

Arduino based Real Time Clock with Ringing of Bell and National Anthem

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Abstract—Now a days many school and college bells are operated manually. Hence there is a huge demand of accuracy is required. In market there are many digital clocks available with bells but rings only at specific time and cannot stop after that specific time. A new and inexpensive design is being presented here, in this project. The benefit of this design is that, the bell rings at the start of each period without any human intervention and hence takes over the manual task of switching on/off the college bell with respect to time. It uses Real Time Clock (DS1307) which work at the real time.

The Arduino UNO is used to control all the functions; it gets the time through the keypad and stores it in its memory and display it on LCD display. When this programmed time equals the real time then the bell is switched on via a relay and rings for a predetermined time. The bell ringing time can be edited at any time, so that it can be reused at normal class timings as well as at exam times. Also the voice play module with USB player and speaker, play the national anthem according to the users given time as programmed using Arduino UNO.

Keywords-COMPONENTS: *Arduino, RTC MODULE, voice play module, audio amplifier, USB Player, relay driver,*

I. INTRODUCTION

In this project, we designed an Arduino based Real Time Clock with ringing of bell and national anthem play. A Real Time Clock or RTC is a battery powered clock that measures time even when there is no external power or the microcontroller is reprogrammed using Arduino.

An RTC displays the clock and calendar with all timekeeping functions. The battery, which is connected to the RTC is a separate one and is not related or connected to the main power supply.

When the power is restored, RTC displays the real time irrespective of the duration for which the power is off. Such Real Time Clocks are commonly found in computers and are often referred to as just CMOS (Complementary Metal Oxide Semiconductor).

DS1307 is the frequently used real time clock (RTC) IC for clock and calendar. The clock function provides seconds, minutes and hours while the calendar function provides day, date, and month and year values.

The clock can operate in either 12 hour with AM/PM indication or 24 hour format. A 3V backup battery must be connected to the RTC so that the IC can automatically switch to the backup supply in case of power failure. A 32.768 KHz crystal is connected to the oscillator terminal of DS1307 for 1 Hz oscillations. Arduino takes data and show on LCD screen.

By using the Arduino programming national anthem can be play using playing USB player for particular time slot, and after that turn it off by using MOSFET/ relay or by transistor. USB player requires external memory (USB/ memory card/ HDD) with preloaded national anthem in it. Bell alert is also possible with connecting bell with relay interface.

II. LITERATURE REVIEW

In this project the scope is to design a Arduino based real time clock with ringing bell and national anthem and it's implemented on ARDUINO UNO BOARD. This project is a digital circuit that is used for the purpose of switching of bell and anthem as per the given schedule without any human interference.

III. AIM AND OBJECTIVES

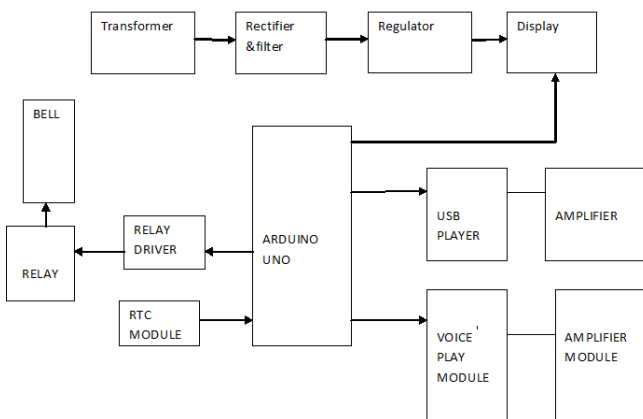
A. Aim

According to real time clock the college bell will use to display date& time and to play national anthem

B. Objective

1. To make human life easy.
2. Which will reduce human efforts

IV. BASIC BLOCK DIAGRAM



A. Arduino Uno Board

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package. The UNO is one of the more popular boards in the Arduino family and a great choice for engineering programming demonstration.

B. RTC Module

A real-time clock (RTC) is a battery-powered clock that is included in a microchip in a computer motherboard. This microchip is usually separate from the microprocessor and other chips and is often referred to simply as "the CMOS" (complementary metal-oxide semiconductor). A small memory on this microchip stores system description or setup values including current time values stored by the Real-time

clock. The time values are for the year, month, date, hours, minutes, and seconds.

C. LCD Display

A real-time clock (RTC) is a battery-powered clock that is included in a microchip in a computer motherboard. This microchip is usually separate from the microprocessor and other chips and is often referred to simply as "the CMOS" (complementary metal-oxide semiconductor). A small memory on this microchip stores system description or setup values including current time values stored by the Real-time clock. The time values are for the year, month, date, hours, minutes, and seconds.

