

# Hardware Based Braille Note Taker

Ms. Varsha V. Gaikwad  
Dept. of Electronics Engg.

Bharati Vidyapeeth's college of Engg, Pune

Prof.R.M.Khaire

Dept. of Electronics Engg.

Bharati Vidyapeeth's college of Engg, Pune

## ABSTRACT –

*Due to the lack of vision, the blind people cannot easily access the latest information and the technologies which can provide them an alternating communication expertise. Modern technological enhancements cannot be easily affordable to the visually impaired people because of their higher cost and the less portability. That is why it has become pretty necessary to develop a low cost, portable and a fast Braille System for the visually impaired people. This paper introduces a new communication channel for the deaf blind and visually impaired people which consist of three different subsystems providing different facilities to improve the communication skill of the visually impaired people. The system consists of the following three modules: i) a portable low cost refreshable Body-Braille system for displaying Braille characters using six micro vibrators. ii) an easy Braille writer for writing the Braille characters and iii) a remote communication system through SMS. This new communication system is cheap, portable, fast and accurate.*

## *Keywords-*

## I. INTRODUCTION

Mobile phone is a very useful invented technology. Today all the people are used mobile phones for their conveniences. The mobile phone is a very good and very useful technology for communication. Using mobile phone communicating with friends and families from anywhere to all over in the world is possible. By calling or sending messages from mobile phone we can easily able to connect with others.

Now a day's SMS (short message service) is the most useful application. Today 80% of mobile phone users are use this data facility. But the visually impaired people cannot able to use this facility.

In this paper the visually impaired people can read message using mobile phone, and also this system help the blind people to send acknowledgment for the current incoming messages. This will be implemented by interfacing the Braille system with mobile phone.

Louise Braille is the father of Braille system. This system is a widely used system; with the help of this system, all the blind peoples for reading and writing like a normal people.

### *I.A. BRAILLE LANGUAGE*

Braille is writing system which enables blind and partially sighted people to read and write through touch. It was invented by Louis Braille (1809-1852), who was blind and became a teacher of the blind. It consists of patterns of raised dots arranged in cells of up to six dots in a 3 x 2 configuration. Each cell represents a letter, numeral or punctuation mark. Some frequently used words and letter combinations also have their own single cell patterns.

There are a number of different versions of Braille:

**Grade 1:** This grade consists of the 26 standard letters of the alphabet and punctuation. It is only used by people who are first starting to read Braille.

**Grade 2:** This grade consists of the 26 standard letters of the alphabet punctuation and contractions. The contractions are employed to save space because a Braille page cannot fit as much text as a standard printed page. Books, signs in public places, menus, and most other Braille materials are written in Grade 2 Braille.

**Grade 3:** This grade is used mainly in personal letters, diaries, and notes, and also in literature to some extent. It is a kind of shorthand, with entire words shortened to a few letters.

### *I.A.I Braille Code*

Braille can be seen as the world's first binary encoding scheme for representing the characters of a writing system. The system as originally invented by Braille consists of two parts:

- A character encoding for mapping characters of the French language to tuples of six bits or dots.
- A way of representing six-bit characters as raised dots in a Braille cell.

Today different Braille codes (or code pages) are used to map character sets of different languages to the six bit cells. Different Braille codes are also used for different uses like mathematics and music. However, because the six-dot Braille cell only offers 63 possible combinations ( $2^6 - 1 = 63$ ), of which some are omitted because they feel the same (having the same dots pattern in a different position), many Braille characters have different meanings based on their context. Therefore, character mapping is not one-to-one.

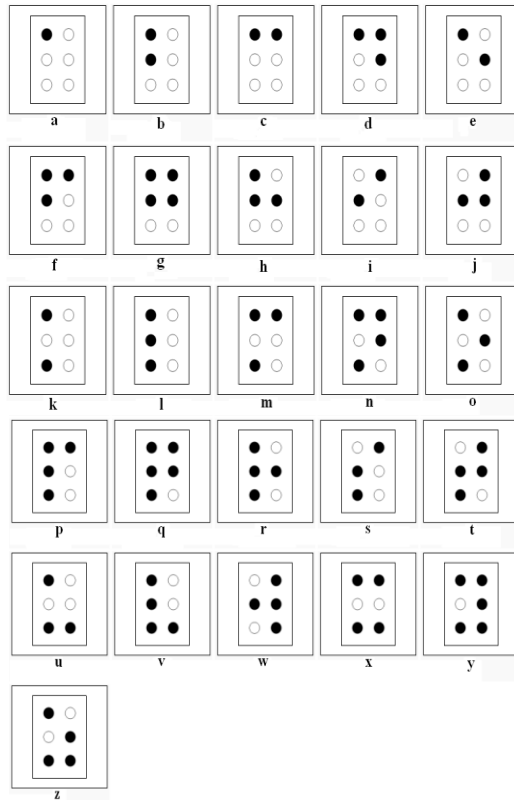


Fig 2.1 Braille code for English characters (p-z)

