



VOICE OPERATED DEVICE FOR DIFFERENTLY ABLE PEOPLE USING GSM

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ABSTRACT

In recent days, the numbers of mobile phone users are increased drastically due to technological development. At the same time it is difficult for the people with no hands to use mobile phones. So, the major objective is to help such a differently able people to use mobile phone. Already there is a system in which we can access our electrical appliances through voice commands. We are using a concept of voice recognition in order to operate our mobile phone through voice commands. This voice operated device is implemented on a single chip by means of VLSI technology and that chip will be embedded in our basic model of mobile phone which reduces the complexity of the system. Hardware integration is more simplified in this system. Also there is a no need of data connection for this system. This is one of major advantage of this system. It is most effective and most economical. So it has good social aspects.

Keywords: *Voice recognition, Microcontroller, GSM, LCD.*

I. INTRODUCTION

Mobile phone is a one of the important and essential thing in this century because we are in digitizing world. Now a day most of the people are having mobile phone due to technological development. Mobile phones have really changed the way of communications. Cell phones are the most used communication tool today. But they are not just limited to communication purposes today. The internet is one of the biggest blessings to man by technology. In recent days, one cannot imagine the life without internet. The mobile phones make it as possible. Mobile phones are the essential thing in various fields in day to day life. However it is difficult to use mobile phones for differently able people such as people with no hands and blind people. So the major objective of this system is to help such a differently able people to use mobile phones without any difficulties.

We are designing one voice recognition based voice operated device. This device is embedded in mobile phone and through this device we can make a basic mobile phone operation through voice commands. There is no need of data connection for this operation and it is most effective and most economical.

II. FUNCTIONAL BLOCK DIAGRAM

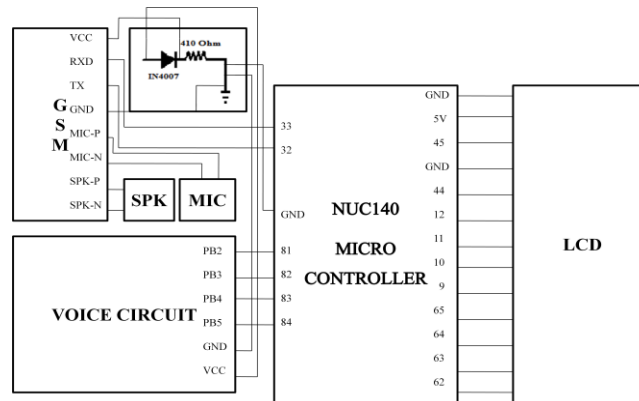


Fig 1 Functional block diagram of voice operated device

The functional block diagram of voice operated device is as shown as in the figure 1. In this system GSM interface, LCD interface and voice recognition circuit interface are associated with microcontroller. Initially the voice is captured by using microphone which is associated with voice recognition circuit and that voice is stored in a voice recognizer. The voice recognition circuit converts that voice into binary output and which is fed to the NUC140 microcontroller. The microcontroller performs basic operations with the help of GSM module based on the input. The LCD module displays at present operation. A person with no hands can make basic operations like call enabling and sending SMS by means of microphone and speaker which are associated with GSM module.

III. HARDWARE REQUIREMENTS

A) Microcontroller

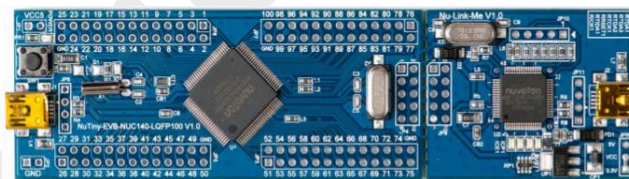


Fig 2 PCB layout of NUC140 Microcontroller

For this voice operated system we are using NUC140 Microcontroller. The PCB layout of this controller is shown in the figure 2. This controller is a 32-bit Microcontroller comes under Cortex family M series runs up to 50 MHz. It supports low power sleep mode also. It has 128KB of internal flash memory and 16KB of internal SRAM. Also it has four I/O modes such as < Quasi bi-direction mode, < Push-Pull output mode, < Open-Drain output mode and < Input only with high impedance mode. The GSM interface, LCD interface and voice recognition circuit interface are associated with Microcontroller in order to perform basic mobile phone operations.

B) Voice recognition circuit interface

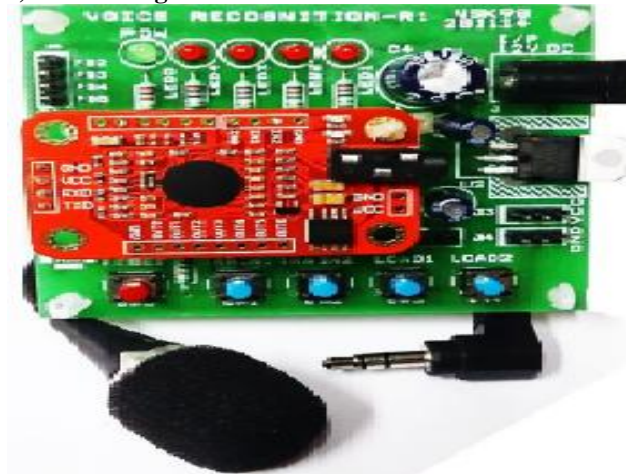


Fig 3 Voice recognition circuit interface

The above figure 3 shows the voice recognition circuit interface. It can recognize as much as 14 voice instruction, which is suitable for most cases involving voice control. This voice recognition circuit requires 12V/2A DC power supply. It consists of many switches and pins. The functions of these switches and pins are, TRAIN1 switch is for record the first seven voice commands, TRAIN2 switch is for record the second seven voice commands, Load1 switch is for load the first group of voice commands to voice recognizer and Load2 switch is for load the second group of voice commands to voice recognizer. PB2, PB3, PB4, PB5 pins are 4bit data output. It also contains 3.3mm mono channel microphone connector through which we can give the voice input to the voice recognizer.

