Sudan University of Science and Technology

College of Engineering

Electronics Engineering Department

Design of :

Warehouse Control System

(Case Study: Petroleum &Chemical Materials)

A Research Submitted In Partial fulfillment for the Requirements of theDegree of B.Sc. (Honors) in Electronics Engineering

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الآية

{ قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاّ مَا عَلّمْتَنَا إِنّكَ أَنتَ
الْعَلِيمُ الْحَكِيمُ }

صدق الله العظيم
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{32 }

DEDICATION

This project is lovingly dedicated to our respective parents who have been our constant source of inspiration. They have given us the drive and discipline to tackle any task with enthusiasm *and determination. Without their love and support this project would not have been made possible.*

This dissertation is dedicated to our families for their good-natured forbearance with the process and for their pride in this accomplishment. It was a team effort.

We also dedicated our dissertation to all people give us useful information, and to all our school professors and to our colleagues.

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ABSTRACT

Storing have a great role in the security and stability of the country that we it is needed to store an adequate amounts of food stuff , medical supplies, pharmaceuticals,petroleum productsand other necessary materials .

All this materials should be kept under suitable environment because the variation in humidity and temperature may have consequences losses or changes in there specification till it is consumption or be exported during all these processes these materials should kept under proper condition. Therefor cheap method,easy maintenance and easy to use by the concerned members.

The design system consists of three sensors, temperature sensor, humidity sensor and smoke sensor. The temperature in which each point in a warehouse requires to maintain its normal state is controlled by connecting a temperature sensor to the microcontroller. These three sensors have connected to microcontroller which have given the specific range and control the changes that happened in the room storage, and gives the results to the administration of the room weather increase or decrease in the range of the sensors.

THIS PROJECT AIMS to design multi-purpose electronic circuit that controls the appropriate environment for storing which enables to monitor and maintains any changes in the required storing environment.

المستخلص

للتخزين أهميه كبيره في أمن وإستقرار البلاد ,حيث نحتاج لتخزين كميات كبيرة من الادوية والعقاقير والأغذية و المواد البترولية او اي مواد ضروريه .

كل هذة المواد يجب ان تحفظ لفترات طويلة في ظروف معينة للمحافظة عليها من التلف او اي تغير في مواصفاتها بسبب التغير في الظروف البيئه الرطوبه ودرجات الحراره إلي حين وصولها للتجار أو تصديرها .ويجب علي التاجر أيضا تحسين ظروف التخزين للمحافظه علي السلعة بصورة سليمة حتي وصولها للمستهلك.

من هنا يجب توفير طريقه تخزين غير مكلفة نسيبا ومتوفرة وسهلة الصيانة.

يحتوي النظام علي ثلاثه حساسات (حساس رطوبه ,حساس درجه الحراره,حساس للغاز) .للمحافظه علي درجه الحراره في كل حيز من المخزن عند درجه الحراره المطلوبه يتم التحكم بها باستخدام المايكروكنترولر مع حساس الحراره .هذه الثلاثه حساسات موصله مع المايكرو كنترولر مع ضبط المدى المعين .واعطاء النتيجه للاداه وحدات المعالجه في المخزن (فتح او اغلاق) .

الهدف من المشروع تبتصميم دائرة الكترونية للتحكم في بيئة المخزن متعدد الاستخدامات حيث يتم التحكم في الظروف البيئه المناسبه للتخزين ولها المقدره على مراقبة ومعالجة التغيرفي العوامل البيئة .

