



## Hardware Based Braille Note Taker

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**Abstract** - In our day to day life the telecommunication technology plays an important role. It has completely revolutionaries the way we communicate, especially long distance communication. Despite of all these advancement in the telecommunication field, the physically impaired people have no access for these technologies. So as a step to bridge the gap between the blind people and the technological advancement in the telecommunication field we decided to design a SMS system for them by interfacing Braille pad with the cell phone so that dual impaired person can have the access to the SMS system and through which they can take important notes. Here the user sends the SMS to the blind person's mobile number which is connected to the microcontroller which reads the SMS using GSM module through the AT commands and then converts the letters of the SMS into the Braille language using the lookup table in its memory. With the help of 6 relays Microcontroller vibrates the Braille pad on which the blind person can read the SMS. For sending a SMS, the  $\mu C$  converts the typed Braille letter on Braille pad to the English alphabets using the Lookup table. Loud speaker is also used for making the voice announcement.

**Keyword-** Braille pad, AT commands, GSM module, lookup table, bridge the gap.

### I. INTRODUCTION

The telecommunication technology has become the integrated part of our day to day life. It has completely revolutionaries the way we communicate, especially long distance communication. It began with the introduction of telegram, followed by telephones. Then it was overtaken by the advanced telephone systems. Then there came the age of mobile communication which facilitates a great deal to communicate on a go. Mobile cell phones are the milestone in telecommunication technology. Despite of all these advancement in the telecommunication field, the physically impaired people have limited access for these technologies. So as a step to bridge the gap between the blind people and the technological advancement in the telecommunication field we decided to design a SMS system for them. We are designing a modular device which is accessible by blind person. For that we are using Braille language as the basis of the project. Blind people use the Braille language for reading and writing purpose. Till date they conventionally use Braille books. But it is not an economical way of communicating now a day. It has limitation on the maximum number of words per page and pages per book. So we are interfacing Braille pad with the cell phone so that impaired person can have the access to the SMS system. We are also providing voice announcement system with it as extra feature.

### II. DESCRIPTION

#### A SMS Read

Here the sender sends the SMS to the blind person's mobile connected to the controller. The microcontroller reads the SMS through the AT commands and then converts the letters of the SMS in to the Braille language using the lookup table stored in its memory. Then with the help of 6 relays the Microcontroller vibrates the Braille pad on which the blind person can read the SMS.

#### B SMS Send

Here the blind person can type the SMS using the key pad interfaced to the  $\mu C$ . The  $\mu C$  then converts the Braille letter to the English alphabets using the Look table. After the message is translated into alphanumeric English letters the  $\mu C$  sends the typed SMS via the dedicated mobile using AT commands.

#### C Braille System

Braille is writing system which enables blind and partially sighted people to read 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 matrix configuration. Each cell represents a letter, numeral or punctuation mark. Some frequently used words and letter combinations also have their own single cell patterns. For e.g.

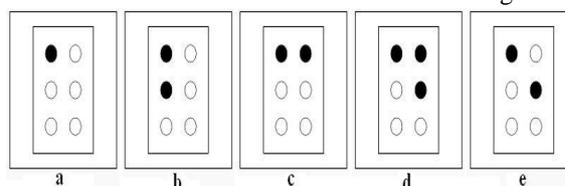


Fig. 1 Braille code examples for English characters

### III. MARKET SURVEY

To fill in the gap between physically impaired people and technological advancements many Multinational companies have taken their initiative. These electronics companies have produced devices that would help physically impaired people. The devices produced by these companies are much expensive. They are beyond the affordable limit of a common man.

Intex Company launched mobile phone in India for blind persons which only had calling facility. It excluded all other multimedia facility. Market contains devices which are helpful for physically challenged people but are costlier. There is a need for such devices that would be cheap, portable and include latest multimedia facilities.

### IV. BLOCK DIAGRAM

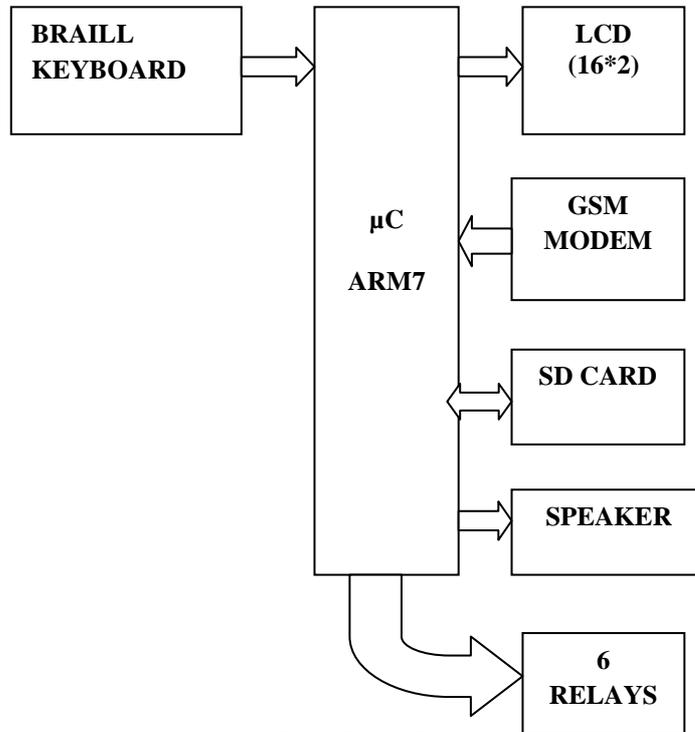


Fig. 2 Block Diagram

### V. BLOCK DIAGRAM DESCRIPTION:

#### A Liquid Crystal Display

LCD is used in a system to the output of the application. Graphics LCD can also used in a system to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a system to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