C) GSM interface



Fig 4 PCB layout of GSM

The PCB layout of GSM is shown in the figure 4. GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. 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. Since many GSM network operators have roaming agreements with foreign operators, users can often continue to use their mobile phones when they travel to other countries. SIM cards (Subscriber Identity Module) holding home network access configurations may be switched to those will metered local access, significantly reducing roaming costs while experiencing no reductions in service. GSM, together with other technologies, is part of the evolution of wireless mobile telecommunications that includes High-Speed Circuit-Switched Data (HSCSD), General Packet Radio System (GPRS), Enhanced Data GSM Environment (EDGE), and Universal Mobile Telecommunications Service (UMTS).

D) LCD interface

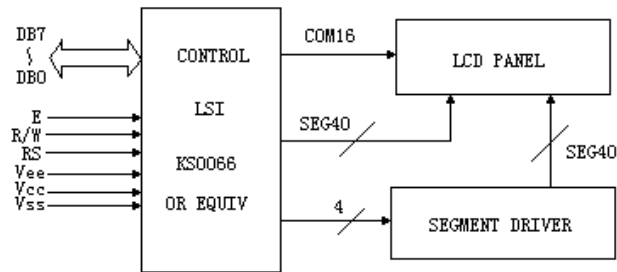


Fig 5 Block diagram of LCD interface

The above figure 5 shows the block representation of LCD interface. This LCD interface is used in the voice operated device in order to display at present operation. It is a 5x8 and 5x10 dot-matrixes Liquid Crystal Display. It also supports low power operation (2.7 to 5.5V). It can be configured to drive a dot matrix liquid crystal display under the control of 4-bit or 8-bit microprocessor. Since all the functions such as display RAM, character generator, and liquid crystal driver, required for driving a dot-matrix liquid crystal display are internally provided on one chip, a minimal system can be interfaced with this controller/driver.

IV. SOFTWARE REQUIREMENTS

A) Keil µVision IDE

In this system we are using a Keil µVision IDE software tool. This tool supports several Microcontrollers from different vendors. Keil software is a world’s leading developer of embedded systems software, makes ANSI C compilers, macro assemblers, real time kernels, debuggers, linkers, library managers, simulators, integrated environments, and evaluation boards for the 8051, 251 ARM7 and Cortex Microcontroller families. Keil MDK version 5 is the latest release of complete software development environment for a wide range of ARM, Cortex-M and Cortex-R based controllers.

V. EXPERIMENTAL RESULTS

A) Call Enable Output

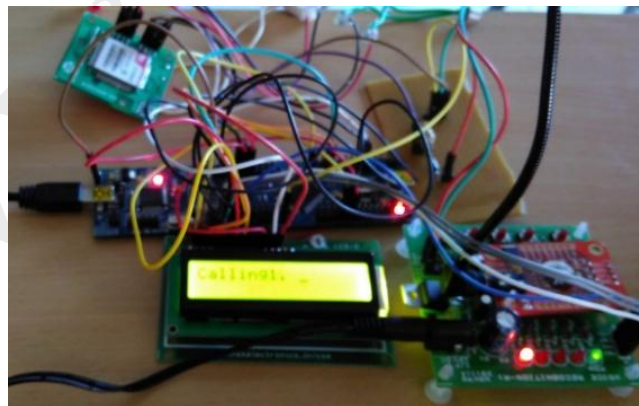


Fig 6 Output of Call Enable

B) Call Receiving Output

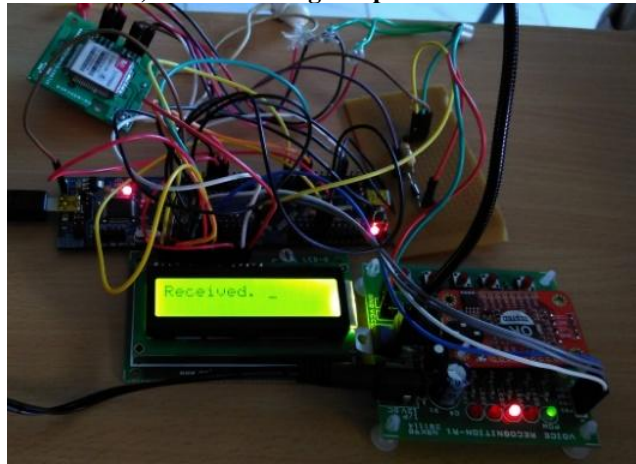


Fig 7 Output of Call Receiving

VI. CONCLUSIONS AND FUTURE WORK

This voice operated system makes easier to people with no hands to use mobile phones. It is economically effective and easy to operate. In future this voice operated system will be constructed on a single chip by means of VLSI technology and embedded that chip into mobile phones which reduce the complexity of the system.

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