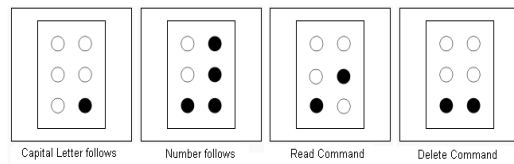


Fig 2.2 Braille code for Special Commands

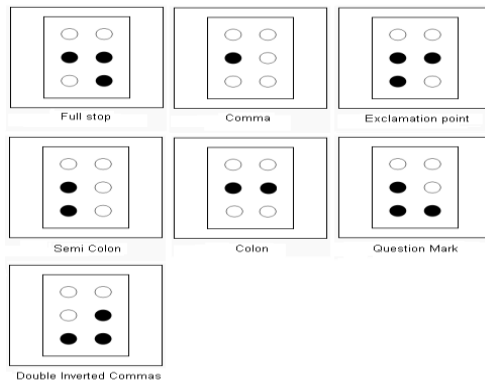


Fig 2.3 Braille code for Punctuation

The Basic ideal to design a SMS system for blind person came in our mind after reading the following two IEEE papers:

- 1) Hardware-software complex "Dashpoint" for learning and communication of deaf blind people.(year-2011)
- 2) E-mail Client having Articulation and Braille Transcription of E-mails for the Blinds.(year-2010).

## II. OBJECTIVE

The main objective of the project is to create a low cost, economical SMS system which is accessible by visually impaired person.

III. BLOCK DAIGRAM

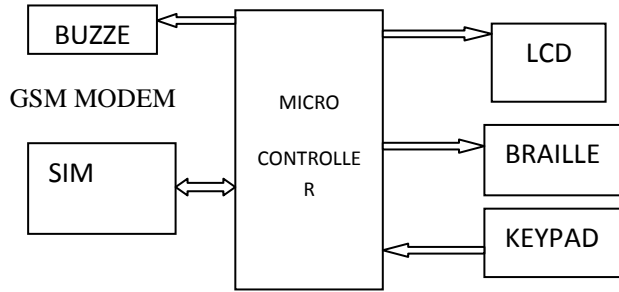


Fig. 1 Block Diagram

In this system the message received from the GSM modem using SIM 300. Every incoming message is indicated by external vibration motor using vibration. The every single message collecting in the arm processor, will be display on LCD display, Braille board and voice output. Here LCD is used for user except blind people, but output message from the audio is used for blind and dumb people .Braille output and audio output can be used by the blind people.

III.A SMS SEND

The steps required to send the messages from device are as shown below.

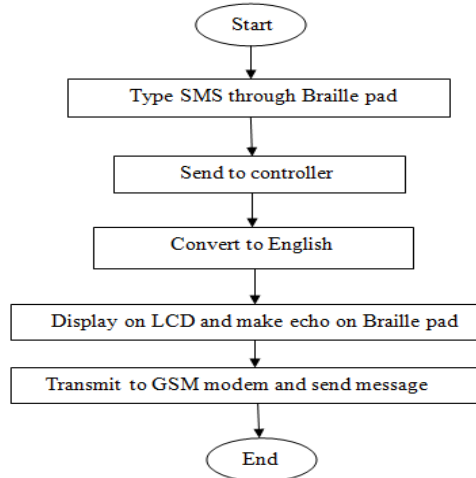


Fig 2. Flowchart for sending SMS

III.B SMS READ

The steps required to read the messages from device are as shown below.

