Microcontroller Controlled Automated College Bell

Abyash Gautam [#1], Deepak Rasaily [*2], Sejal Dahal [#3]

[1 #] diploma students of ECE dept., CCCT polytechnic

[2*] Senior lecturer of ECE dept., NEQIP co-ordinator, CCCT polytechnic

[3] diploma student of ECE dept., CCCT polytechnic

Abstract- *The need for an automatic school/college bell is now a necessity which has been evolved with the revolution in technology and boost in the education system where time is a major factor affecting the educational system where the time has to be accurate. Man power can also be saved with the use of automatic college bell as it is not to be operated manually and manpower can be saved it is also more accurate than the manual bell systems. Time being a major factor in all of our lives has to be utilised properly and it is a very efficient device for the time management. The college bell is a simple project implementing the use in real time with its properties as an alarm with further more improvements.*

Keywords — *Microcontroller, Dot matrix display, Keypad, real time clock, Bell.*

I. INTRODUCTION

The AT89s52 a lower power, high-performance CMOS 8-bit microcontroller with 8k bytes of in-system programmable flash memory. The device is ATMEl manufactured high density non-volatile memory technology and is compatible with the industry standard 80c51 instruction set and pin out. The inbuilt flash allows the program memory to be programmed in-system or by usual programming. By passive components formed in a single chip, the ATMEL at89c51 is a powerful microcontroller which provides the following standard features: 8k bytes of flash, 256 bytes of RAM, 32 I/O lines, and architecture, a full duplex serial port, on-chip oscillator, and clock circuitry [1-2].

The at89s52 is an easily available microcontroller with more memory than any other microcontroller. Its port are totally functional and can be used with the real time clock without any other IC being used its inbuilt flash makes it easier for the user as we do not need any external memory for the circuit.

II. MY PROJECT

This system demonstrates a simple configuration of a circuit of automatic school\college bell using Microcontroller AT89S52 which is designed so as the bells in the school\colleges are not to be operated manually and are fully automatic and once data is entered the college bell rings after a regular interval as per the programmers need and the timing may be varied in between to include breaks.it also displays time [3].

In today's world where time is money it can be wasted on Operating manual things and one of the most common would be school/college bell which has to be operated hour after hour and which is also not accurate and requires the use of manpower this can be easily overcome by using a fully automatic system which is operated using a microcontroller where the college bell is operated fully automatic and doesn't requires any manpower and which is much more accurate than the one which is operated manually. It replaces the manual switching of the bell in the college [4].

The main components used in the circuit are Microcontroller AT89S52, 5x7 LED board, real time clock.

III. Block diagram

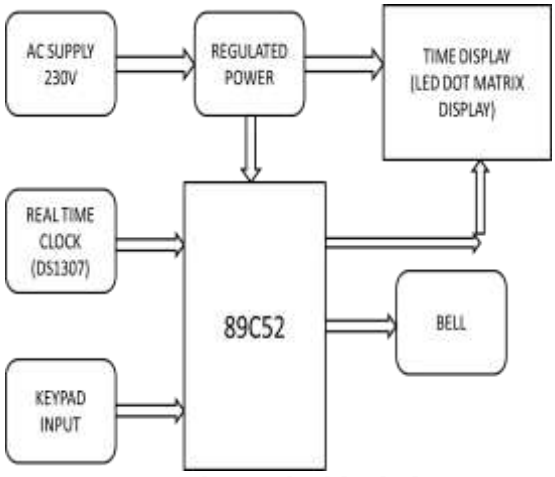

Fig. I shows the block diagram.

Automatic school/college bell is AT89S52 microcontroller and a real time clock which is used for time detection and is used to display time and also keep track of time. It uses a LED dot matrix display which is used to display time it keeps track of the time and the bell is rung after proper intervals of time.The system can be re programmed to modify any change in time intervals which may take place during the school/college hours the break in the school/college can also be included which is of more accuracy.

.1. POWER SUPPLY: In this circuit, we are using three supply of 5V.The 5V supply basically used for LED matrix display, seven segment display and supply to the Microcontroller.

2. MICROCONTROLLER (89C52): A microcontroller is a single chip that contains the processor non-volatile memory for the program, volatile memory for input and output, a clock and an input I/O control unit.

