LOW COST HOME COOLING SYSTEM

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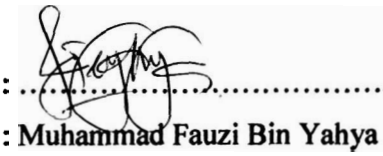
Signature : 

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To my beloved father and mother

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ABSTRACT

The design of smart device for is proposed in this project. This device is intended to; first to measured display room temperature. Second; when the temperature exceed the preset temperature, the device automatically on the system. Therefore, it will stabilize the room temperature.

ABSTRAK

Projek ini dicadangkan untuk mencipta sebuah alat pintar. Alat ini bertujuan untuk; pertama untuk menyukat dan memaparkan suhu di dalam bilik. Kedua, apabila suhu melebihi masa yang telah ditetapkan, alat ini akan beroperasi secara automatik. Oleh itu, ia akan menstabilkan suhu di dalam bilik.

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LIST OF ABBREVIATION

IC	Integrated Circuit
CA	Convert Analog Signal to Digital Signal
LCD	Liquid Crystal Display
CO_2	Carbon Dioxide
C	Celsius
R	Rankine
K	Kelvin
F	Fahrenheit
CMOS	Complementary metal–oxide–semiconductor
CPU	Control Processing Unit
RAM	Random Access Memory
I/O	Input and Output
LED	Light Emitted Diode
A/D	Analog to Digital
BCD	Binary Coded Decimal
V/I	Voltage to Current
Hz	Hertz
V	Volt
GND	Ground
AC	Alternate Current
MCU	Multipoint Control Unit
MSD	Most Significant Digit
LSD	Least Significant Digit
NSD	Next Significant Digit

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CHAPTER I

INTRODUCTION

1.0 Overview

This chapter consists of the project background, the objective and scope of project, the problem statement, methodology and the work schedule. It will give the overview of the whole project, from the beginning until the implementation part.

1.1 Project Background

Low Cost Home Cooling System is one complex system in which this system is consists of microprocessor circuit ATMEL 89C4051, Digithermo circuit and motor circuit. This circuit is proposed when an investigation is made on the hot temperature problem encountered by many people in their house.

Most of the complaints are about the hot temperature in the house especially at afternoon time. It make they feel uncomfortable to rest or do some job although with the use of a fan. For certain people, do not have enough money to buy an air conditioner because it so expensive and at same time can make the electric bill increase. So for that

reason this project "Low Cost Home Cooling System" project is proposed to solved the problem.

This system is aimed to decrease the hot temperature (around 24° Celsius) in the house. Water is taken from the water tank using motor circuit and the water flow to the roof top through PVC pipe. After the water flow on the roof process the hot temperature in house decreased. This process cycle continued until the temperature decreases to 24° Celsius.

The important component for this circuit is Integrated Circuit (IC) ATMEL 89C4051, CA3162 (convert analog signal to digital signal), IC78L05 (low voltage from +9volt to +5volt), LM35D (temperature sensor), 16x2 Liquid Crystal Display (LCD) Display (to show time and temperature) and relay (switch for motor circuit).

1.2 Problem Statement

Before this project is made, a research on the problem faced by common people is made. The common problem is when a hot season arrives. The hot season problem in Malaysia contributes an increase in the air conditioner usage. As the usage increases, the electricity also increase leading to a higher cost of electricity bills.

Looking into a health aspect, air conditioning has no greater influence on health than heating—that is to say, very little—although poorly maintained air-conditioning systems (especially large, centralized systems) can occasionally promote the growth and spread of microorganisms, such as *Legionella pneumophila,* the infectious agent responsible for *Legionnaire's disease*, or *thermophilic actinomycetes*. Air conditioner can also contribute to global warming. It produces Carbon Dioxide (CO_2) and can reduce ozone layer. Furthermore house can use air conditioner. For example village house.

1.3 Project Objectives

The objective of this project is to solve the problem, stated before by designing a low cost Low-Cost Homes Cooling System that can stabilize the temperature room. This project involved familiarization and utilization of a C language and assembly language. The system is designed to include a 16 X 2 Liquid Crystal Display (LCD) to display the measured temperature.

1.4 Scope Work

The scope of work for this project can be divided into three parts. First is project design. It comprised 3 separate tasks: circuit design, hardware and software implementation. Each task is conceptually independent from the other, but each is necessary in order for the final product to work

The second is circuit design - In order to complete the project and before the hardware implementation, all the circuits that related to the project have to be designed. The software like C language or assembly language is used for this project. After all the task is done, the circuits are ready to be constructs and then combined together to make it as a one complete project.

The last part for this project is hardware and software implementation. After all the circuit has been designed, a technical is selected in order to implement the hardware by combining idea and prototype from the earlier work. The motor circuit and temperature circuit that have been created must be constructed and then combined. After the circuit is created, the software is used to make the circuit fully operate.

