Bangladesh University of Business & Technology (BUBT)

FINAL REPORT

ON

"Emergency Fire Alarm System"

Submitted to:

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We would like to thank our classmates for the support and encouragement they have given us during the course of our work.

ABSTRACT

Fire Alarm Circuit is a simple circuit that detects the fire and activates the Siren Sound or Buzzer. Fire Alarm Circuits are very important devices to detect fire in the right time and prevent any damage to people or property. Fire Alarm Circuits and Smoke Sensors are a part of the security systems which help in detecting or preventing damage. Installing Fire Alarm Systems and Smoke Sensors in commercial buildings like offices, movie theatres, shopping malls and other public places is compulsory. There are many expensive and sophisticated Fire Alarm Circuit in the form of stand-alone devices, but we have designed five very simple Fire Alarm Circuits using common components like Thermistor, LM358, Germanium Diode, LM341 and NE555. This is a very simple alarm circuit using Thermistor, LM358 Operational – Amplifier and a Buzzer. The primary purpose of fire alarm system is to provide an early warning of fire so that people can be. evacuated & immediate action can be taken to stop or eliminate of the fire effect as soon as possible. Alarm can be. triggered by using detectors or by manual call point (Remotely).

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Chapter 1
Introduction

1.1 Introduction

A fire alarm system has a number of devices working together to detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide or other emergencies are present. These alarms may be activated automatically from smoke detectors, and heat detectors or may also be activated via manual fire alarm activation devices such as manual call points or pull stations. Alarms can be either motorized bells or wall mountable sounders or horns. They can also be speaker strobes which sound an alarm, followed by a voice evacuation message which warns people inside the building not to use the elevators. Fire alarm sounders can be set to certain frequencies and different tones including low, medium and high, depending on the country and manufacturer of the device. Most fire alarm systems in Europe sound like a siren with alternating frequencies. Fire alarm electronic devices are known as horns in the United States and Canada, and can be either continuous or set to different codes. Fire alarm warning devices can also be set to different volume levels. Manually actuated devices; also known as fire alarm boxes, manual pull stations, or simply pull stations, break glass stations, and (in Europe) call points. Devices for manual fire alarm activation are installed to be readily located (near the exits), identified, and operated. They are usually actuated by means of physical interaction, such as pulling a lever or breaking glass. Automatically actuated devices can take many forms intended to respond to any number of detectable physical changes associated with fire: convicted thermal energy; heat detector, products of combustion; smoke detector, radiant energy; flame detector, combustion gases; fire gas detector, and release of extinguishing agents; water-flow detector. The newest innovations can use cameras and computer algorithms to analyse the visible effects of fire and movement in applications inappropriate for or hostile to other detection methods..

1.2 Objective

- To provides a system which we can detect fire in the area during the initial stage.
- To provides a system which will shown LCD Display when Fire is Ditected.
- To alert occupants, so that they escape the building safely.
- Summon trained personnel to take charge of controlling the fire as quickly as possible.
- To initiate automatic fire control and suppression system.
- To provides a system which we can control the light with that remote.
- To provides a system which safety for fire.
- We have to design the project as simply as possible.
- We need to minimize the cost of production.
- To support and supervise the fire control and suppression system.
- We need to minimize the run time and make as efficient as possible.
- We have to make it user friendly.

Chapter 2

MATERIALS

2.1 Arduino UNO

This microcontroller is based on the ATmega328P. There are total of 20 pins (0-19) out of which 6 are analog inputs, 14 are digital input output pins(6 pins provide PWM voltage) which can also be used as general purpose pins, a ceramic resonator of frequency 16 MHz, an USB connection, a power jack and a reset button. It has an operating voltage of 5V. It contains everything needed to support a microcontroller.

