keys:	12
Dimensions:	6 * 3 * 1 inches

3.1.3 Microcontroller



Digital Home Safe uses a microcontroller to program the system.

Specifications:

Micro Controller	Atmega328p
Digital I/O pins	14
Clock Speed	16 Mhz

3.1.4 Battery



Digital home safe consists of 4 AA alkaline batteries to power the lock system. Specifications:

Volts:	1.4V
Quantity:	4
Rechargeable:	Yes
Battery:	AA alkaline

3.1.5 Storage Container



Digital Home Safe comes with a double layered anti-theft storage container which is fire and waterproof.

Specifications:

Color:	Black
Lock Type:	Electronic, Key
Dimensions:	14 * 12 * 14 inches
Material:	Alloy Steel

3.2 Software components

The control software for the system will be programmed in Java. The control software interacts with the user through UI and receives incoming input from the keypad, and then verifies if the security pin is correct. If the security pin is correct, then it will send a signal to open the lock via the microcontroller. The software also keeps record of the user profiles and any changes to the system.

4 Capabilities

4.1 Secure Access

Digital Home Safe ensures maximum security by providing access to only authorized users of the system. Features like Dual factor authorization can be enabled by every user profile which adds an extra layer of security to the system.

4.2 Programmable

Digital Home Safe provides each user profile with the privilege of resetting their profile security pin access in case they forget it which makes it a lot more convenient and easier to use since customers do not have to worry about losing a mechanical key. The central authority is vested in the parent account which is provided with the administrative privileges to create, freeze, or delete user profiles giving the customer more regulated control over their security system.

4.3 Advanced Features

Users can interact with the Digital Home Safe via Bluetooth and Wi-fi, which makes it convenient and easier to access. Access via Bluetooth and Wi-fi allows users to access the system using various authentication methods like one time guest access codes, times entry and passwords.

4.4 Manual Entry

Digital Home Safe also provides the customer with a manual entry to the safe box using a mechanical key, which can be useful to manually override the system in the event the system freezes.

5 Design Constraints

- The software for the product must be deliverable in two weeks' time.
- The software should not store any kind of identification or personalized information of the users.
- The software must enable a security notification system for excessive failed login attempts.
- The cost of the hardware components of the Digital Home Safe should not cost more than 100\$.
- The product must be portable and as such should not weigh more than 60 pounds.
- The product must be produced in large quantities to ship it all over the United States.