International Journal of Modern Engineering Research (IJMER)
www.ijmer.com Vol.2, Issue.5, Sep-Oct. 2012 pp-3448-3450 ISSN: 2249-6645

Design and Implementation of A TALKING LCD Display

Rohit Kumar[1], B. Malla Reddy [2], Prof. N. Bhoopal[3]
[1, 2]*Electronics and Communication Engineering Department, Mizoram University*
Electrical and Electronics Engineering Department, BVRIT

Abstract**:** *the most electronic device conveys the information by Liquid Crystal Display (LCD). Visually Impaired people cannot use those type of devices. We present a design and construction of a Talking LCD display Clock. The design incorporates audio and visual function. The reproduction of human voice accomplished by pre-recording on speech module, a simple circuit of control unit makes the design affordable, practice, economical and user friendly.*

Keywords: *speech module (APR-9600), delay time, RTC (DS1307), LCD display, storage time, Proteus Isis, Visually impaired*

I. INTRODUCTION

This project is completely independent. Unlike the existing solution [3], it depends on extremely powerful automatic text recognition and processing that can process text and transform it into speech or an alarm. The second aim of the project is to develop an alarm/speech display for visually impaired. The application facilities the impaired persons to customize a reminder alarm within it by customized user voice recording system. For example, if a person with visual disability wants to set an alarm or a reminder, he will not able to communicate and set. Therefore it is significant for visually impaired to record and receive information at all times. Many devices are emerging to address the related problem of reading text in printed documents [2, 16], but they are not designed to tackle the challenge of finding and reading characters in appliance displays [1, 14, 15]. Many devices have been built for security alarm [9, 10, 11] and communication aid [12, 13] visually impaired persons.

We designed a talking LCD display clock which is can be easily operated by the visually impaired people. For performing any operation like to know the time one has to press the button, to set the alarm one has to go through the instructions spoken by the system. For conforming any option mentioned in the instruction one has to just press the button. The block diagram of the design is shown below:

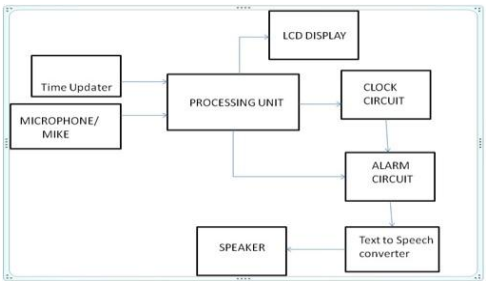

Fig 1.1: Block diagram of Talking LCD display Clock for Visually Impaired

II. DESGIN OVERVIEW

1. Flow Chart of Control in the System

The designed system will work as the flow chart shown in the fig 2.1.1. The time and date for the clock is received from real time clock (RTC-DS1307) and then transferred to the LCD display. The watch dog timer occur in the design when more than one button is pressed before the execution of command of first button is completed. In the case, the execution of command of second button will depend upon the executing address of APR9600. The system will not execute the second command till the execution of that address is completed.

