



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**HIGH TECHNOLOGY MEDICINE PILLBOX**

This report submitted in accordance with requirement of the Universiti Teknikal  
Malaysia Melaka (UTeM) for the Bachelor Degree in Electronic Engineering  
Technology (Telecommunication) (Hons.)

by

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TAJUK: **HIGH TECHNOLOGY MEDICINE PILLBOX**

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## **DECLARATION**

I hereby, declared this report entitled “High Technology Medicine Pillbox” is the results of my own research except as cited in references.

**Signature** :.....

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**Date** : **16 January 2016**

## **APPROVAL**

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor in Electronic Engineering Technology (Telecommunication) (Hons.). The member of the supervisory is as follow:

.....

(Mr. Hasrul Nisham Bin Rosly)

## **ABSTRACT**

“High Technology Medicine Pillbox” is the solution in order to solve the problem faced by people nowadays who are very busy with their daily activities especially elder people. The compactness of their day may cause the people to forget their important task such as medication time. Prevention is the best way in helping people to stay fit and healthy in their life rather than curing. Hence, this project is the best way in helping them to remember their medication time as long as they keep using it. The design is using the latest technology as it is light and portable to be carried anywhere. This project also connected to the smartphone which will acts as alerting devices. Nowadays, there are many medicine pillboxes available in the market as well as medicine reminders. They come with a variety of design and size in order to attract the users. The pill compartments and design may be convenient and comfortable to be brought outside, but main disadvantage of them are the price which sometimes could be too expensive and not affordable. Other than that, they also do not have any alerting system that connected to the smartphone. Most of the medicine reminders come with an alerting system such as buzzer or LED that will be connected to the pill box. This may lead to the disadvantage as the user sometimes may leave the medicine pillbox. So by having an alerting system in the smartphone, user will no longer worry anymore. In order to come out with the best solution, some research and study had been done about the existing medicine reminder and try to improve the system to make it affordable and user friendly. So, this is where the idea of concept and known as “High Technology Medicine Pillbox”. This project serves and built with an alerting system and pill compartments. These two devices which are pillbox and smartphone will be connected through Bluetooth as the interface.

## ABSTRAK

“High Technology Medicine Pillbox” merupakan jalan penyelesaian kepada masalah yang sering dihadapi oleh orang zaman sekarang yang sentiasa sibuk dengan aktiviti harian mereka terutamanya orang tua. Kepadatan harian mereka boleh menyumbang kepada kealpaan dalam sesuatu perkara yang penting seperti pengambilan ubat. Pencegahan merupakan jalan terbaik dalam membantu manusia sentiasa sihat dalam hidup mereka berbanding rawatan. Oleh itu, projek ini adalah jalan terbaik dalam membantu mereka mengingati waktu pengambilan ubat selagi mereka mengaplikasikan projek ini. Projek ini direka agar ianya ringan dan dilengkapi dengan teknologi terkini. Ia juga boleh dibawa kemana-mana. Projek ini dihubungkan kepada telefon pintar yang dipakai oleh pengguna. Pada zaman sekarang, terdapat pelbagai bekas ubat yang terdapat dipasaran. Ianya datang dengan pelbagai reka bentuk dan saiz sebagai daya tarikan kepada pembeli. Petak ubat mempunyai reka bentuk yang selesa untuk dibawa keluar tetapi ia mempunyai kelemahan dari segi harga yang agak mahal. Selain itu, alat penggera hanya diletakkan pada petak ubat tersebut sahaja. Ini menyumbang kepada waktu pengambilan ubat secara tidak teratur. Oleh itu, dengan adanya alat penggera yang terdapat pada telefon pintar pengguna, mereka tidak perlu risau lagi dengan masalah yang dihadapi. Dalam mengatasi masalah ini, kajian dan pembelajaran terhadap beberapa petak ubat yang sudah terdapat dipasaran telah dibuat. Penambahbaikan akan dilakukan bagi mendapatkan sebuah projek yang mesra pelanggan dan murah. Kombinasi antara pembekas ubat dan telefon pintar ini akan dihubungkan melalui Bluetooth.