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ABBREVIATION

AC	Analog Current
ADC	Analog to Digital Convertor
CO2	Carbon dioxide
ºC	Celsius (Centigrade)
C	Colom
CMSPC	Central Medical Supplies Public Corporation.
DC	Direct Current
EMI	Electromagnetic Interference
E	Enable
EPROM	Erasable Programmable Read Only Memory
F	Fahrenheit
Ft	Foot
IR	Infrared
I/O	Input/ Output
ICD	Interface Control Document
JTAG	Joint Test Action Group
K	Kelvin
KB	Kilo Byte
KHz	Kilo Hertez
kΩ	Kilo Ohm
LED	Light Emitting Diode
LCD	Liquid Crystal Display
MHz	Mega Hertez
MΩ	Mega Ohm
M	Meter
Ma	Micro Ampere
µv	Micro Volt
MC	Microcontroller
NTC	Negative Thermal Coefficient
PTC	Positive Thermal Coefficient
PWM	Pulse Width Modulation
RAM	Random Access Memory
R/W	Read/Write
RS	Register select
RH	Relative Humidity

RISC	Reduced Instruction Set Computing
RTD	Resistance Temperature Detector
Sec	Second
SCADA	Supervisory Control And Data Acquisition
SSPI	Security Support Provider Interface
USART	Universal Synchronous Asynchronous Receiver Transmitter
VCC	Voltage Collector to Collector
V	Volt
WH	Warehouse

Chapter One

Introduction

Chapter One

1.Introduction

1.1 Preface:

Warehouses are facilities that provide a proper environment for the purpose of storing goods and materials that require protection from the change of environment parameter. Warehouses must be designed to accommodate the loads of the materials to be stored, the associated handling equipment, the receiving and shipping operations and associated trucking, and the needs of the operating personnel. The design of the warehouse space should be planned to best accommodate business service requirements and the products to be stored.

Special-designed warehouses meeting strict requirements can also provide liquid storage, flammable and combustible storage, radioactive material storage, hazardous chemical storage, and ammunition storage [1].

1.2 Problem Statement:

When the materials are brought to the warehouse, every materials needs specific conditions to maintain their quality.

Some of the materials will become spoiled if they are not kept under necessary conditions.

- Shutting down of electricity may cause an increase the temperature and humidity of the room which need to control.
- The fire may cause to damage the materials which may be need.

To provide optimum conditions in storage is main issue to be addressed.

1.3 Proposed Solution:

To provide the warehouse withcircuit for monitoring any changes in the standard environmentalrequirements that may change in the characteristic of the store materials.

The alarm should show the personnel if any changes took place humidity, temperature, etc.

1.4 Objectives:

The main objectives of this project are to design the system and develop in it by using these steps:

1. Designing of warehouse control system.
2. Simulate the proposed system.
3. Verification and evaluation of the system. (testing).

1.5 Methodology:

This Part discusses the method that followed, to complete the objective of this system:

- **Phase one:**

- Research and collect information aboutsensor and approach of manipulator .Determined the problem statement, objective, the proposed solution and methodology.
- Visit and study petroleum training center warehouseand Central Medical Supplies Public.

❖ **Phase two:**

- Hunting the information for building back ground knowledge by compared with standard system and local system.
- Study about microcontroller.
- Research about the component and the systems used to design the warehouse.

❖ **Phase three:**

- System block diagram of warehouse control circuit.

➢ Determine the block diagram circuit for warehouse monitor.

➢ Working mechanism of control system.

❖ **Phase four:**

- Select the components of the warehouse control circuit.
- Simulate the warehouse control circuit.
- Evaluate performance the warehouse control circuit simulation.

❖ **Phase five:**

- Establish a prototype warehouse design.
- Optimize the design.
- Document the work with a design proposal.

❖ **Phase six:**

- Develop the software driver for the control circuit.
- Integrate the software with the hardware.
- Testing the final warehouse control circuit.
- Final documentation of project.

1.6Research Outlines:

- Chapter one includes preface, problem statement, proposed solution, objective and methodology.
- Chapter two include literature review about petroleum training center and central medical supplies public corporation .also include some information about temperature sensor, humidity sensor and gas sensor(their types and principles).
- Chapter three consists ofblock diagram,system component system scenario and flow chart.
- Chapterfour includes circuit simulation, software implementation, hardware implementation and result.
- Chapter five includes conclusion and recommendation.