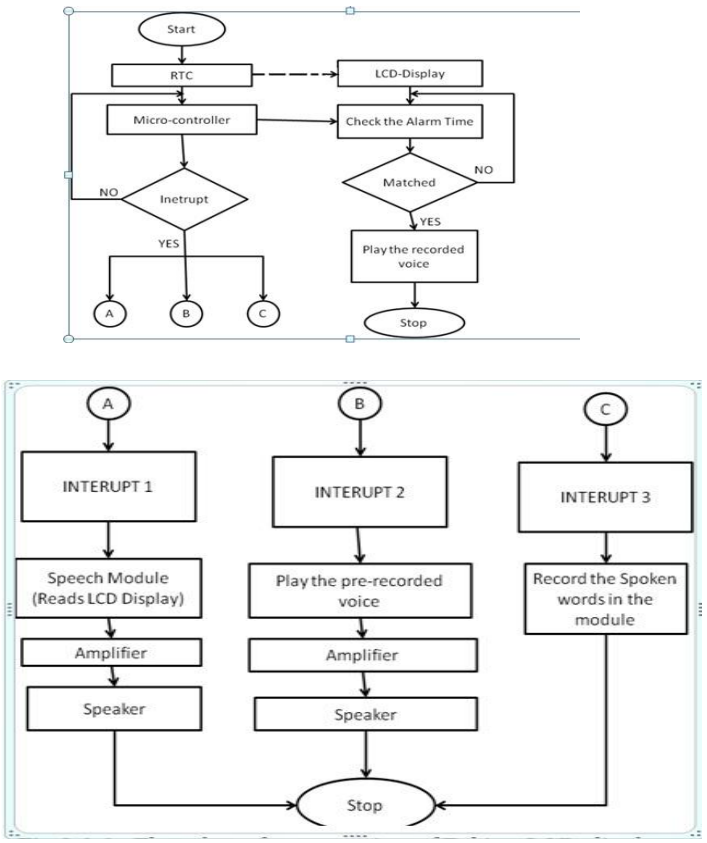

Fig 2.1.1: Flowchart for operation of Taking LCD display clock

2. Hardware Set Up

As shown in fig.2.2.1 the signal of time and date is received from RTC (DS1307) in micro-controller PIC18F4550 and then bypassed to LCD which is parallel connected to the micro-controller. The LCD display besides its seven pin for display, has three more pins namely RS for reset, RW for read-write operation and E for enable purpose. The speech module APR9600 has pre-recorded human voice and one address free for the recording of the remainder tone. The 8 address pins of the speech module are connected with the 8 pins of micro- controller. The keypad connected to the micro-controller has only first row active buttons.

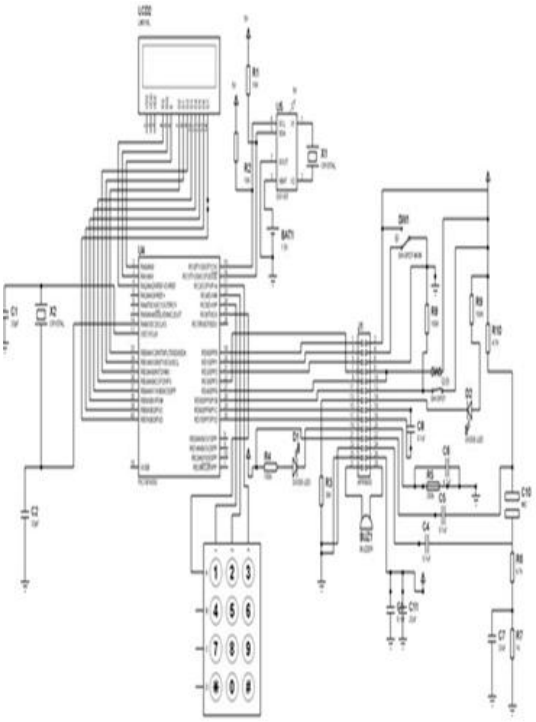

Fig 2.2.1: Schematics of Talking LCD display clock

The first button indicated as 1 is used for the purpose of listening time and date, the second button indicated as 2 is used for setting the alarm time and the third button indicated as 3 is used for recording the reminder for alarm.

III. MODELLING

1. RECORDED VOICE

The pre-recorded voice is stored at the eight memory locations in APR9600 speech module as shown in fig 3.1.1 below:

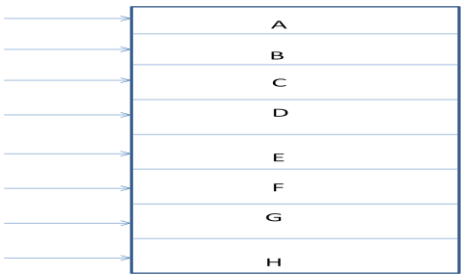

Fig 3.1.1: Memory location in APR9600

The pre-recorded human voice can be retrieved from the speech module by making the addressing pin of the memory location high[20]. Suppose we want the sound stored at memory location A as shown in fig 2.C.1.1 to be retrieved then the pin addressing memory location A is made high.

The sound from the module is not received continuously if we want to get from every location at the instant, as shown in fig 3.1.2 below:

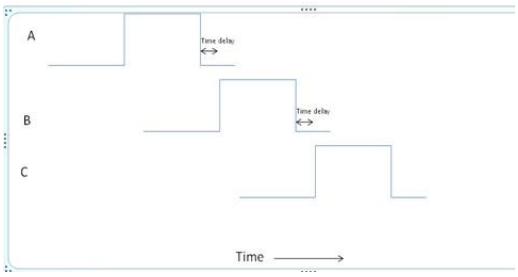

Fig 3.1.2: Delay time in operation of two consecutive memory locations.

Although the delay time is very small but plays important role in case of two interrupt occur due to consecutive pressing of buttons before the full command of first interrupt is executed.

The storage time in the module depend upon the frequency we want to use as shown in equation 2.1 below as:

$$Storage\ time = \frac{k}{f} \quad \text{..... (2.1)}$$

Here, 'k' is the proportionality constant having value of $2\ X\ 10^{-3}$ at room temperature and depends upon the temperature and [5, 6], 'f' is the frequency band at which we want to record the voice; it is a function of frequency of oscillator.

2. REAL TIME CLOCK

RTC (DS1307) is a timer and has a life of about hundred years and has consumption of about 500nA [17]. RTC is connected with the micro-controller by its SDA and SCL port [7, 18]. The timing diagram of both the port is shown in fig 3.2.1. The synchronisation of DS1307 with the system is very efficient [8].

