

Advanced Braille System-Communication Device for Blind-Deaf People

Saraswathi Y.S¹, Shivangi Garg¹, Spurti Kulkarni¹, Swetha¹, Kiran B²

¹Student, Dept. of ECE Engineering, SET-Jain University, Bangalore, India

²Assistant Professor, Dept. of ECE Engineering, SET-Jain University, Bangalore, India

Abstract - Braille is a tactile writing system used by a blind and the visually impaired. It is a traditionally written with embossed paper. They can write Braille with the original slate and stylus or type it on a Braille writer. In this project we are developing a new methodology using a Braille system in order to read a message for a blind-deaf people. Here we are using a GSM modem to receive a message the contents/letters of the message can be read by blind people easily just by feeling the vibration of the vibrator motor and the same contents/letters will be displayed on the LCD so that even deaf people can easily read it. Buzzer is working as a message alerter.

KeyWords:ArduinoUNO,Vibratormotor,LCD, Buzzer,GSM,Keypad.

1. INTRODUCTION

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-deaf people and the technological advancement in the telecommunication field. We decide to design a Short Message Service (SMS) system for them. For that we are using Braille language as the basis of the project. Braille is a tactile writing system used by the blind and visually impaired. Braille characters are small rectangular blocks called as cells that contain tiny palpable bumps called raised dots. The number and arrangement of these dots distinguish from one character to another. We are designing a modular device using which blind-deaf people can send and receive message without any support of others. The basic grid of a Braille alphabet character consists of six cells, positioned like the figure six on a die, in two parallel vertical lines of three dots each using which 64 different signs can be created. In our modular design we are representing cells in the form of vibrator motors.

2 .DESCRIPTION

SMS Read

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

SMS SEND

Here the blind-deaf person can type the SMS using the keypad interfaced to the microcontroller. The microcontroller then converts the Braille letter to the English alphabets using the lookup table. After the message is translated into alphanumeric English letters the microcontroller sends the typed SMS via the dedicated mobile using AT commands.

Braille System

Braille is writing system which enables blind and partially sighted people to read through touch. It consists of patterns of raised dots arranged in cells of up to six dots in a 3x2 matrix configuration. Each cell represents letters, numeral or punctuation marks.

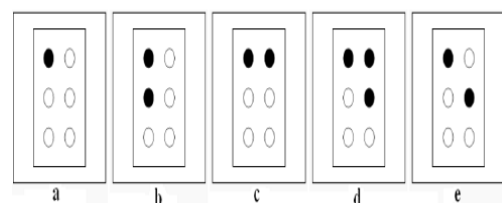


Fig-1: Braille Code for English character

3. BLOCK DIAGRAM

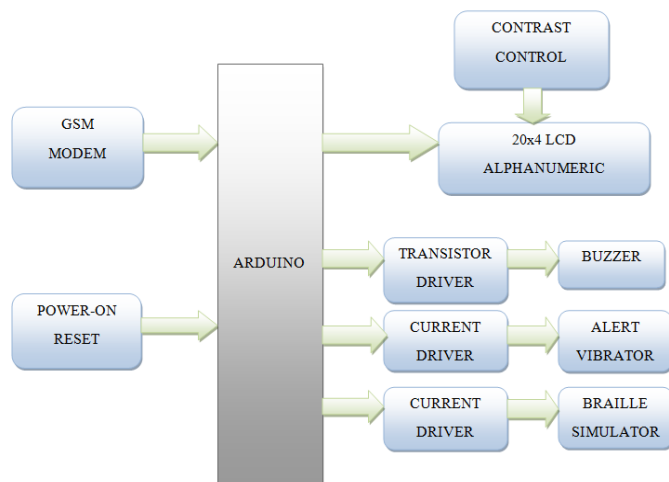


Fig-2: Block diagram of proposed Braille System

4. HARDWARE DESCRIPTION

A. Arduino UNO

Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. This system is supported by a 32 bit Atmel ARM processor. These systems provide sets of digital and analog I/O pins that can be interfaced to various extension boards and other circuits. The board features serial communication interfaces, including USB on some models, for loading programs from personal computers. The Arduino platform provides Integrated Development Environment (IDE) based on the processing project, which includes support for C and C++ programming languages.

