IMPROVISED BRAILLE CHARACTER TO ROMAN TEXT CONVERTER USING PIC MICROCONTROLLER

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This report is submitted in partial fulfillment of the requirements for the award of Bachelor of Electronic Engineering (Computer Engineering) With Honours

Faculty of Electronic and Computer Engineering
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Special dedication to my loving mom and dad, my siblings, and my kind hearted supervisor Mr. Adie Bin Mohd Khafie and also dearest friends.

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ABSTRACT

Improvised Braille Character to Roman Text Converter Using PIC Microcontroller is a one equipment could function convert the Braille character to Roman text by using microcontroller. This project improvised from a previous project in writing Braille translation to the Roman are more complex can be translated. Braille system usually only used by blind people to write and read. This project will be used in special education school especially. It will help teacher or instructor to check their student essay or assignment without using common method. In the real situation Braille dot is very small size, it brings problems to the teacher or instructor to read and review their student essays or assignments. This product has three grades, the first grade represent the basic characters such as letters A to Z, numbers and punctuation. The second grade is a combination of letters that form words or compensation, and while the final grade of the third grade represents the short form for the word. The third grade is used for shorthand writing. With this project, anyone not have knowledge about Braille writing can understand the Braille writing.

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ABSTRAK

Penambahbaikan penukar aksara Braille kepada teks Roman dengan menggunakan pengawal-mikro merupakan satu alat yang boleh berfungsi menukar tulisan Braille kepada tulisan Roman. Penambahbaikan alat ini membolehkan penterjemahan tulisan Braille kepada tulisan Roman yang lebih kompleks dapat dilaksanakan. Sistem Braille selalunya hanya digunakan oleh orang-orang cacat penglihatan untuk menulis dan membaca. Alat ini akan digunakan di Sekolah Pendidikan Khas terutamanya. Pengguna tulisan Braille akan menggunakan jari untuk merasa titik-titik Braille semasa membaca. Oleh kerana titik-titik Braille terlalu kecil, ia membawa masalah kepada tenaga pengajar untuk membaca dan membuat semakan terhadap karangan atau tugasan bertulis pelajar mereka. Alat ini akan membantu tenaga pengajar untuk memeriksa karangan atau tugasan bertulis tersebut tanpa menggunakan kaedah biasa. Alat ini mempunyai tiga peringkat iaitu peringkat pertama mewakili huruf-huruf asas seperti huruf A hingga Z, nombor-nombor dan tanda bacaan. Peringkat kedua pula merupakan gabungan huruf-huruf yang membentuk perkataan atau imbuhan dan manakala peringkat terakhir iaitu peringkat ketiga mewakili singkatan perkataan. Peringkat ketiga ini digunakan untuk penulisan teringkas. Oleh itu, dengan adanya alat ini sesiapa sahaja bolah memahami tulisan Braille.

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CHAPTER 1

INTRODUCTION

1.1 Background

Braille is a system of printing or writing for the blind people in which the characters are represented by tangible a points or dot. The real dot of Braille character is very small. This project is to build the prototype of Braille character to Roman text converter by using PIC microcontroller. The purpose for this project is to help and facilitate the instructor or teacher for blind people in checking their student's essay or assignment.

This project use an infrared sensor to sense the real dot of Braille but the real dot is very small. The solution is the infrared sensor will be connected to the fiber optic where the fiber optic can sense the real dot of Braille. In this project, seven sensors will be used which six sensors used for detect the dot and one sensor use for detect the next row in the Braille sheet. Here, this project also used PIC microcontroller and liquid crystal display (LCD). PIC microcontroller is used to read the binary and convert the Braille dot to Roman text using ASCII code. Output from infrared sensor is an input for PIC microcontroller and the output from PIC microcontroller is an input for the LCD. The LCD will be display output of the PIC microcontroller in a Roman text.