3. REAL TIME CLOCK (DS1307): The (DS1307) serial real time clock is a low power IC .The clock/calendar provides seconds, minutes, hours, day, date, months and your information at the end of the month, date is automatically adjusted for months with fewer than 31 days .The clock operates in either 24Hr or 12Hr format with AM/PM indicator[5]. The DS1307 has built-in power, sense circuit that detects power failures and automatically switches to the backup supply.

4. DOT MATRIX DISPLAY: It is a display device used to display information on machines, clocks, railway departure indicators and many other devices requiring a simple display device of limited resolution.

The display consists of dot matrix of lights or mechanical indicators arranged in a rectangular configuration (other shapes are also possible, although not common) such that by switching on or off selected lights, text or graphics can be displayed. A dot matrix controller converts instructions from a processor into signals which turns on or off lights in the matrix so that the required display is produced.

5. KEYPAD: User will alter any change if occurred during the functioning of the college bell it is used to set time and also can be used to view the timing of the next bell.

IV.Circuit

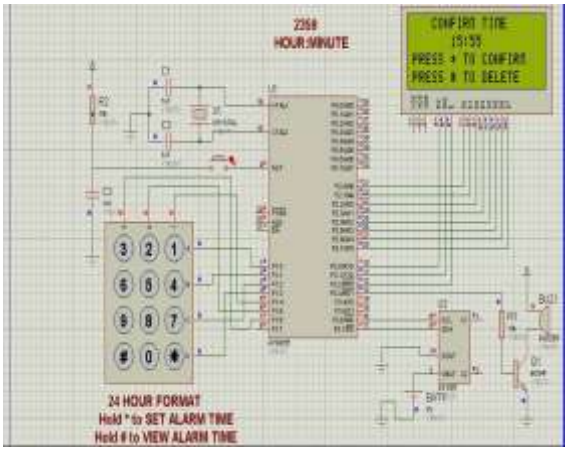

Fig 2 shows the Circuit diagram

Hardware Requirements:

IC 89S52-microcontroller
IC DS1307- Real time clock
IC 7805
Crystal
Diode
Relay switch
Resistor
Transistor
Storage capacitor
Ceramic capacitor
LED
LED matrix
Switch
Bell
IC 7809
BT 1306
Pull-up resistor
CMOS battery
SMPS
Connecting wires

Software Requirements:

Keil compiler
Flash magic
Proteus

Principle behind the Circuit:

The main component of the circuit is microcontroller, real time clock and bell. The real time clock keeps the track of the time and is used for the correct detection of time for display and for the bell ringing which has to be done accurately as our project focuses on the improvisation of the accuracy in school/college systems. The power is used and an alternative power supply is used for the times of power failure. The time which is tracked using AT89S52 is displayed in the dot matrix display.

Circuit description

In the circuit shown above, we provide 220V A.C. power supply to the "Step-Down Transformer" which converts 220V A.C. into 12V A.C. (i.e. stepped down the power supply). Now this 12V A.C. is converted into 12V D.C. with the help of "Full Wave Rectifier" which consists of 2 Diodes & 2 Condensers [a filter capacitor (1000µF)]. Two different voltage levels are required for our circuit – One is 12V D.C. to operate relay switch. Second is 5V D.C. supply to operate microcontroller "AT89S8252". For this purpose we will use voltage regulator "LM7805" which can take 8V -25V as I/P & provide 5V constant voltage. Here we have used "Atmel AT89S8252" microcontroller to control various timing of the ringing. Here we also use a "12MHz Crystal" which will provide the microcontroller a reference time. We have used "Assembly Language" to program this microcontroller and we have also used a microcontroller programmer [6]. We have used different types of capacitors and resistors in this circuit. We have used two 33pF capacitor which are

acting as a High Pass Filter [H.P.F.]. The 10KΩ resistor is used for RESET circuit to provide negative potential to RESET pin of microcontroller. We have used IC DS 1307 which is a low-power clock/calendar with 56 bytes of Battery-backed SRAM. It uses an external 32.768 kHz crystal[7-8]. The oscillator circuit does not require any external resistors or capacitors to operate. The accuracy of the clock is dependent upon the accuracy of the crystal and the accuracy of the match between the capacitive load of the oscillator circuit and the capacitive load for which the crystal was trimmed. We have used four seven segment display for the displaying the real time. Here BC 547 is used for the amplification process. The microcontroller can operate on 5V and 10mA current maximum but we have to operate 12V relay switch which consume more than 100A current. So, we have to amplify this current and voltage [9-10]. For this purpose we are using transistor.