D. USB Player

USB player is used to play stored voice (MP3 file in USB) device. Its output is very weak, so amplifier and speaker required getting loud sound.

E. Audio Amplifier

An audio amplifier is an electronic power amplifier that strengthens low power, inaudible electronic audio signals from radio receiver or a USB player to a level that is strong enough for driving (or powering) loudspeakers or headphones. Power amplifier makes the signal whether it is recorded music, a live speech or live singing audible to the listener. It is final electronic stage in a typical audio playback chain before the signal is sent to the loudspeaker.

F. Relay

Relays are switches that open and close circuits by electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. It allows one circuit to switch a second circuit which can be completely separate from the first. In this project we use relay for providing the connection between the bell and the Arduino.

G. Voice Play Module

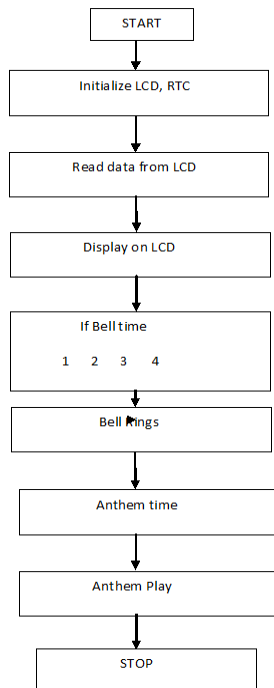
This module is used as recording and playback system. The national anthem is first recorded using this module and then according to the defined time in the software the recorded national anthem is then played. A voice announcement is also done by using this module.

H. Speaker

Speakers are used for providing the signals to be clear to hear. It means that if we want to hear the signals properly we have to use the speakers. The speaker in this project provides the national anthem to be clear to hear.

V. FLOW CHART

I.



the transistor which amplify the signal and hence the bell gets turn according to the time scheduled programmed using Arduino software.

VI. ADVANTAGES AND APPLICATIONS

A. Advantages

- The circuit required power supply for charging the battery is very less. (12V, 500mah)
- The components required for this hardware is easily available in market.
- It reduces the human efforts.
- It provides real time operation, with displaying the current time, date, month and year on LCD display.

B. Applications

- It can be used in real time system.
- We can implement the whole circuit into small module later.
- Less power consuming and safe system.
- In schools and colleges for playing the national anthem and ringing the bell according to the scheduled time.

A. Working

The 230V AC input is given to the step down transformer which step down the input to 12V AC and its output is given to the rectifier circuit for getting the DC supply of 12V. The capacitor is used as a filter which removes the ripples and provides the pure DC supply which is required for Arduino, relay and amplifier circuit. This 12V DC is indicated using the red LED. The remaining circuits such as voice play module, USB player, RTC and LCD requires 5V DC, hence to get the 5V DC we use the positive regulator IC 7805 for converting 12V to 5V. This 5V is indicated using blue LED.

The RTC is used to provide real time which is displayed at the LCD screen. The switches are used to set the time, date, month and year, if in case the RTC is not working properly. This time, date, month and year are displayed on LCD display whose control signals and data signals are connected to the Arduino.

Depending upon the programming, RTC gives the instruction to the Arduino and it then gives the signal to the MOSFET which is use to derive the USB player. The output of USB player is given to the amplifier circuit which amplifies the signal and then its output is given to the speaker.

Voice module is used for recording the different voices and according to the programming time the Arduino gives the instruction to the voice play module and it will then play the recorded sound.

The bell is connected using relay with the Arduino. The current provided to the relay is insufficient, which is coming through Arduino, hence to increase the current we use

VII. CONCLUSION

Present day ringing the bell in colleges or schools are carried out manually. The main disadvantage of this is that one person has to be alert for this. At the same time during that time he could not be engage in another task. To overcome from this, we have decided to prepare the circuit which will be operated automatically and the ringing of bell will start by its own time. The time input can be edited as per requirements. This circuit is simple to prepare and easy to install. Also it provides playing of national anthem according to the programmed time. We can say that it will be much useful for colleges or schools or other educational Institutions.

FUTURE SCOPE

A lot more advancement can be done in this design. The advantage of this design is that the timings can be edited according to an individual's requirement. Hence it can be reused infinite number of times. Automatic bell system with announcement and national anthem is also played according to the programmed time using this design. In future much advanced automatic bell system can be made.

REFERENCES

- [1] www.alldatasheet.com
- [2] <https://www.arduino.cc/en/Tutorial/HomePage>
- [3] Basic electrical engineering, Kothari and Nagrath
- [4] Basic electronics engineering, R.S.Shedha
- [5] Basic Electrical and Electronics Engineering, R.K. Rajput
- [6] Electronic for you, Magazine