#### B GSM Module

GSM (Global System for Mobile communication) is a digital mobile telephony system. With the help of GSM module interfaced, we can send short text messages to the required authorities as per the application. GSM module is provided by sim uses the mobile service provider and send sms to the respective authorities as per programmed. This technology enable the system a wireless system with no specified range limits. This is a plug and play GSM Modem with a simple to implement RS232 and TTL serial interface. It is used to send SMS, make and receive calls, and do other GSM operations by simple AT commands through a serial interface from microcontrollers and computers. It uses the SIM300 module for all its GSM operations. Thus GSM Module is connected to the controller and transmits the incoming messages to the controller. It also receives the messages from controller. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

#### Features of GSM Sim :

1. TTL UART interface for connection to  $\mu C$ .
2. RS232 interface for connection to PC/Laptop. 3. 12V power supply option.
4. 5V power supply option.
5. LED indicating network status.

### C Keypad

It consists of 9 keys arranged in 4x4 format i.e. 3 rows and 3 columns. These keys are connected to the I/O port of the controller.

### D Braille Pad

It consists of 6 relays connected to the I/O port of the controller via driver circuit. Relays are energized according to the input from controller. As per the received commands the relays are toggled up and down. Thus the blind person will be able to sense the letter.

### E ARM7 LPC2148

Controller reads the message coming from GSM module and converts it to the Braille format using lookup table. It sends the corresponding control signals to the Braille pad via I/O port. It also reads the keys connected to port and convert it to the alphanumeric form and transmits the entered message through the GSM Module. The messages are also displayed on the LCD and voice announcement is also made by the controller.

### F LOUD SPEAKER

Loud speaker is used for making the voice announcement.

### G RELAY

It operates in two modes:

- Normally Open
- Normally Closed

Relay can be used to control different devices by turned on and off these devices whenever required.

### H MICROCONTROLLER

Here the controller is acting as Embedded Web Server. It is the heart of the heart of our project. An HTML page is loaded in it. Different devices are interfaced to it. It accepts input from the sensors and devices at remote places and produces control output. The data transaction is through Zigbee.

## VI. FLOWCHART

### A. SMS Receive

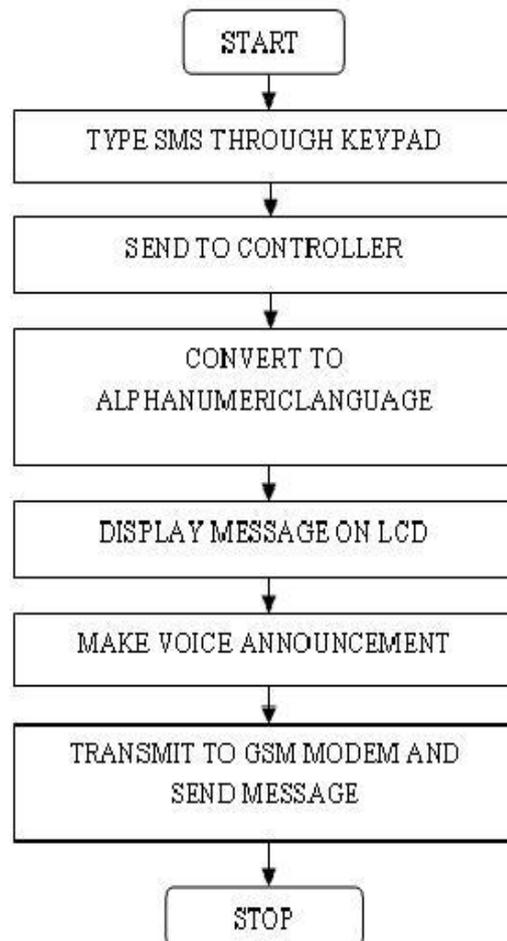


Fig. 3 Flowchart of SMS receive

B. SMS Send

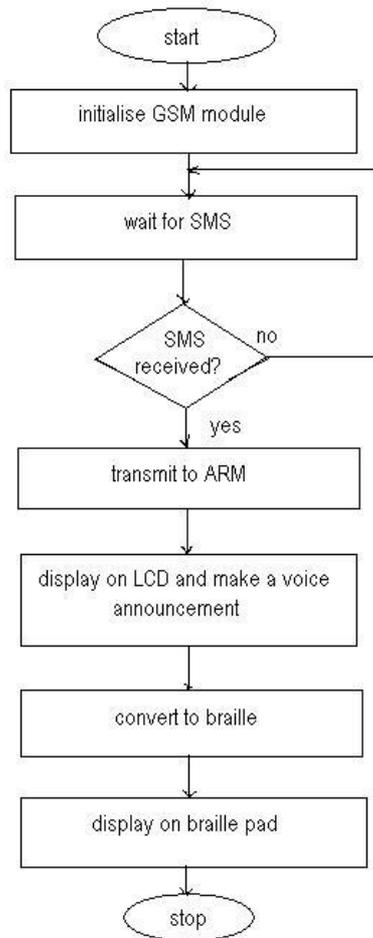


Fig. 4 Flowchart of SMS sends

### VIII. ADVANTAGES

- A. *Efficient way voice dictionary*
- B. *Less time delays*
- C. *Quick response time*
- D. *Fully automate system*
- E. *Robust system, low power requirement*

### IX. DISADVANTAGES

- A. System is a bit bulky and handy.
- B. As it reads the SMS character by character, so it's a slow process.

### X. FUTURE SCOPE

In future the system can be modified to read the sms in a string ,also blind person able to read the e-mail also.

### XI. CONCLUSION

Thus we can conclude that with some modifications in conventional communicating device, we can include large no. of physically challenged people in communication system.

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