

الآية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْخَكِيمُ }

صَدَقَ اللَّهُ الْعَظِيمُ

الآية 32 سورة البقرة

Dedication

To

My great parents

My teachers

My wife

ACKNOWLEDGEMENT

I am very grateful to my supervisor: **Ust. Aballah Salih** for his guidance, assistance and his helpful advices.

Thanks extended all the staff of the School of Electrical and Nuclear Engineering, Sudan University of Science and Technology.

Last, and foremost thanks to my family for their care and my wife for her valuable effort in presenting this work.

ABSTRACT

Medication management is an important issue in order to ensure the delivery of specific drug in the exact time hence increasing the effectiveness and avoidance of missing doses or timing doses incorrectly that can cause complications. The Electronic Medication Management System (EMMS) is a dosage reminder device that serves as a regular and dispenser reminder of when a medication was last taken and when a medicine should next be taken. In this thesis, an electronic system has designed using the microcontroller, Liquid Cristal Display (LCD), and other components. EMMS was able to provide different doses at separate time electronically. The simulation results obtained using proutous proved efficiency of the system

المُستخلص

إدارة الدواء مسألة هامة من أجل ضمان أخذه في الموعد المحدد وبالتالي زيادة الفاعلية وتجنب عدم أخذ الجرعات أو توقيتها بشكل خاطئ والذي يمكن أن يسبب مضاعفات. نظام إدارة الأدوية الإلكتروني هو جهاز تذكير بأخذ الجرعة متى تم أخذ آخر جرعة دواء ومتى يجب أن تؤخذ الجرعة المقبلة. في هذا البحث تم تصميم نظام إلكتروني باستخدام المتحكم الدقيق وشاشة عرض LCD ومجموعة أخرى من المكونات. أيضا يستطيع هذا النظام تقديم جرعات مختلفة في أوقات منفصلة إلكترونيا. برهنت نتائج المحاكاة المتحصل عليها باستخدام Protous علي كفاءة النظام.

TABLE OF CONTENTS

Title	page
الآية	i
Dedication	ii
Acknowledgement	iii
Abstract	iv
المستخلص	v
Table of Contents	vi
Table of Figures	vi
CHAPTER ONE: INTRODUCTION	1
1.1 General	1
1.2 Problem statement	2
1.3. Objectives	2
1.4. Methodology	3
1.5 Thesis Layout	3
CHAPTER TWO: LITERATURE REVIEW AND MAIN COMPONENTS	4
2.1 Previous Works	4
2.2 Microcontroller	14
2.2.1 Programs	15
2.2.2 Atmel AVR	16
2.3 Darlington Transistor	18
2.4 Liquid Crystal Display (LCD)	20

2.5 Stepper Motor	20
2.5.1 Fundamentals of operation	21
2.5.2 Interfacing PIC with stepper motor	21
2.6 A buzzer	25
2.7 Solenoid Valve	25
2.8 Relay	26
2.9 Resistors	27
2.10 Voltage Regulator	27
2.11 Crystal Oscillator	28
2.12 Capacitor	29
2.13 Modulator and Demodulator:-	30
2.14 Encoders and Decoders	30
2.14.1 Encoder HT12E	31
2.14.2 Decoder HT12D	31
2.15 Line Print Terminal	32
CHAPTER THREE: SYSTEM IMPLEMENTATION	34
3.1 Introduction	34
3.2 System block diagram	34
3.2.1 Transmitter block diagram	34
3.2.2 Receiver block diagram	35
3.3 Flowchart	36
3.4 Transmitter Circuit	36

3.4.1 Microcontroller	37
3.4.2 Crystal oscillator	38
3.4.3 Liquid crystal display	38
3.4.4 Switches/ buttons	38
3.4.5 IC ULN2804	38
3.4.6 IC L293	38
3.4.7 Encoder HT12E	39
3.5 Receiver Circuit	39
3.5.1 Microcontroller	40
3.5.2 Decoder HT12D	40
3.5.3 Local Printer Port	40
3.5.4 Regulator	40
3.5.5 Resistor	41
3.5.6 LED	41
CHAPTER FOUR SIMULATION AND RESULT	42
4.1 Introudction	42
4.2 Simulation and Results	42
4.2.1 Scenario one	42
4.2.2 Scenario tow	43
4.2.3 Scenario three	44
CHAPTER FIVE CONCLUSTION AND RECOMENDATION	45
5.1 Conclusion	45

5.2 Recommendations	45
References	46
Appendix	47

TABLE OF FIGURES

Figure	Title	page
2.1	Top plan view of A dose time indicator embodying the present invention	5
2. 2	side elevation of the indicator	6
2.3	enlarged sectional view taken on the line	6
2.4	fragmentary top plan view of a modified form of this invention	6
2.5	side elevation of the indicator	7
2.6	side elevation, partly in section of another modified form of this invention	7
2.7	Dosage indicating pill tray	8
2.8	Medical reminder device	9
2.9	Reminder system for taking medication	10
2.10	The reminder device for pill containers	11
2.11	Dosage reminder device and medication carton	12
2.12	Medication reminder system	13
2.13	Microcontroller architecture	14
2.14	AVR Atmega8535L microcontroller overview	17
2.15	Darlington transistor	19
2.16	Liquid crystal display (LCD)	20
2.17	Starting position of motor	22
2.18	The rotor position	23
2.19	Multi pole motor	24
2.20	the specific stepper motor	24
2.21	A buzzer	25
2.22	Solenoid valves	26
2.23	Relay	26
2.24	Resistors	27
2.25	A popular three pin 12 V DC voltage regulator IC	27
2.26	crystal oscillator	28
2.27	The ST-TX01-ASK	30
2.28	Encoder HT12E	31
2.29	Decoder HT12E	32
2.30	LTP Pin configuration	33
3.1	Transmitter block diagram	35
3.2	Receiver block diagram	35
3.3	Flowchart	36
3.4	Transmitter circuit diagram	37

3.5	Receiver circuit diagram	39
3.6	Line print port pin configuration	40
3.7	LM7805 power regulator circuit	41
4.1	EMMS Under scenario one	42
4.2	EMMS Under scenario tow	43
4.3	EMMS Under scenario tree	44