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1.2 Project Objectives

The project is aimed to meet the following objectives:

i. To build the prototype to detect the real dots in Braille character and display the normal characters on LCD display using PIC microcontroller and fiber optic.

ii. To write, compile and burn the source code to convert Braille character to normal character by using the ASCII code in PIC microcontroller

1.3 Problem Statements

Braille writing commonly use by blind people for writing and reading. Braille used small dots to represent alphabet, number and special sign. For writing, blind people used special typing machine or a slate and stylus to write. The dots of Braille very small and it make hard for instructor for blind people to check their students' article or essay (in Braille character). Along with this project, it gives convenience to the instructor or teacher for blind people to check their students work. Ordinary this project also can help normal people which do not have any knowledge about Braille have ability to read or understand Braille document. They can use this equipment to read article or essay that the blind people write in Braille form.

1.4 Scope of the Project

All projects have their own scope or limitation as a guideline throughout the completion of the project. The project scope for implementation these projects are consists of two major part, hardware and software development.

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1.4.1 Hardware Development

In hardware development part, the scope is focusing in design, simulate and fabricate infrared sensor circuit and PIC microcontroller circuit. These parts also need to design and fabricate the prototype of Braille converter. For the infrared sensor, this circuit will use seven sets of infrared circuit where six circuits used for sense the real dot and one set used for sense the next row. The input for sensor circuit must be 5V and the output must be in 5V and 0V. The High and Low voltage will be read as binary 1 and 0 as an input for microcontroller. The prototype of Braille converter is used to represent the real situation Braille converter function. In the prototype, the real size of dot should be used.

1.4.2 Software Development

In software development part, the scope will focus in programming aspect in read data from sensor part and convert the data using microcontroller. The suitable software need to use to write and test the program for sensor and PIC microcontroller. In this part, Proteus software and MPLab IDE software are used to design, write and test the source code for the program. The program will be written in C language. The program will be cover in three grade of Braille character. The Roman text as an output from the PIC will be display in LCD.

1.5 Report Structure

This report contains of five chapters that will explain detail about this project. The first chapter is the introduction of the project. This chapter contains of project introduction, project objectives, problem statement, scope of work, project methodology and report structure.

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The second chapter is literature review about Braille writing, PIC microcontroller, Comparator, Infrared Sensor, LCD and other theory related to this project. This chapter also contains the theory of the components, equipments and programming languages that is used in the project. So, it is very important to understand the concepts involved and how this system works.

The third chapter is Project Methodology. This chapter will explain step by step about the whole method that be used for this project. This chapter contain the method used such as data collecting, hardware development process and analyzing of data flow chart for project flow.

The fourth chapter is about result and discussion were be explain about the any result from this project and discuss about the circuit used in this project, design process, simulation, testing and practical result.

The lastly chapter fifth is conclusion and recommendation. . This chapter also contain of suggestion to improve this project for future works. The overall conclusion of this project showed.

1.6 **Methodology**

Methodology is a part will explain about the project path from the beginning until it is completed. Every selection and action that has been done while implementing the project must be explains in stages. This methodology must be done to make sure the project that consists of hardware and software development will be developed systematically, smoothly and successfully.

Basically, this project start with study all the research and journal, application notes, all data and book about Braille writing, PIC functionality and study available design. For the software, in this project start study with the C language using MPLab IDE software. Than, used the Proteus software to simulate the circuit design such as

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sensor circuit and microcontroller circuit. Last step is constructing prototype circuit and test functionality. If the prototype not functions, troubleshooting step is a one of the method in this project.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will explain and discuss the sources or articles that are related to the project. It consists of the products that have been appeared in the market nowadays. This chapter is also about the theory of the components, equipments and programming languages that is used in the project. The literature review must be done to comprehend the whole system and decide the best inputs, outputs and devices. Equipment and part manuals include information such as dimension, operation and specification. This chapter will cover the study of Braille writing, Infrared sensor, Comparator, PIC 16F877A microcontroller and LCD.

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