## **DEDICATIONS**

To my beloved parents,

Jumali bin Ponin

&

Ruslinah binti Misran

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# TABLE OF CONTENTS

DECLARATION .....	iv
APPROVAL.....	v
ABSTRACT.....	vi
ABSTRAK .....	vii
DEDICATIONS .....	viii
ACKNOWLEDGMENTS .....	ix
TABLE OF CONTENTS.....	x
LIST OF FIGURES .....	xiv
LIST OF TABLE .....	xviii
LIST OF SYMBOLS AND ABBREVIATIONS .....	xix
CHAPTER 1 .....	1
1.0 Introduction .....	1
1.1 Background .....	1
1.2 Problem Statement .....	1
1.3 Objectives .....	2
1.4 Scope of Project.....	2
CHAPTER 2 .....	4
2.0 Introduction .....	4
2.1 Type of Medicine Pillbox.....	4

2.1.1	Pillmate Day Out.....	5
2.1.2	Pillmate Large 7 Day .....	5
2.1.3	Pillmate Twice A Day.....	6
2.1.4	Pillmate Multi Dose Weekly.....	7
2.1.5	Tabtime Wallet.....	7
2.1.6	Keep Able Wallet.....	8
2.1.7	RNIB Darrow Medi Tray.....	9
2.1.8	Le Mem-X.....	9
2.1.9	Vibrilite 8.....	10
2.1.10	Cadex.....	11
2.1.11	Pillmate Day Out.....	11
2.1.12	Tabtime 4 .....	12
2.1.13	Pivo Tell MiniTell.....	13
2.1.14	Tabtime Snap-On .....	13
2.1.15	Tabtime Medminder.....	14
2.1.16	Pivo Tell Automatic Pill Dispenser .....	15
2.1.17	Pillmate Automatic Dispenser.....	15
2.2	Studying of Peripheral Interface Controller (PIC) 16F777 .....	16
2.3	Studying of Bluetooth .....	18
2.3.1	Features of Bluetooth .....	18
2.3.2	Adopted Protocol of Bluetooth .....	20
2.3.3	The ISO/OSI Reference Model for Bluetooth .....	21
2.3.4	Network Topology of Bluetooth .....	22

2.4	Studying of Magnet Code Platform.....	23
2.5	C Language.....	23
CHAPTER 3 .....		24
3.0	Introduction .....	24
3.1	Project Overview .....	24
3.2	Flow Chart of Project .....	25
3.2.1	Overall Flow Chart of Project.....	25
3.2.2	Detailed Flow Chart of Project .....	27
3.3	Project Sequences.....	28
3.4	Development of Hardware .....	29
3.5	Development of Software.....	31
3.6	Construction of Circuit.....	42
3.7	Printed Circuit Board (PCB) Fabrication Process.....	45
3.7.1	PCB Layout and Preparation.....	45
3.7.2	PCB Exposure .....	46
3.7.3	PCB Development.....	46
3.7.4	PCB Etching.....	47
3.7.5	PCB Stripping .....	48
CHAPTER 4 .....		49
4.0	Introduction .....	49
4.1	Outcome of Project.....	49
4.2	Analysis of Bluetooth Signal.....	58
4.2.1	Experiment 1 (Open Area Analysis).....	59

4.2.2	Experiment 2 (Close Area Analysis) .....	60
4.3	Analysis of 12V Battery Lifetime (Experiment 3) .....	61
4.4	Experimental Results .....	61
4.4.1	Experiment 1 (Open Area Analysis) .....	62
4.4.2	Experiment 2 (Close Area Analysis) .....	64
4.4.3	Experiment 3 (Lifetime of 12V Battery Analysis).....	66
4.5	Discussion of Results .....	68
4.5.1	RSSI Signal Strength Varies on Distance .....	68
4.5.2	RSSI Signal Strength Varies on Environment .....	68
4.5.3	Bluetooth Affect Battery Lifetime .....	69
CHAPTER 5	.....	71
5.0	Introduction .....	71
5.1	Summary of Project .....	71
5.2	Limitations and Recommendation.....	72
APPENDIX A	.....	74
APPENDIX B	.....	77
REFERENCES	.....	84

## LIST OF FIGURES

Figure 2.1: Pillmate Day Out .....	5
Figure 2.2: Pillmate Large 7 Day .....	5
Figure 2.3: Pillmate Twice A Day .....	6
Figure 2.4: Pillmate Multi Dose Weekly .....	7
Figure 2.5: Tabtime Wallet .....	7
Figure 2.6: Keep Able Wallet .....	8
Figure 2.7: RNIB Darrow Medi Tray .....	9
Figure 2.8: Le Mem-X .....	9
Figure 2.9: Vibralite 8 .....	10
Figure 2.10: Cadex .....	11
Figure 2.11: Pillmate Day Out .....	11
Figure 2.12: Tabtime 4 .....	12
Figure 2.13: Pivo Tell MiniTell .....	13
Figure 2.14: Tabtime Snap-On .....	13
Figure 2.15: Tabtime Medminder .....	14
Figure 2.16: Pivo Tell Automatic Pill Dispenser .....	15
Figure 2.17: Pillmate Automatic Dispenser .....	15
Figure 2.18: Datasheet of PIC16F777 .....	16
Figure 2.19: ISO/OSI reference model for Bluetooth .....	21