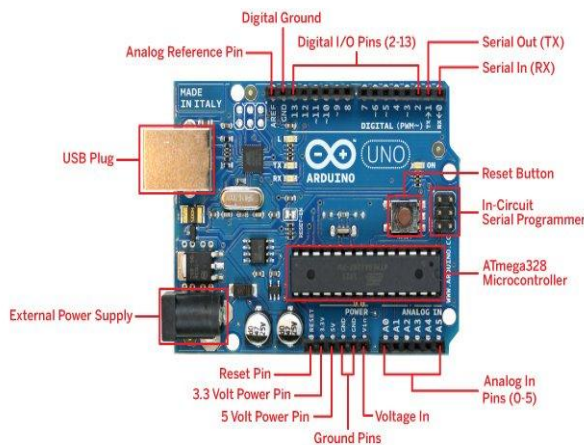


Fig-3: Arduino UNO

B. GSM Module

GSM engine works on frequencies 850MHz, 900MHz, 1800MHz and 1900MHz. It is very compact in size and easy to use. It is designed with RS232 level converter circuitry, which allows you to directly interface PC serial port. The baud rate can be configurable from 9600-115200 through AT command. Using this modem, you will be able to send and receive SMS and also connect to internet via GPRS through simple AT commands.



Fig-4: GSM

C. LCD

20x4 LCD has 14 pins. It uses eight pins for parallel data and three pins for control signals, two pins connected for power supply and one pin for contrast adjustment and two connections for LED back light. LCD accepts two types of signals, one is data and another is control. These signals are recognized by the LCD module from status of the RS pin. The data can be read by LCD display by pulling R/W pin high. As soon as the Enable pin is pulsed, LCD display reads at the falling edge of the pulse and executes it, same for the case of transmission.

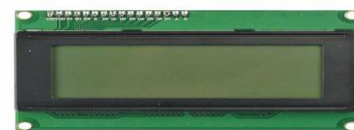


Fig-5: LCD

D. Buzzer

A Buzzer is a device which makes buzzing or beeping noise. There are several kinds; the most basic is piezoelectric buzzer, which is just a flat piece of piezoelectric material with two electrode. This type of buzzer requires some kind of oscillator to drive it. They are cheap and can be very loud without using very much power. A piezoelectric material also produce a voltage in response to pressure, so piezo electric buzzer can also be used as crude pressure sensor or microphones. Typical use of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.



Fig-6: Buzzer

E. VIBRATOR MOTORS

An Eccentric rotating mass vibration motor(ERM) uses a small unbalanced mass on a dc motor, when it rotates it creates a force that translates to vibration. A miniature DC vibration motors have the benefit of being easy to implement and are low cost. A small vibration motor can be integrated into a design so that equipment operators and users can rely on the sense of touch, no longer requiring line of sight or high volumes. This is one of the obvious benefits with mobile phones, you can receive notification when a device is in your pocket without disputing those around you. Now there are a wide range of application that use this tiny vibration motors to offer vibration alert notification and haptic feedback.

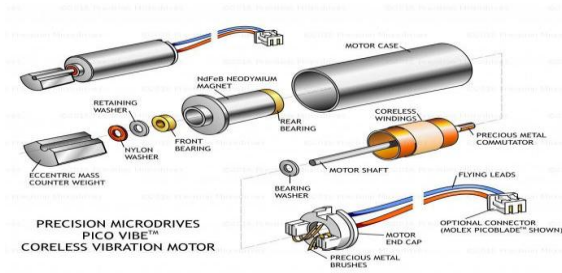


Fig-7: Vibrator Motor

F. LED

A light emitting diode is a two lead semiconductor light source. It is a p-n junction diode, which emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light is determined by the energy band gap of semiconductor. LED are used in applications as automotive headlamps, traffic signals, camera flash and lighted wallpaper.

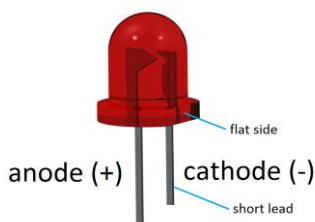


Fig-8: LED

G. Keypad

An alphanumeric keypad is a keyboard that contains both numbers and letters on the same keys. Typically, they are found on telephones and cellular phones. They also can appear on laptops, ATMs or any device where both numbers and letters are equally necessary. There is half a second delay

