PORTABLE LED DOT MATRIX DISPLAY BOARD

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This Report Is Submitted In Partial Fulfillment Of Requirements For The Bachelor Degree of Electronic Engineering (Industrial Electronic)

Fakulti Kejuruteraan Elektronik dan Kejuruteraan Komputer

University Teknikal Malaysia Melaka

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ABSTRACT

Banners and posters are among the most popular advertising medium in the business world in order to promote goods or services. Nevertheless, this medium has its disadvantages, where it costs a lot of money. Preparation of these advertising medium also involves a period of time in designing and printing the required advertisement of goods and services. Each printed advertisement may only be used for the stated promotional purposes. The electronic billboards known as "Electronic Display Board" has been widely used as it is one of the creative innovations in technology for displaying running messages and attractive graphic designs. It also provides the same functionality as banners and posters. Although, electronic display board can attract more people to read it, the device has its own drawbacks. It is relatively expensive for small businesses and it is not mobile friendly. This project is an innovation to the existing electronic display board as it is lighter and portable. This portable device is a combination of six units of 8x8 LED dot-matrix that can display 256 different characters including alphabets, numbers, punctuations, symbols and basic smiley icon. In addition, this device can be controlled using smartphone by downloading the application from Android. This new innovation also uses the Bluetooth system as an interface to connect smartphone with the message display unit.

ABSTRAK

Sepanduk dan poster merupakan medium pengiklanan yang popular dalam dunia perniagaan bagi mempromosikan barangan atau perkhidmatan. Walaubagaimanapun, medium ini ada kekuranganya dimana ia melibatkan kos yang tinggi. Penyediaan sesebuah medium pengiklanan juga melibatkan satu tempoh jangka masa bagi mereka bentuk seterusnya mencetak iklan perkhidmatan atau barangan yang hendak dijual. Setiap iklan yang telah dicetak hanya boleh digunakan untuk promosi yang dinyatakan sahaja. Pengunaan papan iklan elektronik atau dikenali sebagai "Papan Paparan Elektronik" kini telah banyak digunakan kerana ia merupakan satu teknologi inovatif yang lebih kreatif bagi memaparkan maklumat secara bergerak dan rekabentuk grafik yang menarik. Ia juga mempunyai fungsi yang sama seperti sepanduk dan poster. Meskipun papan paparan elektronik boleh menarik minat lebih ramai pengguna untuk membacanya, peranti ini mempunyai kelemahan yang tersendiri. Peranti ini agak mahal bagi peniaga kecil-kecilan untuk memilikinya dan tidak mudah untuk dibawa. Projek ini merupakan inovasi bagi papan iklan elektronik yang sedia ada supaya ia lebih ringan dan mudah dibawa. Ia merupakan sebuah projek mudah alih yang menggabungkan enam unit 8x8 dot matriks LED yang boleh memaparkan 256 jenis karakter termasuklah huruf, nombor, tanda baca, simbol dan ikon asas *smiley*. Selain itu, peranti ini boleh dikawal secara langsung menggunakan telefon pintar mudah alih dengan memuat turun aplikasi daripada Android. Projek ini mengunakan sistem *Bluetooth* untuk menghubungkan telefon pintar mudah alih dengan papan paparan mesej.

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UNIVERSTI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : PORTABLE LED DOT-MATRIX DISPLAY BOARD

Sesi Pengajian : 1 5 / 1 6

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(AMIRAH NADIAH BINTI ANWARUDDIN)

Tarikh: 13 JUNE 2016

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Tarikh: 14/6/16

"I hereby, declared this report entitle "Portable LED Dot-Matrix Display Board" is the result of my own work except for quotes as cited in the references"

Signature: .....

Author: AMIRAH NADIAH BINTI ANWARUDDIN

Date: 13 JUNE 2016

"I hereby declare that I have read this report and in my opinion, this report is sufficient in terms of the scope and quality for the award Bachelor of Electronic Engineering (Industrial Electronics)"

Signature: .....

Supervisor Name: MR. HAZIEZOL HELMI BIN MOHD YUSOF

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Every challenging work needs effort as well as guidance of elders especially those who were very close to our hearts. My humble effort I dedicated to my sweet and loving

Father & Mother,

Whose affection, love, encourages and pray of day and night made me able to get such success and honour,

Along withal hard working and respected

Brothers, Sisters & Friends

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In the name of Allah, The Most Beneficent, The Most Merciful. I would like to express my sincere gratitude to Him for giving me strength, health and ability to complete my project of "PORTABLE LED DOT-MATRIX DISPLAY BOARD".

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Greatest credit goes to my supportive families and friends for their endless support, giving valuable information and ideas which help me in order to solve problems and complete the whole project within the given period of time.