Figure 2.20: Point-to-point connection .....	21
Figure 2.21: Point-to-multipoint connection.....	21
Figure 3.1a: Overall Flow Chart .....	25
Figure 3.1b: Overall Flow Chart .....	26
Figure 3.2: Detailed Flow Chart.....	27
Figure 3.3: Project sequences of project .....	28
Figure 3.4: Illustration of drawer 1 .....	29
Figure 3.5: Illustration of drawer 2 .....	29
Figure 3.6: Illustration of drawer 3 .....	30
Figure 3.7: Illustration for pillbox.....	30
Figure 3.8: Heading of C language program.....	31
Figure 3.9: Serial interrupt body .....	32
Figure 3.10: Void_main body .....	32
Figure 3.11: Morning medication time button command .....	33
Figure 3.12: Afternoon medication time button command.....	34
Figure 3.13: Night medication time button command .....	35
Figure 3.14: “Find it” button command .....	36
Figure 3.15: “Stop” button command .....	37
Figure 3.16: “No Pill” button command .....	38
Figure 3.17: Command for mode 1 .....	39
Figure 3.18: Command for mode 2 .....	40

Figure 3.19: Command for mode 3 .....	41
Figure 3.20: Ending of C language program.....	41
Figure 3.21: Click on the new project.....	42
Figure 3.22: Click on the ISIS icon.....	42
Figure 3.23: Searching for component.....	43
Figure 3.24: Finishing of schematic circuit.....	43
Figure 3.25: Click on the ARES icon .....	44
Figure 3.26: Finishing of PCB layout diagram .....	44
Figure 3.27: 3D view of circuit .....	45
Figure 3.28: UV curing machine.....	46
Figure 3.29: PCB Development machine .....	46
Figure 3.30: PCB Etching machine.....	47
Figure 3.31: PCB Stripping machine .....	48
Figure 4.1: View when morning medication time reached .....	49
Figure 4.2: View when drawer 1 is opened.....	50
Figure 4.3: GUI for morning medication time .....	51
Figure 4.4: View when afternoon medication time reached .....	51
Figure 4.5: View when drawer 2 is opened.....	52
Figure 4.6: GUI for afternoon medication time .....	53
Figure 4.7: View when night medication time reached .....	53
Figure 4.8: View when drawer 3 is opened.....	54

Figure 4.9: GUI for night medication time .....	55
Figure 4.10: GUI for “Find it” and “Stop” button .....	56
Figure 4.11: Message send for every medication session .....	57
Figure 4.12: Message send for “No Pill” button .....	58
Figure 4.13: BlueScan application interface .....	59
Figure 4.14: Illustration for experiment 1 (Open Area) .....	59
Figure 4.15: Illustration for experiment 2 (Close Area) .....	60
Figure 4.16: Graph of distance over RSSI strength in open area.....	63
Figure 4.17: Graph of distance over RSSI strength in close area .....	65
Figure 4.18: Graph of time taken over voltage value for 12V battery.....	67
Figure 4.19: Comparison graph of experiment 1 and experiment 2 .....	69



## LIST OF TABLE

Table 2.1: Characteristic of PIC16F777 .....	17
Table 4.1: Data Collection for Experiment 1 .....	62
Table 4.1: Data Collection for Experiment 2 .....	64
Table 4.1: Data Collection for Experiment 3 .....	66

## LIST OF SYMBOLS AND ABBREVIATIONS

Abbreviation	Meaning	Page
LCD	Liquid Crystal Display	1
LED	Light Emitting Diode	1
PIC	Peripheral Integrated Controller	2
LVD	Low Voltage Directive	17
RTC	Real Time Clock	17
UART	Universal Asynchronous Receiver/Transmitter	17
USART	Universal Synchronous Asynchronous Receiver/Transmitter	17
SPI	Serial Peripheral Interface	17
MCCP	Mud Client Compression Protocol	17
ADC	Analog to Digital Converter	17
FH-CDMA	Frequency-Hopping Code Division Multiple Access	19
RSSI	Received Signal Strength Indicator	19
OTA	Over the Air	19
PPP	Point to Point Protocol	20
IETF	Internet Engineering Task Force	20
RFCOMM	Radio Frequency Communication	20

TCP	Transmission Control Protocol	20
UDP	User Datagram Protocol	20
IP	Internet Protocol	20
OBEX	Object Exchange	20
WAP	Wireless Application Protocol	20
SDP	Service Discovery Protocol	21
BNEP	Bluetooth Encapsulating Protocol	21
Android OS	Android Operating System	23
SMS	Short Message Service	23
GUI	Graphical User Interface	23
PCB	Printed Circuit Board	24

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

In Chapter 1: Introduction, a brief idea of the project will be explained. The focus will be more on the overview of the project, detailing the objectives, the problem statement, scope and outcome of the project.

