TIMER BASED AUTOMATIC COLLEGE BELL SYSTEM

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ABSTRACT:

In this paper we introduce an automatic college bell system using Arduino UNO. The main objective of this system is to ring the bell at predetermined time-intervals with high accuracy and without any human intervention. It uses RTC(DS1307) to track the real time and Arduino keeps control on all the functions. LCD display is used to show date and timings. When programmed time equals to real time then the bell is switched ON through relay for predetermined time intervals. There is provision to change the bell ringing time so that it can be reused again and again

KEYWORDS: RTC (Real Time Clock), Liquid Crystal Display (LCD), Arduino UNO, Bell.

I.   INTRODUCTION:

Traditionally college or school bells were operated by humans manually in India especially rural areas, as automation adopted in every sector here design of automatic college bell system is being presented [1],[2],[6]. In some industries bell plays an important role throughout the day [3]. As the function of bell is related with time there is need to ring the bell at required time and with accuracy, so one employ is engaged to ring the bell at specified time [4],[5]. The design of automatic college bell system takes over the task of ringing the bell at predetermined time [7]. It saves manpower, time and ultimately money and with highest accuracy. Manual operation of college bell creates lot of disturbances caused by human errors. If the bell operator forgets to ring the bell for a specific period, or delayed to ring the bell, it creates disturbances. Automatic Periodic College Bell is the only solution to avoid all these problems [8-12].

The paper presented in following sections such as: in Section-II we discussed about problem Identification, Section-III Proposed Methodology, and in Section-IV Simulation Results.

II.   Problem Identification

A major problem with manual bell system is that there should be a person present to press the switch according to the time. So sometimes it produces delay and the timetable disturbs. In order to avoid this problem, we have designed this paper "Timer based automatic college bell system". We used an Arduino UNO microcontroller and a 16×2 LCD for making this paper. You can set it according to the timetable so it automatically rings.

A bell is a hollow vessel usually of metal, but sometimes of horn, wood, glass, or clay, struck near the rim by an interior clapper or exterior hammer or mallet to produce a ringing sound. An automatic bell system for schools or institutions reduces the effort necessary to control an electric bell manually that gives alarm for certain intervals of time based on school or college timings. The proposed system uses a simple basic. A bell is a hollow vessel usually of metal, but sometimes of horn, wood, glass, or clay, struck near the rim by an interior clapper or exterior hammer or mallet to produce a ringing sound.

An automatic bell system for schools or institutions reduces the effort necessary to control an electric bell manually that gives alarm for certain intervals of time based on school or college timings. The proposed system uses a simple basic.15 to 20 years ago, the bell rang by the human using hammer and iron plate. Now this process replaced by Manual switching of the bell due to this process. we are some problems like Delay to ring the bell for a specific period, operator forgets to ring the bell and operator on leave and many more problems.

III.   Proposed Methodology

This section design methodology discusses about the schematics circuit diagrams, explanations, description. In this section also deals with the hardware and software description of our paper.

➢ The main objective of the paper is to ring the bell automatically without any human interaction.

➢ We used RTC to track the real time.

➢ Arduino is used to control the all the functions and gets time through keypad and stores in main memory.

➢ LCD is used to display the time and date and Relay acts as a switch, it is used to switch on the bell at predetermined time.

