Automatic School Bell with User defined Time Schedule

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ABSTRACT: Now a day's many school/college bells are manually operated. Hence there is a huge demand of accuracy. In market there are many digital clocks available with bells but rings only at specific time and cannot stop after specific time.Here a new and inexpensive design is beingpresented.The benefit of this design isthat the bell rings at the start of each period without any human intervention to a great degree of accuracyand hence takes over the manual task of switching on/off the college bell with respect to time. It uses RealTime Clock (DS1307) which tracks the real time. The scheduled time results are related with that of aclock, conversely, some drift is noticed, which is irrelevant. The microcontroller ATmega2560 is used to controlall the functions, it gets the time through the keypad and stores it in its memory. When this programmedtime equals the real time then the bell is switched on via a relay for a predetermined time. The bell ringingtime can be edited at any time, so that it can be reused again and again at normal class timings as well as atexam times. Also it can be made password protected so that no unintended person can operate this systemexcept for the operator. For this a microcontroller has to be programmed using the C language or assemblylanguage for controlling the circuit.

KEYWORDS: DS 1307RTC, Relay, ATmega2560Microcontroller, & LCD

I. INTRODUCTION

In today's life, everyone gives importance to time.Time does not wait for anybody. Everythingshould be performed in time & with accuracy.Now a day's school/college bells are operatedmanually. Hence there is a big question ofaccuracy. Also there is necessity of manpower andmoney. Hence here we have presented a system,which saves our manpower and money & alsogive highest accuracy. A bell is a percussioninstrument used in schools and colleges thatindicates the students when it is time to go to theclass in the morning and when it is time to changeclasses during the day. No other instrument can dosuch a work. So it is an important instrument inboth primary and secondary schools and even inthe industries and other businesses where the belltimer plays a critical role throughout the day.Clock towers can be heard over long distancewhich was especially important in the time whenclocks were too expensive for widespread use.And also due to literacy awareness the number ofcolleges, schools and institutions are rapidlyincreasing. At present bells for periods in schoolsare operated manually. After every class, oneemployee is engaged into operating the bell.Automatic college bell helps us to avoid this. Thisdesign takes over the task of ringing the bell incolleges as the bell would ring automatically atthe schedule time. It has a Real Time Clock(DS1307) which tracks overthe real time. When this time equals to the bellringing time, then the relay for the bell is switchedon. The real time clock is displayed on LCDdisplay. This is very wonderful design to controlthe working of college bell.

II. RELATED WORK AND BACKGROUND

Early methods included the hand ringing of bells - some ofwhich are still used at the moment. Progressively technologyhas seen the beginning of more dependable and more andmore accurate systems, to the position where today's schoolscan have fully planned timetables that automatically makechanges for exams. Present day ringing the bell incolleges/schools are carried out manually. The maindisadvantage of this is one person is to be keeping alert forthis. At the same time during that time he could not beengaged in another task. Of course, one further hitch of themanual bell ringing approach is the question of hearing losscaused by close proximity to the noisy bells. This

exposurewas either unknown in the past or at least it was by no meansconsidered a significant enough issue to deserve changes tothe practice.

In recent decades, several other school bell systems have beentested, some proving more functional than others. Severalschools have tried using sirens and klaxons to alert studentsand teachers of period times, nevertheless these were usuallyfound to be stressful, and had an adverse effect on theconcentration ability of students.
Real Time Clock Based Automatic College Bell where it replaces the Manual Switching of the Bell inCollege/school. It has an Inbuilt Real Time Clock which tracksover the Real Time. When this time equals to the Bell Ringingtime, then the Relay for the Bell is switched ON. The BellRinging time can be edited at any time, so that it can be used atnormal class timings as well as examination timing.The Real Time Clock is displayed on LCD display. When theReal time and Bell time get equal then the Bell is switched onfor a predetermined time. These bells are equipped with theCPU which controls the bell.

Embedded Based Automatic College Bell developedfor the users to control Bell system in companies or institutionsautomatically. All the bell timings and durations are predefinedand set in the microcontroller. The user can set the timingsusing a key pad. A LCD display is used to display the timings.The timings set by the user are stored in the microcontroller.At the particular time, signal is generated in themicrocontroller and sent through the output port. Theelectronic circuit receives the signal and drives acorresponding relay.The relay is used as a switch to operate the Bell. As soon asthe duration is over, the signal is stopped and waiting for thenext set time. This system is mainly used in Schools, Collegesand other companies where Bell system is implemented. Thereis no need of a person managing the bell timings.

