

## Design of Blind Assistance System Using Refreshable Braille Display

<sup>1</sup>Atish Peshattiwar, <sup>2</sup>Sandeep Kakde, <sup>3</sup>Kuldeep Pande, <sup>4</sup>Vilas alagdeve, <sup>5</sup>Abhinav Parkhi

<sup>1,2,3,4,5</sup>Assistant Professor

<sup>1,2,3,4</sup>Department of Electronics Engineering

<sup>5</sup>Department of Electronics & Telecommunication Engineering

YCCE, Nagpur, Maharashtra, India.

**Email:** <sup>1</sup>atishp32@gmail.com, <sup>2</sup>sandip.kakde@gmail.com, <sup>3</sup>ycce.kuldeep@gmail.com,

<sup>4</sup>vilas\_a23@rediffmail.com, <sup>5</sup>abhinav.parkhi@gmail.com

### Abstract

*In this paper, we demonstrate that Braille embosser is a type of device which is very useful for the initial stage Braille language learner. Here the input is provided with the help of serial port by mobile through Bluetooth module. This input is in the form of alphabetical form so the input is converted into Braille language which is displayed with the help of actuators. Blind assistance system also allows visually impaired people to do common tasks such as reading in Braille and reading documents. It is a portable device, they can carry wherever they want so that they could get information of place they are visiting with ease. As this device detect the obstacles and also determine at what distance obstacle is person can safely use this device for indoor purpose.*

**Keywords:** Refreshable Braille display, RFID, Bluetooth Module, PIC16F886

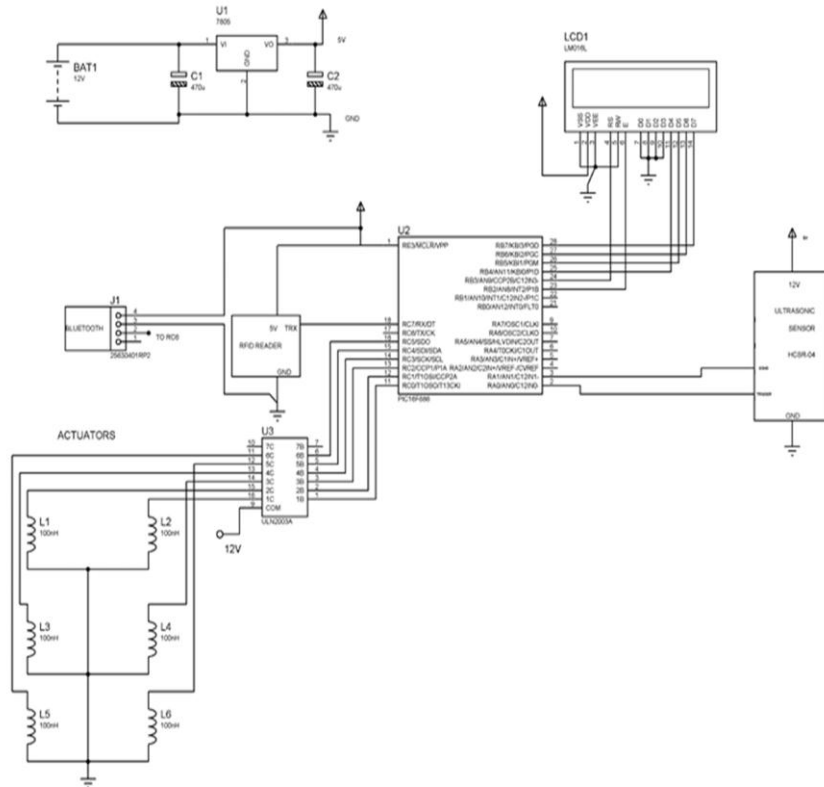
### INTRODUCTION

The cumulative force of the blind Self-emancipators' was sufficient by the 18th century to face the social conscience for bringing about a transform in the condition of this segment of society. It changed the mind set of researchers and forced them for directing their energy to think suitable thoughts for enabling common blind to receive education.

There is sample evidence to prove that

educational services for the Visually Handicapped have registered remarkable advances during last century. It is no longer an exercise generated by compassion for a group of persons living on the margins of social conscience. On the other hand, it is now meant to prepare them for shouldering responsibilities in personal as well as community life with confidence and success. It is to prepare them for citizenship in its wider sense.

**ARCHITECTURAL MODEL**



*Fig 1: Architectural Diagram*

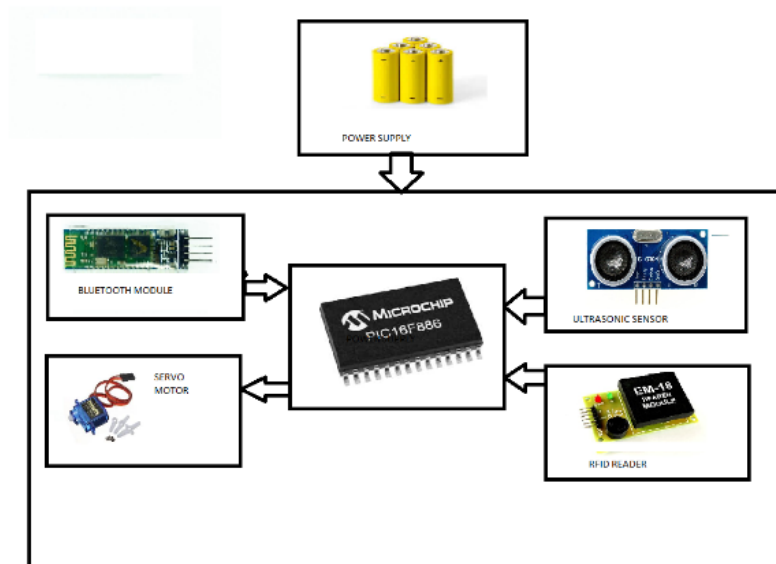
The explanation of above architectural model is as follows:

1. People with complete blindness or low vision often have Difficult time self-navigating .In fact, physical movement is one of the biggest challenges for blind people, simply walking down may pose great difficulty. Because of this, many people with low vision will bring a sighted friend or family member to help navigate.
2. Here we are using microcontroller PIC16F886 input is given to microcontroller from blue-tooth module, RFID sensor and ultrasonic sensor and output will be in a form of braille on servo motor which is refreshable braille display
3. Bluetooth module on a portable device is connected to mobile through

bluetooth terminal HC-05 through which any text document is transmitted and converted to braille language word by word

4. Ultrasonic sensor detect distance of obstacle in a way of blind person that input is given to controller to convert it into braille and also with that buzzer is connected if obstacle is below certain threshold level then it will buzz to indicate blind person
5. RFID reader is used to read RFID card to indicate at which place person is standing or to give information of place person wants to visit.
6. Here we are using servo motor as refreshable braille display which works on command and rotates at 90 degree, 180 degree and 360 degree.

**HARDWARE MODULES**  
**Block Diagram**



*Fig 2: Block Diagram*

The above block diagram represents our proposed Blind assistance system using Refreshable Braille display.

**PIC16F886**

The PIC16F886 features 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 11 channels of 10-bit Analog-to-Digital (A/D) converter, 1 capture/compare/PWM and 1 Enhanced capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I<sup>2</sup>C™) bus and an Enhanced Universal Asynchronous Receiver Transmitter (EUSART). All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances or consumer applications.

**RFID reader**

RFID Reader should be within the specific range from 3 to 300 feet, in order to work properly. Radio Frequency technology allows several items to be rapidly scanned and enables fast identification of a

meticulous product, even when it is surrounded by numerous other items.

**Ultrasonic Sensor**

Ultrasonic Sensor is used to measure the distance to an object by means of sound waves. It calculates distance by sending out a sound wave at a definite frequency and listening for that sound wave to bounce back. It is used for recording the onwards time between the sound wave being generated and the sound wave bouncing back.

**Bluetooth Module**

HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband.

**CONCLUSION**

An attempt has been made to make a practical model of ‘Blind Assistance System using Refreshable Braille Display.’

Blind assistance system allows visually impaired people to do common tasks such as reading in Braille, reading electronic mail and reading documents. It is a portable device, they can carry wherever they want so that they could get information of place they are visiting with ease. As this device detect the obstacles and also determine at what distance obstacle is person can independently travel anywhere safely.

#### REFERENCE

1. Azenkot, Shiri, SanjanaPrasain, Alan Borning, Emily Fortuna, Richard E. Ladner, and Jacob O. Wobbrock. "Enhancing independence and safety for blind and deaf-blind public transit riders." In Proceedings of the SIGCHI conference on Human Factors in computing systems, pp. 3247-3256. ACM, 2011.
2. Russomanno, Alexander, SileO'Modhrain, R. Brent Gillespie, and Matthew WM Rodger. "Refreshing refreshable braille displays." IEEE transactions on haptics 8, no. 3 (2015): 287-297.
3. Russomanno, Alexander, SileO'Modhrain, R. Brent Gillespie, and Matthew WM Rodger. "Refreshing refreshable braille displays." IEEE transactions on haptics 8, no. 3 (2015): 287-297.
4. Lévesque, Vincent, JérômePasquero, Vincent Hayward, and MaryseLegault. "Display of virtual braille dots by lateral skin deformation: feasibility study." ACM Transactions on Applied Perception (TAP) 2, no. 2 (2005): 132-149.
5. Hasselbring, Ted S., and Candyce H. Williams Glaser. "Use of computer technology to help students with special needs." The Future of Children (2000): 102-122.
6. Patinge, Suraj, Yogesh Suryawanshi, and Sandeep Kakde. "Design of ARM based data acquisition & control using GSM & TCP/IP network." In Computational Intelligence and Computing Research (ICCC), 2013 IEEE International Conference on, pp. 1-4. IEEE, 2013.
7. Ingole, Abhilasha, Shrikant Ambatkar, and Sandeep Kakde. "Implementation of health-care monitoring system using Raspberry Pi." In Communications and Signal Processing (ICCSP), 2015 International Conference on, pp. 1083-1086. IEEE, 2015.
8. Zeng, Limin, and Gerhard Weber. "Audio-haptic browser for a geographical information system." In International Conference on Computers for Handicapped Persons, pp. 466-473. Springer, Berlin, Heidelberg, 2010.
9. Patil, Neha, Shrikant Ambatkar, and Sandeep Kakde. "IoT based smart surveillance security system using raspberry Pi." In Communication and Signal Processing (ICCSP), 2017 International Conference on, pp. 0344-0348. IEEE, 2017.
10. <http://www.microchip.com/wwwproducts/en/PIC16F886>
11. [https://en.wikipedia.org/wiki/Refreshable\\_braille\\_display](https://en.wikipedia.org/wiki/Refreshable_braille_display)
12. [https://wiki.eprolabs.com/index.php?title=Bluetooth\\_Module\\_HC-05](https://wiki.eprolabs.com/index.php?title=Bluetooth_Module_HC-05)
13. <https://en.wikipedia.org/wiki/Servomotor>
14. <http://www.rfidreader.info/>