Figure 1: Block diagram of College Bell

1. Hardware Requirements:

- ATMEGA328.
- LCD DISPLAY.
- TIMER(RTC).
- KEYPAD.
- POWER SUPPLY.
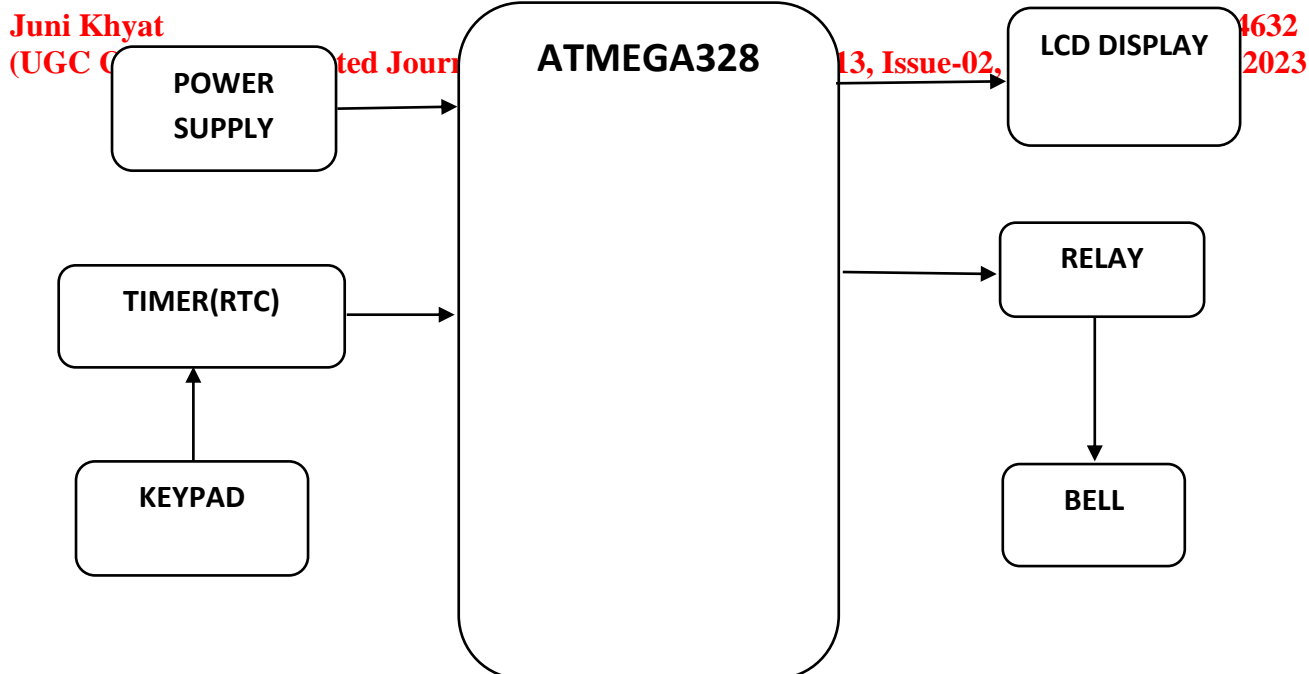- RELAY.
- BELL.

2. Bell:

Electric Bell is based on the principle of electromagnets. When switch is pressed, electromagnet is activated and the hammer moves and hits the gong. As the hammer moves, circuit breaks and the electromagnet is disabled. This causes the hammer to go back to initial position due to the spring and the circuit completes again. This process is continuously repeated giving the ringing sound of the bell.

a. Construction:

It is made of an electromagnet, bell(metallic cup), soft iron strip(which works as a hammer) and contact screw. The bell is a cup-shaped device made of metal. A soft iron strip works as a small hammer.

b. Working:

When current is passed through the circuit, the electromagnet acts like a magnet and attracts the iron strip. The iron strip(hammer), being elastic, strikes the bell. Simultaneously, its contact with the screw is broken, the circuit breaks and the current stops flowing through the electromagnet. As such, the iron strip returns to its original position, and again the current passes through the electromagnet.