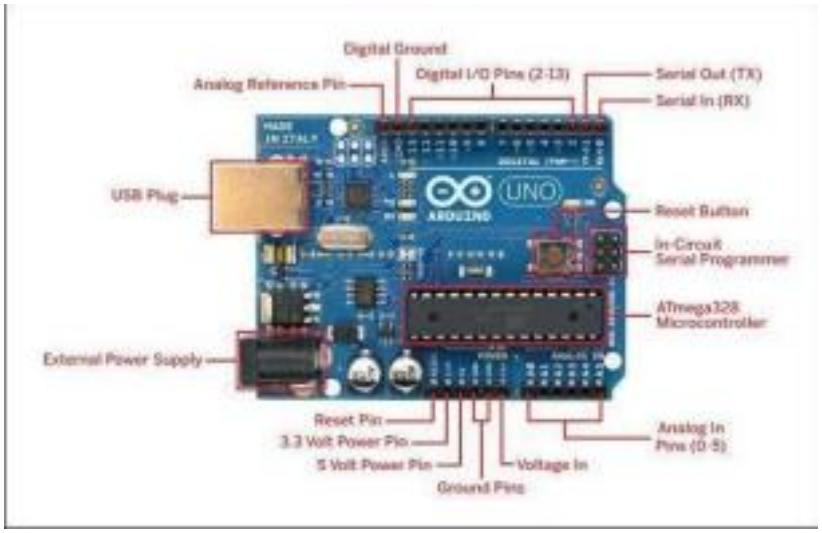


Figure 2.1: Arduino Uno

2.2 LCD

Liquid Crystal Display, which we are using in our project is 16*2 LCD. This display consists of 16 columns and 2 rows. This is programmed using the library <LiquidCrystal.h>

Figure 2.2 : 16*2 LCD

2.3 Buzzer

In our project the buzzer is used for beep sound indicating the entry of wrong password

Figure 2.3: Buzzer

2.4 Potentiometer

In our project we have used a potentiometer of 10Kohm resistance in order to adjust the contrast of the Liquid crystal display

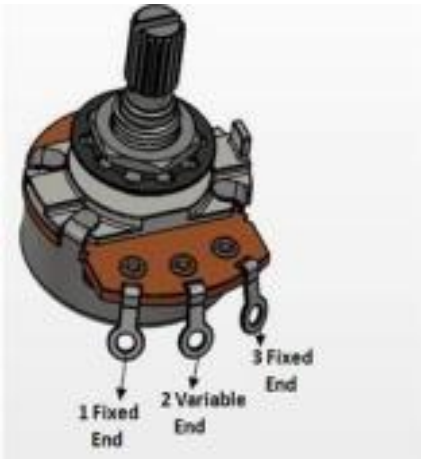


Figure 2.4: Potentiometer

2.5 IR Flame Sensor

A flame-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or flame. The flame detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system. This sensor is used in industrial boilers. The main function of this is to give authentication whether the boiler is properly working or not.The response of these sensors is faster as well as more accurate compare with a heat/smoke detector because of its mechanismwhile detecting the flame.

Figure 2.5: IR Flame Sensor

2.6 Jumper Wires

A jumper wire is a conducting wire used to transfer electrical signals between two points in a circuit. The wires can either be used to modify circuits or to diagnose problems within a circuit.

- Mele to Male.
- Male to Female.
- Female to Female.

Figure 2.6: Jumper wires

2.7 Source Code

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(2, 3, 4, 5, 6, 7); // LCD Display (RS,EN,D4,D5,D6,D7)
#define flamePin 10 // Flame Sensor Connected To Arduino
#define buzzerPin 11 //Buzzer Connected To Arduino
void setup() {
Serial.begin(9600);
lcd.begin(16, 2);
pinMode(buzzerPin,OUTPUT);
pinMode(flamePin,INPUT);

lcd.setCursor(0,0);
lcd.print("    GROUP-02 ");
delay(2500);
lcd.clear();
//rashed
lcd.setCursor(0,0);
lcd.print("   RASHIDUL ");
delay(1000);
lcd.clear();



lcd.setCursor(0, 0);
lcd.print("Device Loading  ");
for(int i = 0; i <15; i++){
if (i==4)
{
lcd.setCursor(0, 1);
lcd.print(".");
}
else lcd.print(".");
delay(500);
}
lcd.setCursor(11, 1);
lcd.print("Done");
delay(1000);
lcd.clear();
lcd.setCursor(1, 0);
lcd.print("Sensor Active");
delay(1500);
lcd.clear();
```