1.5 Thesis Overview

In this part, the summary or overview for each chapter contained in this thesis is discussed. The introduction of this project is outlined in Chapter I where it contains problem statement, objectives of the project and project scope methodology.

Literature research and review is discussed in Chapter II. The function each of the main components used in this project such as IC ATMEL 89C4051, LM35D, CA3162, LCD Display 16 x 2 and other component.

For chapter III, the methodology and development of the project is to be explained. The flowchart showing the flow of this project is outlined here to show step by step plan to achieve the goal of this project.

Result and discussion of the project is covered in chapter IV. All the findings and analysis is discussed in this chapter to determine whether it has covers the overall objectives of the project.

Finally, in chapter V the conclusion for the project is made and few enhancements is suggested for further implementation and consequently to upgrade the system itself.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

There is a concern whether this project is practical as it is believed this project cannot make the home temperature stable/cold as the water in tank itself can be hot. To make water in the tank hot is not fast like boiling water in the kettle. Before the sun warm the water in the tank, this project will automatically operate as soon as possible and there is not hot water issue. This project is considered as very cheap compared air conditioning system and can make room temperature stable. It just cost a few ringgits and can make all room in the house cold. As compared to air conditioning system customers have to spend more money to buy air conditioner to cool all room and their house.

Based on the interview with an air conditioner technician, to start using the air conditioning system, there are pre-work to be considered and they all cost some money. First the technician do is to see the room area. For the small room, customers have to pay RM700 and for the hall the air conditioner costs RM1800. That's depends on the area where to use it. Installation of air conditioner depends on the room area. Big spacious room, more money is needed. Plus 6 months the air conditioner must be

serviced. Air conditioning service usually involves the following: filter cleaning (RM 4), gas refill (RM 80) and leak piping checking (RM 30). In other word, there is a cost need to be considered for every 6 months.

As comparison, only water is used in this project to stabilize the home temperature. Plus, the used water can be recycled.

2.2 Disadvantage of Using Air Conditioning

2.2.1 Personal Cost

i. Increased Utility Bills

Air conditioning can substantially increase in your electricity bill (and these costs don't begin to reflect the real costs of damage to our health and environment)

ii. Indoor Air Quality Problems

If anyone in the household is sensitive to molds or chemicals, closing the windows for air conditioning purpose can increase discomfort or even make them ill.

iii. Trapped Indoors

Living or working in an air-conditioned environment means people have to readjust each time they go outside. This can be uncomfortable, stressful and could lead to illness. It also means people are more likely to avoid outdoors activity and exercise. See the tips below for ways to enjoy hot weather, rather than trying to run from it.

iv. Blackouts

Air conditioning strains the electrical system at peak times and increases the likelihood of brownouts and blackouts. The personal effects of electrical system event include disruption of communication and transportation, lost pay, health and safety risks, as well as potentially catastrophic damage to appliances, computers and electronic equipment – just to name a few.

v. Noise

The noise that air conditioners make can be unpleasant and stressful. It can interfere with conversation and enjoyment both indoors and out.

2.2.2 Social & Environmental Costs of Air Conditioning

i. Blackouts and Brownouts

When electrical system becomes unstable, it has serious effects on public health and safety, the economy and the environment.

ii. Climate Change and Smog

Ironically, air conditioning contributes to climate change and smog. This only creates an increasingly uncomfortable world.

iii. Social Isolation

A community in which everybody is sealed behind closed windows and doors is not a healthy community. Decreased social interaction and physical activity lead to a myriad of social, economic and health problems [1].

2.3 Room Temperature

Room temperature (also referred to as ambient temperature) is a common term to denote a certain temperature within enclosed space at which human beings are accustomed. Room temperature is thus often indicated by general human comfort, with the common range of 18°C (64.4 °F) to 24°C (75.2 °F), though climate may acclimatize people to higher or lower temperatures.

The term can also refer to a temperature of food to be consumed which is placed in such a room for a given time. Furthermore, it may refer to a certain temperature within settings of scientific experiments and calculations.

For human comfort, desirable room temperature greatly depends on individual needs and various other factors. According to the West Midlands Public Health Observatory (UK), 21 °C (69.8 °F) is the recommended living room temperature, whereas 18 °C (64.4 °F) is the recommended bedroom temperature. A study carried out at the University of Uppsala (Sweden), on indoor air quality and subjective indoor air quality (SIAQ) in primary schools, states that perception of high room temperature was related to a poor climate of cooperation. To achieve a good SIAQ, it recommends room temperature should be at a maximum of 24.0 °C (75.2 °F). [2]

2.3.1 Scientific Definition

For scientific calculations, room temperature is taken to be 20 to 23.5 degrees Celsius, 528 to 537 degrees Rankine (°R), or 293 to 296 kelvins (K), with an average of 21 °C, about 69.8 degrees Fahrenheit (°F). For numerical convenience, either 20 °C or 300 K is often used. However, room temperature is not a precisely defined scientific term as opposed to Standard Temperature and Pressure, which has several, slightly different, definitions.