



Voice Controlled L.E.D Matrix Display

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ABSTRACT:Speech is the most effective medium for communication among human beings. Without speech, its very difficult to communicate with each other. For differently abled people who are unable to hear properly it becomes a challenging task for proper communication . This project aims to develop a system that is able to display speech onto a led matrix display screen. This system would be able to convert the speech of a person sent wirelessly via a mobile to the PIC microcontroller and display it on the 7x35 LED MATRIX display.

KEYWORDS: L.E.D Matrix, Voice, Speech, Android, Bluetooth.

I.INTRODUCTION

Today is an era of technology. Without technology, it is very difficult to imagine our lives. It helps us to lead a better live in an easier manner. The most important role of technology is to overcome our incapability. L.E.D Matrix Display using Voice to Text is a system that converts speech of a person into text and then displays the same as a scrolling message on the L.E.D Matrix. This System is useful at Public Places where announcements are done. The message can be displayed on the Notice Board (L.E.D Matrix) and can be read by people who have hearing issues or couldn't listen to it anyway. This system uses an application to convert speech into text and then transmits the message to the microcontroller via Bluetooth. This message is then displayed on the L.E.D Matrix which is connected to the microcontroller.

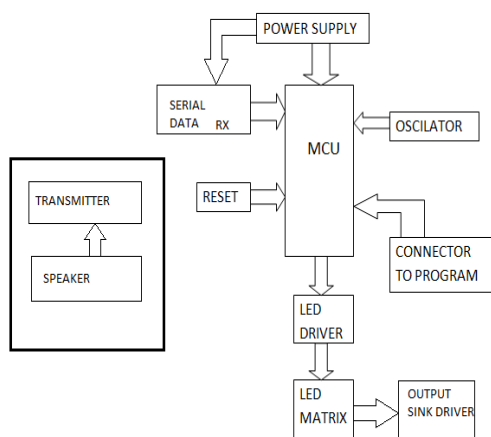


Fig. 1 Block Diagram

User uses his/her voice for transmitting data to the wireless receiver and which should be in a specific range. Receiver is serially connected to the Microcontroller. Microcontroller receives the data and according to the character database, data will be send to the Matrix. Microcontroller is connected to the crystal oscillator which provide clock plus to it and



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power supply will give power to it. L.E.D Driver at input of matrix amplifies the current so as to increase the brightness of the L.E.D's and data will displayed on L.E.D Matrix.

II. DIFFERENT SECTIONS

Matrix Section

Matrix section consists of a 7x35 red common cathode led matrix. It consists of seven 7x5 led matrix cascaded together. Power dissipated by each segment is 72mW so the total max power consumption will be 500mW. The matrix is driven by a transistor driver at input and output. The luminous intensity of one dot is approx 30mcd. The columns pins are to be connected to the input signal and the rows pins are for current sink.

Driver Section

ULN2803 is a transistor driver of 8 bit which is connected between the controller PORT B and the matrix input port (rows). It is used to increase the current capacity for the matrix hence the brightness of LED. This IC is also used for the sink of current and is connected to the output of the 74HC595 shift register.

Controller Section

Controller section consists of PIC16F887 microcontroller having 8kb flash memory of 100000 read /write cycles. This section is responsible for taking the serial data from the Bluetooth receiver and displays it on the matrix. This section is powered by 5V power from the supply section. Current supplied per pin is 40mA, which is insufficient for driving the whole matrix so it requires a driver.

Power Section

The power section consists of bridge rectifier, filter capacitor, regulator and smoothening capacitor and is capable of providing at max 1A current.

Transmitter & Receiver

The transmitter consists of an android mobile with AMR_VOICE application pre installed in it. The mobile is connected to the microcontroller via HC-05 Bluetooth module on the serial port.

III. WORKING

This system consists of a mobile phone with AMR_VOICE app installed in it. The mobile is connected to the HC-05 Bluetooth module which is further connected to the serial port of PIC16F887. The microcontroller is connected to the 7x35 red led matrix (common cathode) via a transistor IC to increase the current capacity and hence brightness. The anode terminals of all individual matrix segments are connected to PORT B of the controller. The same driver (ULN2803) is used for the current sinking at the cathode of the led's. The sinking driver is driven by 74HC595 shift register which is 8-bit IC and is controlled by the microcontroller for shifting the data to a particular column in the matrix.