```
}
void loop() {
int Flame = digitalRead(flamePin);
if (Flame == LOW)
{
digitalWrite(buzzerPin,HIGH);
lcd.setCursor(0, 0);
lcd.print(" Fire : ");
lcd.print("Fire is ");
lcd.setCursor(0, 1);
lcd.print(" Detected");
Serial.print(Flame);
Serial.print("\t");
Serial.print("Fire is Detected");
}
else if (Flame == HIGH)
{
digitalWrite(buzzerPin,LOW);
lcd.setCursor(0, 0);
lcd.print("Fire : ");
lcd.print("No Fire");
lcd.setCursor(0,1);
lcd.print ("Ditected");
Serial.print(Flame);
Serial.print("\t");
Serial.println("No Fire Ditected");
}
delay(300);
lcd.clear();
}
```

Chapter 3

3.1 METHODOLOGY

The main feature of our project is if The Fire ditected, then the system given a signal fire alarm and displays the status “Fire Detected” on LCD. If no Fire Detect or normal environment show displays “No Fire Ditected” on LCD.

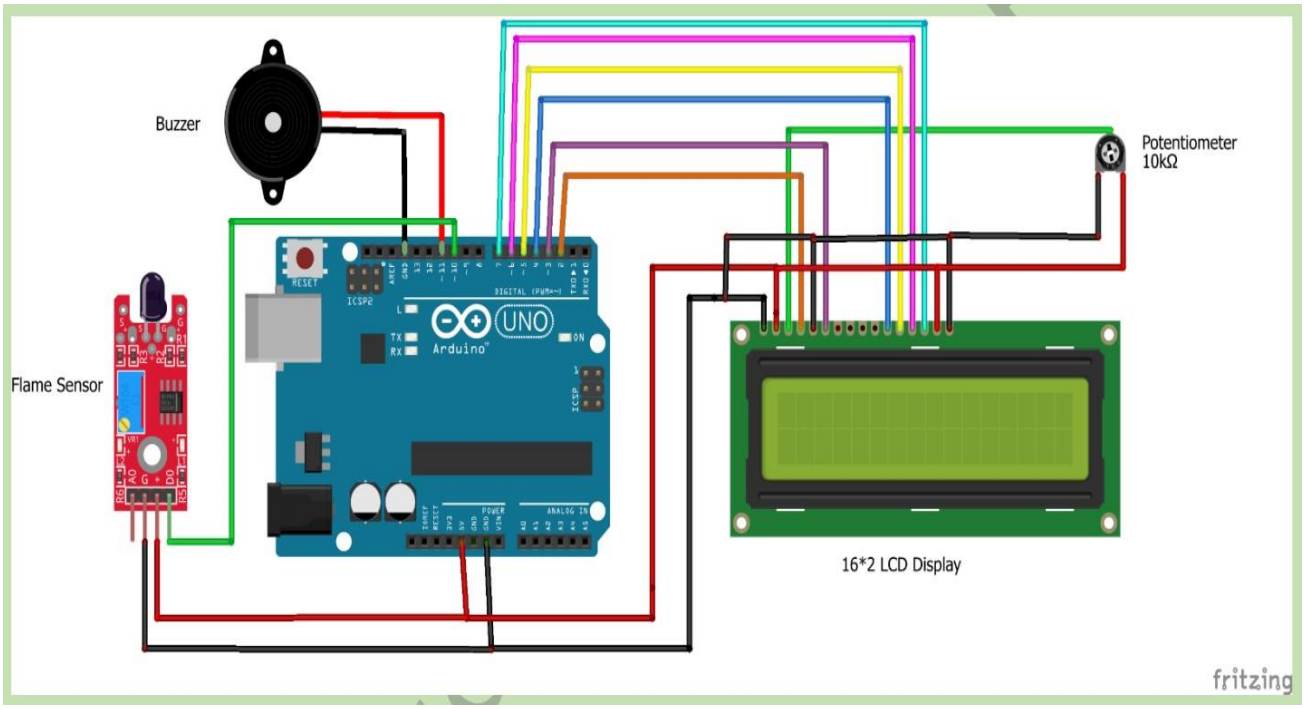
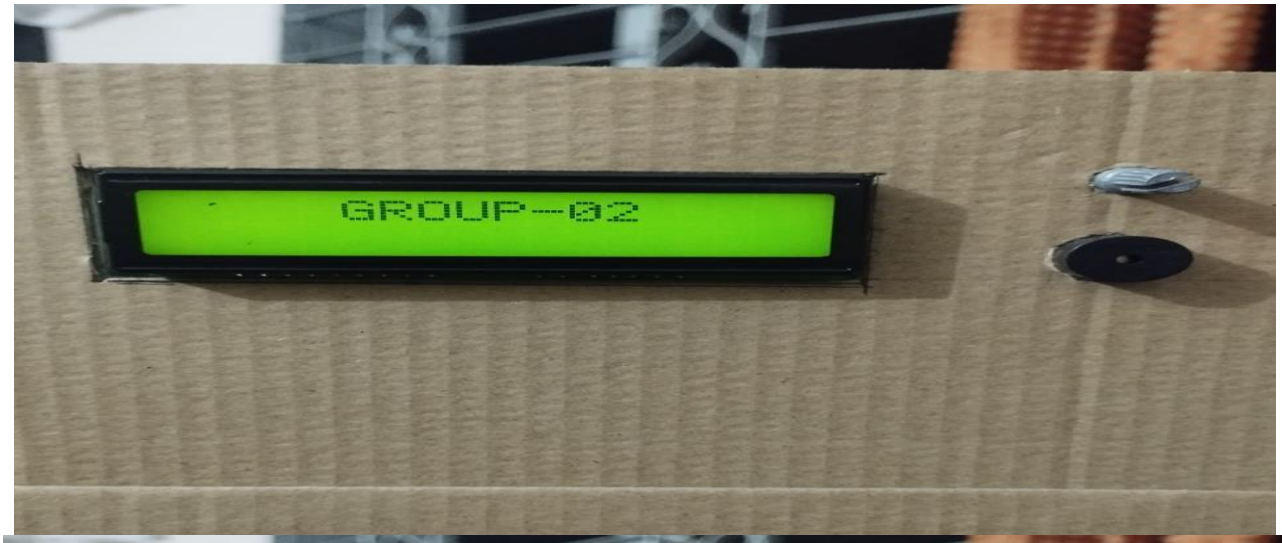
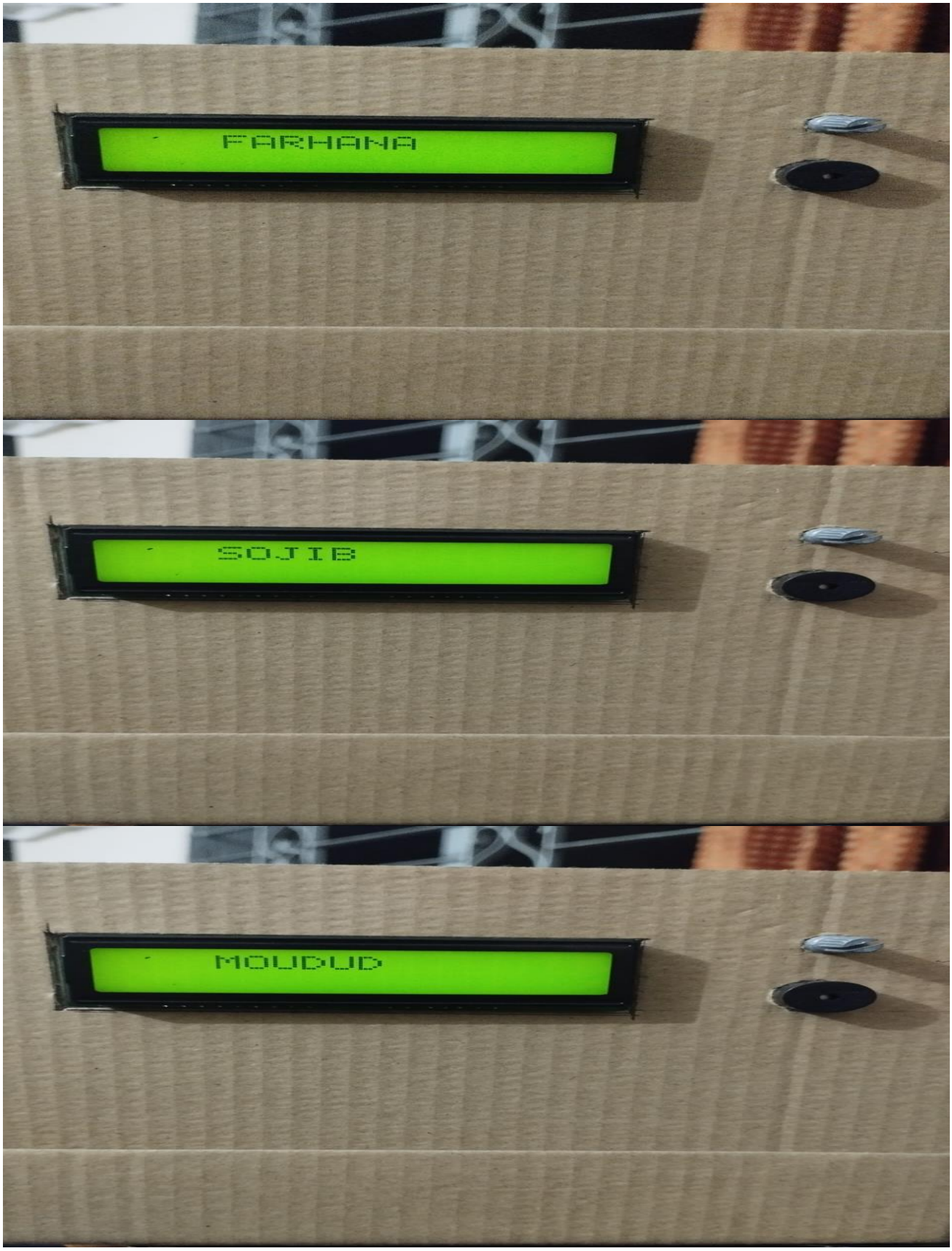


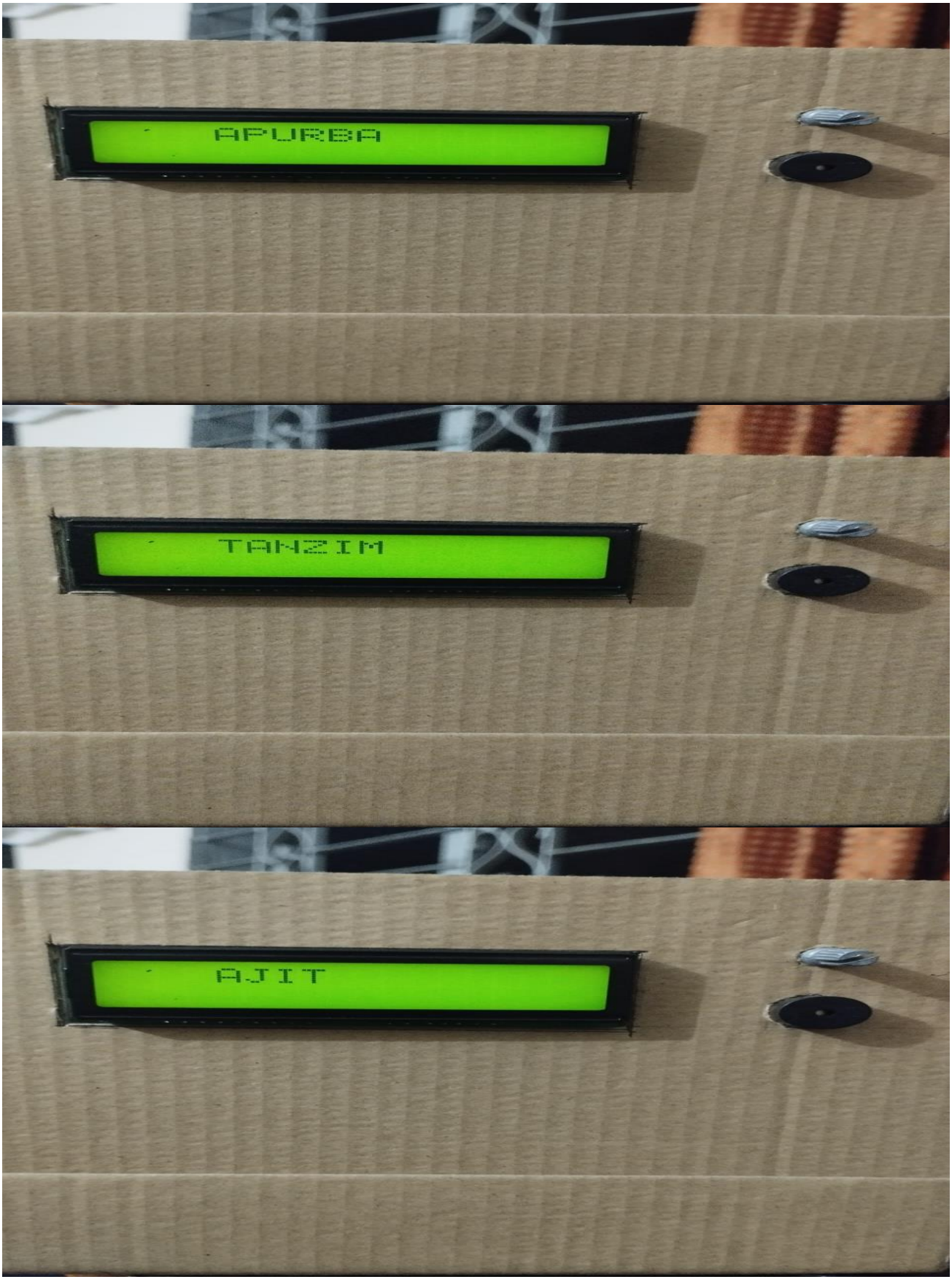
Figure 3.1: “Emergency Fire Alarm Systems”


GROUP--02


RASHIDUL


MAHIRA


FARHANA
SOJIB
MOUDUD


APURBA
TANZIM
AJIT


Device Loading
.....Done


'Sensor Active

Figure 3.1.1: "No Fire Detected"

Figure 3.1.2: "Fire Is Detected"

Chapter 4

4.1 Literature Review

From author Prof.A.Y.Prabhakar, The main objective of their project is to give safety for home and at every common other places like home, public places.. When the there is fire it will be message on display “Fire is detected”, the