III. PROPOSED SYSTEM

Our project takes over the task of Ringing of the Bell in Colleges. It replaces the Manual Switching of the Bell in the College. It has an Inbuilt Real Time Clock (DS1307 /DS 12C887) which tracks over the Real Time. When this time equals to the Bell Ringing time, then the Relay for the Bell is switched on. The Bell Ringing time can be edited at any Time, so that it can be used at Normal Class Timings as well as Exam Times.
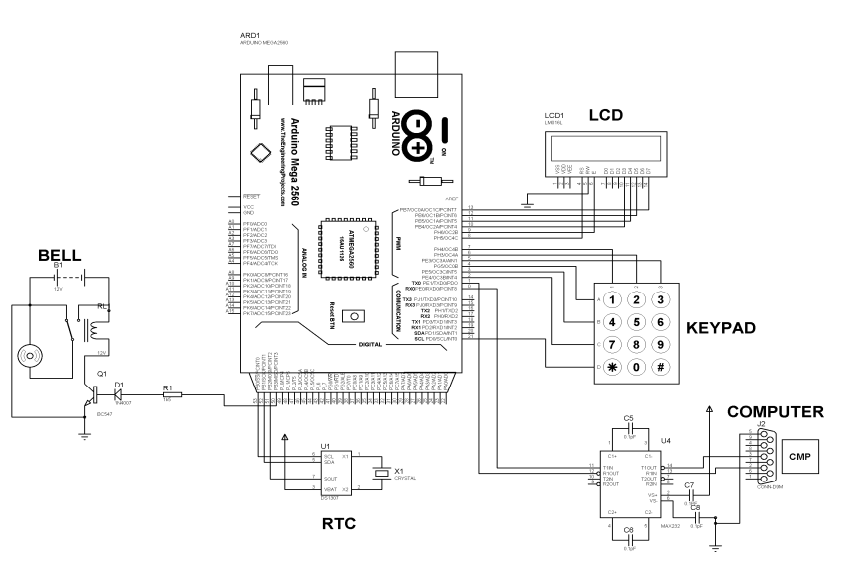

Fig.1 Circuit diagram of the Automatic school bell with user defined

A. MICROCONTROLLER (ATMEGA2560)

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega is compatible with most shields designed for the Arduino Duemilanove or Diecimila.

B. REAL TIME CLOCK

A real time clock is a clock that keeps track of the time even when the system is turned off. Real time clocks run on a special battery that is not connected to the normal power supply of the system. In contrast, clocks that are not real-time do not function when the system is off.The DS1307 Serial Real-Time Clock is a low-power; full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially via a 2-wire, bi-directional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power sense circuit that detects power failures and automatically switches to the battery supply.

Fig.2: DS1307 RTC

C. LCD DISPLAY:

A Liquid Crystal Display is a flat panel display, electronic visual display, or a video display that uses the light modulating properties of liquid. The purpose of using this LCD display in this prototype model is to display the information about vehicle access is granted or denied and to display information about locked and unlocked status of the vehicle here we are using 16*2 LCD displays which are connected to port1 of microcontroller. The following are the basic commands used for LCD are shown in Table.1.

Table.1

S.NO	COMMANDS	FUNCTION
1	01H	Clear screen
2	38H	Select 5*7 matrix
3	0EH	Turn ON display, Turn ON Cursor
4	80H	Select Top row
5	C0H	Select bottom row

D. RELAY

A relay is an electromechanical switch, which perform ON and OFF operations without any human interaction. General representation of double contact relay is shown in fig. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

IV. RESULTS AND DISCUSSION

For making an accurate and precise time controller, DS1307 serial RTC (Real Time Clock) is connected to the microcontroller. This RTC is a low-power, fully binary-coded decimal clock with 56 bytes of SRAM. This clock displays year, month, date, day, and hours, minutes and seconds information. In this clock, data and address are serially transferred by I2C bidirectional bus. It also has a built-in backup supply to keep time operation continuous in times of power failures as shown in the figure.

Matrix keypad is interfaced to the microcontroller for setting and storing the timing values. Various keys are used in this keypad for setting real-time hours and minutes, bell timing operations, and for storing and deleting bell and real timings.The Seven-segment display is connected in common anode mode and interfaced to the microcontroller for displaying the timing information.

Buzzer is switched using relay and the relay coil is energized by the microcontroller.The microcontroller has inbuilt flash EPROM memory to store the data that remains even after power failure. The microcontroller is programmed in such a way that it accepts the real timing and bell timings and correspondingly sends the controls signals to the seven-segment display and also to the transistor connected to the relay coil.

When the relay transistor is enabled, it energizes the relay coil so that the path is closed to power the bell device.Prior to working with this system we have to configure the real time and bell time values using a matrix keypad.Micro Switches is provided for entering the required timings. This switches made this project user friendly. 16X2 LCD display is provided to display the alarm times and current time. DS1307 is interfaced to the microcontroller for real timing performance. A 3V battery can be connected to DS1307 to avoid time disturbances caused by power failures.

V. CONCLUSION

The basic design of the Automatic School Bell (mainly for Primary and Secondary Schools) in this work remains the same though extra functions can be included. This will ring the School Bell at pre-scheduled times of periods on each day. There are different times per period varying from one school to the other. The basic design provides an opportunity of selecting the suitable time schedule for every school by momentarily pressing one of the push-to-on switches. This signals the microcontroller to carry out the specific task, thereby ringing the bell at a regular time interval. Therefore, from the results obtained, it can be concluded that the aim of this work has been practically and theoretically achieved.

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