This phenomenon happens many times in a second, and as the hammer strikes the bell, the sound is heard. The bell rings till the circuit has been switched off. The electric bell is used in alarms and bells in schools, offices, homes and industries.
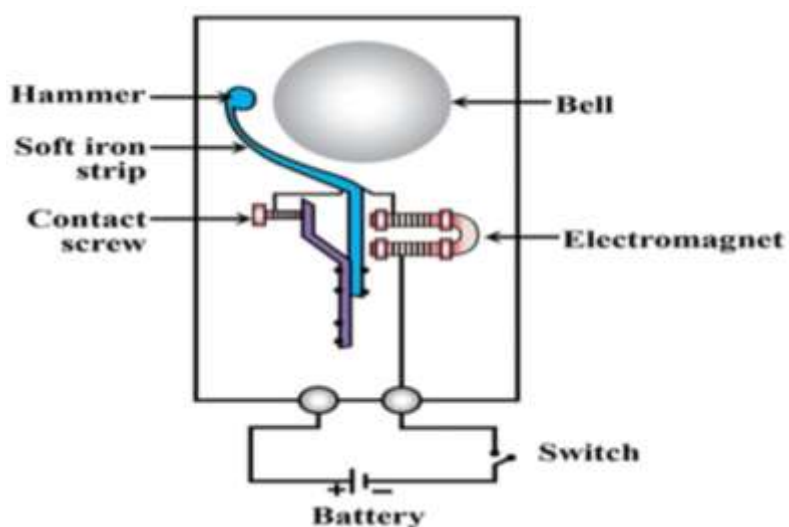

Figure 2: Internal circuit of Bell
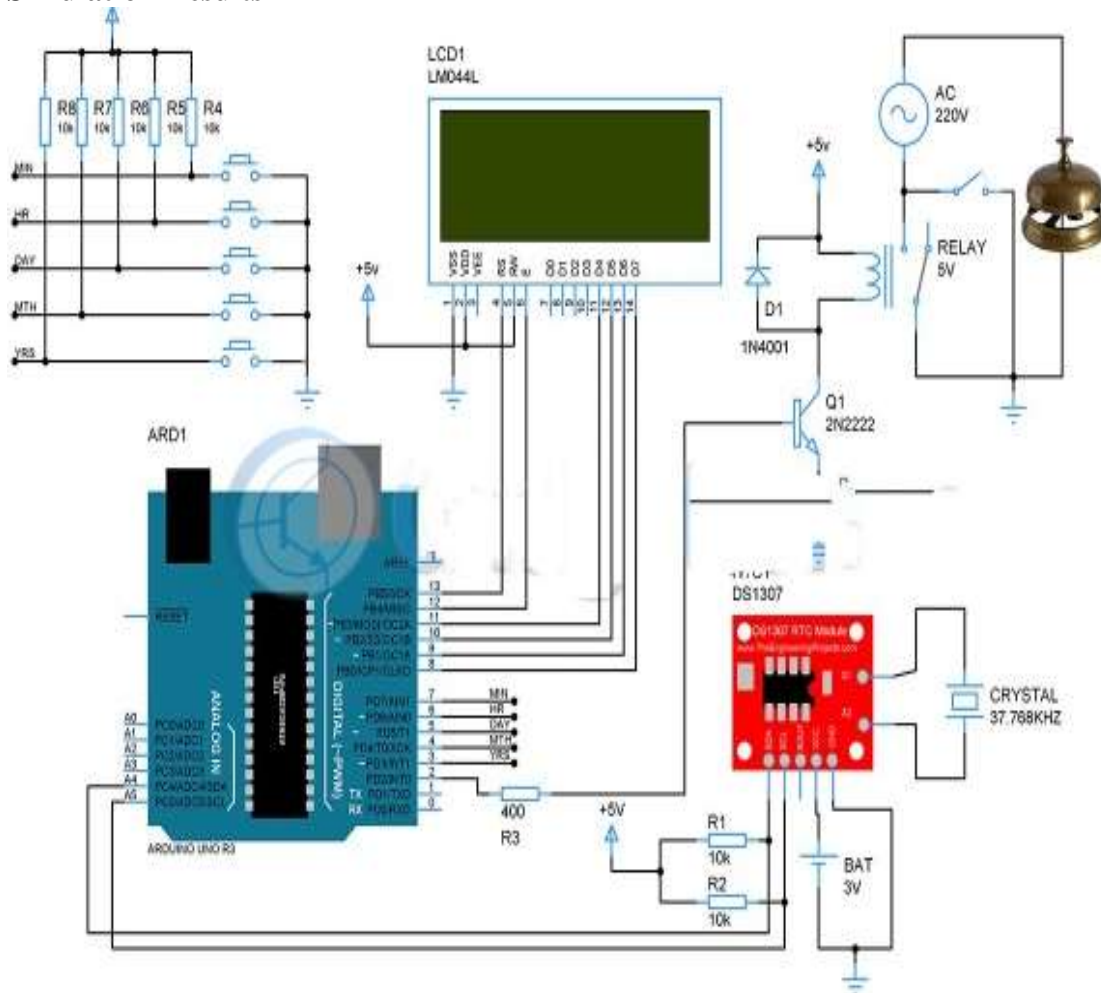
IV.   Simulation Results