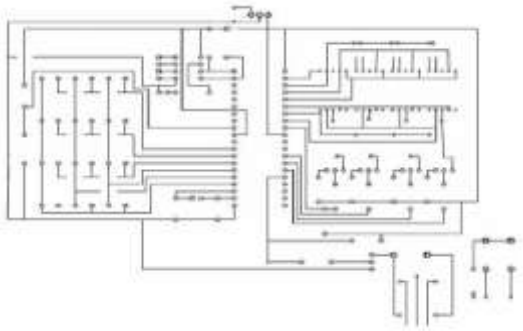

Fig 3 shows the pcb layout

V. Result and analysis

- The bell which was set at an interval of 30 min is functioning as per expected
- The timing of the bell can be varied using the keypad supplied with it
- The time is displayed in the led screen
- The variation in timing is also applicable and is used in this circuit

VI. Conclusion

A automatic college bell can be successfully designed and can be applicable in school and colleges as per to save manpower and also to save time it's a cost effective project which can be built using easily available equipment and can be used in real time in the school and in the colleges this can be included in every educational institution as per the timing which can be easily reprogrammed by a common laymen and can also vary timing for some classes as per the schedule of the school. The display of time in the project also increases it effectiveness.

Reference

[1] Naresh, p.raveendra babu, k.satyaswathi, ijsetr "mobile phone signal jammer for gsm, CDMA with coverage prescheduled time duration using arm7" , volume2, issue september 2013 .

[2]. Ally s. Nyamawe, nixin mtonyole ijsetr, "the use of mobile phones in university exams cheating : proposed solution" volume 17 2014.

[3]. alaparthi pardhasaradhi, rayalaravi kumar jsr ,india online issn:2319-7064 signal jamming and its modern applications.

[4]. .ctisacr.com/Spanish/pdf/coverage.pdf.

[5]. N.Radhakrishnaniah,mrs.p.brundavani , fpga based wireless jamming networks ,ijmer volume 3, issue no. 4, july-aug.2013.

[6] simple fm radio jammer circuit, jose dankarlis romero-academia.edu8.

[7] Das, S., Toya, L., Green, Perez, B., and Murphy, M. M., "Detecting User Activities using the Accelerometer on the Smartphone", Team for Research in Ubiquitous Secure Technology REU Research Program, July 2010.

[8]. Aroca, R. V., AntônioPéricles B. S. de Oliveira, and Gonçalves, L. M.

[9]. G., "Towards Smarter Robots with Smartphone", 5th workshop in Applied Robotics and Automation, Bauru-Brazil, June 2012.

[10] .Song, M., Kim, B., Ryu, Y., Kim, Y., and Kim, S., "A design of real time control robot system using android Smartphone" The 7th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI), BusanKorea, Nov. 2010

[11] LEE,J.D.;Nam,k.y.;Jeong,S.H.;choi,S.B.;Ryooo,H.S.;Kim, D.K.;"Development of zigbee based street light control system",IEEE conferences on Power systems,(20006)",pp.2236-2240.

[12] I.F.Akyilidiz,W.Su.Y.San and E.cayirici,"A Survey on Sensor Networks", IEEE communication magazine,pp.102-114,aug.

AUTHORS

Abyash Gautam is a final year Diploma student, Dept. Of Electronics and Communication Engineering from Centre for Computer and Communication Technology, Chisopani, South Sikkim. His main areas of interest are satellite communications, microcontroller, microprocessor and Microwave Theory and Techniques.

Deepak Rasaily is presently associated with the Department of Electronics and Communication Engineering at Centre for Computer and CommunicationTechnology (CCCT-Govt.Polytechnic) Chisopani, South Sikkim, India as

a Senior Lecturer since 2003 to till date. He is ME-Scholar at National Institute of Technical Teachers' Training & Research, Chandigarh, India. He Worked as Project Scientist in the Department of Science and Technology, Govt.of Sikkim prior to Lecturer in CCCT. His areas of interest are PLC and Robotics, Microprocessors and Microcontroller and Digital Signal Processing.

Sejal Dahal is a final year Diploma student, Dept. Of Electronics and Communication Engineering from Centre for Computer and Communication Technology, Chisopani, South Sikkim. Her main areas of interest are Analog and Digital Circuits, Embedded Systems and Wireless Communication & Networking.