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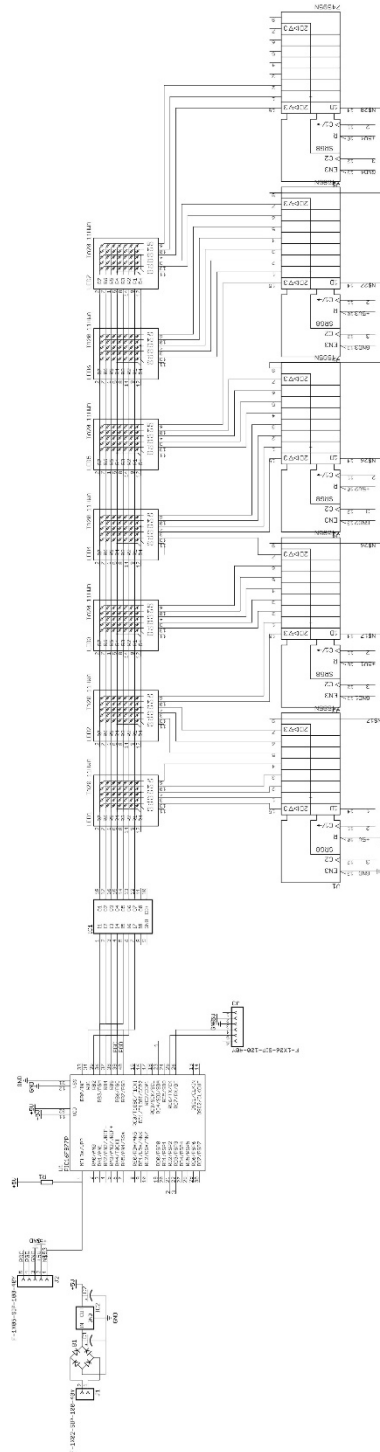


Fig. 2 Circuit Diagram

The user speaks into the mobile while the AMR_VOICE is already connected to the HC-05 module. The app will convert the speech into text and transmit the same to the Bluetooth module. The module will feed the data to the serial



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port of PIC16F887. Database of all characters for display and program is inside the chip. The microcontroller looks up the characters from input data from the database and accordingly sends data to the matrix for display using the column scanning technique

IV. SOFTWARE REQUIREMENTS

EAGLE: EAGLE is an electronic design automation application that is used to develop printed circuit board layouts. It stands for Easily Applicable Graphical layout Editor. It has a schematic editor to design circuit diagrams. Eagle save files in the standard forms that are accepted by many PCB fabrication companies.

PROTEUS: Proteus is a circuit analysis and physical simulation software which run on Windows platform. I was launched by British Lab Centre Company and is made up mainly by the ISIS and ARES. The main function of ISIS is schematic design and simulation. ARES is used for printed circuit board design.

MPLAB: MPLAB is a freeware integrated development environment developed by Microchip for the development of embedded applications on PIC microcontroller. These applications include project management, code editing, debugging and programming of PIC microcontroller. The latest version MPLAB X can be used for 8-bit, 16-bit, 32-bit PIC microcontrollers.

VI. CONCLUSION

This project is designed to establish a connection between human speech and a L.E.D display so as to make it convenient for the user to display messages on the L.E.D matrix. We designed a basic functional block diagram that matches the required specifications of the project. Accordingly then power supply, printed circuit boards were developed and hardware selections were made. Different approaches to light the matrix were tested and column scanning method was selected. For voice to text conversion AMR_Voice application on an android phone was selected.

The system developed is found to be very useful at public places to display human speech on the L.E.D Matrix so as make it easy for public to understand and also for people having hearing problems. The system can be used anywhere there is a need for information sharing like bus stations, railway stations, markets, banks etc.

The system can also be used at engineering colleges to illustrate a circuit with programmable microcontroller and basic electronic components. It would allow the students to understand the concept clearly and construct other circuits on their own.

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