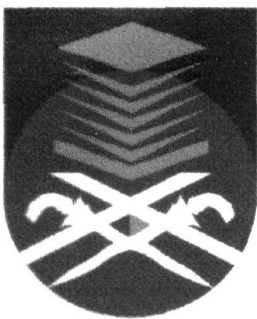


CONTROLLING HEATER FOR A PORTABLE EGG INCUBATOR

This project report is presented in partial fulfillment for the award of Bachelor of
Electrical Engineering (Honours) Universiti Teknologi MARA



AZNILINDA BINTI ZAINUDDIN
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MARCH 2004

ACKNOWLEDGEMENT

In the name of Allah S.W.T., the Most Beneficent and the Most Merciful. I praised him the Al-Mighty for the blessing endowed upon me and provide me with perseverance and patience to complete the project entrusted to me.

My sincerest gratitude and appreciation to Assoc. Prof. Mahmud Ibrahim, whom to me not only my project supervisor but also more like my father. His supervision guidance, advice and enlightening discussion throughout the period of my project development and preparation for this thesis are invaluable. Throughout this project development, it has given me an exposure and experience in the project design of software and hardware.

I would also like to express my deepest appreciation to Suhaimi Alias for the many useful views he suggested and tools he lent me, which turned out very useful.

I am also indebted to Halila, Norlie and to all individuals who have contributed and help me in my difficulties. Without them this project is impossible.

Lastly I would like to acknowledge the endless support, understanding and encouragement of my parents, which have kept me strong and made everything possible.

Thank You.

ABSTRACT

This thesis describes the design of temperature controller of a home egg incubator. This project intends to build a system that regulates the temperature in the incubator appropriate to fowls' egg incubation process using the micro controller Peripheral Interface Controller (PIC) as the main controller. The controller will enable the regulations of suitable temperature for at least 5 types of fowls such as chicken, turkey, duck, goose, and pigeon. The incubation is to hold about 30 eggs. The temperature is controlled by the PIC dependent on the occurrence of day and hour signals from the clock of the system. The PIC generates control for temperature egg incubation. The program for the PIC is written in assembly language and then downloaded into the micro controller to operate the circuit which is built to handle the electronics of heating and temperature sensing of the incubation chamber.

In designing the incubator several incubation environments need such as humidity, correct temperature, ventilation, and egg turning need to be controlled to mimic the natural incubation by the brooding hen, to ensure successful hatching of the chicks.

However, this project only concentrates on the temperature controller. However in the design of the temperature controller other incubation environmental factors are considered, as ultimately the entire environmental control will be done by the PIC.

TABLE OF CONTENTS

CHAPTER		PAGE
	DECLARATION	i
	ACKNOWLEDGMENT	iii
	ABSTRACT	iv
	LIST OF FIGURES	ix
	LIST OF TABLE	xi
	LIST OF ABBREVIATIONS	xii
1	INTRODUCTION	
1.1	Introduction	1
1.2	Objective of the Project	2
1.3	Scope of the Project	2
2	THEORITICAL BACKGROUND	
2.1	Incubation Process	3
2.1.1	Introduction	3
2.1.2	Temperature	3
2.1.3	Eggs	4
2.1.4	Incubation Period	4
2.2	The Microcontroller	5
2.2.1	Introduction	5
2.2.2	The PIC16F877	6
2.2.3	Other Features of PIC16F877	7
2.3	Stepper Motor	9
2.3.1	Introduction	9
2.3.2	Stepper Motor Operation	10

CHAPTER 1

INTRODUCTION

1.1 Introduction

Incubation is the process by which the embryo within the egg develops into a fully formed fowl and has the capability of breaking free from the shell. The primary concern of environmental consideration in incubating eggs is the temperature. The Early Egyptian incubators of some 3,000 odd years ago were a series of mud brick egg ovens type rooms built each side of a central passageway all within a large mud brick building or hatchery. Temperature control was achieved via the strength of the fires, jute covers over the manholes and regular openings of vents in the roof of the ovens [1].

Natural incubation uses a broody fowl to incubate eggs by sitting on them in a nest. Artificial incubation uses an incubator to do the job of the broody fowl. The incubator closely controls temperature and relative humidity within the proper limits to hatch fowls. Artificial incubation is an excellent alternative to the broody hen.

The fundamental techniques of incubation remain the same whether for hatching millions bird per year or a dozen fowls as backyard enthusiast, which is to maintain and regulate its temperature inside the incubator [2].

This project presents a system to maintain and regulate the temperature for a portable incubator by adapting the micro controller. Software has been developed for the micro controller to read the signal from the inputs and produce suitable outputs to control the operations.