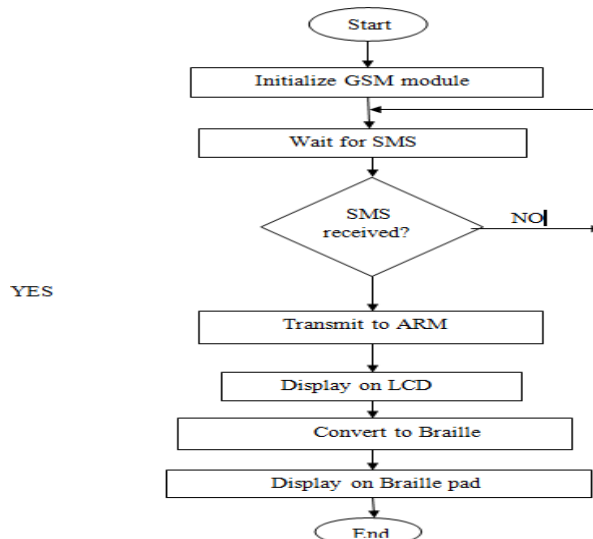


Fig. 3 Flowchart for reading SMS



Fig 4 GSM Module

III.C Liquid Crystal Displays (LCD):-

An LCD is a small low cost display. It is easy to interface with a micro-controller Because of an embedded controller (the black blob on the back of the board). This controller is standard across many displays (HD 44780) which means many Micro-controllers have libraries that make displaying Messages as easy as a single line of code.

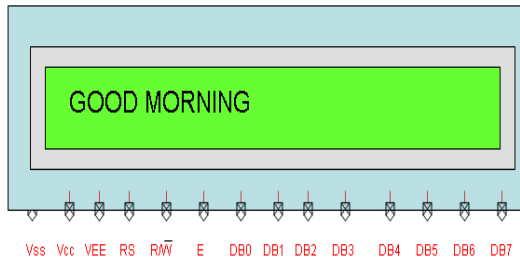


Fig 5. LCD Display

IV. AT-COMMAND SET

The following section describes the AT-Command set. The commands can be tried out by connecting a GSM modem to one of the PC’s COM ports. Type in the test-command, adding CR + LF (Carriage return + Line feed = \r\n) before executing. Table gives an overview of the implemented AT-Commands in this application. The use of the commands is described in the later sections.

AT-Command set overview

Command	Description
AT	Check if serial interface and GSM modem is working.
ATE0	Turn echo off, less traffic on serial line.
AT+CNMI	Display of new incoming SMS.
AT+CPMS	Selection of SMS memory.
AT+CMGF	SMS string format, how they are compressed.
AT+CMGR	Read new message From a given memory location.
AT+CMGS	Send message to a given recipient.
AT+CMGD	Delete message.

V. RESULT AND DISSCUSSION

V.A RESULT

1.To detect a pressed key, the microcontroller grounds all rows by providing 0 to the output latch, and then it reads the columns. However, if one of the column bits has a zero, this means that a key press has occurred. After a key press is detected, the microcontroller will go through the process of identifying the key. Starting with the top row, the microcontroller grounds it by providing a low to row D0 only; then it reads the columns. In our system, keypad works satisfactorily as per the functions given to it.

2. On the output side the ULN2803 is generally rated at 50V/500mA, so it can operate small loads directly. In electrical terms, the ULN2803 uses the low level (TTL) signal to switch on/turn off the higher voltage/current signal on the output side. The relays are energized and toggled up and down as per the instructions given to it.

3. Thus, our system enables the blind persons to access the SMS in their mobiles anytime anywhere in a very low cost.

#### **V.B. DISCUSSION**

##### **V.B.1 Advantage**

1. Quick response time

The I/O toggling time is 3 times faster than 8051 microcontroller. So the system has quick response time.

2. Low power requirement

LPC 2148 consumes 100µA current in power down mode and 12mA current ISP mode. It requires only 3.3V for its operation

3. Fully automated and robust system

##### **V.B.2 Disadvantages**

1. Lengthy process

As it reads character by character, so it is a bit lengthy process.

2. Handy System

As the system is somewhat handy, it is not portable.

## **VI. CONCLUSION**

Thus the system we have designed is useful for blind and/or deaf person to access mobile SMS system. These people can send and receive the SMS as normal person. It is easy to use system by blind people as it uses Braille language. It is a low cost device and can be modified as a portable product. By using such type of device blind people will be enabled to read and write through electronic media. The system will be very user friendly to these people.

## **REFERENCES**

- [1] MikroElektronika EasyARM v6 user manual
- [2] MikroElektronika EasyARM v7 user manual
- [3] <http://www.datasheetarchive.com>
- [4] Keil RK-1159 development Board for LPC2148