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LIST OF ABBREVIATION

LED	-	Light-emitting Diode
MCU	-	Micro Controller Unit
ASCII	-	American Standard Code for Information Interchange
MCB	-	Most significant bit
MATLAB	-	Matrix Laboratory
IC	-	Integrated Circuit
GSM	-	Global System for Mobile Communication
PIPO	-	Parallel-input-parallel-output
PIC	-	Peripherals Interface Controller
C	-	Programming language
RAM	-	Random-access memory
USB	-	Universal Serial Bus
LAN	-	Local Area Network
SMS	-	Short Message Service
SIM	-	Subscriber Identity Module
PCB	-	Printed Circuit Board
AT	-	ATtention
SO	-	Small Outline
DIP	-	Dual In-line Package
RF	-	Radio Frequency
UART	-	Universal Asynchronous Receiver/Transmitter
PIO	-	Programmed Input / Output
PCB	-	Printed Circuit Board

CHAPTER 1

INTRODUCTION

This chapter gives an overview of the project including introduction, problem statement, objectives and scope of the project.

1.1 Introduction

Nowadays, display board can be seen everywhere and becoming popular as it is one of the innovations in technology for displaying information. Graphics and visual displays are an extremely powerful tools in spreading the information and influence public perception. If all of the information are clearly stated, it can avoid problems such as miscommunication in delivering information.

Portable LED Dot-Matrix Display Board is an electronic message display system which uses combination of 8x8 LED dot-matrix. The purpose of this project is to display running messages through smartphone. It operates via Bluetooth in order to connect the display unit with the smartphone wirelessly. Besides, it is a portable device which it can be easily carried by hand. This portable message display is convenient especially for salesman to advertise their products or promotions during exhibitions. It will attract customers to read the running messages. Users can use the application of Android, "Arduino Control Bluetooth" that can be easily downloaded through Play Store in order to set the input of messages.

Figure 1.1 shows major components that being used in this project. It starts with the application from the mobile phone as the input of the system. It must be paired with the Bluetooth module in order to connect with the display system. Arduino Uno is used as the microcontroller to decode the messages that have been sent through smartphone and appears it on the display unit.

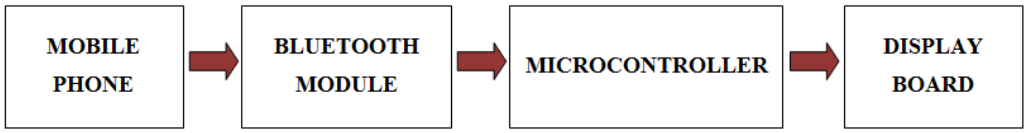

Figure 1.1: "Portable LED Dot Matrix Display Board" block diagram

1.2 Problem Statement

Advertisement is one of the important thing for salesman to promote their product or services. People need to use different and interesting method rather than just produce a banners or posters. Creating banners and posters or by using big electronic display board are some of the advertisement methods that can be seen nowadays. There are a lot of problem faced by the current advertisement method. For example, printed banner will be wasted if promotion ends and salesman need to print out new sets for new product or new promotions. Printed banner cost a lot of money and need time to prepare according to the promotion and it cannot be recycled when the promotion ends or product change. While, by using big electronic display board seems to be an attractive method for advertising but it is not portable because it is very heavy and not convenient to carry around. Besides, it need to use computers to set the messages and cannot change the wordings of the advertisement immediately.

Solution for the problem stated is by using Portable LED Dot-Matrix Display Board. Attractive display with different styles will attract people to read it. This message display uses the application of smartphone to set the input of the messages. Besides that, this display board is a mobile friendly device which can be carried by hand and can be powered by plugged in to any power source that uses 5V.

1.3 Project Objectives

There are several objectives that need to be accomplished at the end of this project as follows:

1) To develop a portable message display using combination of 8x8 LED dot-matrix.
2) To analyze the performance of displaying the message by using Smartphone that operates via Bluetooth.

1.4 Scope of Work

The scope of this project is:

1) uses combination of 6 units of 8x8 led dot-matrix to display message.
2) Arduino Uno R3 is used as microcontroller.
3) Bluetooth is used as the interface module between Smartphone and display system.
4) The input power is up to 5 V with the range of 1000 mA to 2000 mA.
5) Display alphabets, numbers, punctuations, symbols and basic smiley characters.

1.5 Thesis Outline

This thesis contains five chapters that describe Portable LED Dot Matrix Display Board that interface via Bluetooth system where the first chapter contains Introduction followed by Literature Review, Methodology, Results and Discussion and Conclusion.

Chapter I – This section describe the background of the whole project. It includes objectives, problem statement and scope of work in developing this project.

Chapter II – Literature Review consist of findings that have been done before. The content of the studies includes the information about the LED dot matrix, Bluetooth device and Microcontroller used.

Chapter III – Method or approaches that have been used for this project were describe in this chapter. For example, this chapter explains steps taken in fabrication process that have been done throughout this project.