Figure 3: Schematic of College Bell System

Description:

As shown in figure 3 the proposed "Timer based Automatic School Bell system" is very simple. Let's start with the 4 push buttons. Each Push button is connected in series with a 10K ohm resistor. This is a Pullup resistor. When the push button is not pressed 5Volts are available at the controller pin. When the push button is pressed the ground is given as the signal to the Arduino's I/O pin. Push Buttons1 to Push Buttons4 are connected with the Arduino's Analog Pins AO to A3. The RTC DS1307 has a built-in button cell that allows keeping track of real-time irrespective of the power supply. For interfacing with the Arduino board, SDA and SCL pins of the RTC are connected to the SDA (Pin A4) and SCL (Pin A5) pins of the Arduino Uno board.

On the top is the 5V regulated power supply based on the famous LM7805 Linear Voltage Regulator. J1 is the Dc female power jack and this is where we connect the 12V adaptor or a 12V battery. The DC Female power jack J1 is further connected with the input and Gnd legs of the LM7805 voltage regulator. Two 470uF capacitors are connected at the input and output sides of the voltage regulator. The advantage of using 12Volts adaptor or a 12V battery is that, we get 12Volts and the regulated 5Volts. 12volts can be used to power up the Relay while the 5Volts can be used to power up the Arduino or other 5 volts electronics. You can connect a wire from the output of the LM7805 with the Vin pin of the Arduino Uno.

The 16X2 LCD display is used to display the messages prompting to input time table information. It is connected to the Arduino Uno board by connecting its data pins to pins 3 to 6 of the Arduino Uno board. The RS and E pins of the 16×2 LCD are connected to pins 13 and 12 of the Arduino Uno respectively. The RW pin of the LCD is grounded. The CONTR "contrast" pin of the LCD is connected with the middle leg of the 10K ohm potentiometer. This potentiometer is used to

control the contrast of the LCD. Pin number 1 and pin number 16 of the LCD are connected with the ground while the pins 2 and 15 are connected with the 5volts, a 12V 1 channel relay module of the type SPDT. As this is a 12V relay that's why one side of the relay coil is connected with the 12volts while the other side of the relay coil is connected with the collector of the 2n2222 NPN transistor. The emitter of the transistor is connected with the ground. The base of the 2n2222 NPN transistor is connected with the 10k resistor. The 10k resistor is connected with the Arduino's pin number 2. A freewheeling diode is connected across the relay coil pins, and this is used against back EMF. The Buzzer will be connected between the common and normally open legs of the relay.

V. Conclusion

The paper "timer based automatic college bell system" has been successfully simulated. Traditionally college or school bells were operated by human beings. So, we have presented this design of automatic college bell system which saves time, man power and ultimately money. This design rings at prescribed interval automatically with highest accuracy. The variation in timing is also applicable and is used in circuit. The timing of the bell can varied using the keypad supplied with it. The time is displayed in the LCD screen.

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