Fingerprint Lock System Manual

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1 Introduction

This project, developed for the Computer Architecture lecture at the University of Basel, integrates multiple components to provide secure access control. This system provides a robust and secure method for access control. With PIN and fingerprint authentication, users can effectively manage entry permissions while ensuring security.

2 System Overview

2.1 Components

- **LCD Display:** Displays system messages and prompts.

- **Fingerprint Sensor:** Allows fingerprint enrollment and authentication.

- **Keypad:** Enables PIN entry and menu navigation.

2.2 Operating Modes

1. **Default Mode:** Displays the current time and options to access the menu or unlock the door.

2. **Menu Mode:** Allows the user to perform administrative tasks like managing fingerprints and changing PINs.

3 System Setup

3.1 Powering the System

1. Connect the 12V power supply to the power socket.

2. Ensure all components are properly wired.

3.2   Initializing the System

Upon startup, the system will:

- Display an initialization message.

- Connect to the Wi-Fi network.

- Synchronize the time via an NTP server.

4   Functionalities

4.1   Unlocking the Door

- Press # on the keypad.

- Authenticate via fingerprint within allowed hours (8 AM – 8 PM).

- If a registered fingerprint is matched, the door will unlock.

4.2   Menu Access

- Press * to enter the menu.

- Enter the master PIN (default: 9999).

- Navigate through options for fingerprint management and PIN changes.

4.3   Menu Functionalities

- **Fingerprint Management:**

  - Add Fingerprint
  - Remove Fingerprint

- **Change PIN:**

  - Enter current PIN
  - Set a new PIN

- **Exit Menu:** Press * to return to the main screen.

5   Error Handling

Error Message	Cause	Solution
No Match Found	Fingerprint not recognized	Try again, enroll if necessary
Wrong PIN	Incorrect PIN entered	Re-enter the correct PIN
WiFi Connecting	Wi-Fi connection issue	Check SSID and password
Timeout	No fingerprint detected within time	Place the finger correctly