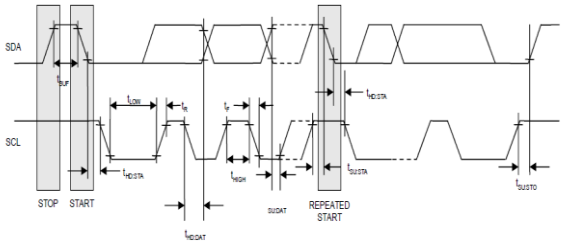

Fig 3.2.1: Timing diagram in RTC

3. POWER SUPPLY UNIT

The 5V/ 2Amp adapter is used to provide the constant power of 5V to the system at 133kHz frequency instead of regulated power supply as there is less power loss in the power supply unit.

IV. RESULTS AND DISCUSSION

1. Simulation Result

By switching ON the power supply of the device the LCD display starts displaying the time and date on the screen. The simulation software used is Proteus Isis and the programming is done on software Mikro C Pro for Pic and then dumped in the micro-controller.

2. Result of Implementation of Hardware

The alarm system work properly for one alarm and can be incremented if desired. The condition of hanging of system is avoided in the design with help of APR9600.

The complexity of design and programme increases with the increase in number of APR9600 used.

Same technique can be used for the purpose of security alarm and temperature measurement can be included in the same manner.

3. Conclusion

The system can be used very well within a large group of visually impaired person. The algorithm can be implemented in any kind of talking display. Voice activating feature can make it very useful for paralysed persons.

ACKNOWLEDGMENT

The authors pay their sincere gratitude to the management of BVRIT for funding this technical work. We also are grateful to ATL for fulfilling the technical requirement of the project. Rohit Kumar and B.Malla Reddy extends their heartily thanks to Hardware Engineer, ATL-BVRIT for his valuable time and effort for scrutinizing the design of the project. RK and BMR is obliged to LLK Singh , NP Maithy, Reshmi Maity and Abhijoti Gosh from Mizoram University to help us as when required.

REFERENCES

[1] Paul Blenkhorm .,"Designing products that speak:lessons from talking systems for blind people ,computing and control engineering journal,2009

[2] Xuanzhang , Cesar Ortega-Sanchez , Iain murray., IEEE ,2009,978-0-7695-3474-9/08

[3] Marius A.Beukes, , Beatrys M. lacquet., IEEE AFRICON ,2004 ,0-7083-8605-1-2004

[4] GPS Based Voice Alert System For Blind – Rishabb Gulati, IJSER, volume-2, Issuse-1, Jan-2011

[5] Remote Operation of Household Gadget using mobile phone- Debapratim Sakar, Saikat Das, Dept. ECE, Technoindi College

[6] Frequency Hopping Synchronization Scheme Based on Real-Time Clock - Novi Sad, Serbia , April 11-April 13, ISBN: 978-0-7695-4664-3

[7] A Multifunction domestic Alert System for the Deaf and blind -Robert I. Damper, *Senior Member, IEEE,* and Mike D. Evans, VOL. 3, NO. 4, DECEMBER 1995

[8] J. Hurvitz and R. Carmen, *Special Devices for Hard of Hearing, Deaf and Deaf-Blind Persons.* Boston, MA: Little, Brown and Co., 1981.

[9] T. A. Doumas, "Aids for the deaf," in *Electronic Devices for Rehabilitation,* J. G. Webster, A. M. Cook, W. J. Tompkins, G. C. Vanderheiden, Eds. London, England Chapman and Hall, 1985, pp. 148-174.

[10] Portable communication aid for deaf-blind people- Mu-Chun Su, Chia-Yl Chen, Shi-Yong Su, Chien-Hsing Chow, Hsiang-Feng Hsiu and Yu-Chine Wang

[11] SZETO, A. Y. J., and CHRISTIANSEN, K. M.: 'Technological device for deaf-blinded children: need and potential impact', *IEEE Engineering in Medicine and Biology Magazine,* September 1988, pp.25-29

[12] Telecommunications Standardization Sector of 1TLL *Dolo* Communication *Over* the *Telephone Nerwork - 600N200-Boud Modem Srondmiked for the General Switched Telephone Nefwork,* 1TL Rccommcndation V.23.

[13] lndependcnt Communications Authority of South Africa, *Functional requirements for ortologue colling line identificorion (CLI)* customer *pmmises equipment - ICASA TE-010,* May 2002.

[14] K. R. Ingham, "Braille, the Language, Its Machine Translation and Display", IEEE Transactions on Publication, Vol. 10, no. 4, Dec. 1969, pp. 96-100.

[15] Ying-Wen Bai ," An adjustable design for the Real Time Clock of high-end server systems" Electrical and Computer Engineering, 2008. CCECE 2008. Canadian Conference on,IEEE.

[16] Sadeque Reza khan, Alvir Kabir, Dilshad Ara Hossain ,"Designing Smart Multipurpose Digital Clock Using Real Time Clock(RTC) and PIC Microcontoller , IJCA journal ,volumew41-Number 9,2012.