### 1.1 Background

High-Technology Medicine Pill Box is about helping people who take medication daily in order to remind them in taking medicine. Taking care of them is a serious concern in developing countries. This prototype will be completed with three drawers where it will remind them to take medicine in three different times which are morning, afternoon and night. As a prototype, this device only set for a week medication time. When the programmed time has been reached, LCD screen will display “Please take your medicine in drawer 1!” and the LED and buzzer start to turn on. In order to make sure user alerts with the reminder, this device will be connected with smart phone by using Bluetooth as the interface. Once the user take out the drawer and take the medicine, user has to put back the drawer and the LCD screen will display “Thank you for taking your medicine in morning.”

### 1.2 Problem Statement

For some people, missing or taking medicine at a wrong time only can lead to a worst healthy condition. Besides that, taking incorrect amount of medicine at the proper time also can lead to over dosage. For individual that have remembering problem, they may face with overdosing their medicine as they forget that they already consumed the medicine or not. This individual also may not taking their medicine on purpose because they uncertain if they have already taken the medicine.

Hence the project will be focused on helping elder people and someone who had a remembering problem in this project. Sometimes the people of surrounding also not realize that these people need their help to make sure they can continue doing their daily activities. This project will be a replacement for the care taker as well.

Therefore, this project is an invention of medicine pill box from the previous study. It is able to store the medicine and also reminds the user to take their medicine on the right time and the right dosage. Hence, with the benefit of this project, people in this world especially elder now can be independent without depend to others.

### **1.3 Objectives**

The objectives of this project:

1. To apply the basic concept of Bluetooth and its application in electronic medicine pill box.
2. To introduce medicine pill box for elder people and other people that have remembering problem to take their medicines.
3. To provide a medicine pill box that can keep their medicine for a week that can be carried along.

### **1.4 Scope of Project**

The scope of this project is based on the Bluetooth which works as an interface, MagnetCode software and also PIC16F777 microcontroller. Bluetooth is a wireless communication protocol which able to communicate with other Bluetooth-enabled devices. Eventhough Bluetooth has a short range area covered, but this networking technology only use low-power consumption to make it work.

Besides that, this project also uses MagnetCode which is a prototyping platform to develop App for control purpose. This platform will be installed in the smartphone and will communicate with a microcontroller using Bluetooth. User friendly commands and user interface is the main target of using this platform.

Last but not least, this project will use PIC16F777 microcontroller in order to carry out a vast range of tasks. In this project, the PIC microcontroller will be programmed to be a timer and also able to turn on the LED and buzzer as well.

# **CHAPTER 2**

## **THEORETICAL BACKGROUND**

### **2.0 Introduction**

In Chapter 2: Theoretical Background, the theory of the High-Technology Medicine Pill Box will be discussed. The discussion includes the previous invention and the features of the project that will be revealed part by part. The previous inventions with the same ideas with this project will be discussed in in order to make sure this project comes out with the best invention. The features also will be covered about the hardware and also software that will be used in this project. Based on the research that had been done previously, this project will be focused more on elder people as they have a big potential to forget the medication time and this can lead to a worst health condition. The research shows the major cause of this problem is the elder have a problem in remembering. That is why this project will introduce a portable medicine box complete with an alerting system using smartphone. This idea then leads to a project named as High-Technology Medicine Pill Box.

### **2.1 Type of Medicine Pillbox**

High-Technology Medicine Pill Box will come with a user-friendly design that can be carried along everywhere and anywhere. At the western country, the same invention with this project has a variety in shape, size and also their function. But, the design majorly is not user friendly as the alerting system is only at the medicine pill box. This feature cannot guarantee the elder to not skip their medication time. Besides that, some of the medicine pill box may be too large to be carried along together. With this project, both of the two problems may be fixed as this project will be connected to smartphone which act as alerting system and also easy to carry along everywhere and anywhere.

### 2.1.1 Pillmate Day Out



Figure 2.1: Pillmate Day Out [2]

Figure 2.1 above shows a Pillmate Day Out. This is a simple and cheap pill box which can be organised pills only for a day medication time. It has 4 small pill compartments which can be flipped to open. This pill box is good for the users if they know what pills they have to take at specified time. Without having an alerting and ordering system, it will be disadvantage if the users have a difficulty in understanding where they may take the pill in the wrong order [1].

Pill Box Rating:

Easy to use: Very Good

Easy to understand how it works: Poor

Easy to fill: Good

Secure (if dropped): Very Good

### 2.1.2 Pillmate Large 7 Day



Figure 2.2: Pillmate Large 7 Day [2]

Figure 2.2 above shows another type of pillmate product which is a simple and also cheap. It can organise the pills for a week if and only if the medication time is