

**COMPUTERISED TEMPERATURE MEASUREMENT OF
MULTIPLE COLD ROOM**

**This is presented to fulfil the requirement of Advanced Diploma in Electrical
Engineering of MARA Institute of Technology**

ANUAR ABU BAKAR

NOVEMBER 1994

**Department of Electrical Engineering
School of Engineering
MARA Institute of Technology
40450 Shah Alam
Selangor Darul Ehsan
MALAYSIA**

ACKNOWLEDGEMENT

In the name of ALLAH s.w.t, the Beneficent, the Merciful, who has given me patience in completing my project.

I would like to express my most appreciation and heartfelt gratitude to MRS. ROZIAH JARMIN, as my project supervisor, for her guidance, encouragement and ideas from beginning up to the end of my project.

I also thank all lecturers in Research and Development lab and technicians who gave me informations, suggestions in improving the project and give me full cooperations towards success of my project.

Last but not least, my special thanks to all my friends in R & D lab for their suggestions and contribution in the successfulness of my project.

ABSTRACT.

Basically this project is the temperature measurement of the multiple cold room. The range of temperature to be measured is between -40°C and 60°C. In order to suit with this range of temperature, RS590 is used as temperature sensor. This temperature is then displayed by using a personal computer. Quick basic high level language is used as a program in order to display the measurement.

TABLE OF CONTENTS

Topic	Page
Approval	i
Acknowledgement	ii
Abstract	iii
Table of contents	iv
CHAPTER 1.0 INTRODUCTION	1
CHAPTER 2.0 HARDWARE DESIGN	3
2.1 Temperature Sensor	3
2.2 Signal Conditioning	5
2.3 Analog To Digital Converter	9
2.3.1 Resolution	11
2.4 Address Decoder	12
2.5 Octal D-Type Flip-Flop	15
2.6 Interface Card	17
CHAPTER 3.0 SOFTWARE DESIGN	22
CHAPTER 4.0 TESTING AND TROUBLESHOOTING	24
CHAPTER 5.0 DISCUSSION AND FUTURE DEVELOPEMENT	29

1.0 INTRODUCTION.

Computerized temperature measurement of multiple cold room is part of the project for MARDI Central Alarm System. The basic block diagram of this project is shown in figure 1.0. RS590 has been chosen as a sensor because of its operating temperature range is between -55°C to 15°C where this range is suitable for this project. One more consideration is, its output can be easily transmitted over an inexpensive two-wire twisted pair line without degradation of performance due to line resistance, connector resistor or noise.

Signal conditioning is the most important part in this project. It is needed in order to convert the current output from the sensor to voltage and make the PC possible to read the data. This is because the output of the sensor is in millivolts, but PC can only recognized readings in volts.

Analog signal was converted to the digital signal by using analog digital converter (ADC) in order to interface it with the personal computer. Personal computer was chosen because of it is easy to handle and user friendly. The project is to display the temperature below 0°C where the range is -30°C to 0°C . -30°C is the maximum temperature set by MARDI for their cold room. Linearization is one more important thing that must be considered in designing the hardware because if the output from the circuit is not linear, we cannot get the actual output that we need in order to process it.