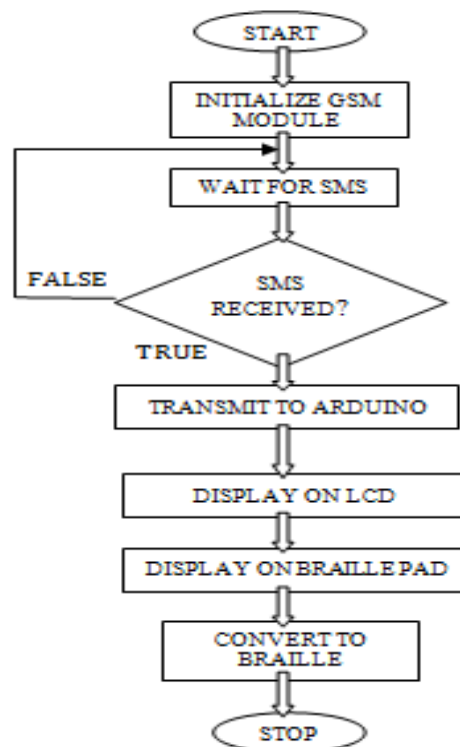
in characters of a same button. For example button 1 is printing 1a,b,c. Now if we want to print b, press button 1 first time then within half a second press it second time, then in half a second press it third time and b will be displayed on the 20x4 LCD. If you do not press the button in half second you will stuck to the last printed character and will be unable to go next character.



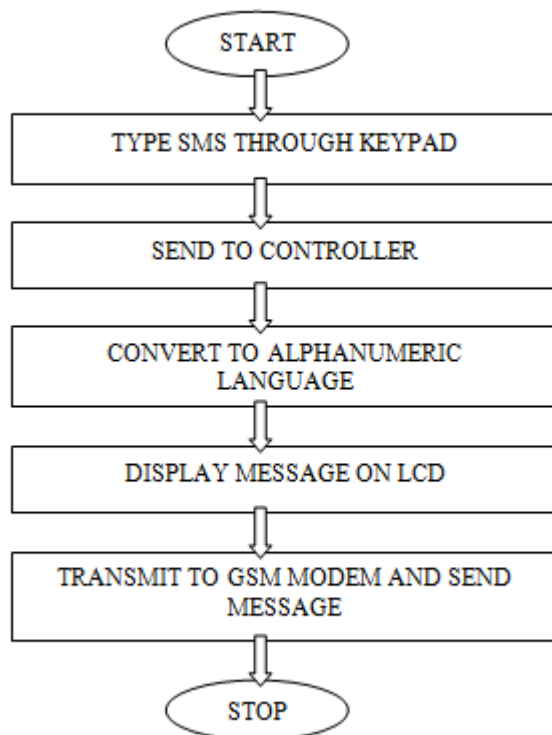
Fig-9: Keypad

5. FLOW CHART

5.1 SMS SEND



5.2 SMS RECEIVE



[4]. Fernando Ramirez Garibay, Cesar Millan Olivarria, Alejandro Federico Eufrazio Aguilera, and Joel C. Huegel. "MyVox—Device for the communication between people blind, deaf, deaf-blind and unimpaired", 978-1-4799-7193-0/14©2014 IEEE.

[5]. Abhinav Kulkarni, Kishor Bhurchandi "Low cost e-book reading device for blind people", 2015 International Conference on Computing Communication Control and Automation 978-1-4799-6892-3/15 \$31.00 © 2015 IEEE.

[6]. Harshit Gupta, Aswin Anil Kumar. "The Braille Interface", 978-1-5090- 978-15090-0774-5/16/\$31.00 © 2016 IEEE.

6. CONCLUSION

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

REFERENCES

[1]. Ramesh Sankara Subbu, Pawan Gnanaraj "Enabling Visually Impaired To Read Messages From Modern Gadgets", 2012 Sixth International Conference on Sensing Technology (ICST).

[2]. Nikhil Siva Subash, Siddhartha Nambiar, Vishesh Kumar "Braille Key: An alternative Braille text input system", IEEE Proceedings of 4th International Conference on Intelligent Human Computer Interaction, Kharagpur, India, December 27-29, 2012.

[3]. Satoshi Ohtsuka, Tai Tomizawa, Sadao Hasegawa, Nobuyuki Sasaki and Tetsumi Harakawa. "Introduction of a Wireless Body-Braille Device and a Self-learning System", 978-1-4799-0892-9/13/\$31.00 ©2013 IEEE.