microcontroller will give instruction to Flame sensor. Flame sensor will perform the action on detecting fire, Thus, what they want is digital technology to construct an integrated and well customized safety system at a price which is reasonable.

From author Pradnya Joshi, Their system has two parts, namely; hardware and software regarding Arduino. The hardware system consists of Arduino board, Keyboard and LCD display. The software consists of set of C/C++ functions. These hardware components are used in order to control the home security. Arduino board will help to develop an interface between the hardware and the software application. The Arduino Board will help in transmitting and receiving the output given. For the energy purpose, they have used battery here, so that the fire system used for safety is a DC lock, Flame sensor will be used to ensure the fire is detect. On the outer view, they will be able to see just the display board and the remaining parts of this project will be help inside and outside for the safety purpose of them.

4.2 Target Customers:

Bank: Because a bank is a place where a lots of transaction of money people goinf going on continuously. So it should maintain a high security and hight alart alarm , for this purpose bank is one of our target customer to protect their information and all the important things.

House: Sometimes we go to some place for enjoy our holiday. And we protect our house by a simple lock and it’s very risky for our house property. If anywhere Fire detect where alart alarm. And people go to safe palce.. That’s why house is also one of our target customers.

Office: There are many types of office in the world. Different types of office has different types of information, and a lots of useful and expensive things. Those are so important for offices. Because all of these things will must be keep safe and it will not be possible for a normal locker. So that office also our target customer.

University: Many Student study at university together . if there is fire there can be a lot of damage.

Chapter 5

5.1 Purpose of the Project:

The 4 Purposes of Your Fire Alarm System

The four ways your fire alarm system works to protect your property and its occupants from the dangers of fire are by detecting fire, alerting occupants, managing risk, and notifying the fire department.

1 Detect Fire

Your fire alarm system is designed to detect fire in two main ways: smoke and heat. It should also have the capability of manual pull, in case a fire is observed before smoke or heat reaches the sensors of the system. Other systems are activated when movement in the sprinkler system is detected, indicating that the sprinklers are responding to a fire.

2 Alert Occupants

When the fire alarm system detects smoke, heat, or water movement, it alerts occupants of the building using both audible and visible alarms. These alarms will be bright, loud, obnoxious, and impossible to ignore, which help mobilize individuals to follow your evacuation plan. Using both types of alarms ensure that every person in the building is alerted.

3 Manage Risks

Your building's fire alarm system works in a third way to protect you: by reacting to potential risks using control measures. When the alarm is activated, some systems perform a set of tasks that help prevent fire and smoke from spreading as well as protect occupants, such as: automatically shutting doors in different zones, powering off ventilation and air conditioning, or redirecting elevators to bring cars to a designated level.

4 Notify Authorities

The fourth purpose of your fire alarm system is to notify authorities. This ensures the fire department is en route as quickly as possible, so they can respond and extinguish the fire before it becomes an even bigger threat.

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5.2 Problem Statement:

Problem statement of our project is, we have to open a door using remote and also control the light with that remote.

5.3 Tools and Resources:

Hardware Requirements:

1. 8051 Microcontroller
2. Arduino UNO.
3. 16×2 LCD
4. Connecting wires
5. Power Supply
6. Buzzer
7. Flame sensor.
8. Potentiometer

Software Requirements:

1. Proteus (for circuit diagram and simulation)
2. Arduino UNO

5.4 Cost:

There are above Two Thousand Taka.

5.5 Challenge:

We are continous learning microcontroler. So it will be hard for us to implement the project and perfectly finish the project.

Chapter 6

Future Scope

6.1 Future Scope

I. In Future we adding with smoke detector.
II. We include Fire safety when fire is detect, fire safety will activate.
III. We use notification system .If fire detect when message or phone call in mobile .
IV. This fire alarm system also incorporates the heat and flame detector that is connected to the infrared smoke detector in parallel.
V. The microcontroller is used as the heart of this fire alarm system that controls the entire operations involved.
VI. The fire alarm system is capable to locate and identified the place that is in fire where by it is monitored using the monitoring system.
VII. Capable to display the output from each sensor in the monitoring system

6.2 Conclusion

There are numerous interesting technical issues relating to the design of alarm system. However, if one stands back from these, the key issue is whether it is cost beneficial to try to improve them. The evidence is very clear that at much residential and industrial area the poor performance of alarm systems ·s resulting in significant financial loss, environmental J. cballeoge and hazard to people. MoreoveJ" there are many ca es of consi.derable imp~ovement being achieved from a relatively small mvesbnent. The general conclusion is th~t i~nplementing the_ ~re alarm system in very low cost 1 likely to be beneficial Lo the people and the environment.

6.3 REFERENCES

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